DESIGN FOR SOCIAL PRESENCE AND EXPLORING ITS MEDIATING EFFECT IN MOBILE DATA COMMUNICATION SERVICES

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The mobility, flexibility, convenience, and ubiquity of mobile data services (MDS) have contributed to their enormous growth and popularity with users. MDS allow users to communicate through mobile texting (mTexting), mobile Instant Messaging (mIM), multimedia messaging services (MMS), and email. A unique feature of MDS that enhances its popularity among its users is the awareness capability, which is revolutionizing the way MDS is being used to communicate today. It allows potential communication partners to socialize through these technologies. This dissertation explored the relationship between user experience, perceived richness, perceived social presence and satisfaction with MDS. A research model for examining the antecedent conditions that influence social presence, richness, social interaction and satisfaction with MDS was developed. Partial least square analysis showed that user experience influenced both social presence and richness. Also supported was the relationship between richness, social presence and satisfaction with MDS. Social presence mediated the relationship between user experience and richness. However, only one dimension of interactivity influenced social presence.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Research Background

Communication is important in people's lives whether it is at work, home or personal lives. People communicate with friends, family members and workmates.

Communication can take different forms including face-to-face, emails, telephone calls and texting. The goal of communication is to transmit information between the sender and the receiver. The transfer of information may be direct, for example, face-to-face, or indirect through a medium such as a phone or a computer. In both cases a communication channel is needed to facilitate transfer of information. For communication to be successful between two communication partners, the objective of the communication and the outcome must be aligned. Additionally, an appropriate communication channel is needed, depending on the type and nature of the task to be accomplished.

Over the years different computer-mediated communication mediums have emerged such as mobile data services. Mobile data services (MDS) allow users to communicate through mobile texting (mTexting), mobile instant messaging (mIM), multimedia messaging services (MMS), and email. These services are collectively referred to as MDS communication services (I.T.U, 2002). A MDS communication channel is defined in this study as a mobile

communication service used to convey data (mobile text, mIM and MMS) from sender to receivers, while at the same time allowing users to socially interact.

Although MDS provides several communication channels, the most commonly used ones are mTexting and mobile IM. MDS communication channels are popular because they facilitate communication, interaction and social relationships amongst its users.

Furthermore, the mobility, flexibility, convenience, and ubiquity of MDS have contributed to the enormous growth and popularity of MDS communication channels with users. People want to stay connected to friends, families, and colleagues from any place at any time. MDS communication channels are the answer to this necessity.

MTexting has become very popular in the U.S over the last few years. In 2008, US mText users sent 601 billion text messages, an increase of 954% over 2005 (CTIA, 2008). According to Forester Research, 35% of cellphone users send or receive text messages with 76% of 18-24 year olds using it (Rattivarakorn, 2007). The popularity of mTexting among young people in the U.S. is further supported by Forester Research report, which found that mTexting and mIM were widely used among a certain demographic as shown in Table 1.

Table 1

MDS Usage in the U.S. (Rattivarakorn, 2007)

Age (yrs)	mTexting	mIM	Email	Picture Messaging	Games	Ringtones
12 -18	70	38	20	40	31	26
18 – 27	72	22	22	41	20	40
28 - 41	50	10	17	28	12	24
>42	21	5	10	12	4	10

According to Telecoms Market Research mTexting contributed the largest share to total non-voice revenues, and accounted for approximately 49 percent of worldwide MDS revenues in 2007 (Telecoms Market Research, 2008). In-spite of the growth in other MDS communication services such as mobile video, they project that mTexting will continue to hold a larger share of total revenue from MDS. Pyramid Research, Inc also projects that future growth in mTexting is expected to come from emerging markets such as Africa and Asia (Pyramid Research, 2007). These projections point to the potential revenue from mTexting. The rising popularity of mTexting is supported by the way it is impacting businesses today. For example, airlines use mTexting to remind travelers of their itineraries and alert them of delayed flights and gate changes, banks use it to alert customers when their balance has reached a certain level, and brand marketers use it for mobile marketing campaigns. MTexting is also changing people's shopping behavior – people can buy products instantly using mTexting

thus, eliminating the need to go to the retail store.

Mobile IM (mobile Instant messaging) is an evolution of the computer based IM, which has been around for several years. MIM has continued to experience growth just like mTexting. Research suggests that in North American, mIM has grown from virtually zero in 2003 to approximately 126 million users in 2004. Telecoms market research project that mIM will experience one of the fastest growth compared to other services such as mTexting.

A unique feature of MDS that enhances its popularity among its users is the awareness capability, that is, the ability of users to know the location, activities, surrounding, and nearby resources close to potential partners in real time (Smith, 2009). This is especially true with mIM which provides users with awareness information about potential communication partners (Cameron & Webster, 2005). This capability is revolutionizing the way MDS communication channels are being used today. It allows potential communication partners to socialize through these technologies. The technology (MDS) is no longer the center of interest, but instead the focus is on how the technology facilitates social interaction among potential communication partners. As a result, MDS designers are faced with the challenge of how to design these artifacts to maximize the benefits of social interaction among potential communication partners. According to Chan (2006), there is growing interest in how to design these technologies to maximize user interaction through the technology medium. Chan (2006), argues that designers of mobile technologies (MDS) must therefore, design the user

experience such that these technologies produce results which are beneficial to both individuals and organizations. Chan posits that social interface – the convergence of user interface and social interaction - is an important aspect of mobile technologies such as MDS. Prior literature defines social interface as intelligent interfaces that provide new interaction methods that can be tailored to the user (Khamis, Kamel, & Salichs, 2007).

Chan (2006) posits that social interface design is more challenging than conventional user interface design because social interface involves the interdependence of the interactive technology, user and hence communities. Therefore, interaction should not be limited to the user interface and application only. Both user experience and usability encounter a social interface.

In this study however, we are more interested in examining interactivity among users at the social interface. Social interface and interactivity design falls outside the scope of this study.

Khamis et al. (2007) suggests that social interactivity can be achieved through a social interface. The challenge facing IS researchers is to theorize social interactivity in mobile technologies. This dissertation makes an attempt to fill this gap by developing a research model for understanding interactivity at the social interface in MDS communication channels, and how interactivity influences awareness, perceptions of richness and satisfaction.

Purpose of Study

The purpose of this study is to develop a theoretical model that examines the relationship between user experience, perceived richness, perceived social presence, interactivity, and satisfaction in MDS. The study also investigates the mediating effect of social presence on the relationship between experiential factors and communication channel richness. This relationship has not been investigated in prior research work related to MDS.

This study also examines interactivity among users of MDS communication channels. The study draws mostly from prior IS researcher work on the role of interactivity in designing computer-mediated communications (Johnson, Haigh, Becker, Craig, & Wigley, 2008; Khalifa & Shen, 2004), to explore interactivity at the social interface in MDS. We hope that this study will shed some light on the relationship between interactivity and social presence.

Research Questions

This study addresses the following research question

Research Question 1: Is there a relationship between user experience, perceived social presence, and perceived richness in MDS communication channels?

Research Question 2*:* Does perceived social presence mediate the relationship between user experience and perceived communication richness in

MDS communication channels?

Research Question 3: Is there a relationship between interactivity and social presence in MDS communication channels?

Research Objectives

One of the objectives of this study is to use channel expansion theory and social presence theory to explain perceived richness, social presence, and satisfaction in both asynchronous and synchronous MDS communication channels. In the same vein, this study examines and validates the mediating effect of social presence in the relationship between user experience and perception of richness in both asynchronous and synchronous MDS communication channels. Additionally, this study also explores how interactivity enhances social presence in an MDS communication channel. The objectives of the study are summarized as follows:

1. To identify the factors that influence communication channel richness among users of asynchronous and synchronous MDS communication channels.
2. To show that perception of communication channel richness differs among users of asynchronous and synchronous MDS communication channels.
3. To show that perceptions of social presence differs among users of asynchronous and synchronous MDS communication channels.
4. To investigate the mediating effect of social presence in the relationship between experiential factors and perceived richness.

5. Explore the dimensions of interactivity that influence social presence

Theoretical Basis

This study draws upon the literature on channel expansion, social presence, media richness, user information satisfaction, and interactivity to develop an integrated model that explains and validates the relationship between user experience, perceived richness, social presence, interactivity, and satisfaction with communication channel as shown in Figure 1.

The rationale behind this model is that experience plays a role in the perception of social presence and perception of richness of a communication medium (MDS communication channel) – an argument that is widely supported in the IS literature (Carlson & Zmud, 1994; Carlson & Zmud, 1999; D'Urso & Rains, 2008).

Furthermore, the proposed model explains and validates the mediating effect of social presence on the relationship between experience, channel richness and satisfaction. Additionally, this study borrows from the human-computer interaction (HCI) literature to investigate and validate the interactivity dimensions that enhance social presence.

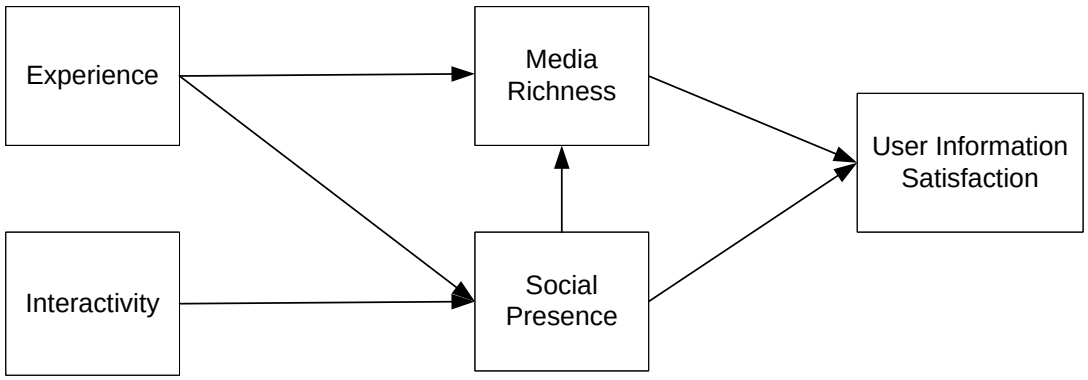


Figure 1. Theoretical framework

Importance and Contributions of Study

This study developed a research model for MDS research by incorporating both the design science and behavioral science perspectives. Such a model could be used to explore interactivity, awareness and richness of similar technologies such as Facebook.

This study is also a response to the call for more research and theoretical development on communication channels in new media and the impact of experiential factors on other types of new media other than email (D'Urso & Rains, 2008; Markus, 1994). Few studies have examined MDS communication channels in this context. As the number of subscribers to MDS increases globally it is important to understand the impact of deploying MDS communication channels in an organizational setting.

Theoretical Advancement of IS Literature

This study is an attempt to bridge the gap between communication channel expansion theory and social presence theory in the context of MDS communication channels. Researchers have suggested that experiential factors play an important role in communication channel richness (Carlson & Zmud, 1999). Other researchers found that social presence influences communication channel richness and hence communication channel choice. This study proposes a model that shows that external variables influence perceived richness and social presence of MDS communication channels – a view expressed and supported in earlier studies conducted with different communication technologies. Findings from studies on the relationship among experiential factors, perceived social presence and communication channel richness are instrumental for mobile communication research.

Practical Application

This study makes practical contributions to the industry by enhancing the understanding of MDS communication channel richness. This study helps system designers better understand the dimensions of interactivity at the social interface in MDS communication technologies.

Results of the study should interest managers considering implementation of MDS communication channels for collaboration work. Employees with experience in using these technologies can maximize their potential (richness and social presence) to collaborate on different projects.

Overview of Dissertation

Chapter 1 introduces the research objectives, research questions and the research framework. Additionally, theoretical and practical contributions of this study are also discussed. Chapter 2 presents the review of the literature relevant to the study, including mobile data services, media richness theory, social presence theory and channel expansion theory. The two views on channel richness and social presence are discussed here while making a case for subjective properties for both channel richness and social presence (Figure 2). Research framework and hypotheses development is discussed. Chapter 3 covers the methodology used in this study. Topics discussed include research design, data collection, study population and questionnaire development. Chapter 4 presents data analysis. This serves as the basis for discussion and conclusion in Chapter 5. It provides key summary of the theoretical, practical implications, limitations and future directions for research.

CHAPTER 2

LITERATURE REVIEW

Introduction

Chapter 2 is a review of the relevant literature that forms the theoretical foundation for the research framework developed in this study. The chapter begins by briefly reviewing importance of research on MDS. Next, it lays down an extensive review using selected authors on the two views that have been used in prior research to explain communication channel richness and social presence. These are: (1) static view (2) dynamic view. Conflicting research findings with static view are pointed out and a case is made for supporting the alternative view – dynamic view using theories such as channel expansion theory. This is followed by an extensive review of communication channel expansion theory, social presence theory, and interactivity, and communication channel satisfaction. A research framework and hypotheses are proposed (Figure 6).

Mobile Data Services (MDS)

Consistent with IS literature, this study defines MDS as consisting of digital data services that are accessed through a mobile device over a wide geographical region (Hong & Tam, 2006b). More definitions and discussion of other MDS communication channels can be found in Schneiderman (2002). Prior literature classifies MDS into four broad categories: (1) communication

services (2) information acquisition services (3) entertainment services and (4) commercial transaction services (I.T.U., 2002).

Communication services include services used for information exchange such as mobile texting (mTexting), multimedia message service (MMS), mobile instant messaging (mIM) and email. Information acquisition services include location based services, weather, sports, news, etc. Entertainment services are services that focus on enjoyment such as ringtones, music, and games. Commercial transaction services include shopping services, and financial transaction services. The demand for these services has generally been high for countries with high mobile penetration rates (I.T.U., 2002, 2006). This study focuses on the communications services category.

In this study reference will now be made to the four communication services as MDS communication channels. MDS communication channel therefore, represents a mobile communication service used to convey data (mobile text, mIM and MMS) from sender to receivers, while at the same time allowing users to socially interact.

The use of the word communication channel as opposed to media communication is driven by the fact that unlike prior studies that mostly compared traditional, new and sometimes mobile communications, this study specifically examines communication channels in an MDS context.

Asynchronous and Synchronous MDS

Synchronicity is defined as the ability of a channel to create an

environment where all users are simultaneously engaged in the communication activity (Carlson & George, 2004). It describes the ability of a channel to create an impression that all users are simultaneously engaged in a communication activity. Highly synchronous channels enable users to communicate in real-time, observe the reactions and responses from other co-participants, and easily determine whether other co-participants are fully engaged in the communication activity.

Table 2 is a summary of the differences between synchronous and asynchronous communication channels, such as, mTexting and mIM respectively. The differences are based on five dimensions of synchronicity as follows: (1) communication richness, (2) communication structure, (3) interactivity, (4) speed of feedback, and (5) ability to convey multiple cues. The table suggests that synchronous MDS communication channels are richer, highly interactive, have immediate feedback, and have the ability to convey multiple cues. The opposite is true of mTexting communication channel such as mTexting.

Table 2

Comparing mIM and mTexting

Characteristics	mTexting	mIM
Synchronicity	Asychronous communication	Synchronous communication
Communication richness	Lean channel	Richer channel
Communication structure	Supports one-to-one and one-to-many	Supports one-to-one and one-to-many
Interactivity	Not interactive	Highly interactive
Feedback	Slow feedback (time-lag)	Immediate feedback
Ability to convey multiple cues	No	Yes

The concept of synchronicity explains why some MDS communication channels, such as mTexting face challenges in delivery of time critical content. As new applications such as gaming continue to grow the market is forced to embrace richer MDS communication channels. This has given opportunities for the growth of newer communication channels, which enables users to further personalize messages with pictures, sounds and animations.

Prior research posits that synchronicity of any communication channel is important because it influences interpersonal communications (Burke & Chidambaram, 1999; Walther, 1996). Communication channels may be used synchronously or asynchronously. In synchronous communication the users communicate simultaneously (e.g. FTF, video conferencing, and mIM), where as

in asynchronous communications users do not communicate simultaneously (Dennis, Fuller, & Valacich, 2008).

Prior research has identified different dimensions of synchronicity (Table 3) as follows: (1) speed of interaction, (2) rehearsability, (3) reprocessability, (4) parallelism, and (5) symbol variety (Carlson & George, 2004; Dennis & Valacich, 1999). These dimensions vary between asynchronous and synchronous MDS communication channels (Table 3).

Carlson and George define speed of interaction as the amount of time delay between sending and receiving information. Some communication channels experience a time delay between responses, while others have an instant response. Communication channels with immediate response are referred to as synchronous (e.g. FTF, telephone, chat, IM) while those with delays (ranging from few seconds to a few days) are called asynchronous (e.g. letter, emails, voicemail, mTexting and video messages). In channels with a slower interaction speed or longer time delay, users may plan, edit and probably rehearse the actual content and manner of delivery before sending the message. This is called rehearsability.

Rehearsability is defined as the ability of users to fine tune a message before sending it out. It allows users to be more comfortable with the information they wish to convey and to craft a more persuasive and believable message (Carlson & George, 2004). Rehearsability therefore represents the time availability for users to analyze information and adapt their message during the

ongoing interaction process. The speed of interaction is related to rehearsability although the relationship is negative.

Reprocessability is defined as the ability to readdress a message within the context of the communication event. All channels have some degree of reprocessability. A user may replay the interaction and even recall additional details or interpret certain aspects of the information they acquired. Reprocessability of a channel can impact information transmission since it allows both senders and receivers to reread and reconsider prior messages before engaging in the communication. Doing this can lead to delays in the transmission of messages especially when receivers take longer to review the messages

Parallelism is defined as the extent to which signals from multiple senders can be transmitted over the channel simultaneously. In traditional channels such as telephone, very few transmission can take place over the channel simultaneously thus limiting the quantity of information transmitted per time period (Dennis et al., 2008). Parallelism affects synchronicity of a channel by increasing the number of simultaneous transmission and by supporting both simultaneous sending messages to multiple recipients and receiving messages from multiple senders respectively (Dennis et al., 2008).

Symbol variety is defined as the format by which information is conveyed, verbal and non-verbal symbols included, cost of delays in order to change or compose a message for a channel (DeLuca & Valacich, 2006). It represents the different ways that a channel allows information to be encoded for

communication (Dennis et al., 2008).

Prior research suggests that parallelism, rehearsability and reprocessability may provide a way of adapting communication channels that lack speed of interaction and symbol variety (DeLuca & Valacich, 2006; Robert & Dennis, 2005). Synchronous media such as FTF and IM, although high in speed of interaction, may be low in rehearsability and therefore not as desirable as predicted by the media richness theory. Asynchronous channels such as email and SMS allow for rehearsability before sending, a characteristic that may sometimes be desirable than speed of interaction (DeLuca & Valacich, 2006).

Table 3

Channel Capabilities (DeLuca & Valachi, 2006)

Synchronici	Channel	Immedic Feedbac	Symbol-Variety	Parall-elism	Rehear-sability	Reproce-ssability
Synchronous	Face-to-face	High	High	Low	Low	Low
	Video conference	Med-High	Medium	Low	Low	Low
	Telephone conference	High	Medium	Low	Low	Low
	Instant messaging	Med-High	Low-Med	Low-Med	Medium	Med-High
Asynchronous	Email	Low-Med	Low-Med	High	High	High
	Texting (SMS)	Low-Med	Low-Med	High	High	High
	Written mail	Low	Low-Med	High	High	High

Mobile Instant Messaging (mIM)

Mobile IM allows users to conduct one or more real time conversations in text windows on mobile communication device screen such as a Smartphone. The text appears virtually simultaneously on the screens of the devices, making it more informal and conversational than traditional email (Schneiderman, 2002). Mobile IM is very popular because it is easy to use and efficient than email. It allows users to exchange instant messages with the other communication partner using different Internet service.

Mobile IM, is an evolution of the computer based IM, which has been around for several years. In this study mIM refers to mobile instant messaging, an IM service that is conducted across a mobile platform. To be able to use mIM, a user must have an account with major mIM providers such as AOL, MSN or Yahoo!

Mobile IM is an example of a synchronized one-to-one text based communication (Muller, Raven, Kogan, Millen, & Carey, 2003). Hung et al. (2006) examined mIM at the workplace using media synchronization theory and found that mIM was perceived as a highly synchronous channel. mIM provide users with awareness information about potential communication partners (Cameron & Webster, 2005). Prior research suggests that IM is mostly used to support informal communication that is unplanned, brief and context-rich (Cameron & Webster, 2005). Muller et al. investigated IM and found that it is mostly suitable for 4 functions as follows: (1) questions and clarification, (2) coordination and

scheduling of work task, (3) coordination of impromptu meetings, and (4) reaching out to friends and family (Muller et al., 2003). Research suggests that users of m IM will show different patterns of use depending on their intensity of use and experience with a communication partner (Muller et al., 2003).

Mobile Texting (mTexting)

This is a service that allows a mobile terminal to send, receive and display messages of up to 160 characters in Roman text and variations for non-Roman character sets. Messages received are stored in the network if the subscriber terminal is inactive and relayed when it next becomes active. MTexting is a resilient messaging service, which despite the emergence of several enhanced messaging services, will continue to remain popular with MDS users in the near future (Reid & Reid, 2004).

MTexting is also changing people's shopping behavior – people can buy products instantly using text messages thus eliminating the need to go to the retail store.

Importance of Research on MDS Communication Channel

Research on MDS communication channel is important because MDS allows users to stay connected at any place at any time. MDS is important because it allows individuals to communicate through different communication channels such as email, mTexting, mIM, and multimedia services. MDS also enables individuals to access information (e.g. sports, news), entertainment services (e.g. games, ringtones) and commercial transaction services (e.g.

shopping). Individuals can select these services based on their personal needs. Most importantly these services can be accessed by users anytime at any place.

In business there are several benefits that can be provided by MDS. Benefits include sending messages containing images and media clips to reward consumer loyalty, mobile marketing and advertising.

In mobile entertainment services, mobile postcards and photo messaging, cartoons or comics, and games can be incorporated into screen savers, game applications or simply delivered to users. Additionally, MMS enhances delivery of services such as traffic information, weather, sports to users (Skvarla, 2003).

Another important area is location based services. This is the ability to sense geographical locations with better accuracy. By combining location awareness services applications with user experiences, users will be able to personalize access to other users as well as optimize their own experience.

Some researchers believe that there is a shift from mobile voice to MDS in the mobile industry (Balasubramanian, Peterson, & Jarvenpaa, 2002; Pedersen, 2002). They argue that MDS creates many application possibilities which create value for end users, mobile operators as well as application providers.

This school of thought is supported by Nielsen's research findings, which shows that mTexting among mobile phone users in the U.S. has exceeded the number of phone calls, for example, in the second quarter of 2008, mobile subscribers sent or received approximately 357 text-messages per month compared with 204 phone calls. This represents an increase of 351 percent from

the previous year's estimates. These findings simply point to the enormous potential for MDS as a platform for knowledge creation and exchange in an organizational setting.

Other researchers have identified other values of MDS as follows: convenience, efficiency, entertainment, time-critical, mobility and location and web benefits (Anckar & D'Incau, 2002). From the above discussion it is quite clear that there are lots of untapped opportunities in for MDS. The challenge faced by users is how to make decisions on the appropriate communication channels to use and how to maximize its richness.

Communication Channel Richness Viewpoints

This section begins with a brief historical timeline that describes the development of theories used in this study to develop a model that show the relationships between user experience, richness and social presence in communication technologies. This is followed by a discussion of two theoretical perspectives that articulate richness and social presence in communication technologies.

In mid 1970s Short et al. proposed Social Presence Theory (SPT) to explain how users select communication channels. According to this theory, communication channels with high social presence are described as sociable, warmer, and personal. This theory is similar to MRT because both place communication channels in a continuum of richness and social presence, thus rich communication channel is considered having high social presence, whereas

a lean communication channel will have a low social presence.

In the 1980s Daft and Lengel proposed Media Richness Theory (MRT) to explain how users select communication channels in computer-mediated communication based on the characteristics of the channel. According to this theory, a fit must occur between message content and communication channel characteristics (Daft & Lengel, 1984; Daft & Lengel, 1986). Messages can be described as complex (equivocal) or simple (unequivocal). Complex messages require communication channels with the following capabilities: (1) timely feedback (2) multiple verbal and non-verbal cues and (3) personal. Such communication channels are described as rich. Communication channels that do not support these characteristics are described as lean.

In late 1990s a new approach to explain richness and social presence was introduced by Carlson and Zmud (1999). Contrary to MRT and SPT that posit that richness and social presence are inherent characteristics of a communication channel, Channel Expansion Theory (CET) posits that external variables such as .experience will impact users' perception of richness and social presence of a communication channel. As a result, it does not support the idea of placing communication channels in a continuum.

Although prior research argues that communication channel satisfaction is driven by richness and social satisfaction, the literature is split on whether richness and social presence are inherent characteristics of a communication channel, or whether they are influenced by other external factors, and therefore

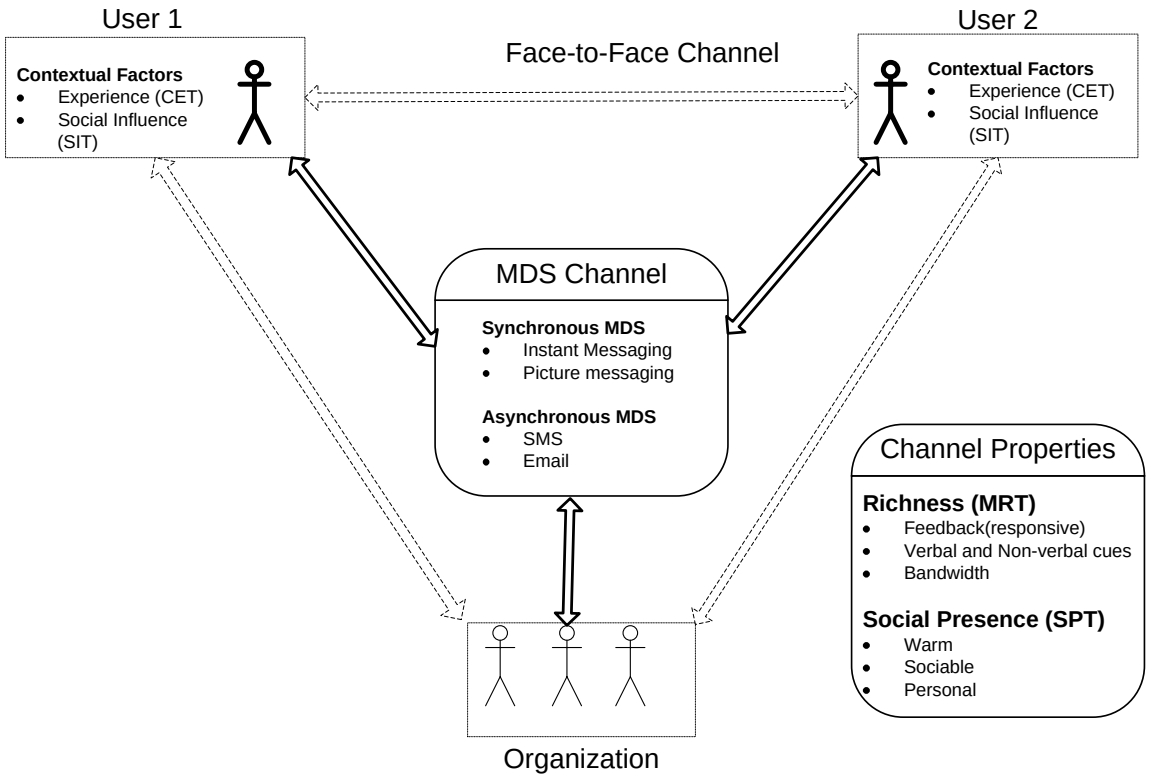
perceived differently by different users. This has given rise to two theoretical views that have attempted to explain communication channel richness and social presence (1) static view or communication media-based characteristics view (2) dynamic view or time-based interactive view of a communication channel(Burke & Chidambaram, 1999).

In this study we use static view instead of media-based characteristics view because this view emphasizes the rigid (static) properties of richness and social presence of a communication channel. This view places communication channels in a continuum based on the level of richness and social presence. The rationale behind this view is that different communication channels have different richness and social presence based on certain criteria such as speed of feedback, use of verbal and non-verbal cues, richness of language, sociability, and personalness (Burke & Chidambaram, 1999; Daft & Lengel, 1984; Daft & Lengel, 1986; Short, Williams, & Christie, 1976).

According to the static view richness and social presence are inherent properties of a communication channel. This view therefore places communication channels in a continuum of richness and social presence, for example, face-to-face (FTF) is richer and has a high social presence whereas email is leaner and has a low social presence. Rich communication channels are most suitable for task with high uncertainty and ambiguity (equivocal task) and hence better communication. On the other hand, lean communication channels are best suited for unequivocal task and are characterized by lower social

presence (Daft & Lengel, 1984; 1986). The weakness of the static view is the inconsistencies in research findings on media richness theory (Burke & Chidambaram, 1999; Carlson & Zmud, 1999; Carlson, Kahn, & Rowe, 1999; Lee & June, 1994).

The term dynamic view is used in reference to the time based interactive perspective (Burke & Chidambaram, 1999). The rationale behind this view is that richness and social presence are not static. The dynamic view argues that richness and social presence of a communication channel is dependent on the users' perceptions and influence from contextual and environmental factors – Figure 3 (Markus, 1994; Ngwenyama & Lee, 1997).



CET – Channel Expansion Theory; SIT – Social Influence Theory; MRT – Media Richness Theory; SPT – Social Presence Theory

Figure 2. MDS communication channels

The dynamic view posit that richness and social presence of a communication channel are socially constructed (perceived differently by the user), and are influenced by other factors such as (1) situational, (2) experiential, (3) contextual, and (4) environment as shown in Figure 3 (Burke & Chidambaram, 1999).

Researchers who support this view argue that the static view overlooks other factors that may influence richness and perceived social presence of a communication channel such as social forces, which may create different levels

of social interaction in computer-mediated communications (Markus, 1994). Channel expansion theory supports the dynamic view because experience with a communication channel will influence both users' perception of the richness and social presence (Carlson & Zmud, 1994; Carlson & Zmud, 1999). Experience may lead to change of behavior among the users in the way they perceive richness in a communication channel (Carlson & Zmud, 1994).

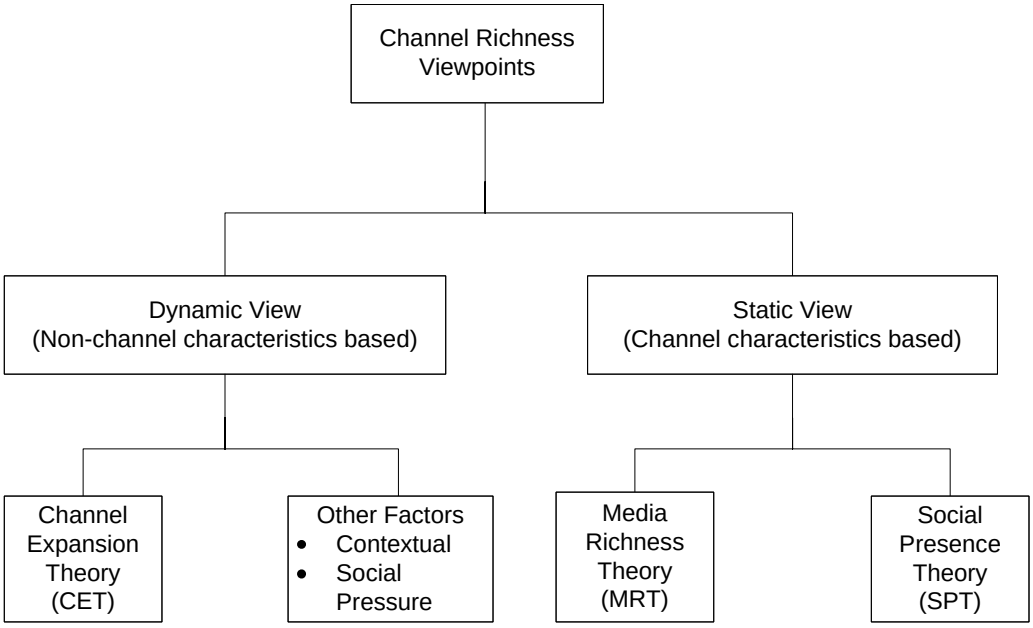


Figure 3. Communication channel richness views

Communication Channel Expansion Theory (CET)

Communication channel expansion theory was proposed by Carlson and Zmud (1994) in an effort to reconcile the inconsistencies in studies on media

richness. The central tenet of this theory is that individual's relevant experiences play an important role in influencing perceptions of communication channel richness. The theory identifies four dimensions of user experiences that influence perception of channel richness as follows: (1) experience with communication channel (2) experience with the messaging topic (3) experience with the communication partner (4) experience with the organizational context (Carlson & Zmud, 1994; Carlson & Zmud, 1999). This study adopted the first three user experiences because of they apply to the individual level of analysis.

Carlson and Zmud (1999) conducted a cross-sectional and longitudinal study on electronic mail (email) use using 362 university employees, and 63 business students and found that richness perceptions were positively correlated with an individual's experience with a communication channel (email) and experience with a communication partner. However, experience with topic of discussion was only supported partially. Experience with organizational context did not find any support in both studies.

Experience with communication channel

Experience with the communication channel is defined as the extent to which a user gains knowledge enhancing experience with an identified communication channel. Such experience may be used to code and decode rich messages of a communication channel. Carlson and Zmud (1999) argue that users with more knowledge enhancing experience will perceive communication channel as rich, and will therefore participate in rich communication. On the other

hand users with less knowledge experience may not perceive the richness of such a channel.

Experience with the topic of discussion

Experience with the communication channel is the extent to which an individual gains knowledge enhancing experience with the topic of discussion. An individual's experience with the topic of discussion enables the individual to develop a knowledge base for the topic and allows the individual to decode and encode messages richly. When the topic of experience is similar for two individuals then richer messages can be facilitated by using jargon that facilitates shared meaning. Experience with topic also facilitates learning and interpretation of the messages more richly.

Experience with communication partner

Experience with the communication partner is the extent to which an individual gains knowledge enhancing experience with an identified communication partner. When two parties who are familiar with each other communicate, they will develop a knowledge base tailored to each other, and will therefore use cues containing shared experience with richer meaning and relevant for each other. Individuals learn to decode massages from their specific communication partners richly and supplement message contents with contextual information.

The relationship between communication channel experience and media richness has been investigated in previous studies (Carlson & Zmud, 1999). In

one study people with email experience and training rated email as richer than those without experience (Fulk, Steinfield, Schmitz, & Power, 1987). Media richness perception was found to be related to media experience. Carlson and Zmud (1999) found that email experience was positively correlated with email richness in a cross-sectional study. However, the relationship diminishes with time as communication channel experience becomes less important as other experiences begin to play a major role in user perceptions.

Carlson and Zmud (1999) study was replicated and validated several years later (Timmerman & Madhavapeddi, 2008). Consistent with previous findings Timmerman and Madhavapeddi found that experiences with communication partners and topic were the primary factors that contribute to perceptions of email richness. However, knowledge building experience with email did not influence perception of email richness. They argue that as individual's knowledge experiences with email increases it may no longer be important in determining richness perceptions. This observation is consistent with Carlson and Zmud (1999) observation that "over time communication channel experience becomes less important determinant as other experiences begin to play an increasing role in shaping the user perception" (Carlson & Zmud, 1999, pg. 165). Its influence diminishes as users gain more knowledge about the technology.

The impact of experiential factors on IM usage has been investigated in the past. In one such study, IM users displayed different behaviors when

communicating with long-time IM-communication partners than with new partners (Hung, Kong, A., & Hull, 2006; Isaacs, Walendowski, Whittaker, Schiano, & Kamm, 2002; Muller et al., 2003).

The dimension associated with user experience in an organizational context was not adopted in this study because the level of analysis is individual. We are more interested in the individual impacts associated with communication channel choice as opposed to the organizational context. This study therefore predicts that experiences with MDS communication channel, topic and communication partner will lead to an increase in the perception of richness of the MDS communication channel.

H1a: An increase in experiences an individual has with topic will be positively related to the individual's perception of richness of both asynchronous and synchronous MDS communication channel.

H1b: An increase in experiences an individual has with communication partner will be positively related to the individual's perception of richness of both asynchronous and synchronous MDS communication channel.

H1c: An increase in experiences an individual has with both asynchronous and synchronous MDS communication channel will be positively related to the individual's perception of richness of that communication channel.

H1d: Users' perception of channel richness will be higher in synchronous MDS than in mTexting.

Social Presence Theory (SPT)

In the presence literature, presence has been shown to consist of two interrelated dimensions: telepresence and social presence (Biocca, Harms, & Burgoon, 2003; Heeter, 1992). Telepresence is defined as the aspect of being physically present in an environment simulated by a medium (Biocca et al., 2003; Venkatesh & Johnson, 2002), whereas social presence represents the concept of being together with another person (Biocca et al., 2003). Both dimensions have been used in prior IS literature (Gefen & Straub, 2003; Kumar & Benbasat, 2002; Miranda & Saunders, 2003; Qiu & Benbasat, 2005; Venkatesh & Johnson, 2002).

Social presence is defined as the degree of salience of the other communication partner in the interaction and interpersonal relationship (Short et al., 1976). Fulk et al. (1987) defined it as the degree to which a communication channel facilitates awareness of the other party and interpersonal relationship during interaction.

In the IS literature social presence is conceptualized as the extent to which an individual perceives the communication channel as unsociable-sociable, insensitive-sensitive, cold-warm, and impersonal-personal (Gefen & Straub, 2003; Kumar & Benbasat, 2002; Miranda & Saunders, 2003; Qiu & Benbasat, 2005; Shen & Khalifa, 2008; Venkatesh & Johnson, 2002).

Social presence theory suggests that communication channels fall along a single continuum of “social presence” (Short et al., 1976).For example, face-to-face (FTF) communication has the greatest social presence followed by audio

plus video (e.g. teleconference) and then audio (e.g. telephone) only. Print or text media is considered to have the least social presence according to this approach (Rice, 1993).

Short et al. argues that Social presence is a subjective quality of the communication medium, and is related to the concepts of intimacy and immediacy in psychology (Short et al., 1976). Intimacy is characterized by physical distance, eye contact, smiling and personal topics, whereas immediacy is determined by a medium's capacity to transmit information immediately. Social presence therefore consists of both verbal cues such as tone of voice, and non-verbal cues such as posture and facial expression. They add that a channel with high intimacy and immediacy such as FTF has a high social presence than computer-mediated communications medium such as email that lacks non-verbal cues. On a continuum of social presence, FTF medium has the most social presence, whereas written, asynchronous communication, the least.

In summary social presence has been approached from different perspectives. These include: (1) as a quality inherent in the communication channel (Short et al., 1976), (2) capacity to transmit information about facial expression, posture, and non-verbal cues (Short et al., 1976), (3) relationship to information richness and interactivity (Massey & Montoya-Weiss, 2006; Rice, Hughes, & Love, 1989; Sproull & Sara, 1986; Straub, 1994; Straub & Karahanna, 1998), and (4) perception of warmth and sociability (Rice & Case, 1983; Steinfield, 1986). This study adopted the last perspective of social presence.

Social presence is an important concept in this study because of its role in the development of social presence technologies such as mobile and wireless telecommunications (Biocca et al., 2003). Social presence influences the design of communication technologies and is a key construct in the study of computer-mediated communication systems such as MDS (Biocca, Kim, & Levy, 1995).

Although prior research have proposed a relationship between experience with medium or communication partner and perceived social presence, very little work has been done to validate this relationship. Therefore, drawing from Carlson and Zmud (1999), Rice (1993), Sia, Tan and Wei (2002), and Massey and Montoya-Weiss (2006), this article proposes that experiences with both communication channel and communication partners will have an effect on the perception of social presence of MDS communication channel selection. Drawing from the above literature review, this study proposes the following hypotheses:

H2a: The experiences an individual has with communication partner will be positively related to the individual's perception of social presence of both asynchronous and synchronous MDS communication channel.

H2b: The experiences an individual has with both asynchronous and synchronous MDS communication channel will be positively related to the individual's perception of social presence of that communication channel.

H2c: Users' perception of channel social presence will be higher in synchronous MDS than in mTexting.

Media Richness Theory (MRT)

Media richness theory (Daft & Lengel, 1984; Daft & Lengel, 1986), is one of the most studied and cited theories in organizational media research. The purpose of this theory was to improve the flow of information in an organization by helping managers to identify the best communication channels for the most effective use of communication media (D'Urso & Rains, 2008).

The premise of this theory is communication channels fall along a continuum of information richness based on four criteria: (1) speed of feedback, (2) type of communication channels employed, (3) personalities of source, and (4) richness of language as shown in Figure 4 (Trevino, Lengel, & Daft, 1987).

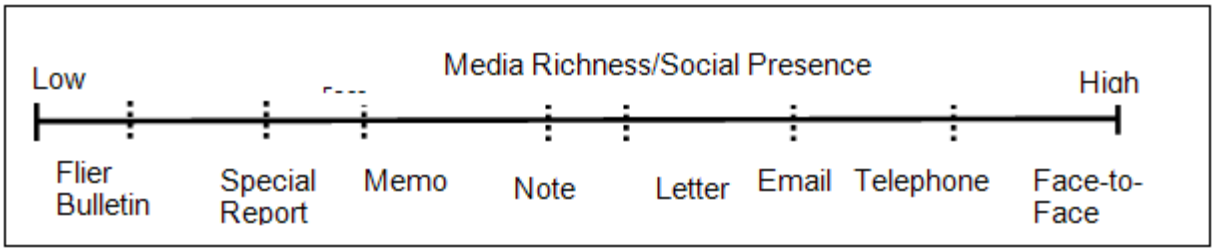


Figure 4. Hierarchy of media richness

The key component of media richness theory is message ambiguity Ambiguous tasks require rich media whereas unambiguous tasks require lean media. Therefore, when selecting a communication channel, richness of the communication channel should match ambiguity of the communication task to be performed. The central tenet of this theory is that managers should match the

level of uncertainty and task equivocality with communication channel richness (D'Urso & Rains, 2008). Richer communication channels such as FTF, video and telephone, should be used for equivocal task, whereas lean communication channels, such as email, letters, should be used for unequivocal tasks. The whole idea of matching uncertainty and ambiguity of a message to the communication channel richness, is to enable efficient and effective interactions (D'Urso & Rains, 2008).Other factors include the contextual determinants such as geographical separation and the symbolic meaning of the media, which may increase the appropriateness under certain situations (Fulk et al., 1987).

Support for this perspective has been mixed. Some studies show support for this perspective (Daft & Trevino, 1987; Trevino et al., 1987). Other studies however, only show weak support especially for new media such as email. Previous research show mixed results on email rankings in the richness continuum, from lean to the third richest communication channel just behind the telephone (D'Urso & Rains, 2008). These mixed findings may suggest that richness characteristics may not be the only objective feature of communication channels (Fulk, Steinfield, C.W., 1990; Schmitz & Fulk, 1991).

On the other hand, the concept of matching media richness with message ambiguity has also produced mixed results (El-Shinawy & Markus, 1997; Russ, Daft, & Lengel, 1991). This argument has not found support with new media such as email and voice mail either (Rice, D'Ambra, & More, 1998). However, matching media richness with message ambiguity was supported by traditional

communication channels such as FTF, memos, letters, etc.

As a result of several inconsistencies in media richness research findings using new media, scholars have reconsidered the descriptive and predictive validity of media richness theory for new media (Carlson & Zmud, 1999). Several predictor variables have been added to previous research models on media richness, in an effort to explain media perception and selection behaviors. These efforts include but not limited to examining task characteristics, symbolic and situational influences, and social influences (Rice, 1992; Rice, 1993; Schmitz & Fulk, 1991; Trevino, Lengel, Bodensteiner, Gerloff, & Muir, 1990).

Dimensions of Media Richness

The richness of a medium is based upon four dimensions: (a) the potential for immediate feedback, (b) the ability to convey natural language, (c) personal focus and (d) the capacity for multiple cues (Daft & Lengel, 1984; Daft & Lengel, 1986).

The potential for immediate feedback is defined as the ability of the medium to allow for feedback (e.g. two way audio systems) and the speed of the feedback. The ability to convey natural language is related to the use of a variety of signs and symbols in written form, for example, using numeric data or pictures to send a message, and using different language formats, for example, non-word utterances that convey meaning (Ferry, Kydd, & Sawyer, 2001). Personal focus or personalness is the degree to which a message conveyed through a certain medium is perceived to be personal (Ferry et al., 2001). It is related to the

concept of social presence because it is the degree to which the presence of the sender is felt by the receiver through the medium (Ferry et al., 2001). The capacity for multiple cues is related to the use of different cues such as body language and facial expressions.

Prior IS studies have examined media richness using a four-item composite measure (Daft & Lengel, 1984; Daft & Lengel, 1986, Carlson & Zmud, 1999). However, a more comprehensive, reliable and validated measure of media richness was later developed (D'Urso & Rains, 2008; Ferry et al., 2001). These new measures would make it more effective to assess the potential impact of experiential factors on both perceived usefulness and social presence of MDS communication channel.

According to technology acceptance model individuals usually form perceptions about the usefulness of an IT (MDS communication channel) before deciding to use that IT (MDS communication channel) (Davis, 1989). On the other hand media richness theory suggests that individuals match a medium with the task at hand, and choose rich medium for ambiguous or equivocal tasks (Short et al., 1976). It is predicted that certain MDS communication channels will be viewed as richer than others, for example, MMS will be perceived as a much richer communication channel than email because of the ability of MMS to convey text, pictures, video, etc.

The effect of social presence on media choice has been investigated in previous research (Short et al., 1976; Rice, 1993; Straub, 1994; Straub &

Karahanna, 1999). Social presence of the email medium was found to be positively correlated to email choice (Dermar Straub & Karahanna, 1998), and media choice (Trevino et al., 1987). Rice (1993) found that media with bigger bandwidth have a high social presence and therefore perform better. Additionally, Karahanna et al. conducted an interview and found that the relationship between the sender and the message recipient was a major determinant of social presence of email (Karahanna, Straub, & Chervany, 1999). Consistent with these findings this study proposes that perceived social presence will have an effect on media richness. Drawing from the above literature review, this study proposes the following hypotheses:

H3a: Users' perception of channel social presence will positively influence perceptions of channel richness for both synchronous and mTexting.

H3b: The influence of social presence on perceived channel richness will not be different between asynchronous and synchronous MDS.

Social Interface/Social Interaction Design

Interactivity which is the focus of this study is closely related to social interface and social interaction. Before discussing interactivity, we begin this section by taking a brief look at concept of social interaction design. Social interaction design is an approach that focuses on the social dimension of interactivity between users and the communication technology.

Anytime users use technology for communications, for example, MDS communication channels, social interaction becomes an integral part of it.

Interaction is not limited to the user interface and applications only, but instead both the user interface and usability encounter a social interface.

There are three views that examine and define interaction design: (1) Technology-centered view, (2) behaviorist view, and (3) social interaction design view (Saffer, 2010). In the technology-centered view, technology is the center of interest, is considered useful, usable and pleasurable to use. The goal of interaction designers is to make technology pleasurable. The behaviorist view defines the behavior of the artifact, environment, and system (e.g. product). The focus is on functionality and feedback on how users are using them. The social interactive design view has a social dimension and is concerned with facilitating communications between humans and systems.

Designing for social interaction is therefore, an important issue that should be addressed from an interaction design perspectives. Designers are increasingly faced with the challenges of designing and facilitating relevant forms of social interactivity in ubiquitous computing including MDS.

Hevner et al. (2004) seminal piece on design science present two perspectives of IS research: the behavioral research and the design science research. The goal of behavioral science is to develop and verify theories that explain or predict human or organizational behavior, whereas the design-science seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts. Other researchers have contributed to the field of design science in IS.

Chidambaram and Jones posit that simplicity, accessibility, restrictiveness and ease of interaction influence communication medium, and are important in the design of a communication interface (Chidambaram & Jones, 1993). They define a communication interface as the actions required by a medium of the participants to activate a communication channel in order to exchange information with the group. Kumar and Benbasat argue that communication characteristics of a communication channel are influenced by a combination of technology and communication interface design decisions.

Some researchers argue that system designers should place more emphasis on social impacts of technology because IT plays a role in shaping social relationships (Norman et al., 1986). Prior research suggests that humans respond socially in their interaction with technology (Dryer & Eisbach, 1999). Dryer and Eisbach argue further that the social context of MDS is very complex because of the changing social context of the users, i.e. from work (or formal settings) to personal lives (or informal settings). Dryer and Eisbach posit that accessibility, familiarity, input sharing, output sharing and relevance (usefulness) are important design dimensions that influence MDS.

One of the strategies for improving social presence lies in the design of a communication social interface that enhances social presence. Prior research have attempted to link social interactive design with social presence (Johnson et al., 2008; Kumar & Benbasat, 2002). In most of these studies, a major component is the concept of interactivity. This study provides a brief review of the

literature on interactivity and then links it to social presence.

Interactivity

The relationship between interactivity and social presence is well documented and supported in the literature (Williams & Rice, 1993; Garramone et al., 1986).

Johnson et al. posit that interactivity and social presence is key ingredients in the design of e-learning effectiveness in information systems. Khalifa and Shen posit that interactivity is an important construct in the design of user interface that enhances perceived social presence in a computer-mediated communication (Khalifa & Shen, 2004).

The literature on interactivity has identified several characteristics of interactive communication which might be useful for differentiating communication modes such as the simultaneous and continuous exchange of information, use of multiple, non-verbal cues, potentially spontaneous, unpredictable, and emergent progression of remarks, ability to interrupt or preempt, mutuality and patterns of turn-taking, and the use of adjacency pairs (Zack, 1993).

Dimensions of interactivity

Prior research has conceptualized interactivity using multiple processes, functions, and perceptions (McMillan & Hwang, 2002). A review of the literature on interactivity suggest that three dimensions most commonly identified with interactivity are: direction of communication, user control and time (McMillan &

Hwang, 2002).

In another study, Liu (2003) developed and validated a scale with three dimensions for measuring interactivity as follows: active control, two-way communication and synchronicity. Their study however, was based on a website and may not be applicable in this context. Khalifa and Shen while borrowing heavily from both Liu and McMillan and Hwang conceptualized interactivity as having three dimensions: active control, communications and synchronicity.

This study adopted the three dimensions of interactivity shown in Figure 5: (1) synchronicity, (2) no-delay (3) engaging (Khalifa & Shen, 2004; Liu, 2003; McMillan & Hwang, 2002). Khalifa and Shen define active control as "characterized by voluntary and instrumental action that directly influences the user's experience" (Khalifa & Shen, 2004, pg. 550). No-delay is the ability to reciprocate a message exchange and includes relevance and response contingency. Synchronicity is the ability of the communication to occur in real-time (synchronous) or to be delayed (asynchronous) (Khalifa & Shen, 2004).

Synchronicity may contribute to social presence through enhanced perceived immediacy (Khalifa & Shen, 2004). Perceived immediacy will positively impact and enhance richness and hence lead to higher social presence (Trevino et al., 1987).

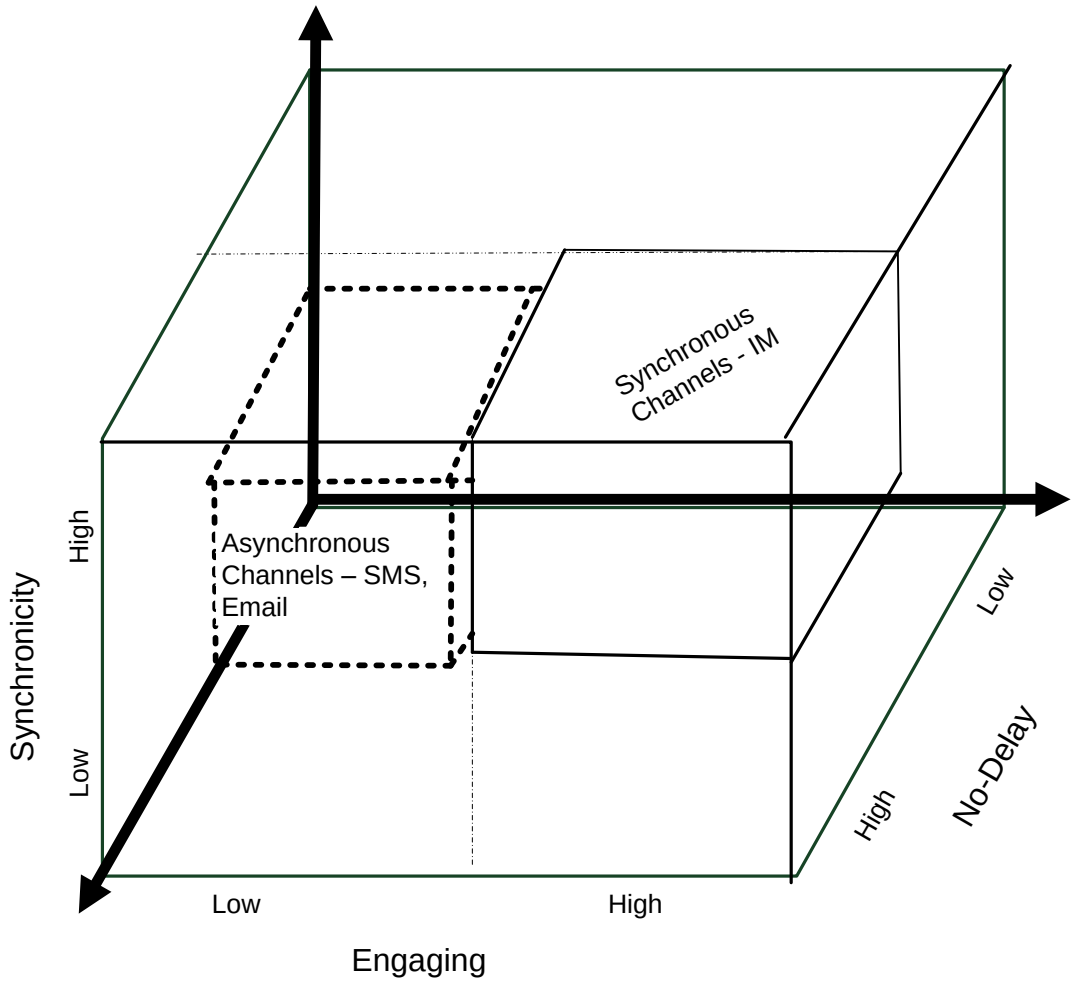


Figure 5. Dimensions of interactivity in MDS communication channels

Social presence has been recognized as an important factor in the context of computer-mediated communication, online learning or virtual communities (Schmke et al., 2007). According to Gunawardena and Zittle (1997) social presence is a strong predictor of satisfaction in a computer-mediated communication system. Prior research found that social presence affects the

degree of social interaction taking place in computer supported collaborative learning environments (Gunawardena, 1995; Tu, 2002). Venkatesh and Johnson (2002) found that social presence has a positive influence on motivation, and hence higher system usage. Additionally, Perse et al. (1992) found a positive relationship between social presence and perception of computer expertise. Otondo et al. (2006) found that social presence was associated with media effectiveness and satisfaction. Drawing from the above literature review, this study proposes the following hypotheses:

H4a: Synchronicity will positively influence perceived social presence in both asynchronous and synchronous MDS communication channels

H4b: No-delay will positively influence perceived social presence in both asynchronous and synchronous MDS communication channels

H4c: Engaging will positively influence perceived social presence in both asynchronous and synchronous MDS communication channels

H4d: Users' perceptions of social presence will differ between asynchronous and synchronous MDS communication channels.

Communication Channel Satisfaction

Satisfaction with information technology has been widely accepted as an indicator of IT usage, which is considered an important driver of IT success (DeLone and McLean, 1992).Research on end-user satisfaction with information technology is very extensive as evidenced by the literature review and meta analysis by IS researchers (Au, Ngai, & Cheng, 2002; Mahmood, Hall, &

Swanberg, 2001). Other IS researchers provide a theoretical and practical significance of the IS satisfaction construct through a comprehensive review of the current status of the IS satisfaction research and how it is related to customer satisfaction from the marketing literature (Khalifa & Shen, 2004).

However, in a computer-mediated communications such as MDS communication channels, research work has focused mostly on the effectiveness and choice of a communication channel. There is very little work on communication channel satisfaction. Lower communication channel satisfaction in a computer-mediated environment has been associated with lower physiological arousal that takes place when communication is not face to face (Bates & Cleese, 2001). Ease of use of a communication channel has also been linked to satisfaction (Simon, 2006). Other researchers suggest that individuals using asynchronous communication channels experienced less satisfaction compared to those who used face to face mode of communications (Thompson & Coovert, 2002). Other researchers also found that satisfaction varies with the communication channel (Kinney & Watson, 1992), task-communication channel interaction (Suh, 1999; Velacich et al., 1994), and individual perception of the communication partner (Kiesler et al., 1985).

Research Framework and Hypotheses Development

Drawing upon the literature on communication channel expansion, social presence and media richness, we develop an integrated model that shows that experience with both the communication medium and partner play a role in the

perception of social presence and perception of richness of a communication medium (MDS communication channel). This finding will further support prior research findings that richness concept is dynamic and not static as advanced by media richness theory. We also argue that although prior research have proposed a relationship between experience with medium or communication partner and perceived social presence, very little work has been done to validate this relationship.

The causal relationship in the proposed framework is based on individual level of analysis using mobile data services as the medium of communication. Understanding how these factors interact and drive the richness and hence channel satisfaction, is critical in answering the research questions above.

Previous research findings suggest that satisfaction varies with medium (Kinney and Watson, 1992). We argue in this paper that different MDS communication channels vary in richness perceptions. We expect synchronous MDS to be richer than mTexting. Otondo et al. (2006) investigated media richness using three types of media – video, audio and text. Contrary to media richness theory (MRT) they found that text was rated as having the highest effectiveness. They found that the effects of media type on richness features were different from those predicted by MRT in three out of four cases.

Prior research findings suggest that individuals using asynchronous communication channels experienced less satisfaction compared to those who used face to face mode of communications (Thompson & Coovert, 2002). Other

researchers found that satisfaction varies with medium (Kinney & Watson, 1992), task-medium interaction (Suh, 1999; Velacich et al., 1994), and individual perception of the other party (Kiesler et al., 1985). Measures were borrowed from Downs and Hazen (1977). This instrument has been validated and supported in later research on computer-mediated communications (Otondo, et al., 2007). Drawing from the above literature review, this study proposes the following hypotheses:

H5a: Users' perceptions of social presence will positively influence perceived channel satisfaction for both asynchronous and synchronous MDS communication channels

H5 b: The influence of users' perceptions of social presence on channel satisfaction will be higher in synchronous MDS than in mTexting communication channels.

H6a: Users' perceptions of channel richness will positively influence perceived channel satisfaction for both asynchronous and synchronous MDS communication channels

H6b: The influence of users' perceptions of channel richness on channel satisfaction will be higher in synchronous MDS than in mTexting communication channels.

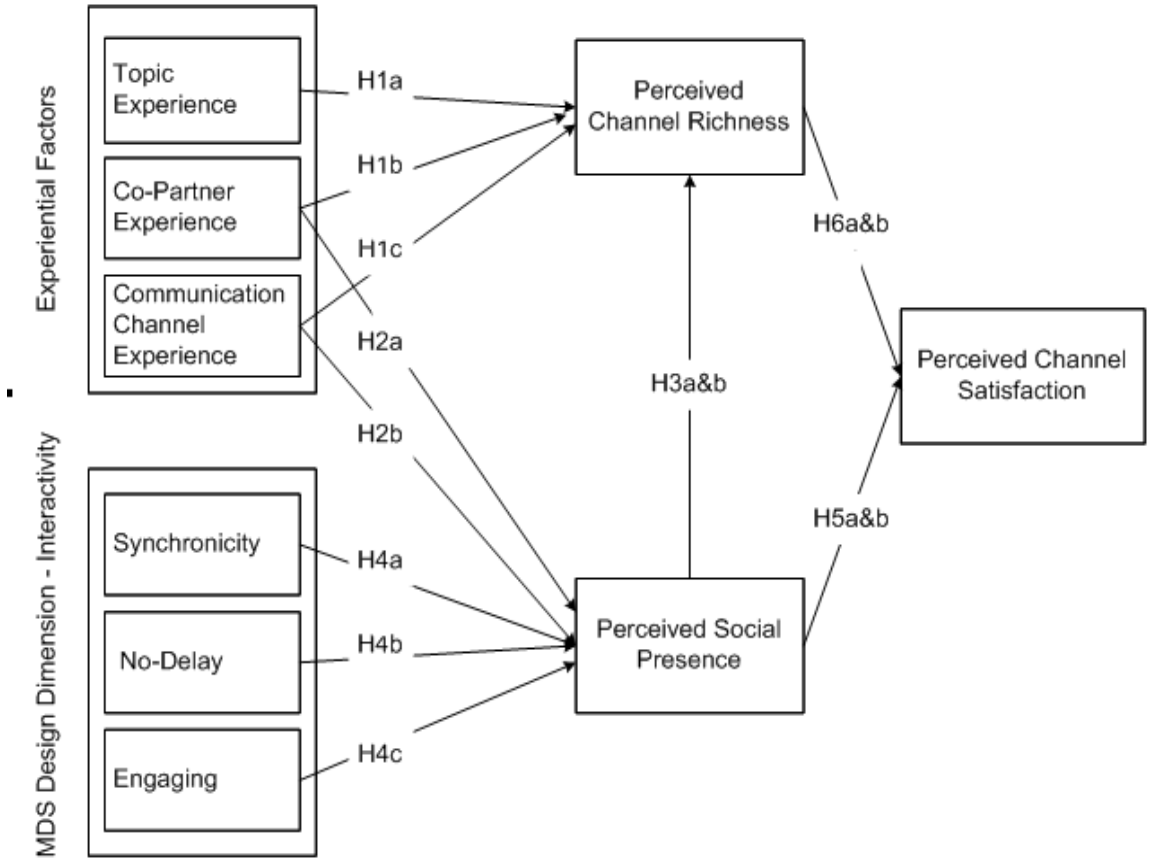


Figure 6. Conceptual model

Summary

Chapter 2 presented a literature review of the theories used in this study. Conflicting research findings with media richness theory is pointed out and a case is made for supporting the dynamic view. This is followed by an extensive review of communication channel expansion theory, social presence theory, and design dimension and communication channel satisfaction. A research framework and hypotheses are proposed.

CHAPTER 3

METHODOLOGY

This chapter describes the research methods used in testing the hypotheses presented in Chapter 2. It describes the collection of data, development of the research instrument, assessment of reliability, and validity of the instrument and data analysis procedures. The chapter has the following sections: (1) description of the population sample, (2) discussion of research design, (3) description of instrument design and development, and (4) discussion of survey administration and data analysis procedures

Population Sample

The respondents for this study were university students from a state university in the U.S. The choice of students was driven by experience and exposure to MDS. The use of students for research is well documented in the literature. Most often, students are used as representatives for professionals since they are convenient and easy to access. Experience is often considered in determining whether students are suitable to be study subjects (Berander, 2004). One of the guiding factors for the choice of students was the Nielsen's research that analyzed the popularity of MDS services for different age groups, and found that MDS was more popular among users between the age of 13 and 24. This finding therefore lends support to the use of University students because a majority of them fall within this demographic.

The survey targeted two groups of users: mobile texting (mTexting) and mobile instant messaging (mIM) users. Respondents were randomly administered either an instrument designed for mTexting users or mIM users. Potential respondents were asked a priori if they had used MDS communication channels in the past. Only respondents with prior knowledge of either mTexting or mIM were asked to complete the survey. Respondents were assured that their identity would remain anonymous, and they would have access to the study findings. They were also informed that participation was voluntary, and respondents could opt out at any time without completing the survey.

Research Design

The survey was conducted using Qualtrics software. Qualtrics is a web-based survey software package that offers different question types, a well-designed survey development interface, and a powerful reporting engine.

The purpose of survey-based research is to make an inference about some characteristics of the general population based on the data collected from a sample. Survey-based research provides several advantages: (1) a lot of information can be obtained from a large population, (2) information from survey research is accurate (Kerlinger & Lee, 2000), and (3) surveys are convenient for capturing respondents' attitudes and perceptions.

The advantages of using web-based or online surveys are well documented in the literature as follows. (1) easy access to populations that would otherwise be difficult to reach, (2) easy to obtain a large sample, (3) convenient

and data collection takes shorter time, and (4) low administrative cost (Wright, 2005). Online surveys do present some challenges: (1) problem of establishing a sample frame, (2) problem of randomization when there are multiple responses, and (3) difficult to track non-response rates (Wright, 2005).

Response rate can affect the quality of the study results, such as reliability and generalizability of findings. The literature suggests several ways that can be used to increase response rate such as use of follow-up reminders, financial incentives, university sponsor, stamped return envelopes and personalization and promise of anonymity (Dillman, 2000). In this dissertation, students were offered an incentive to encourage participation.

Instrument Design and Development

The instrument used in this study has six parts. The first part contains items used to measure the dependent variable – channel satisfaction. The second part contains three independent variables: (1) experience with channel, (2) experience with topic and (3) experience with co-partner. The third part contains items used to measure the independent variables, perceived social presence. The fourth part contains items used to measure the independent variable, perceived channel richness. The fifth part contains items used to measure the following independent variables: synchronicity, engaging and no-delay, and the last part contain items used to measure demographics. Table 4 provides a summary of the variables used in the instruments, their sources, as well as their definition.

The following instrument design principles were used in developing the instrument: (1) brief and concise questions, (2) carefully-ordered questions, and (3) clearly defined terminologies (Armstrong & Overton, 1977; Mangione, 1995; Schuman & Pressor, 1981).

Table 4

Definition and Sources of Constructs

Construct	Definition/No of Items	Source
Perceived channel satisfaction	• Is the perceived affective reactions of the respondent to the communication channel • Contains 3 items	Otondo et al., 2007
Experience with channel	• The extent to which a user gains knowledge base through exposure to a communication channel. It examines characteristics such as the degree of experience, competence and ease of use of a medium • Contains 6 Items	Carlson & Zmud (1999)
Experience with topic	• The extent to which a user gains knowledge base through exposure to a communication topic • Contains 3 items	Carlson & Zmud (1999)
Experience with co-partner	• The extent to which a user gains knowledge base through exposure to communication partner. It examines characteristics such as closeness, familiarity, comfortability, etc, with a communication partner • Contains 10 items	Carlson & Zmud (1999)
Perceived social presence	• Is the degree of salience of the other communication partner in the interaction and interpersonal relationship and is based on four dimensions • Contains 4 items	Short et al. (1976)

(Table 4 continued)

Perceived channel richness	• Is the potential of a communication channel to allow multiple communication channels, language variety, personalness and immediacy of feedback • Contains 4 Items used	Daft and Lengel (1984)
Synchronicity	• Is the potential of a communication occurring in real-time or is delayed • Contains 6 items	MacMillan & Hwang (2002) Liu (2003) Khalifa & Shen (2004)
No-delay	• Is the ability to reciprocate a message exchange and includes relevance and response contingency • Contains 4 items	
Engaging	• Is characterized by voluntary and instrumental action that directly influences the user's experience • Contains 7 items	

Reliability and Validity of Instrument

Reliability refers to dependability, stability, consistency, reproducibility, predictability and lack of distortion (Kerlinger & Lee, 2000). The reliability of the items in the instrument is determined using Cronbach's alpha. Generally, an overall Cronbach's alpha of at least 0.67 is considered acceptable.

An instrument is regarded as reasonably reliable when three conditions are met: (1) it produces consistent results when applied to same set of objects, (2) it reflects the true measure of the properties measured, (3) no measurement error is present (Kerlinger & Lee, 2000).

Internal consistency, one of the most widely used measures of reliability,

measures how consistently individuals respond to items within a scale (Cronbach, 1951). The reliability of a multi-item measurement scale is usually assessed using Cronbach's alpha. Generally, items are considered internally consistent if coefficient of alpha is equal to or greater than 0.80 (Nunnally & Bernstein, 1994).

Content validity refers to the representativeness or sampling adequacy of the content of the instrument (Kerlinger & Lee 2000). Content validity addresses if the content of the instrument truly represents the content of the property being measured. Methods of assessing content validity include conducting a thorough search of the relevant research on the topic and consulting with experts who are considered knowledgeable in the research field (Churchill, 1979). To ensure the content validity of this study, all items were adapted from relevant studies previously published in peer-reviewed journals. In addition, experts in academia were asked to review the instrument and provide feedback on whether the items adequately covered the relevant dimensions of the topics being covered. Necessary modifications were made based on their feedback.

Construct validity, unlike other validities, focuses on theory, theoretical constructs and scientific empirical inquiry involving testing of hypothesized relationships (Kerlinger & Lee, 2000). It refers to the overall degree of correspondence between the constructs and measures used to represent the construct (Peter, 1981).

In order to establish construct validity it was necessary to assess the

unidimensionality of the items used to measure a given construct. A commonly used method for assessing unidimensionality is exploratory factor analysis. Factor analysis is a method of reducing a large number of measures to a smaller number, called factors, by discovering which measures go together or assess the similarity and the relationship among the clusters of measures that go together (Kerlinger & Lee, 2000). Principle component factor analysis using a Varimax rotation was used to assess the variables in the study. Eigenvalues were used to assess if the factors are sufficient to explain the variance in the model. Dimensionality of each factor was assessed using factor loading. Items with a factor loading of greater than 0.50 were considered adequate indicators of the factors. Items with a factor loading of at least 0.30 on other factors were examined to determine whether they measure another factor (Hair, Anderson, Tatham, & Black, 1998).

Construct validity requires both convergence and discriminality, where convergence refers to the ability of an instrument purporting to measure the same thing to be highly correlated, whereas discriminality refers to the ability of instruments that measure different to show low correlation (Kerlinger & Lee, 2000).

Convergent validity is the extent to which a measure correlates highly with other methods to measure the same construct (Churchill, 1979). In order to demonstrate convergent validity, items measuring the same construct should be highly correlated with one another (Campbell & Fiske, 1959). Discriminant validity

is concerned with the ability to differentiate between objects being measured (Campbell & Fiske, 1959). The test for discriminant validity is that an item should correlate more highly with other items intended to measure the same construct than with different items used to measure a different construct (Campbell & Fiske, 1959). In addition, the correlation among constructs should not be high. External validity defines representativeness or generalizability of a survey instrument (Kerlinger & Lee, 2000). It is the degree to which the findings from a single study can be generalized from the sample to the population.

Factor analysis is used to describe the relationships between observed variables (items) by a few underlying but unobservable variables called constructs. Exploratory factor analysis assumes total variability and finds the factors that maximize the common variance that is explained. Eigenvalue is one means of demonstrating the total variance explained by a factor. The most common method of factor analysis is the principal axis factor in SPSS. Principal axis factor selects the smallest number of factors which account for the common variance (correlation) of a set of variables. Confirmatory factor analysis would then be used to validate the model.

Confirmatory factor analysis estimates the parameters and empirically validates the hypothesized model. Confirmatory factor analysis was analyzed using Partial Least Squares. The most popular SEM technique is the covariance techniques such as LISEL, AMOS, EQS, EZPath, SEPATH, CALIS, MX, and RAMONA (Chin, 1995). This technique generally follows five stages: model

specification, identification, estimation, testing fit and respecification.

Partial least squares (PLS) was used to analyze loadings and cross-loadings of items on different latent variables in order to investigate any evidence of discriminant validity. PLS was chosen mainly because it allows latent constructs to be modeled as either formative or reflective indicators. Reflective indicators reflect an unmeasured latent construct that is deemed to exist before it is measured and account for the observed variances and covariances. Formative indicators are used to form a superordinate construct where the individual indicators are weighted according to their relative importance in forming the construct (Chin, 1998).

PLS has an advantage over LISREL in that it does not require a multivariate normal distribution or a large sample size (Fornell and Bookstein 1982). LISREL emphasizes overall model fit, while PLS is more prediction-oriented and seeks to maximize the variance explained in the constructs (Barclay, 1995). PLS estimates the variance of dependent construct and their associated latent variables (Chin, and Newsted, 1999; Chin, Marcolin, and Newsted, 2003). PLS basically relies on principal component analysis whereas the covariance method relies on common factor analysis. Falk and Miller (1992) identify four conditions under which PLS-based SEM is better than covariance-based SEM as follows: (1) theoretical conditions, (2) measurement conditions, (3) distributional conditions, and (4) practical conditions.

Theoretical conditions consider the purpose of the study and whether or

not strong theory exists. PLS is best suited when: (i) hypotheses are derived from theory and the relevant variables are not known, (ii) the relationships between theoretical constructs and their manifestations are unclear, and (iii) the relationships between constructs are hypothetical (Falk, 1992).

Measurement conditions consider the characteristics of the latent and manifest variables. PLS is best suited when: (i) some or all of the manifest variables represent different levels of measurement, (ii) manifest variables have some degree of unreliability, and (iii) residuals on manifest and latent variables are correlated. Under the distribution condition PLS is better suited when data come from non-normal or unknown distributions. Under the practical conditions PLS is best suited when: (i) the following designs are used - cross-sectional, survey, secondary data, or quasi-experimental research designs, (ii) a large number of manifest and latent variables are modeled, and (iii) too many or too few cases are available (Falk, 1992).

CHAPTER 4

DATA ANALYSIS AND RESULTS

Introduction

This chapter discusses the analysis and results of the survey data gathered in this study. First, a descriptive statistics of the survey respondents are presented. Secondly, results of the findings are presented. To test the hypothesized model, Partial Least Squares (PLS) was used to examine the direct and indirect causal relationships among variables. PLS was also used to determine if the data collected supported the hypothesized model. Third, series of regression equations were used to test mediational hypothesis.

Measurement Scales

Descriptive statistics for each item is presented in Table B1 – Appendix B. Each statement required responses based on a 7-point Likert scale. A total of 9 latent variables were used in this study, and they included: (1) perceived channel richness, (2) perceived social presence, (3) experience with channel, (4) experience with communication partner, (5) experience with topic, (6) no-delay, (7) synchronization, (8) social influence, and (9) perceived channel satisfaction. Corresponding questions for each latent variable are included in Table B1 – Appendix B.

Survey Respondents

Email was sent out to students enrolled in a University located in the southwestern U.S. requesting them to participate in a web-based survey between March 10 and April 30, 2010. The survey was conducted in two phases over a six week period. During the first phase, from March 10 to April 14, more than 235 students participated in the survey. The second phase of survey ran from April 10 to April 30, 2010 with more than 270 students participating in this phase. The second phase was conducted because sufficient data was not collected during the first phase of data collection. Also, collecting data in two phases allowed for examining non-response bias in the data. A total of 545 responses were received over the six week period, of which 28 responses were discarded as incomplete and unusable.

Analysis of Missing Data and Non-Response Bias

Missing data refers to “information not available for a subject (or case) for which other information is available” (Hair et al., 1998, p.38). Missing data is often caused by the respondent’s refusal to answer one or more questions.

Non-response bias is a major source of bias in survey research. If it is not addressed properly, it can lead to conclusions that differ systematically from the actual situation in the population. Comparing early and late respondents has been shown to be a useful means by which to assess non-response bias (Karahanna et al., 1999). If late respondents and early respondents do not differ in certain characteristics, it is less likely that non-respondents will differ

significantly from respondents (Compeau, 1995). Non-response bias was assessed by comparing the early and late respondents.

A t-test was performed to compare the early response group and the late response group for their responses on four dependent and demographic variables: perceived social presence, perceived channel richness, perceived channel satisfaction, and age. The results of the t-test as shown in Tables 5 and 6 indicate no significant differences between the early and late response groups at the 0.05 significance level for both mIM and mTexting. The results show that the variances are not statistically significant since the *p*-value of Levene's test is more than 0.05. Likewise the t-value based on equal variances is not significant with a two-tailed *p*-value of more than 0.05. These results suggest that there is no significant difference in the means of early and late respondents for both mTexting and mIM. Table 6 provides a summary of the result of test for non-response bias for mTexting and mIM respectively.

Table 5

Assessment of Non-Response Bias (mText)

Variable	Resp	N	Mean	SD	Levene's Test for Equal Var		T-test for Equality of Means	
					F	Sig	t	Sig(2-tailed)
Perceived Social Presence	Early	8	4.84	1.014	3.232	.073	.938	.349
	Late	41	4.70	1.260				
Perceived Channel Richness	Early	8	4.73	1.034	2.775	.097	237	.537
	Late	41	4.65	1.141				
Perceived Channel Satisfaction	Early	8	5.57	.945	.472	.493	-.153	.878
	Late	41	5.59	.988				
Age	Early	8	2.38	.806	2.163	.143	1.626	.105
	Late	41	2.55	.832				

Table 6

Assessment of Non-Response Bias (mIM)

Variable	Resp	N	Mean	SD	Levene's Test for Equal Var		T-test for Equality of Means	
					F	Sig	t	Sig(2-tailed)
Perceived Social Presence	Early	122	4.98	1.354	1.306	.254	1.902	.058
	Late	154	4.65	1.470				
Perceived Channel Richness	Early	122	4.47	1.082	.042	.837	.030	.976
	Late	153	4.47	1.089				
Perceived Channel Satisfaction	Early	122	5.29	1.128	.023	.880	.905	.366
	Late	153	5.16	1.157				
Age	Early	122	2.33	.776	.513	.474	-.973	.331
	Late	153	2.42	.758				

Profile of Respondents

Of the total (N=517) individual respondents that reported their gender, 289 were male and 224 were female thus suggesting that more males participated in this study than females. 62.1% (N=149) of the respondents who used mIM were male and 37.5% (N=90) were female. 50.9 % (N=141) of the respondents who used mText were male and 48.4% (N=134) were female. Gender distribution between males and female mIM users was not uniform because there were half as many female users as their male counterparts. On the other hand, gender distribution in mTexting was very close. Further analysis showed that there was no significant difference between male and female mText users. These results are summarized in Table 7.

Table 7

Gender Distribution (mIM and mText)

		mIM		mTexting	
		Frequency	Percent	Frequency	Percent
Valid	Male	149	62.1	141	50.9
	Female	90	37.5	134	48.4
	Total	239	99.6	275	99.3
Missing	System	1	.4	2	.7
Total		240	100.0	277	100.0

Age was distributed as follows (Table 8): 65% (N=156) were between 18-22 years old, 24.2% (N=58) were between 23-27 years old, 4.2% (N=10) were between 28-32 years old, and 5.4% (N=13) were above 32 years old among mIM users. The age of mText users were distributed as follows: 1.1% (N=3) were less

than 18 years old, 71.8% (N= 199) were between 18-22 years old, 18.1% (N=50) were between 23-27 years old, 4.3% (N=12) were between 28-32 years old, and 4% (N=11) were above 32 years old. Majority of respondents (approx 90 percent) were made of young people between age 18 and 27. This is because the study was conducted using University students. The results general support prior similar studies, such as Nielsen's research, that analyzed the popularity of MDS services for different age groups, and found that MDS was more popular among users between the age of 13 and 24.

Table 8

Age Distribution (mIM and mTexting)

		mIM		mTexting	
		Frequency	Percent	Frequency	Percent
Valid	<18 yrs	2	.8	3	1.1
	18-22 yrs	156	65.0	199	71.8
	23-27 yrs	58	24.2	50	18.1
	28-32 yrs	10	4.2	12	4.3
	>32 yrs	13	5.4	11	4.0
	Total	239	99.6	275	99.3
Missing	System	1	.4	2	.7
Total		240	100.0	277	100.0

Education was distributed as follows: 6.7% (N=16) were freshmen, 18.8% (N=45) were sophomores, 45% (N=108) were juniors, 27.1% (N=65) were seniors and 1.7% (N=4) were masters students among mIM users. The levels of education among mText users were distributed as follows: 4.3% (N=12) were freshmen, 19.9% (N=55) were sophomores, 49.8% (N=138) were juniors, 23.8%

(N=66) were seniors and 1.4% (N=4) were masters students (Table 9). Essentially, majority of the respondents were undergraduate students.

Table 9

Education (mIM and mTexting)

		mIM		mTexting	
		Frequency	Percent	Frequency	Percent
Valid	Freshman	16	6.7	12	4.3
	Sophomore	45	18.8	55	19.9
	Junior	108	45.0	138	49.8
	Senior	65	27.1	66	23.8
	Masters	4	1.7	4	1.4
	PhD	1	.4	0	.0
	Total	239	99.6	275	99.3
Missing	System	1	.4	2	.7
Total		240	100.0	277	100.0

The distribution of employment among the respondents was as follows: 45% (N=108) were part-time employees, 21.7% (N=52) were full-time employees and 32.9% (N=79) were unemployed among mIM users. Likewise, 45.8% (N=127) were part-time employees, 17.3% (N=48) were full-time employees and 36.1% (N=100) were unemployed among mText users (Table 10). The results generally show that there were more mText users and mIM users among part-time employees than in any other employment category.

Table 10

Employment (mIM and mTexting)

		mIM		mTexting	
		Frequency	Percent	Frequency	Percent
Valid	Part-time	108	45.0	127	45.8
	Full-time	52	21.7	48	17.3
	Unemployed	79	32.9	100	36.1
	Total	239	99.6	275	99.3
Missing	System	1	.4	2	.7
Total		240	100.0	277	100.0

More than half of respondents who used either mTexting or mIM were white. Blacks represented 14.2% (N=34), Hispanics represented 12.5% (N=30), Asian/Pacific Islanders represented 16.7% (N=40) among mIM users. Similarly, blacks represented 9.7% (N=27), Hispanics represented 14.4% (N=40), Asian/Pacific Islanders represented 9% (N=25) among mText users (Table11).

Table 11

Race Distribution (mIM and mTexting)

		mIM		mTexting	
		Frequency	Percent	Frequency	Percent
Valid	White/Caucasian	121	50.4	174	62.8
	Black/African American	34	14.2	27	9.7
	Hispanic/Latino	30	12.5	40	14.4
	Asian/Pacific	40	16.7	25	9.0
	Other	14	5.8	9	3.3
	Total	239	99.6	275	99.3
Missing	System	1	.4	2	.7
Total		240	100.0	277	100.0

Frequency of usage of mTexting was higher than mIM (Table 12). The study found that among the mIM users, 51.3% (N= 123) used mIM daily, 14.6% (N=35) used mIM several times per week, 8.8% (N=21) used mIM weekly, 13.3% (N=32) used it monthly and 12.1% (N=29) used it only once per year. On the other hand 79.1% (N= 219) used mTexting daily, 12.6% (N=35) used mTexting several times per week, 2.2% (N=6) used mTexting weekly, 0.7% (N=2) used it monthly and 0.4% (N=1) used it only once per year. It is conceivable from these findings that mTexting appears to be popular among this demographics. This finding is generally supported by prior studies, for example, Forrester research found that mTexting was very popular among young people in the U.S.

Table 12

Frequency Usage (mIM and mTexting)

	mIM		mTexting	
	Frequency	Percent	Frequency	Percent
Daily	123	51.3	219	79.1
Several times/wk	35	14.6	35	12.6
Weekly	21	8.8	6	2.2
Monthly	32	13.3	2	.7
Once/ yr	29	12.1	1	.4
Total	240	100.0	277	100.0

The study found that AIM, MSN, Yahoo!, and Google applications were the most popular among mIM users. Frequency of usage of these applications were as followed: AIM had the largest market share and commanded 31.3% market share followed by Yahoo! at 25%, Google 14.2% and MSN 10.4%. The

remaining 19.2% respondents used other types of applications besides those mentioned above for instant messaging (Table 13).

Table 13

Mobile IM Applications

Application	Frequency	Percent
AIM	75	31.3
MSN	25	10.4
Yahoo!	60	25
Google	34	14.2
Other	46	19.2
Total	240	100

Normality Test

Univariate normality tests were run for all independent and dependent variables and skewness and kurtosis examined. All the independent and dependent variables were within an acceptable range (Table B1 and B2 - Appendix B) since skewness is between -3 and +3 and kurtosis is between -8 and +8 (Kline, 1998).

Multifactorial Analysis of Variance

This is an extension of one-way ANOVA. Unlike ANOVA, this method is useful in analyzing the simultaneous effects of two or more independent variables on the dependent variable. Multifactorial ANOVA is useful for analyzing the differences among several group means by partitioning the total variance in the dependent variable into effects due to each of the factors called main effects,

interaction between the factors and error variance. The frequency of usage of both mText and mIM were analyzed using multifactorial analysis and profile plots obtained as shown. The results suggest that females were heavy users of both mText and mIM compared to their male counterparts (7). This pattern was observed among part-time and full-time employees. However, the difference was minimal among the unemployed respondents (Figure 8).

Figure 7. Frequency of mText by gender

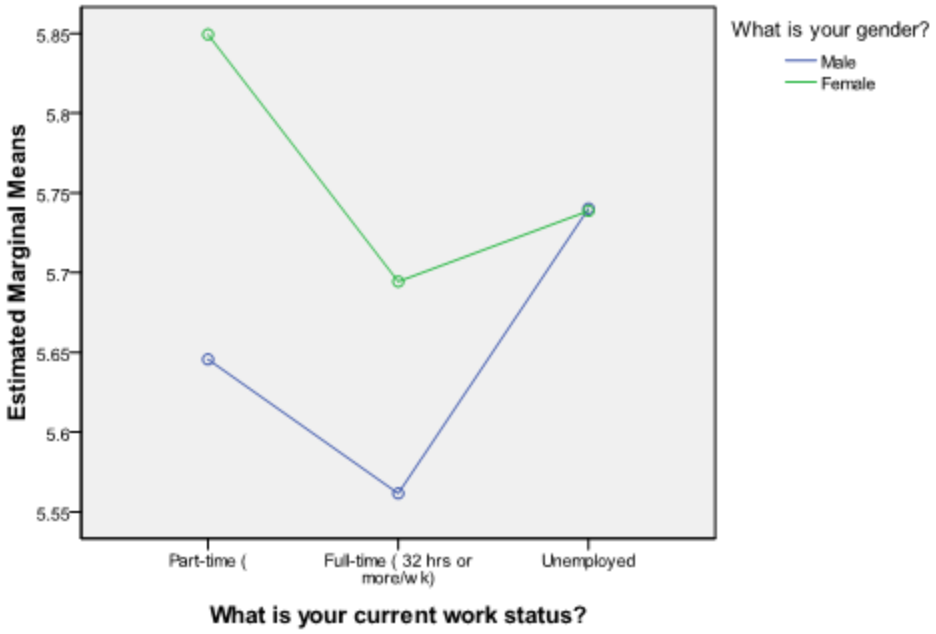


Figure 8. Frequency of mText by employment

A multifactorial analysis and profile plots also showed that mText usage was highest among the 18-22 yrs age group but reduced gradually with increase in the age groups, with the 28-32 yrs age group showing the lowest frequency of mText (Figure 9). Ironically this pattern was not observed among mIM users. Contrary to expectations, mIM usage was least among the 18-22 yr age group, but increased with increase in the age bracket (Figure 10). The spike seen in the (<18 yr) age group may be due to the fact that only one respondent fell in this age group. This could as well be considered an outlier.

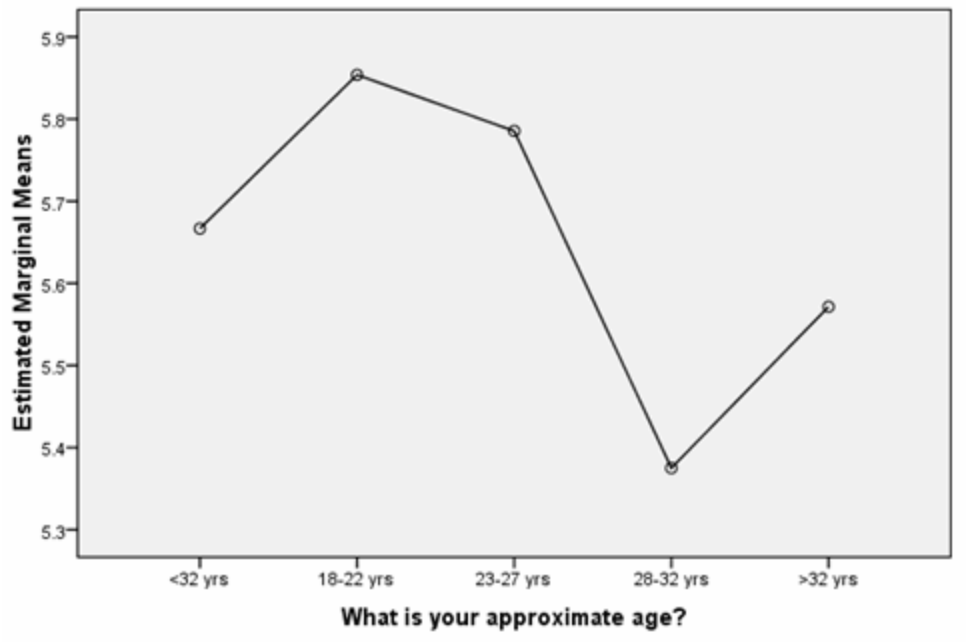


Figure 9. Frequency of mText by age groups

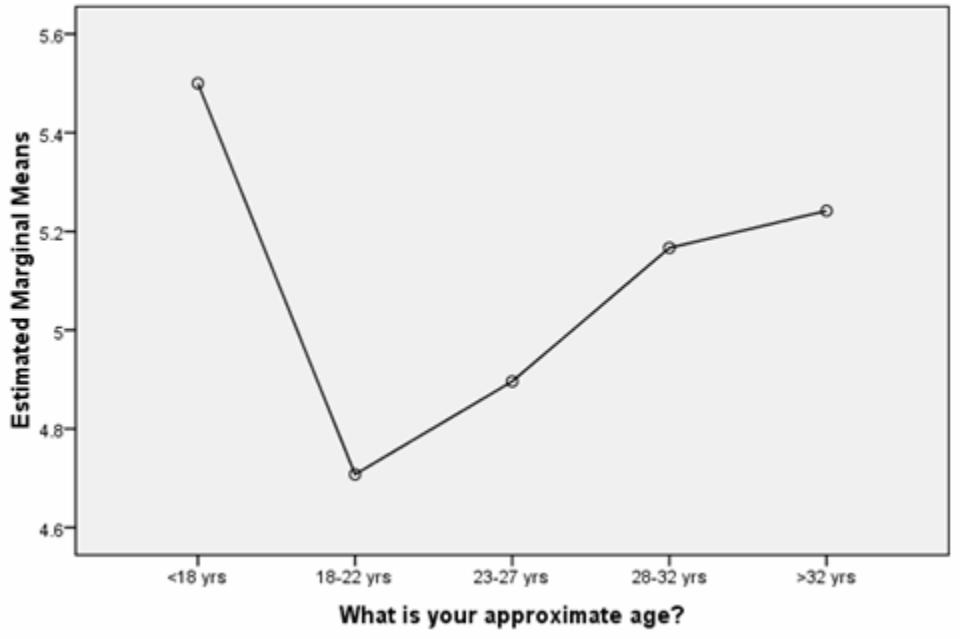


Figure 10. Frequency of mIM by age groups

A multifactorial ANOVA analysis was also used to investigate if there were significant effects on both the main and interaction effects of age, gender, and employment on the dependent variables (perceived channel richness and perceived channel satisfaction). The results show that the main effects were not significant for both mText users and mIM users. However, the interaction effect between age and employment was significant, F (6, 215) = 2.248, $p < 0.05$; gender, age and employment was significant, F (3, 215) = 2.354, $p < 0.1$ for perceived channel richness in mIM (Table 14).

Table 14

Interaction Effects Perceived Richness (mIM)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	34.639[a]	22.000	1.575	1.345	0.145
Intercept	969.923	1.000	969.923	828.306	0.000
Gender	0.372	1.000	0.372	0.317	0.574
Age	4.060	4.000	1.015	0.867	0.485
Employment	2.566	2.000	1.283	1.096	0.336
Gender * Age	6.330	4.000	1.583	1.351	0.252
Gender * Employment	1.528	2.000	0.764	0.653	0.522
Age * Employment	15.794	6.000	2.632	2.248	**0.040**
Gender * Age * Employment	8.270	3.000	2.757	2.354	**0.073**
Error	251.759	215.000	1.171		
Total	5500.667	238.000			
Corrected Total	286.398	237.000			

Dependent variable:PRICH

For the dependent variable – perceived channel satisfaction, the interaction effect between age and employment was also significant, F (6, 215) = 2.814, $p < 0.01$; gender, age and employment was also significant, F (3, 215) = 3.066, $p < 0.05$ for perceived channel richness (Table 15). For mText users the only significant interaction effect was between gender and age, F (4, 248) = 3.362, $p < 0.05$.

Table 15

Interaction Effects Perceived Channel Sat (mIM)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	33.872[a]	22.000	1.540	1.748	0.024
Intercept	1177.732	1.000	1177.732	1336.982	0.000
Gender	0.005	1.000	0.005	0.005	0.941
Age	6.563	4.000	1.641	1.863	0.118
Employment	0.548	2.000	0.274	0.311	0.733
Gender * Age	4.646	4.000	1.161	1.318	0.264
Gender * Employment	0.868	2.000	0.434	0.493	0.612
Age * Employment	14.871	6.000	2.479	2.814	**0.012**
Gender * Age * Employment	9.198	3.000	3.066	3.480	**0.017**
Error	189.391	215.000	0.881		
Total	7637.000	238.000			
Corrected Total	223.263	237.000			

Dependent variable:CHSAT

Pairwise difference was significant (*p=0.05*) between part-time and full-time mIM users. This difference was also evident between AIM, Yahoo! and Google (Table 16).

Table 16

Multiple Comparisons

Employmen/ Application	Employmen/ Application	Mean Differ	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Part-time	Full-time	.20*	.086	.050	.00	.41
Full-time	Part-time	-.20*	.086	.050	-.41	.00
AIM	Yahoo!	-.64	.250	.088	-1.33	.06
	Google	-1.19*	.298	.001	-2.02	-.36
	Other	-.79*	.274	.038	-1.55	-.03
Yahoo!	AIM	.64	.250	.088	-.06	1.33
Google	AIM	1.19*	.298	.001	.36	2.02

* significant at 0.05; full-time (>=32 hrs/wk); part-time (<32 hrs/wk)

Differences in Group Means between MIM and Mobile Text Users.

The results of t-test as shown on Table 17 show that there was a significant difference among mIM and mText users, in perception of richness. The mean score for mIM is 4.6, and is higher than mText users which stand at 4.4. MIM users therefore, have a higher perception of richness of mIM than mText users have for mTexting.

Table 18 however, show that there is no difference in the way mIM and mText users view social presence. The difference between the means is not significant at al. Table 19 shows that there is a significant difference in channel satisfaction between mIM and mText users. The mean of mText users is higher than that of mIM users

Table 17

Differences Group Means Richness

Group	N	Mean	Std. Deviation	Std. Error Mean
Mobile Text users	275	4.469	1.0840	.0654
MIM users	240	4.681	1.0951	.0707

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.358	.550	-2.198	513	.028	-.2115	.0962	-.4005	-.0224
Equal variances not assumed			-2.196	502.202	.029	-.2115	.0963	-.4006	-.0223

Table 18

Differences Group Means Social Presence

Group	N	Mean	Std. Deviation	Std. Error Mean
Mobile Text users	275	4.795	1.4277	.0861
MIM users	240	4.751	1.1565	.0747

	Levene's Test for Equality of Variances	t-test for Equality of Means

(Table 18 continued)

								95% Confidence Interval of the Difference	
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	13.055	.000	.376	513	.707	.0435	.1156	-.1836	.2706
Equal variances not assumed			.382	510.239	.703	.0435	.1140	-.1804	.2674

Table 19

Differences Group Means Satisfaction

Group	N	Mean	Std. Deviation	Std. Error Mean
Mobile Text users	275	6.293	.8451	.0510
MIM users	240	5.589	.9712	.0627

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	9.356	.002	8.802	513	.000	.7044	.0800	.5472	.8617
Equal variances not assumed			8.719	477.382	.000	.7044	.0808	.5457	.8632

Multiple Regression Results for Mediation Analysis

In order to establish mediation effect of perceived social presence between experience and perceived channel richness, we adopted the Baron and Kenny mediational model (Baron & Kenny, 1986; Kenny, 1998). This model describes the following four steps that should be followed in order to establish mediation.

1) Use regression equation to show that experience (predictor variable) affects perceived richness (criterion variable) and then determine the direct effect or path c.
2) Use regression equation to show that experience affects perceived social presence (criterion variable) and then estimate path a.
3) Use regression equation to show that perceived social presence affects perceived channel richness and estimate path b while controlling for experience.
4) Establish complete mediation if the effect of experience on perceived channel richness is zero while controlling for perceived social presence.

The steps should be stated in terms of zero and nonzero coefficients, not in terms of statistical significance because small coefficients can be statistically significant with large sample sizes, and very large coefficients can be non-significant with small sample sizes. If all four of these steps are met, then the data are consistent with the hypothesis that perceived social presence completely mediates the relationship between experience and perceived channel

richness, and if the first three steps are met but step 4 is not, then partial mediation is indicated. According to Kenny et al. (1998), step 4 does not have to be met in order to justify mediation unless the expectation is for complete mediation.

The results of mediation analysis shown in Figure 11, shows that perceived social presence partially mediates the relationship between experience and perceived channel richness. The mediation is partial because controlling perceived social presence does not make the mediation effect of experience on perceived channel richness to be zero (Table 20). The details for multiple regression for mediation analysis are provided in Appendix B – Table B3 – B8.

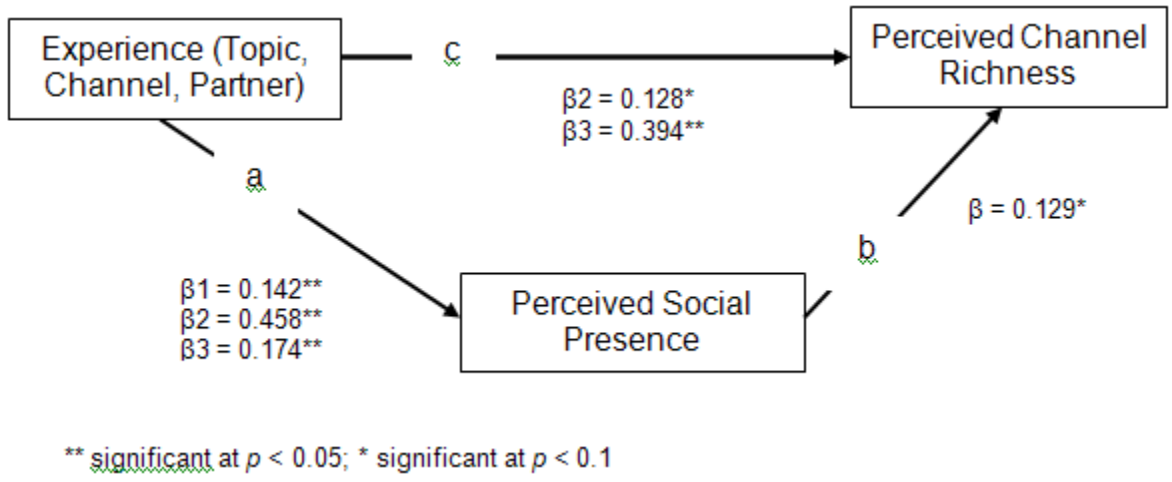


Figure 11. Results of Mediation Analysis

Partial Least Square Analysis

PLS method of structural equation modeling is widely used in IS research (Agarwal & Karahanna, 2000; Gefen & Straub, 1997; Igbaria, 1995; Karahanna

et al., 1999; Thompson, 1991). PLS is sometimes called “component-based SEM,” in contrast to the covariance-based structural equation modeling (SEM). Although the measurement and structural parameters are estimated together, a PLS model is analyzed and interpreted in two stages: (1) the assessment of the reliability and validity of the measurement model and (2) the assessment of the structural model. The goal is to establish reliability and validity of an instrument before attempting to draw any conclusions about the relationships.

PLS is a statistical method that allows optimal empirical assessment of a structural and measurement model. The measurement model is also called the outer model and the structural model the inner model. The measurement model shows the link of each construct with a set of indicators (items) measuring that construct. The structural model shows the causal relationships between multiple constructs (Wold, 1982).

PLS method of SEM (specifically Warp PLS) was chosen because of its ability to handle multicollinearity among the independent variables, robustness in the face of data noise and missing data, and the ability to create independent latent variables directly on the basis of cross-products involving the response variables thus allowing for stronger predictions. Consequently, PLS method has some major advantages over covariance-based methods such as LISREL, EQS and AMOS. PLS requires a sample size consisting of 10 times the number of predictors, using either the indicators of the most complex formative construct or the largest number of antecedent constructs leading to an endogenous construct,

whichever is greater (Marcoulides, 2006).

Assessment of Reliability

Reliability refers to the degree to which the variables are consistent with what they are supposed to be measuring. The Cronbach alpha is one of the most common measures used to measure reliability of the construct. In this study Cronbach's alphas, which are calculated based on the average inter-item correlations, were used to measure internal consistency. According to Straub (1989.), high correlations between items produce high Cronbach's alpha, and are usually signs that the measures are reliable. While there is no standard cut-off point for the alpha coefficient, the generally agreed upon lower limit for Cronbach's alpha is .70 (Straub, 1994), although it may decrease to .60 (Hair et al., 1998) or even .50 (Nunnally, 1978) in exploratory research. Table 20 lists the reliability scores of the constructs used in the model. The values of Cronbach's alpha ranged from 0.56 to 0.92. The low value may be attributed to the fewer number of items that measure this construct. The construct reliability values suggest that the instrument is reliable.

Reliabilities can also be measured by examining the loadings or simple correlations of the measures on their respective construct. Composite reliability developed by Fornell and Larcker (1981) is used to measure the composite reliability. These reliabilities take into account the actual loadings used to construct the factor score and are considered a good measure of internal consistency. The general rule is that both the composite reliability and the

Cronbach alpha coefficients should be equal to or greater than 0.7 (Fornell & Larcker, 1981; Nunnally, 1978; Nunnally & Bernstein, 1994). A more conservative approach is that one of the two coefficients should be equal or greater than 0.7. This typically applies to the composite reliability coefficient, which is usually higher than the Cronbach alpha (Fornell & Larcker, 1981). In some cases a threshold of 0.6 is acceptable (Nunnally & Bernstein, 1994). Table 20 shows that this criterion is met since all composite reliability values are greater than .80, which suggests good internal consistency.

Table 20

Cronbach's Alpha and Factor Loadings

Construct	Variable Name	Variance Explained (R^2)		Composite Reliability		Cronbach Alpha	
		mIM	mText	mIM	mText	mIM	mText
Perceived Social Presence	SOCPR1	0.460	0.528	0.919	0.892	0.881	0.833
	SOCPR2						
	SOCPR3						
	SOCPR4						
Experience with Channel	EXCHA1			0.928	0.957	0.903	0.943
	EXCHA2						
	EXCHA3						
	EXCHA4						
	EXCHA5						
Experience with Communication Partner	EXPAT1			0.896	0.908	0.844	0.865
	EXPAT2						
	EXPAT3						
	EXPAT4						
Experience with Topic	EXTOP1			0.954	0.969	0.928	0.952
	EXTOP2						
	EXTOP3						
Perceived Channel Richness	PRICH1	0.454	0.43	0.820	0.849	0.701	0.762
	PRICH2						
	PRICH3						
	PRICH4						
Nodelay	NODEL1			0.905	0.914	0.859	0.874
	NODEL2						
	NODEL3						
	NODEL4						
Synchronicity	SYNCH1			0.800	0.835	0.624	0.701
	SYNCH2						
	SYNCH3						
Social Influence	SOCINF1			0.921	0.821	0.828	0.563
	SOCINF2						
Channel Satisfaction	CHSAT1	0.294	0.045	0.943	0.935	0.909	0.895
	CHSAT2						
	CHSAT3						

Assessment of Convergent and Discriminant Validity

Evidence of construct validity is demonstrated by presence of both convergent and discriminant validity. Convergent validity is assumed when items correlate strongly with other items in the same constructs. If the items correlate weakly with items in other constructs then that is considered discriminant validity. Two common approaches that can be used to assess the validity of an instrument include: classical and contemporary approaches (Bagozzi, 1991). Classical approaches include multitrait-multimethod (MTMM) technique (Campbell & Fiske, 1959) or principal components factor analysis (Straub, 1989), whereas the contemporary approaches include confirmatory factor analysis utilizing maximum likelihood extraction such as structural equation modeling (SEM). The use of SEM techniques for instrument validation and testing requires a large sample size.

In this study, both principal components factor analysis and confirmatory factor analysis using PLS was also used to test for validity of the instrument. Factor analysis is a multivariate statistical technique that is used to analyze the structure of the correlations among a large number of variables based on a set of common underlying dimensions (Hair et al., 1998). Factor analysis helps the researcher to determine whether a certain set of items do or do not constitute a construct (Straub, 1989). In factor analysis, (a) separate dimensions of the structure are identified and the extent to which each variable is explained by each dimension is determined, and (b) the number of variables is reduced

through summarization and data reduction (Hair et al., 1998).

To test for instrument validity principal component factor analysis utilizing varimax with Kaiser Normalization rotation technique was performed in SPSS (version 17.02). Data were factor analyzed using principal component factor analysis utilizing varimax rotation with Kaiser Normalization technique. A combination of the Kaiser-Guttman Rule (Eigenvalues greater than one) and scree plot were utilized to determine the most appropriate component solution (Chin, Gopal, Salisbury., 1997). Table 21 and 22 shows the results of the principal component factor analysis with the high loadings in the corresponding latent variables bolded out. The factor analysis indicated that the pool of items captured 10 distinct factors. These factors are assumed to represent the latent variables. Convergent validity was established because all the items loaded strongly on their associated factors (loading > 0.50) and each of the factors loaded stronger on their associated factors rather than on any other factors.

To establish convergent and discriminant validity further, confirmatory factor analysis (CFA) was performed by using PLS (Tables 23 and 24). In CFA you specify a priori, a pattern of factor loadings for a specific number of orthogonal or oblique factors, and then check whether the correlation matrix obtained can be reproduced given these specifications. CFA specifies the pattern of loadings of the measurement items on the latent constructs. Then, the fit of this pre-specified model is analyzed by looking at the pattern of loadings of the measurement items and comparing it to the theoretically anticipated factors.

Table 21

Principal Component Analysis (mIM)

	Components									
	1	2	3	4	5	6	7	8	9	10
EXCHA2	0.873	0.121	0.041	0.151	0.011	0.095	0.041	-0.053	0.041	0.046
EXCHA1	0.855	0.165	0.109	0.112	0.032	0.046	0.015	0.016	0.085	-0.003
EXCHA4	0.821	0.077	0.094	0.010	0.042	0.102	0.038	0.088	0.146	0.034
EXCHA3	0.809	0.054	0.064	0.111	0.214	0.121	-0.034	-0.033	-0.010	0.015
EXCHA5	0.742	0.060	0.007	0.121	0.111	0.179	0.140	-0.006	-0.063	-0.033
SOPR1	0.162	0.806	0.137	0.154	0.027	0.187	0.049	0.054	-0.003	-0.044
SOPR3	0.069	0.801	0.121	0.071	0.136	0.014	-0.062	0.157	0.209	0.122
SOPR4	0.136	0.783	0.207	0.044	0.112	-0.027	-0.092	0.109	0.118	0.057
SOPR2	0.126	0.717	0.091	0.212	0.190	0.121	0.032	-0.030	0.233	0.084
EXTOP2	0.074	0.160	0.888	0.040	0.162	0.052	-0.078	0.123	0.152	0.133
EXTOP3	0.054	0.199	0.880	0.080	0.119	0.077	-0.052	0.091	0.170	0.133
EXTOP1	0.191	0.193	0.810	0.113	0.162	0.123	0.016	0.110	0.150	0.082
CHSAT3	0.155	0.166	0.102	0.827	0.209	0.185	0.123	0.083	0.126	0.027
CHSAT1	0.191	0.193	0.158	0.814	0.209	0.136	0.129	0.128	0.082	0.076
CHSAT2	0.220	0.139	-0.011	0.767	0.183	0.170	0.110	0.190	0.205	0.059
NODEL2	0.172	0.177	0.119	0.190	0.798	0.151	0.152	-0.023	0.064	0.053
NODEL1	0.121	0.154	0.178	0.158	0.728	0.172	-0.003	0.132	0.190	0.064
NODEL3	0.153	0.159	0.229	0.309	0.684	0.256	0.105	-0.045	0.017	0.150
SYNCH2	0.230	0.004	0.050	0.158	0.284	0.791	0.145	-0.067	0.142	0.015
SYNCH1	0.305	0.067	0.062	0.122	0.173	0.766	0.149	-0.030	0.087	-0.001
SYNCH3	0.087	0.302	0.182	0.282	0.073	0.644	-0.078	0.012	0.031	0.247
ENGA2	0.033	0.054	-0.063	0.122	0.094	0.037	0.869	-0.006	0.094	0.059
ENGA1	0.146	0.119	-0.054	0.151	0.113	0.135	0.813	-0.149	-0.144	-0.011
SOCINF2	0.008	0.077	0.070	0.157	0.054	-0.061	-0.039	0.885	0.056	0.007
SOCINF1	-0.004	0.144	0.192	0.105	0.000	-0.012	-0.118	0.875	-0.004	0.029
EXPAT2	0.072	0.179	0.249	0.214	0.019	-0.023	-0.030	0.159	0.728	0.138
EXPAT1	0.087	0.244	0.181	0.062	0.154	0.357	-0.043	-0.169	0.667	-0.062

(Table 21 continued)

EXPAT3	0.107	0.444	0.217	0.209	0.253	0.126	0.024	0.051	0.584	-0.03
PRICH2	0.084	0.174	0.278	0.128	0.289	0.130	-0.083	0.049	0.059	0.763
PRICH3	-0.006	0.074	0.056	0.026	0.139	0.055	0.510	-0.089	-0.070	0.669
PRICH1	-0.077	0.271	0.279	0.141	0.327	-0.008	-0.045	0.234	0.341	0.505

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 22

Principal Component Analysis (mTexting)

	Components								
	1	2	3	4	5	6	7	8	9
EXCHA1	0.864	0.141	0.240	0.102	0.029	0.037	0.107	-0.062	-0.005
EXCHA5	0.859	0.174	0.133	0.055	0.148	0.119	0.175	-0.047	0.076
EXCHA4	0.852	0.177	0.189	0.087	0.004	0.078	0.062	-0.006	0.034
EXCHA2	0.846	0.143	0.154	0.111	0.184	0.072	0.146	-0.031	0.088
EXCHA3	0.829	0.101	0.072	0.162	0.108	0.042	0.142	0.043	0.024
SOPR3	0.173	0.871	0.202	0.170	-0.011	0.018	0.020	-0.031	0.094
SOPR2	0.161	0.838	0.167	0.157	0.013	0.077	0.154	0.003	0.025
SOPR4	0.173	0.822	0.119	0.230	0.066	0.060	0.106	0.038	0.125
SOPR1	0.182	0.804	0.153	0.242	-0.014	0.057	0.071	0.048	0.011
SYNCH2	0.120	0.142	0.814	0.161	0.117	0.024	0.045	0.059	0.115
SYNCH1	0.245	0.197	0.808	0.241	0.048	-0.003	0.069	0.006	0.079
SYNCH3	0.187	0.202	0.778	0.069	0.017	-0.022	0.253	0.018	-0.039
SYNCH4	0.272	0.153	0.635	0.250	0.039	0.204	0.096	0.048	0.205
EXTOP2	0.139	0.260	0.199	0.891	-0.021	-0.015	0.103	0.033	0.064
EXTOP3	0.140	0.243	0.206	0.874	0.020	0.038	0.077	0.016	0.113
EXTOP1	0.186	0.283	0.194	0.827	0.031	0.019	0.167	0.039	0.038
CHSAT1	0.089	-0.010	0.068	-0.042	0.925	0.001	0.050	-0.029	0.007
CHSAT2	0.145	-0.032	0.062	-0.001	0.896	0.002	0.036	-0.206	-0.043
CHSAT3	0.108	0.080	0.035	0.064	0.856	0.016	0.045	0.028	0.067
ENGA1	0.056	0.102	0.072	0.091	0.024	0.889	0.030	0.037	-0.035
ENGA2	0.174	0.034	0.013	-0.086	-0.009	0.876	0.110	0.083	-0.040

(Table 22 continued)

NODEL1	0.237	0.061	0.167	0.050	0.164	0.147	0.700	-0.044	0.231
NODEL2	0.401	0.172	0.106	0.179	0.036	-0.063	0.600	0.078	-0.117
NODEL3	0.217	0.267	0.365	0.338	-0.035	0.022	0.579	0.013	0.086
SOCINF2	-0.064	-0.058	0.080	0.104	0.069	0.138	0.105	0.856	-0.008
SOCINF1	0.004	0.110	0.010	-0.035	-0.291	-0.019	0.094	0.777	0.012
PRICH2	0.083	0.106	0.139	0.099	0.017	-0.038	0.122	-0.017	0.896
PRICH1	0.076	0.354	0.242	0.373	0.034	-0.171	0.019	0.070	0.443

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Establishing convergent and divergent validity with PLS

A measurement instrument has good convergent validity if the question-statements associated with each latent variable are understood by the respondents in the same way they were intended in the questionnaire (Kock, 2010). PLS factors are not the same as the latent variables in the common (principal) factor analysis discussed above because whereas SEM is based on common (principal) factor analysis, PLS is based on principal component analysis (PCA), and is therefore sometimes called a “component-based SEM”. Latent variables in SEM are computed in a manner which reflects covariation of their indicators (McDonald, 1996) while in PLS, they are computed as exact linear combinations of their indicators. Therefore, latent variables in PLS and SEM may sometimes diverge considerably, but may be similar only if the PLS weight vector is proportional to the SEM common factor loading vector (Schneeweiss, 1993).

PLS based SEM analysis uses oblique rotation method because it assumes that correlations between latent variables will be stronger. The initial structure matrix contains Pearson correlations between indicators and latent variables which are not meaningful prior to rotation in the context of validation of measurement instrument. Because oblique rotation is employed, some loadings may be higher than 1(Rencher, 1998). In order to investigate convergent validity of the instrument in WarpPLS, loadings and cross-loadings were examined and items with p-values less than 0.05 and loadings less than 0.5 were removed (Hair, Anderson, & Tatham, 1987). Table 30 and Table 31 show indicator loading and cross-loading before and after removing poorly loading indicators (< 0.5 or $p < 0.05$). Six items were removed from the instrument for mIM whereas thirteen items were removed from the instrument for mTexting. Results are similar to those of principal component analysis discussed above, and provide further support to convergent validity of the measuring instrument.

Discriminant validity was also be assessed by comparing the average variance extracted (AVE) values associated with each construct to the correlations among constructs (Staples, 1999). AVE represents the percentage of variance captured by a construct and is shown as the ratio of the sum of the captured variance to the measurement variance (Gefen, Straub, D.W. and Boudreau, M.C., 2000). In order to claim discriminant validity, the square root of the AVE for each latent variable, given in the diagonals (shown in Table 25 and 26) should be larger than any correlations of latent variables (Fornell & Larcker,

1981). The results show that the square root of the AVE (diagonal values) are larger than any correlations of the latent variables (all values above and the respective AVEs) thus suggesting evidence of discriminant validity.

Table 23

Confirmatory Factor Analysis (mIM)

	SOPR	EXCHA	EXPAT	EXTOP	ENGA	SYNCH	NODEL	PRICH	CHSAT	SOCINF	P value
SOPR1	0.988	-0.016	-0.229	0.016	0.220	0.109	-0.014	-0.224	-0.029	0.032	<0.001
SOPR2	0.753	-0.057	0.051	-0.104	0.261	0.001	0.039	-0.022	0.022	-0.117	<0.001
SOPR3	0.845	-0.039	0.080	-0.042	-0.080	-0.034	-0.007	0.091	-0.033	0.037	<0.001
SOPR4	0.846	0.056	0.032	0.091	-0.163	-0.071	0.013	0.024	-0.039	-0.006	<0.001
SOPR5	0.763	0.052	0.052	0.035	-0.201	0.002	-0.029	0.111	0.077	0.046	<0.001
EXCHA1	0.055	0.877	0.033	0.062	0.004	-0.013	-0.112	-0.025	0.037	-0.020	<0.001
EXCHA2	0.043	0.903	-0.026	-0.002	-0.060	0.008	-0.079	0.036	0.099	-0.079	<0.001
EXCHA3	-0.048	0.848	0.000	-0.018	0.001	-0.063	0.186	0.007	-0.071	0.002	<0.001
EXCHA4	-0.043	0.854	0.060	-0.007	0.186	-0.074	-0.070	0.011	-0.137	0.109	<0.001
EXCHA5	-0.013	0.757	-0.070	-0.040	-0.135	0.152	0.092	-0.033	0.067	-0.005	<0.001
EXPAT1	0.178	0.005	0.713	-0.084	-0.063	-0.026	-0.083	0.237	-0.032	-0.029	<0.001
EXPAT2	-0.022	0.106	0.852	-0.172	-0.078	-0.092	0.105	0.140	-0.059	0.013	<0.001
EXPAT6	-0.081	-0.069	0.866	0.168	-0.071	0.249	0.138	-0.328	-0.095	-0.076	<0.001
EXPAT7	-0.164	-0.015	0.656	0.127	0.150	-0.118	-0.250	0.065	0.177	0.067	<0.001
EXPAT8	0.041	-0.036	0.836	0.008	0.079	-0.005	0.056	-0.138	0.032	0.028	<0.001
EXTOP1	0.037	0.069	-0.040	0.881	0.042	0.012	-0.021	-0.024	0.079	-0.041	<0.001
EXTOP2	-0.044	-0.010	-0.001	0.974	-0.048	-0.010	0.043	0.030	-0.071	0.045	<0.001
EXTOP3	0.009	-0.056	0.040	0.948	0.008	-0.001	-0.023	-0.007	-0.005	-0.006	<0.001
ENGA2	0.160	-0.116	0.113	0.205	0.685	-0.096	0.002	-0.010	-0.103	0.013	<0.001
ENGA4	0.073	-0.143	-0.196	-0.377	0.578	0.166	-0.225	0.277	0.262	-0.195	<0.001
ENGA5	-0.073	0.149	-0.197	0.137	0.689	-0.169	0.072	-0.010	0.080	-0.032	<0.001

(Table 23 continued)

ENGA6	-0.130	0.065	0.167	-0.098	0.755	0.141	0.063	-0.136	-0.116	0.122	<0.001
SYNCH1	0.034	0.136	-0.034	0.063	0.080	0.611	0.132	-0.112	-0.052	0.079	<0.001
SYNCH2	-0.088	0.034	0.074	0.016	0.098	0.660	0.271	-0.119	-0.097	0.093	<0.001
SYNCH3	0.196	-0.096	0.039	0.163	-0.176	0.697	-0.042	0.087	0.032	0.158	<0.001
SYNCH4	-0.129	-0.065	0.034	-0.177	-0.125	0.726	-0.271	0.140	0.150	-0.243	<0.001
SYNCH5	-0.029	-0.054	-0.115	-0.121	0.055	0.865	-0.237	0.082	0.035	-0.178	<0.001
NODEL1	-0.034	0.016	0.077	0.030	-0.041	-0.043	0.771	0.084	-0.096	0.102	<0.001
NODEL2	0.031	0.027	-0.028	-0.046	0.014	-0.052	0.955	-0.015	-0.056	-0.051	<0.001
NODEL3	0.018	0.002	-0.098	0.078	-0.014	0.008	0.889	0.022	0.026	-0.046	<0.001
NODEL4	-0.020	-0.045	0.063	-0.064	0.040	0.087	0.732	-0.088	0.122	0.007	<0.001
PRICH1	0.024	0.085	0.239	-0.026	-0.006	-0.035	-0.033	0.613	0.116	0.004	<0.001
PRICH2	0.013	-0.107	0.076	-0.003	0.045	-0.180	0.076	0.794	-0.010	0.074	<0.001
PRICH3	0.003	0.057	-0.197	0.077	-0.109	0.066	0.121	0.929	-0.099	-0.021	<0.001
PRICH4	-0.106	-0.077	-0.308	-0.128	0.176	0.405	-0.437	0.811	-0.013	-0.156	0.008
CHSAT1	-0.077	-0.042	-0.121	0.222	-0.194	-0.083	0.085	0.236	0.569	0.160	<0.001
CHSAT2	0.058	0.008	-0.066	0.027	0.085	-0.037	0.000	-0.050	0.936	-0.057	<0.001
CHSAT3	-0.015	0.057	0.088	-0.153	-0.002	0.089	-0.071	-0.016	0.872	0.031	<0.001
CHSAT4	0.010	-0.033	0.068	-0.038	0.053	0.011	0.009	-0.101	0.947	-0.084	<0.001
SOCINF2	0.029	-0.008	0.154	0.082	0.132	-0.014	0.178	-0.122	-0.023	0.523	<0.001
SOCINF3	0.058	0.003	-0.133	0.059	-0.073	0.033	-0.093	0.061	-0.043	0.946	<0.001
SOCINF4	-0.083	0.002	0.022	-0.124	-0.024	-0.025	-0.038	0.030	0.063	0.911	<0.001

Table 24

Confirmatory Factor Analysis (mTexting)

INDIC	SOPR	EXCHA	EXPAT	EXTOP	ENGA	NODEL	SYNCH	PRICH	CHSAT	SOCINF	P value
SOPR1	0.838	0.060	-0.031	0.103	-0.018	-0.116	0.094	-0.008	-0.054	0.018	<0.001
SOPR2	0.912	0.002	-0.022	-0.046	0.027	0.080	-0.028	-0.057	0.005	-0.018	<0.001
SOPR3	0.891	0.033	0.048	-0.034	-0.079	-0.012	0.053	-0.036	-0.057	-0.054	<0.001
SOPR4	0.847	0.037	0.038	0.064	-0.012	-0.114	0.029	0.046	0.054	0.028	<0.001
SOPR5	0.660	-0.220	-0.058	-0.141	0.138	0.266	-0.244	0.093	0.085	0.047	<0.001
EXCHA1	0.032	0.913	-0.081	0.004	-0.050	0.064	0.050	-0.038	-0.069	-0.043	<0.001
EXCHA2	-0.013	0.873	-0.009	0.004	0.009	0.104	-0.084	0.011	0.094	-0.003	<0.001
EXCHA3	-0.029	0.916	-0.034	0.109	-0.022	-0.132	0.007	0.008	0.035	0.071	<0.001
EXCHA4	-0.020	0.912	0.102	-0.050	0.005	-0.063	0.064	0.001	-0.109	0.006	<0.001
EXCHA5	0.028	0.903	0.022	-0.061	0.057	0.018	-0.033	0.018	0.047	-0.026	<0.001
EXPAT1	0.023	-0.059	0.989	-0.101	-0.075	-0.039	-0.045	-0.042	-0.008	-0.004	<0.001
EXPAT2	-0.186	-0.021	1.038	-0.074	0.005	0.067	-0.004	-0.042	-0.027	-0.048	<0.001
EXPAT6	-0.027	0.118	0.689	0.115	0.091	-0.104	-0.023	0.109	0.048	-0.049	<0.001
EXPAT7	-0.017	-0.020	0.667	0.020	-0.066	0.130	0.033	-0.049	-0.062	0.102	<0.001
EXPAT8	0.201	-0.013	0.655	0.049	0.042	-0.045	0.041	0.023	0.044	0.009	<0.001
EXTOP1	0.033	0.051	-0.013	0.915	-0.007	-0.045	0.032	0.021	0.023	0.011	<0.001
EXTOP2	0.001	-0.010	-0.022	0.997	-0.028	-0.015	0.022	-0.011	-0.036	0.000	<0.001
EXTOP3	-0.032	-0.040	0.035	0.953	0.035	0.059	-0.053	-0.010	0.015	-0.011	<0.001
ENGA3	-0.060	0.105	0.045	-0.106	0.882	-0.055	0.069	0.000	-0.038	0.021	<0.001
ENGA4	0.060	-0.105	-0.045	0.106	0.931	0.055	-0.069	0.000	0.038	-0.021	<0.001

(Table 24 continued)

NODEL1	-0.075	0.008	0.122	-0.025	0.058	0.731	-0.106	0.158	0.009	-0.001	<0.001
NODEL2	0.021	-0.051	-0.079	-0.027	0.061	0.990	-0.020	-0.042	0.009	0.018	<0.001
NODEL3	-0.066	0.052	0.071	0.023	0.060	0.889	-0.047	-0.007	-0.022	-0.015	<0.001
NODEL4	0.119	-0.010	-0.106	0.027	-0.185	0.788	0.172	-0.092	0.006	-0.002	<0.001
SYNCH1	-0.089	0.224	0.019	0.107	-0.144	0.058	0.680	0.044	-0.074	-0.081	<0.001
SYNCH2	0.031	-0.060	-0.033	-0.018	-0.302	0.299	0.752	-0.009	0.018	0.034	<0.001
SYNCH3	-0.051	0.045	0.146	0.066	-0.243	-0.001	0.813	-0.029	0.006	0.025	<0.001
SYNCH4	0.073	-0.124	-0.061	-0.089	0.654	-0.312	0.554	-0.060	0.041	-0.011	<0.001
SYNCH5	0.077	-0.156	-0.120	-0.120	0.358	-0.204	0.780	0.041	0.027	0.033	<0.001
PRICH3	0.036	0.016	0.014	-0.044	-0.118	0.126	-0.043	0.873	0.029	0.024	<0.001
PRICH4	-0.036	-0.016	-0.014	0.044	0.118	-0.126	0.043	0.955	-0.029	-0.024	<0.001
CHSAT1	-0.135	0.001	0.131	-0.005	0.163	0.012	-0.084	0.038	0.790	0.018	<0.001
CHSAT2	0.023	-0.021	-0.022	-0.046	-0.049	-0.013	0.029	0.009	0.940	0.052	<0.001
CHSAT3	-0.038	0.032	0.000	0.005	-0.037	0.001	0.027	-0.036	0.859	-0.142	<0.001
CHSAT4	0.142	-0.013	-0.097	0.049	-0.057	0.003	0.017	-0.006	0.866	0.080	<0.001
SOCINF3	0.119	0.087	-0.052	-0.061	-0.088	-0.095	0.060	0.028	-0.240	0.787	<0.001
SOCINF4	-0.119	-0.087	0.052	0.061	0.088	0.095	-0.060	-0.028	0.240	0.881	<0.001

Table 25

Correlations and AVE (mIM)

Variable	SOPR	EXCHA	EXPAT	EXTOP	ENGA	SYNCH	NODEL	PRICH	CHSAT	SOCINF
SOPR	**0.837**									
EXCHA	0.31***	**0.849**								
EXPAT	0.687***	0.295***	**0.785**							
EXTOP	0.456***	0.244***	0.531***	**0.935**						
ENGA	0.358***	0.406***	0.495***	0.464***	**0.675**					
SYNCH	0.215***	0.416***	0.313***	0.187**	0.537***	**0.698**				
NODEL	0.433***	0.363***	0.534***	0.433***	0.601***	0.522***	**0.839**			
PRICH	0.515***	0.196***	0.571***	0.579***	0.493***	0.299***	0.537***	**0.746**		
CHSAT	0.448***	0.372***	0.499***	0.367***	0.552***	0.427***	0.622***	0.498***	**0.844**	
SOCINF	0.35***	0.099	0.309***	0.37***	0.22***	-0.080	0.231***	0.332***	0.429***	**0.811**

Square roots of AVE's shown on diagonal; *** indicates $p < 0.001$; ** indicates $p < 0.05$; * indicates $p < 0.5$

Table 26

Correlations and AVE (mTexting)

Variable	SOPR	EXCHA	EXPAT	EXTOP	ENGA	NODEL	SYNCH	PRICH	CHSAT	SOCINF
SOPR	**0.832**									
EXCHA	0.398***	**0.903**								
EXPAT	0.727***	0.429***	**0.811**							
EXTOP	0.537***	0.36***	0.634***	**0.955**						
ENGA	0.164**	0.216***	0.103*	0.065	**0.907**					
NODEL	0.496***	0.536***	0.565***	0.558***	0.205***	**0.853**				
SYNCH	0.378***	0.388***	0.379***	0.395***	0.35***	0.623***	**0.717**			
PRICH	0.234***	0.151**	0.325***	0.245***	0.028	0.358***	0.217***	**0.914**		
CHSAT	0.058	0.252***	0.158**	0.057	0.069	0.152	0.204***	0.046	**0.865**	
SOCINF	0.065	-0.044	0.070	0.091	0.13**	0.076	0.102	-0.006	-0.201***	**0.834**

Square roots of AVE's shown on diagonal; *** indicates $p < 0.001$; ** indicates $p < 0.05$; * indicates $p < 0.5$

Variance Inflation Factors

A variance inflation factor (VIF) is a measure of the degree of multicollinearity among the latent variables that are hypothesized to affect another latent variable (predictors). VIF were calculated for the predictor latent variables. Conservatively, VIF should be lower than 5 although a more relaxed criterion is that they should be lower than 10 (Hair et al., 1987; Kline, 1998). A higher VIF between two latent variables indicates that the two latent variables measure the same thing and hence the need to remove one of the latent variables from the model. Tables 27 and 28 show VIF for both mIM and mTexting. All values met the criterion thus suggesting that there are no latent variables that measure the same thing.

Table 27

Variance Inflation Factors (mIM)

Variable	SOPR	EXCHA	EXPAT	EXTOP	ENGA	SYNCH	NODEL	PRICH
SOPR		1.369	1.921	1.735	1.904	1.577	2.05	
EXCHA								
EXPAT								
EXTOP								
ENGA								
SYNCH								
NODEL								
PRICH	2.003	1.131	2.246	1.513				
CHSAT	1.342							1.342

The VIFs are for the latent variables on each column (predictors), with reference to the latent variables row (criteria). VIFs only exist for rows referring to latent variables with more than one predictor

Table 28

Variance Inflation Factors (mTexting)

Variable	SOPR	EXCHA	EXPAT	EXTOP	ENGA	NODEL	SYNCH	PRICH
SOPR		1.509	1.919	1.933	1.331	2.575	1.735	
EXCHA								
EXPAT								
EXTOP								
ENGA								
NODEL								
SYNCH								
PRICH	2.160	1.165	3.106	2.000				
CHSAT	1.005							1.005

The VIFs are for the latent variables on each column (predictors), with reference to the latent variables on each row (criteria). VIFs only exist for rows referring to latent variables with more than one predictor

KMO and Bartlett's Measures

The literature recommends that the researcher should ensure that the data matrix has sufficient correlations to justify the application of factor analysis (Hair et al., 1998). The Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) test and Bartlett's Test of Sphericity were conducted to assess the suitability of the survey data for factor analysis (Table 29). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic which indicates the proportion of variance in the variables which is common variance, i.e. which might be caused by underlying factors. This index ranges from 0 to 1, reaching 1 when each variable is perfectly predicted without error by the other variables. The measure can be interpreted with the following guidelines: marvelous (0.9-1), meritorious (0.8-0.89), middling (0.7-0.79), mediocre (0.6-0.69), miserable (0.5-

0.59), and don’t factor (0-0.49). In this study, Kaiser-Mayer Olkin’s Measure of Sampling Adequacy (MSA) is 0.864, implying that if factor analysis is conducted, the factors extracted will account for a good amount of variance.

The Bartlett test of Sphericity on the other hand, is a statistical test for the presence of correlations among the variables (items), and assesses whether the items are correlated. It tests the null hypothesis that the residual covariance matrix is proportional to an identity matrix. If the test is significant then it means that the items are correlated. It indicates whether a correlation matrix is an identity matrix, which would indicate that the variables (items per specific construct) are unrelated. The significance level gives the result of the test. Small values (less than .05) indicate that the data do not produce an identity matrix, and hence, are suitable for factor analysis. Larger values indicate that the data produce an identity matrix, and hence, are not suitable for factor analysis. In this study, significance level for Bartlett's Test of Sphericity is .000, which means that the data are appropriate for factor analysis. The results of Kaiser-Mayer Olkin’s Measure of Sampling Adequacy (MSA) and Bartlett tests show that the data met the fundamental requirements for factor analysis.

Table 29

KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.864
Bartlett's Test of Sphericity	Approx. Chi-Square	5249.272
	Df	351
	Sig.	.000

SEM Model and Path Analysis

Path analysis involves using an algorithm in which factor scores are estimated by averaging all the indicators associated with the latent variables. P-values are calculated through the process of resampling. The first phase involved defining the outer model by selecting the indicators associated with different latent variables and guided by theory. In PLS there are there are two types of indicators – reflective and formative indicators. A reflective latent variable is one in which all the indicators are expected to be highly correlated with the latent variable score whereas, a formative latent variable is one in which indicators are expected to measure certain attributes of the latent variable, but the indicators are not expected to be correlated with each other (Kock, 2010). Reflective indictors are used in classical test theories and factor analysis models. They are used in an attempt to account for observed variances. Formative indicators, however, are used to minimize residuals in the structural relationship and are not designed to account for observed variances (C. Fornell, and Bookstein, F., 1982). Since we expect the indicators to be highly correlated with each other, the

measurement model was set to reflective.

A bootstrap resampling method (200 resamples) was use in this study because bootstrapping tends to generate more stable resample path coefficients and hence more reliable p-values with larger samples. Since all the measurements are reflective, the item loadings to each block of indicators were examined and compared to previous results of principal component analysis. There was no much difference in the way the items loaded. No items were dropped at this time because all items that did not load in the respective latent variables were dropped when principal component analysis was performed.

Structural Model Analysis

The research model and its related hypotheses were assessed with WarpPLS. The models in PLS are estimated by loadings or weights which describe how the observations relate to the unobservables. They are also estimated by the structural relations, whereby values of the unobservables influence values of other unobservables in the model. A bootstrapping procedure with two hundred resamples was used to generate the t-statistics for the structural paths. Kock (2010) suggests that two hundred resamples is reasonable to obtain adequate standard error estimates.

WarpPLS produces path coefficients with their respective p-values, and R-squared coefficients. In PLS-based SEM analysis, path coefficients are referred to as beta (β) coefficients. The explanatory power of the structural model is evaluated by examining the squared multiple correlation (R^2) value in the final

dependent constructs. The R^2 measures the percentage of variation that is explained by the model. The R^2 for each of the dependent variables for mIM are as follows: perceived social presence (0.46), perceived channel richness (0.45), and perceived channel satisfaction (0.29). On the other hand the R^2 for the dependent variables for mTexting are as follows: perceived social presence (0.52), perceived channel richness (0.43), and perceived channel satisfaction (0.05). The values of R^2 are summarized in Table 30. The path coefficients along with their probability values and the explained variances (R^2) are presented in Figure 12 and 13.

Table 30

Path Coefficients

Scale name/Construct	Effect Indicator	Path Coefficient (β) Estimate	
		mIM	mText
Experience with channel	Perceived channel richness	-0.001	0.020
	Social presence	0.104*	0.046*
Experience with communication partner	Perceived channel richness	0.125**	0.347**
	Social presence	0.495***	0.640***
Experience with topic	Perceived channel richness	0.409***	0.162**
Perceived channel richness	Perceived channel satis	0.339***	0.064
Perceived social presence	Perceived channel satis	0.307***	0.179
	Perceived channel richness	0.124**	0.038
Nodelay	Social presence	0.117	0.075
Synchronicity	Social presence	-0.026	0.081*
Engagement	Social presence	0.072	-0.010

*** indicates p < 0.001; **indicates significance at < 0.05; *indicates significance at < 0.1

Table 31 shows the results for variance explained (R-squared) for all the independent variables used in the model. Variance explained for perceived social presence and perceived richness for both mIM and mTexting were relatively good for some variables, but low in others.

The results show that user experience and social presence explained 45 percent and 43 percent variations in perceived richness for mIM and mTexting respectively. They also show that user experience and interactivity explained 46 percent and 53 percent variations in perceived social presence for mIM and mTexting respectively.

However, perceived richness and perceived social presence explained 29 percent and 5 percent variation in channel satisfaction for mIM and mTexting respectively. These findings suggest that other factors may be acting as major players in channel satisfaction besides perceived richness and perceived social presence.

Table 31

Variance Explained (R-squared)

Construct	Variance Explained (R^2)	
	mIM	mText
Perceived Social Presence	0.46	0.53
Perceived Channel Richness	0.45	0.43
Channel Satisfaction	0.29	0.05

Summary of Findings – Hypotheses

Table 32 provides a summary of which hypotheses were supported and not supported. Hypotheses 1(a1-c2) examined the relationship between experience and perceived channel richness of both mText and mIM. The findings suggest that experiences users have with topic of discussion and communication partner is positively related to perceived channel richness for mIM. The same relationship was true for topic of discussion in mText. However, experience has no positive relationship with perceived channel richness for both mText and mIM.

Hypotheses 2 (a1-b2) examined the relationship between experience and perceived social presence for both mText and mIM. Experience users have with communication channel (mText and mIM), and communication partner is positively related to perceived social presence for both mText and mIM.

Hypotheses 3 (a1-a2) examined the relationship between perceived social presence and perceived channel richness for both mText and mIM. Results suggest that this relationship was only positive for mIM, but was not supported for mText. Hypotheses 4(a-d) examined the relationship between synchronicity, no-delay and engagement on perceived social presence. None of these constructs had a positive relationship with perceived social presence for either mText or mIM. Hypothesis 5 examined the relationship between perceived social presence and perceived channel satisfaction. It was supported in mIM but not supported in mText. Hypotheses 6 (a1-b) examined the relationship between perceived channel richness and perceived channel satisfaction.

Table 32

Summary Hypotheses

No	Hypotheses	Result
H1a1	An increase in experiences an individual has with topic of discussion will be positively related to the individual's perception of richness of mTexting communication channel	Not supported
H1a2	An increase in experiences an individual has with topic of discussion will be positively related to the individual's perception of richness of synchronous MDS communication channel	Supported
H1b1	An increase in experiences an individual has with communication partner will be positively related to the individual's perception of richness of mTexting communication channel	Supported
H1b2	An increase in experiences an individual has with communication partner will be positively related to the individual's perception of richness of synchronous MDS communication channel	Supported
H1c1	An increase in experiences an individual has with mTexting will be positively related to the individual's perception of richness of that communication channel	Not Supported
H1c2	An increase in experiences an individual has with synchronous MDS communication channel will be positively related to the individual's perception of richness of that communication channel	Not Supported
H1d	Users' perception of channel richness will be higher in synchronous MDS than in mTexting.	Not supported
H2a1	The experiences an individual has with communication partner will be positively related to the individual's perception of social presence of mTexting communication channel	Supported
H2a2	The experiences an individual has with communication partner will be positively related to the individual's perception of social presence of synchronous MDS communication channel	Supported

(Table 32 continued)

H2b1	The experiences an individual has with mTexting communication channel will be positively related to the individual's perception of social presence of that communication channel.	Supported
H2b2	The experiences an individual has with mIM communication channel will be positively related to the individual's perception of social presence of that communication channel.	Supported
H2c	Users' perception of social presence will be higher in mTexting than in mIM communication channel communication channel.	Supported
H3a1	Users' perception of social presence will positively influence perceptions of channel richness for mTexting communication channel.	Not Supported
H3a2	Users' perception of social presence will positively influence perceptions of channel richness for mIM communication channel.	Supported
H3b	The influence of social presence on perceived channel richness will be higher for mTexting communication channel.	Not supported
H4a	The influence of synchronicity on perceived social presence will be higher for mIM communication channels	Not Supported
H4b	The influence of No-delay on perceived social presence will be higher for mIM communication channels	Not Supported
H4c	The influence of Engaging on perceived social presence will be higher for mIM communication channels	Not Supported
H4d	Users' perceptions of social presence will differ between asynchronous and mIM communication channels.	Supported
H5	The influence of perceptions of social presence on perceived channel satisfaction will be higher for mTexting communication channels	Not supported
H6a1	Users' perceptions of channel richness will positively influence perceived channel satisfaction for mTexting communication channels	Supported
H6a2	Users' perceptions of channel richness will positively influence perceived channel satisfaction for mIM communication channels	Supported
H6b	The influence of users' perceptions of channel richness on channel satisfaction will be higher in mTexting than in mIM communication channels.	Not Supported

Estimating Model Fit

Estimating the model fit is important in this study because we are interested in determining if the model has a good fit with the original data. Three model fit indices are provided in PLS: average path coeffient (APC), average R-squared (ARS), and the average variance inflation (VIF). P-values are provided for both APC and ARS. These p-values are calculated through resampling estimations coupled with Bonferroni-like corrections. Conservatively, it is recommended that the p-values for both APC and ARS be less than 0.05 (significant at 0.05 level), and AVIF be lower than 5 (Kock, 2010). Addition of new latent variables into a model will increase ARS but decrease APC. On the other hand AVIF will increase if a new latent variable is added to the model in such a way as to add multicollinearity to the model. Table 33 shows that the fit indices meet this criterion thus suggesting that both models fit the data.

Table 33

Fit indices (mIM and mTexting)

Indices	APC	ARS	AVIF
MTexting	0.129*	0.252*	1.787
mIM	0.186*	0.431*	1.678

* significant at 0.001

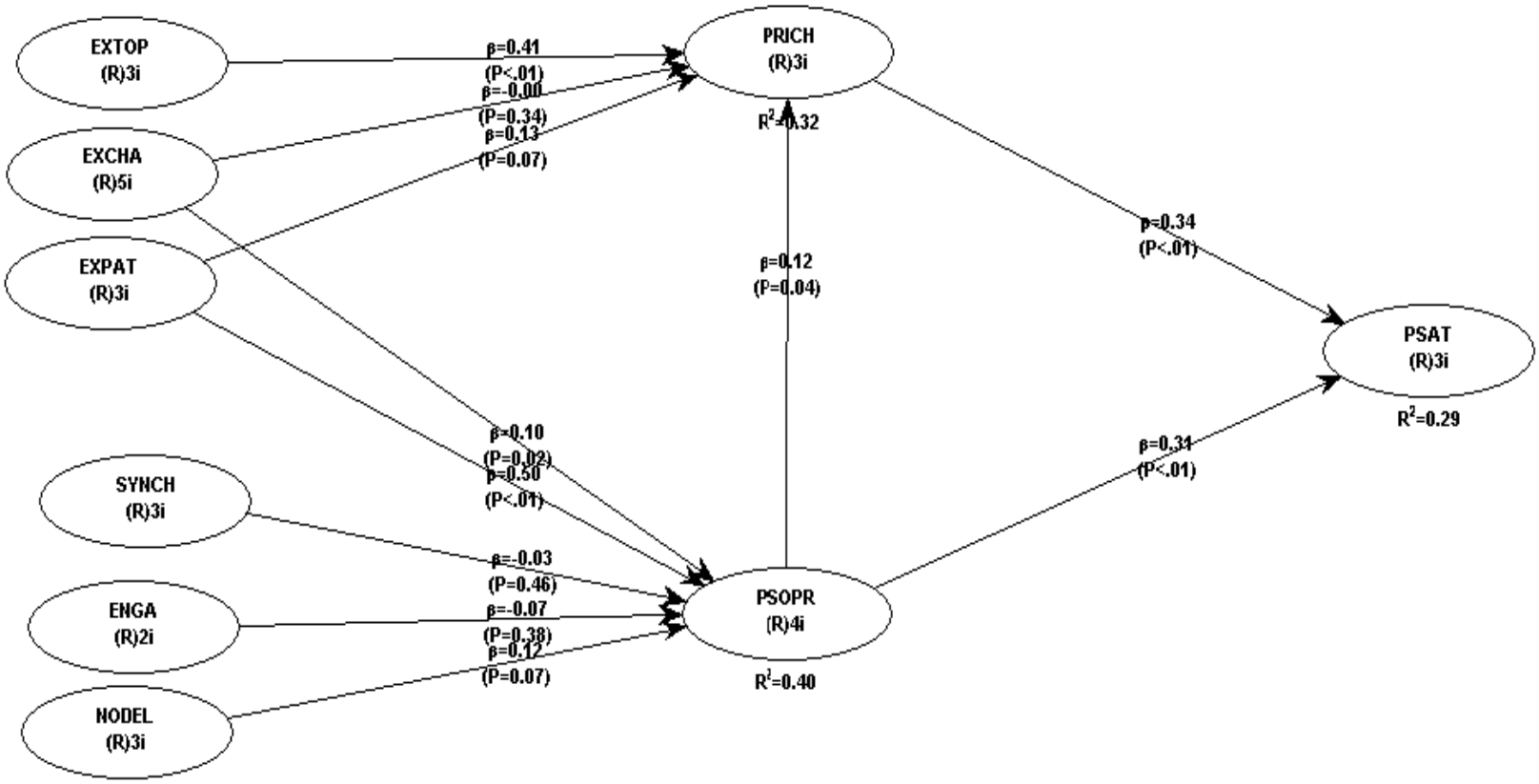


Figure 12. Path analysis mIM

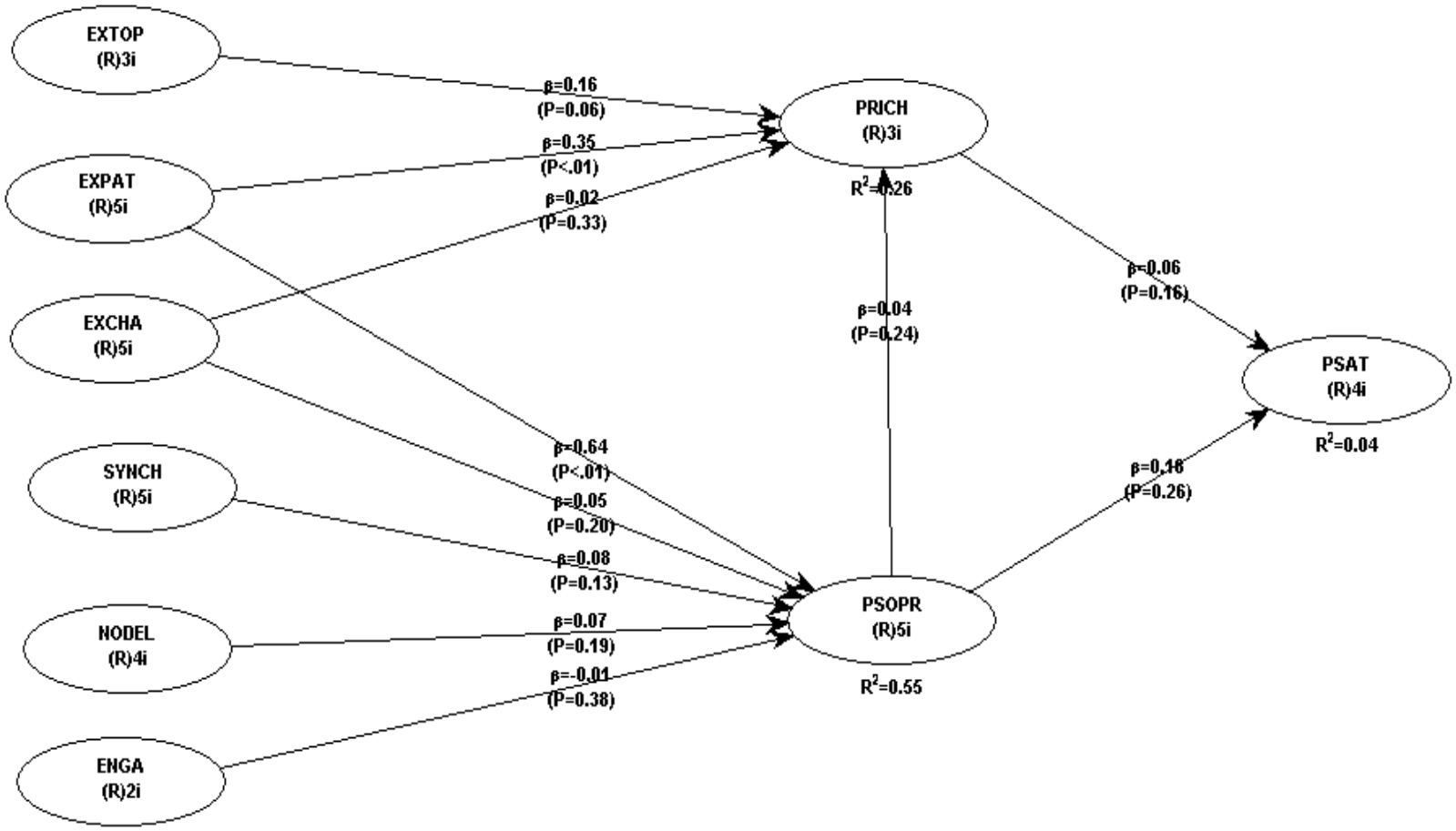


Figure 13. Path analysis mText

CHAPTER 5

DISCUSSIONS AND CONCLUSION

This dissertation explored the relationship between user experience, perceived richness, perceived social presence and satisfaction with communication technologies such as MDS communication services. The dissertation explored further, the influence of interactivity on social presence. This chapter discusses the findings, limitations, contributions, practical implications, and future research directions.

Discussion of Research Findings

A framework for examining the antecedent conditions that influence social presence, richness, social interaction design and satisfaction with MDS communicative services was proposed. This framework consists of three major components.

The first component is user experience proposed by Carlson and Zmud (1994). Three dimensions of user experience used include: (1) experience with communication channel (2) experience with the messaging topic, and (3) experience with the communication partner

The second component is perceived channel richness adopted from Media Richness Theory (Daft & Lengel, 1984; Daft & Lengel, 1986).

Four dimensions of perceived richness which have been used and validated in prior studies were adopted for this study. They included: (a) potential

for immediate feedback, (b) ability to convey natural language, (c) personal focus and (d) capacity for multiple cues (Daft and Lengel, 1984; Daft and Lengel, 1986).

The third component is associated with interactivity. Khalifa and Shen posit that interactivity is an important construct in the design of social interface that enhances perceived social presence in a computer-mediated communication (Khalifa & Shen, 2004). The literature on interactivity identifies several characteristics of interactive communication which might be useful for differentiating communication modes such as the simultaneous and continuous exchange of information, use of multiple, non-verbal cues, potentially spontaneous, unpredictable, and emergent progression of remarks, ability to interrupt or preempt, mutuality and patterns of turn-taking, and the use of adjacency pairs (Zack, 1993).

This study adopted the construct of interactivity from the interactivity literature. Three dimensions were adopted for this study. These dimensions have also been used and validated in prior research work in IS. The dimensions include: (1) synchronicity (2) no-delay (3) engaging (Khalifa & Shen, 2004; Liu, 2003; McMillan & Hwang, 2002).

Hypothesized Relationship User Experience and Richness

The results of this study replicated the Carlson & Zmud (1994; 1999) and D'Urso (2008) study by showing that two dimensions of user experience: user experience with communication partners and communication topic, influenced

perception of richness. The findings therefore, suggest that experience with the communication partner and topic are important in determining how users perceive the richness or leanness of any given communication technology. However, the third dimension associated with users experience with technology did not have a positive influence on perception of richness as hypothesized, and contrary to the Carlson & Zmud (1994; 1999) and D'Urso (2008) study.

Hypothesized Relationship Richness and Satisfaction

According to technology acceptance model individuals usually form perceptions about the usefulness of an information technology (for example, MDS communication channel) before deciding to use that information technology (Davis, 1989). On the other hand media richness theory argues that individuals will match a medium with the task at hand, and then choose rich medium for ambiguous or equivocal tasks (Short et al., 1976).

The hypothesized relationship between perceived richness and perceived satisfaction with MDS was supported in mobile instant messaging (mIM). However, this relationship was not supported in mobile texting (mTexting). Logically speaking, since mIM is richer than mTexting, we expect users to show a higher perceived satisfaction with mIM than mTexting.

Hypothesized Relationship Social Presence and Satisfaction

The hypothesized relationship between user experience and social presence was supported. The result is a replication of prior studies, such as Gunawardena and Zittle (1997), who showed that social presence is a strong

predictor of satisfaction in a computer-mediated communication. Venkatesh and Johnson (2002) found that social presence positively influenced motivation, and hence higher system usage. Also, Otondo et al. (2006) found that social presence was associated with media effectiveness and satisfaction.

However, this relationship was not supported in mTexting. Perhaps, considering the fact that mIM is richer and has a high social presence than mTexting, users will have a tendency to show a higher perceived satisfaction with mIM than mTexting.

Hypothesized Relationship User experience and Social Presence

The findings show that the hypothesized relationship between user experience with communication partners and perceived social presence was supported. These findings are consistent with prior studies that concluded that social presence is a function or is influenced by user experience (Rice, 1993).

Hypothesized Relationship Social Presence and Richness

The results also show that the hypothesized relationship between perceived social presence and perceived richness was supported. However, this relationship was only true for mIM. The relationship was not supported for mTexting.

These findings are also consistent with the literature that increasing the use of visual cues increases social presence, whereas removing verbal cues may not reduce social presence (Sia, Tan, & Wei, 2002). Visual cues are a property of richness. The higher the visual cues the richer the communication

becomes. It is therefore reasonable to argue that a higher social presence is associated with richer MDS channels. That might explain why this relationship was not supported with mTexting because they do not have the attributes of rich MDS communication channels.

Hypothesized Relationship Interactivity and Social Presence

Prior research suggests that synchronicity may contribute to social presence through enhanced perceived immediacy (Khalifa and Shen, 2004). Trevino et. al., posit that perceived immediacy will positively impact and enhance richness and hence lead to higher social presence (Trevino et al., 1987).

However, results of the PLS analysis showed that only one dimension of interactivity positively influenced perceived social presence in mTexting. The rest of the hypothesized relationship between interactivity and perceived social presence were not supported. However, when backward multiple regression was performed between interactivity and perceived social presence, No-delay showed a positive relationship with perceived social presence. The likely explanations for lack of relationship between the engagement dimension and perceived social presence rest on the fact that only two items were used after the rest of the items were removed for reliability and validity reasons.

Differences in Richness, Social Presence and Satisfaction

A t-test for different samples was performed to investigate if there were any differences or similarities in the way mIM and mText users perceived richness, social presence and satisfaction with MDS (Tables 17, 18, and 19).

Whereas there was no difference in the way the two groups perceived social presence, there was a significant difference in their perception of richness. According to Social Presence Theory, mIM should have a higher social presence than mTexting. It is likely that user experience may have contributed to this by raising the perception of social presence among mobile text users.

Mobile IM users had a favorable view of mIM than their counterparts – mobile text users. Ironically, mobile text users showed a high favorable view of satisfaction with mTexting than the mIM users did with mIM.

Limitations of the Study

This dissertation has several limitations that might affect the outcome of the research findings. First, data collection was done using university students. The homogenous nature of the student sample limits the generalizability of the research findings. Nonetheless, university students were selected because they represent the demographics that are frequent users of MDS.

Second, respondents were asked to evaluate their usage of MDS communication services in a given time frame. The assumption here is that respondents could remember how often they used MDS within a given time frame. It is possible that some respondents did not remember how often they used MDS.

Third, the number of mText users and mIM users were not the same. mText users outnumbered mIM users by a slight margin. It is likely that the imbalance between the two groups may have skewed the research findings.

Further studies should be done using sample of the same sizes from the two groups.

Fourth, respondents were recruited from one single university. The perception of students may not be as diverse as those collected from a different setting. Therefore, the sample may not be a good representative of the actual population. The best option would have involved random selection of MDS users from several regions. We recommend that further studies be conducted using samples from different regions.

Contributions of the Study

Hevner et al. (2004) posit that research in Information Systems is characterized by two paradigms: behavioral science and design science. They add that behavioral science develops and validates explanatory and predictive theories in organizational behavior, while design science develops new and innovative artifacts (Hevner, March, Park, & Ram, 2004). Other IS researchers have emphasized on the need of putting greater focus on the design of communication technologies for effective communication (Te'eni, 2001). This study developed a research framework for researchers with interest in MDS communication channels by incorporating both the design science and behavioral science perspectives.

This study is an attempt to bridge the gap between communication channel expansion theory and social presence theory in the context of MDS communication channels. Previous research has suggested that experiential

factors play a role in communication channel richness (Carlson & Zmud, 1999). On the other hand prior research has found that social presence influences communication channel richness and hence communication channel choice (Short et al., 1976).

In the same vein social presence has been found to be a function of the accumulated experiences and information over time(Rice, 1993; Schweizer, Paechter, & Weidenmann, 2001). The more experience individuals have with their communication partner and the media, the more they perceive the presence of each other, for example, group activities or projects provide opportunities for individuals to form impressions of each other and hence increased perceptions of social presence(Newberry, 2009). The empirical research finding on the relationship between experiential factors, perceived social presence and communication channel richness will be instrumental for IS researchers in advancing further research work in mobile communication technologies, for example, Twitter, Facebook.

Practical Implications of the Study

This paper provides some practical implications for the industry as well as IT research. From an industry perspective, companies could borrow a leaf from these findings and then take advantage of the emerging market of mTexting and mIM, to explore opportunities for growth by embracing mText advertising of specific products to a given demographic. For example, Covey (2009) observes that teens in the U.S. represent the largest group attracted to mobility. Perhaps,

by investing in mobile communication technologies, business have an opportunity to reach out to a very important demographic in advertising.

Also, organizations can no longer take for granted user participation and interest in these technologies. Organization should embrace and adopt these technologies into their computing infrastructure and include them in their enterprise applications. Perhaps organization could benefit through knowledge sharing when employees interact socially.

Mobile commerce or marketing is an emerging area that every business should venture into in order to sustain competitive advantage. On the other hand, the gradual convergence of the Internet and mobile communications means that MDS is gradually becoming an integral part of computer mediated business infrastructure. For many people and organizations therefore, MDS will become a major way of accessing information and communication applications, for example, use of mTexting to market products.

From an IS research perspective there is a growing need to for more research directed towards the convergence of user experience and social interaction design. For system designers this study helps to understand the role of interactivity and social presence in the design of social interface for mobile communication technologies, such as MDS.

Future Research

Although a lot of progress has been made in developing measuring instruments for examining the relationship between experience, perception of richness and satisfaction with MDS, more research work is needed in the area of social interactive design. This study simply provides some insight into this emerging area of social interactive design, by examining the relationship between interactivity and social presence.

This study borrowed heavily from the interactivity literature to explore the relationship between interactivity and social presence in MDS. The dimensions of interactivity used in this study may not necessarily be the most suited. More work should be done in this area and better scales developed to measure the construct of interactivity. IS researchers should theorize the role of both user experience and usability on interactivity with the software since interactivity is not limited to the user interface (user interface design), but unfolds among the users when they use MDS communication services. Consequently, Chan (2006) observes that the challenge is that social interface issues are far more difficult to design then the conventional user interface.

Conclusion

Determining the factors that influence richness, social presence and satisfaction with MDS communication services constitutes an important area of research. This dissertation examined MDS communication channels through the lens of media richness, channel expansion, and social presence theories.

The study explored the influence of user experience on perceived richness, perceived social presence, and satisfaction with MDS communication channels. The study also investigated the interactivity dimensions that enhance social presence in MDS. Hypotheses associated with the influence of user experience on perceived richness and perceived social presence was tested based on the survey.

Also tested were hypotheses that examined the relationship between perceived richness, perceived social presence, and satisfaction with MDS. The survey instrument was developed based on validated items used in previous studies. The sample comprised of University students because previous studies have suggested that this demographic make up the largest percentage users of MDS communication channels. Respondents were categorized into two groups according to whether they used mIM or mTexting.

Survey was administered online and data collected over eight week duration. Data was analyzed using both SPSS and PLS statistical software. The study showed that user experience had a direct influence on both perceived richness and social presence in MDS. The relationship between interactivity and social presence was partially supported.

APPENDIX A

SUMMARY OF DEFINITIONS

Construct/ Concept	Definition / Dimensions	Selected Authors /Source
Mobile Data Services (MDS)	MDS consists of digital data services that are accessed through a mobile device over a wide geographical region	Hong and Tam (2006b) Schneiderman (2002)
Synchronicity	The ability of a channel to create an environment where all users are simultaneously engaged in the communication activity. It describes the ability of a channel to create an impression that all users are simultaneously engaged in a communication activity	Carlson & George (2004)
MIM channels	Users communicate simultaneously and in real-time. They have high bandwidth, more responsive (shorter feedback). Examples: Multimedia message services (MMS), instant messaging (IM) and picture messaging	Burke& Chidambaram, (1999) Walther, 1996 Denis et al., (2008) Carlson & George (2004)
MTexting channels	Users do not communicate simultaneously and communication is accompanied by a time delay. Usually have low bandwidths and less responsive. Examples: Short Message Services (SMS) and email.	
Short Message Services (SMS)	Allows Web-enabled cell phone users to send messages up to 160 characters Facility that allows a mobile terminal to send or receive messages up to 160 characters in roman text. Messages are stored if the subscribers are inactive but relayed when active	Schneiderman (2002) (Skvarla, 2003)
Multimedia message services (MMS)	Allow transmission of messages containing text, pictures, audio and video files Mobile messaging standard that supports picture messaging, sounds, graphics and voice	Schneiderman (2002) Skvarla (2003)
Instant messaging (IM)	Allows users to conduct one or more real time conversations in text windows on mobile communication device screen. The	Schneiderman (2002)

	text appears virtually simultaneously on the screens of the devices	
MDS communication channel	Communication medium used to convey mobile data (SMS, email, IM and MMS) from sender to receivers.	(I.T.U, 2002)
Communication channel richness	Is the ability of information to change understanding within a time interval and is based on four dimensions (1) potential for immediate feedback, (2) 2-way communication and speed of feedback, (3) capacity for multiple cues – using different cues such as body language and facial expressions, and (4) ability to convey language variety –using variety of signs, symbols, numeric data, pictures, and non-verbal formats personal focus – degree to which a message is perceived as personal *Rich communication channels* – Take shorter time to communicate understanding and are suitable for more ambiguous and uncertain a task. Richer communication channels are considered *synchronous* communication with wide language variety and personalness *Lean communication channels* – Take longer time to communicate understanding and are suitable for less ambiguous and uncertain a task. Lean communication channels are considered *asynchronous* with low personalness	Daft and Lengel (1984) Daft and Lengel (1986) Ferry et al (2001) Daft and Lengel (1986) Daft and Lengel (1986)
Social presence	The degree to which a communication channel facilitates awareness of the other party and interpersonal relationship during interaction. Highly demanding task (e.g. negotiations) requires communication channels with high social presence. Is the degree of salience of the other communication partner in the interaction and interpersonal relationship and is based on four dimensions (1) sociable, (2) sensitive, (3) warmness and (4) personalness	Fulk et al. (1987) Short et al. (1976)

User Experience	The extent to which a user gains knowledge base through exposure to a communication channel, communication partner or topic	Carlson and Zmud (1994)
Communications Interface	The actions required by a medium of the participants to activate a communication channel in order to exchange information with the group	Chidambaram and Jones (1993)
Interactivity	Conceptualized as three dimensional Synchronicity/Real-time - whether communication takes place in real-time (synchronous) or is delayed (asynchronous) No-delay/two-way - is the ability to reciprocate a message exchange and includes relevance and response contingency Active Control/Engaging - characterized by voluntary and instrumental action that directly influences the user's experience	MacMillan and Hwang (2002) Liu (2003) Khalifa and Shen (2004)

APPENDIX B

DESCRIPTIVE STATISTICS

Table B 1

Survey questions and descriptive stats

Construct	Variable Name	Survey Questions	Mean		SD	
			mIM	mTex	mIM	mTex
Perceived Social Presence	SOCPR1	Using mIM/mTexting makes me feel closer to the person/people I communicate with	5.1	5.1	1.2	1.6
	SOCPR2	Using mIM/mTexting allows me to express myself when communicating with close friends	5.0	5.0	1.3	1.5
	SOCPR3	I feel emotionally connected to mIM/mTexting when communicating with close friends	4.4	4.5	1.5	1.6
	SOCPR4	I find warmth in mIM/mTexting when communicating with close friends	4.5	4.6	1.5	1.6
Experience with Channel	EXCHA1	I am very experienced using mIM/mTexting	5.8	6.4	1.3	1.0
	EXCHA2	I find mIM/mTexting very easy to use	6.0	6.4	1.0	1.0
	EXCHA3	I feel competent using mIM/mTexting	5.9	6.3	1.2	1.0
	EXCHA4	I understand how to use all the features of mIM/mTexting	5.7	6.3	1.2	1.0
	EXCHA5	I feel comfortable using mIM/mTexting	5.9	6.4	1.1	1.0
Experience with Communi-cation Partner	EXPAT1	I feel mIM/mTexting allows me to communicate emotional issues with close friends	4.5	4.3	1.5	1.8
	EXPAT2	I feel mIM/mTexting allows me to communicate personal/private issues with close friends	4.8	4.6	1.5	1.8

(Table B1 continued)

	EXPAT3	Using mIM/mTexting makes me feel I am familiar with close friends	5.0	5.0	1.2	1.4
	EXPAT4	Using mIM/mTexting makes me feel close to my close friends	5.0	5.0	1.3	1.4
Experience with Topic	EXTOP1	Using mIM/mTexting makes me feel I am experienced with the topic of discussion when communicating with close friends	5.1	4.9	1.3	1.5
	EXTOP2	Using mIM/mTexting makes me feel I am more knowledgeable about topic of discussion when communicating with close friends	4.9	4.6	1.3	1.5
	EXTOP3	Using mIM/mTexting makes me feel I am well versed with the concepts of the topic of discussion when communicating to close friends	4.9	4.6	1.3	1.4
Perceived Channel Richness	PRICH1	Using mIM/mTexting allows me and my close friends to share our feelings or emotions in our messages	5.0	4.6	1.3	1.6
	PRICH2	Using mIM/mTexting allows me and my close friends to communicate a variety of different cues (e.g. emotional tone and attitude) in our messages	4.8	4.3	1.6	1.7
	PRICH3	I feel that mIM/mTexting has variety of content (signs, symbols, verbal and nonverbal formats)	5.3	4.9	1.2	1.3
	PRICH4	I feel that mIM/mTexting lacks content (signs, symbols, verbal and nonverbal formats)	4.0	4.7	1.7	1.4
No-delay	NODEL1	I find it easy to input feedback with mIM/mTexting	5.3	5.4	1.1	1.1

(Table B1 continued)

	NODEL2	I feel that mIM/mTexting processes inputs very quickly	5.6	5.5	1.0	1.1
	NODEL3	I find it easy to process information with mIM/mTexting	5.5	5.6	0.9	1.1
	NODEL4	I feel that mIM/mTexting allows me to get information from close friends very fast	5.7	5.7	1.0	1.2
Synchro-nicity	SYNCH1	I feel that mIM/mTexting allows two-way communication	5.8	5.9	1.1	1.0
	SYNCH2	I feel that mIM/mTexting allows instantaneous communications	5.6	5.5	1.1	1.4
	SYNCH3	I feel that mIM/mTexting is interactive	5.5	5.6	1.3	1.2
Social Influence	SOCINF1	My professor/family member(s) has expressed to me the usefulness of mIM/mTexting	4.1	4.7	1.7	1.5
	SOCINF2	My professor/family member(s) frequently uses mIM/mTexting to communicate	4.3	5.4	1.7	1.2
Channel Satisfactio	CHSAT1	Overall I feel satisfied with mIM/mTexting	5.5	6.2	1.1	1.1
	CHSAT2	In future I am likely to use mIM/mTexting	5.6	6.3	1.2	0.9
	CHSAT3	Overall my experience using mIM/mTexting is positive	5.7	6.4	0.9	0.8
GEND	GEN	What is your gender?	1.4	1.5	0.5	0.5
AGE	AGE	What is your approximate age?	2.5	2.4	0.8	0.8
EDUC	EDUC	What is your current grade in school?	3.0	3.0	0.9	0.8
EMPL	EMPL	What is your current work status?	1.9	1.9	0.9	0.9
RACE	RACE	What is your race?	2.2	1.8	1.5	1.3

Table B 2

Skewness and kurtosis (mIM)

Construct	N	Mean	SD	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std Err	Statistic	Std Err
SOPR1	240	5.12	1.249	-.782	.157	.642	.313
SOPR2	240	5.05	1.310	-.697	.157	.060	.313
SOPR3	240	4.37	1.461	-.226	.157	-.591	.313
SOPR4	240	4.50	1.509	-.442	.157	-.399	.313
EXCHA1	240	5.81	1.262	-1.317	.157	1.419	.313
EXCHA2	240	6.04	1.030	-1.728	.157	4.470	.313
EXCHA3	240	5.86	1.170	-1.191	.157	1.468	.313
EXCHA4	240	5.70	1.196	-.950	.157	.310	.313
EXCHA5	240	5.93	1.140	-1.680	.157	3.769	.313
EXPAT1	240	5.04	1.187	-.633	.157	.594	.313
EXPAT2	240	4.79	1.469	-.601	.157	-.137	.313

(Table B2 continued)

EXPAT3	240	5.03	1.306	-.648	.157	.246	.313
EXTOP1	240	5.11	1.303	-.931	.157	1.224	.313
EXTOP2	240	4.86	1.272	-.638	.157	.697	.313
EXTOP3	240	4.93	1.287	-.770	.157	.696	.313
ENGA1	239	4.96	1.629	-.708	.157	-.395	.314
ENGA2	239	4.36	1.719	-.240	.157	-.965	.314
PRICH1	239	4.75	1.583	-.754	.157	-.152	.314
PRICH2	239	5.26	1.195	-.751	.157	.569	.314
PRICH3	239	4.03	1.702	.081	.157	-1.031	.314
NODEL1	239	5.28	1.137	-.697	.157	.536	.314
NODEL2	239	5.56	1.002	-.497	.157	-.026	.314
NODEL3	239	5.53	.938	-.353	.157	-.429	.314
SYNCH1	239	5.77	1.109	-1.704	.157	4.526	.314
SYNCH2	239	5.65	1.074	-.883	.157	.959	.314

(Table B2 continued)

SYNCH3	239	5.46	1.253	-1.054	.157	.993	.314
SOCINF1	239	4.11	1.742	-.286	.157	-1.036	.314
SOCINF2	239	4.33	1.674	-.404	.157	-.718	.314
CHSATI1	239	5.47	1.052	-.746	.157	.398	.314
CHSATI2	239	5.56	1.165	-1.081	.157	1.171	.314
CHSATI3	239	5.72	.944	-.620	.157	.296	.314

Table B 3

Skewness and descriptive stats (mTexting)

Construct	N	Mean	SD	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std Err	Statistic	Std Err
SOPR1	276	5.05	1.552	-.773	.147	-.060	.292
SOPR2	276	5.05	1.543	-.798	.147	-.131	.292
SOPR3	276	4.50	1.648	-.341	.147	-.768	.292
SOPR4	276	4.59	1.596	-.462	.147	-.500	.292
EXCHA1	276	6.36	1.023	-2.436	.147	7.911	.292
EXCHA2	276	6.41	.977	-2.490	.147	7.985	.292
EXCHA3	276	6.31	1.011	-2.117	.147	5.790	.292
EXCHA4	276	6.29	.985	-1.919	.147	5.124	.292
EXCHA5	276	6.39	.968	-2.669	.147	9.963	.292
EXTOP1	276	4.88	1.474	-.458	.147	-.304	.292
EXTOP2	276	4.64	1.504	-.251	.147	-.534	.292
EXTOP3	276	4.60	1.452	-.121	.147	-.538	.292
ENGA2	276	5.32	1.596	-.982	.147	.139	.292
ENGA1	276	4.87	1.670	-.695	.147	-.354	.292
NODEL1	276	6.13	1.115	-1.551	.147	2.533	.292
NODEL2	276	5.91	1.169	-1.620	.147	3.249	.292
NODEL3	275	5.41	1.308	-.766	.147	.357	.293
PRICH2	275	4.87	1.320	.042	.147	-.611	.293

(Table B3 continued)

PRICH3	276	4.06	1.459	-.151	.147	-.104	.292
SYNCH1	275	5.67	1.179	-.841	.147	.575	.293
SYNCH2	275	5.48	1.371	-1.178	.147	1.379	.293
SYNCH3	276	5.67	1.260	-.980	.147	.862	.292
SOCINF1	275	4.74	1.517	-.989	.147	-.354	.293
SOCINF2	275	5.43	1.164	-1.393	.147	2.759	.293
CHSAT1	275	6.20	1.133	-1.597	.147	2.238	.293
CHSAT2	275	6.31	.877	-1.627	.147	4.704	.293
CHSAT3	275	6.37	.760	-2.347	.147	11.965	.293

Table B 4

Regression experience and richness (mIM)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	61.877	3	20.626	21.579	.000[a]
Residual	224.622	235	0.956		
Total	286.499	238			

a. Predictors: (Constant), EXTOP, EXCHA, EXPAT; Dependent Variable: PRICH

(Table B4 continued)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.476	0.44		5.623	0
	EXCHA	-0.038	0.067	-0.034	-0.564	0.573
	EXPAT	0.13	0.07	0.128	1.86	0.064
	EXTOP	0.36	0.062	0.394	5.771	0

a. Dependent Variable: PRICH

Table B 5

Regression experience and richness (mTexting)

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	127.229	3	42.41	50.693	.000[a]
	Residual	197.438	236	0.837		
	Total	324.666	239			

a. Predictors: (Constant), EXTOP, EXCHA, EXPAT; Dependent Variable: SOPR

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.499	0.409		1.219	0.224

(Table B5 continued)

EXCHA	0.168	0.063	0.142	2.662	0.008
EXPAT	0.493	0.065	0.458	7.569	0
EXTOP	0.168	0.058	0.174	2.884	0.004

a. Dependent Variable: SOPR

Table B 6

Regression social presence and richness (mIM)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	64.828	4	16.207	17.108	.000[a]
Residual	221.671	234	0.947		
Total	286.499	238			

a. Predictors: (Constant), EXTOP, EXCHA, SOPR, EXPAT Dependent Variable: PRICH

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.41	0.44		5.48	0
	SOPR	0.122	0.069	0.129	1.765	0.079
	EXCHA	-0.058	0.068	-0.052	-0.857	0.392
	EXPAT	0.07	0.077	0.069	0.904	0.367
	EXTOP	0.34	0.063	0.372	5.378	0

a. Dependent Variable: PRICH

APPENDIX C

QUESTIONNAIRE

MDS Usage and Satisfaction Survey

UNT UNIVERSITY OF NORTH TEXAS COLLEGE OF BUSINESS

University of North Texas Institutional Review Board
Informed Consent Form

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted. The decision to participate or to withdraw will have no effect on the course grade.

Title of Study: Design for Social Presence and Exploring Its Mediating Effect in Channel Richness and Satisfaction: Case of Synchronous and Asynchronous Mobile Data Services

Principal Investigator: Dr. Chang Koh, University of North Texas (UNT) Department of Information Technology and Decision Science.

Purpose of the Study: You are being asked to participate in a research study which involves collecting information on how you perceive the awareness of and interpersonal relationship with other communication partners and satisfaction with Texting and Instant Messaging. The purpose of this study is to answer the following research questions: a) Is there a relationship between experience with communication technology (mobile texting and mobile Instant Messaging) and interpersonal relationship with other communication partners? b) What design characteristics for the user interface are important in enhancing the awareness of other communication

partners in communication technologies such as texting and instant messaging?

Study Procedures: You will be asked to respond to specific questions relating to the use of Short Message Services (texting) and Instant Messaging (IM) on mobile phones. It should involve not more than 25 minutes of your time.

Foreseeable Risks: There are no foreseeable risks involved in this study
Benefits to the Subjects or Others: We expect that the results of the study will directly benefit the subjects by providing them with information on usage of Texting and instant Messaging on mobile phones. Researchers in the discipline of Information Systems, Communications research, Organizational Research interested in organizational communication technologies will benefit from the framework developed in this study.

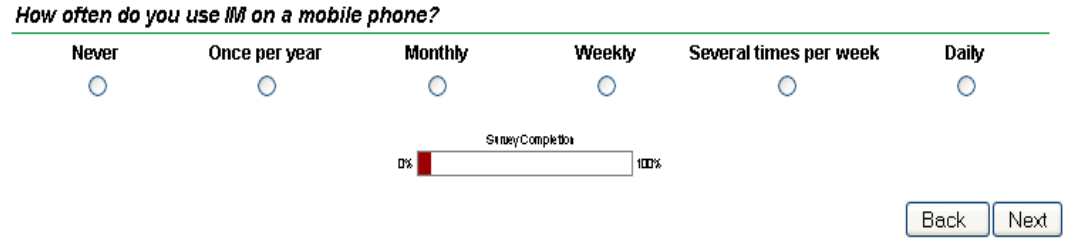
Compensation for Participants: You will receive an extra credit as compensation for your participation. Compensation is conditioned upon completing all tasks requested.

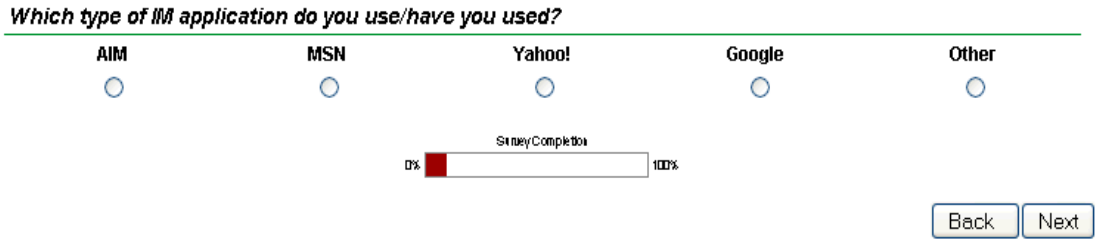
Procedures for Maintaining Confidentiality of Research Records: The confidentiality of individual information will be maintained in any publications or presentations regarding this study. Results will be provided in aggregate form only. No individual-specific information will be disclosed in the report or published and the raw information will be accessible only to me and the University of North Texas faculty on my dissertation committee.

Questions about the Study: If you have any questions about the study, you may contact Dr. Chang Koh or Mr. Solomon Ogara at (940) 565-3525 or (940) 565-3174 respectively.

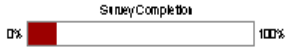
Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:



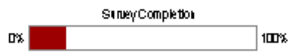


	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Using IM makes me feel closer to the person/people I communicate with	○	○	○	○	○	○	○
Using IM allows me to express myself when communicating with close friends	○	○	○	○	○	○	○
I feel emotionally connected to IM when communicating with close friends	○	○	○	○	○	○	○
I find warmth in IM when communicating with close friends	○	○	○	○	○	○	○
IM provides personalized information presentation	○	○	○	○	○	○	○



Back Next

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I am very experienced using IM	○	○	○	○	○	○	○
I find IM very easy to use	○	○	○	○	○	○	○
I feel competent using IM	○	○	○	○	○	○	○
I understand how to use all the features of IM	○	○	○	○	○	○	○
I feel comfortable using IM	○	○	○	○	○	○	○
I feel I am not experienced using IM	○	○	○	○	○	○	○
I feel IM allows me to communicate emotional issues with close friends	○	○	○	○	○	○	○
I feel IM allows me to communicate personal/private issues with close friends	○	○	○	○	○	○	○



Back Next

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I feel IM allows me to communicate informally with close friends	○	○	○	○	○	○	○
Using IM makes me feel I am not familiar with close friends	○	○	○	○	○	○	○
I feel I do not trust my close friends when using IM	○	○	○	○	○	○	○
Using IM makes me feel I am familiar with close friends	○	○	○	○	○	○	○
I feel that IM allows me to communicate formally/officially with close friends	○	○	○	○	○	○	○
Using IM makes me feel close to my close friends	○	○	○	○	○	○	○

Survey Completion
0% 100%

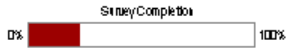
Back Next

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I feel that IM keeps my attention when communicating with close friends	○	○	○	○	○	○	○
I feel that IM is unmanageable	○	○	○	○	○	○	○
I feel that IM doesn't keep my attention when communicating with close friends	○	○	○	○	○	○	○
I feel that IM allows me to respond to messages when convenient	○	○	○	○	○	○	○
Using IM allows me and my close friends to receive an immediate response	○	○	○	○	○	○	○

Survey Completion
0% 100%

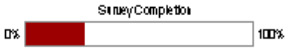
Back Next

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Using IM makes me feel I am experienced with the topic of discussion when communicating with close friends	○	○	○	○	○	○	○
Using IM makes me feel I am more knowledgeable about topic of discussion when communicating with close friends	○	○	○	○	○	○	○
Using IM makes me feel I am well versed with the concepts of the topic of discussion when communicating to close friends	○	○	○	○	○	○	○
I feel that I have a great deal of control over IM	○	○	○	○	○	○	○



Back Next

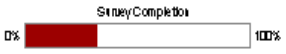
	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I feel that IM keeps my attention when communicating with close friends	○	○	○	○	○	○	○
I feel that IM is unmanageable	○	○	○	○	○	○	○
I feel that IM doesn't keep my attention when communicating with close friends	○	○	○	○	○	○	○
I feel that IM allows me to respond to messages when convenient	○	○	○	○	○	○	○
Using IM allows me and my close friends to receive an immediate response	○	○	○	○	○	○	○



Back Next

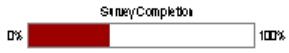
	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Using IM allows me and my close friends to tailor our messages to our personal requirements	○	○	○	○	○	○	○
Using IM allows me and my close friends to share our feelings or emotions in our messages	○	○	○	○	○	○	○
Using IM allows me and my close friends to communicate a variety of different cues (e.g. emotional tone and attitude) in our messages	○	○	○	○	○	○	○
I feel that IM has variety of content (signs, symbols, verbal and non-verbal formats)	○	○	○	○	○	○	○
I feel that IM lacks content (signs, symbols, verbal and non-verbal formats)	○	○	○	○	○	○	○
I find it easy to input feedback with IM	○	○	○	○	○	○	○
I feel that IM processes inputs very quickly	○	○	○	○	○	○	○
I find it easy to process information with IM	○	○	○	○	○	○	○
I feel that IM allows me to get information from close friends very fast	○	○	○	○	○	○	○

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I feel that IM allows two-way communication	○	○	○	○	○	○	○
I feel that IM allows instantaneous communications	○	○	○	○	○	○	○
I feel that IM is interactive	○	○	○	○	○	○	○
I feel that IM is primarily one-way communication	○	○	○	○	○	○	○
I feel that IM does not allow instantaneous communications	○	○	○	○	○	○	○
My close friends frequently use IM to communicate	○	○	○	○	○	○	○
My close friends have expressed to me the usefulness of IM	○	○	○	○	○	○	○



Back Next

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
My professor/family member(s) has expressed to me the usefulness of IM	○	○	○	○	○	○	○
My professor/family member(s) frequently uses IM to communicate	○	○	○	○	○	○	○
The way information is presented in IM is satisfactory to me	○	○	○	○	○	○	○
Overall I feel satisfied with IM	○	○	○	○	○	○	○
In future I am likely to use IM	○	○	○	○	○	○	○
Overall my experience using IM is positive	○	○	○	○	○	○	○



Back Next

What is your gender?

Male ○ Female ○

What is your approximate age?

<18 yrs ○ 18-22 yrs ○ 23-27 yrs ○ 28-32 yrs ○ >32 yrs ○

What is your current grade in school?

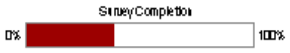
Freshman ○ Sophomore ○ Junior ○ Senior ○ Masters ○ PhD ○

What is your current work status?

Part-time (<32 hrs/wk) ○ Full-time (32 hrs or more/wk) ○ Unemployed ○

What is your race?

White/Caucasian ○ Black/African American ○ Hispanic/Latino ○ Asian/Pacific Islander ○ American Indian/Alaskan Native ○ Other ○



Back Next

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