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**Teenagers' Use of MSN Features, Discussion Topics, and Online Friendship Development:
The Impact of Media Richness and Communication Control**

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Abstract

With a sample of 248 Hong Kong adolescents, this study probed the impact of media richness and communication control on teenagers' use of MSN for online friendship development. Both media richness and communication control contributed to MSN's overall functionality and teenagers' self-presentation and friendship development. Media richness positively influenced both social and task communications, and shortened the time needed to turn a stranger to friend; whereas communication control showed a positive relationship to social, friendship communication. Rich features such as webcam and MSN Space facilitated the increase of acquaintances, new friends, opposite-sex friends, and total number of friends; whereas messaging helped build close friendships. Overall, media richness and communication control appeared to be valid constructs in explaining teenagers' MSN feature use and online friendship development.

Keywords: interpersonal communication, friendship development, instant messenger, media richness, communication control

Youth are at the forefront of communication technologies that are transforming social interactions in ways yet to be fully understood (Boyd, 2008). Teenagers make friends and form social circles on the Internet (Peter, Valkenburg, & Schouten, 2005). They favor instant messengers (IMs) (Lenhart, Madden, & Hitlin, 2005). Examining teens' online friendship development is important as adolescence is a special period of development in which concerns with interpersonal relationships are most acute (Allison & Schultz, 2001).

The important role of IM in online friendship development has sparked many studies that have examined mainly the impact of early instant messengers which are characterized by anonymous, synchronous exchange of text messages (e.g., Green, Hilken, Friedman, et al., 2005; Henderson & Gilding, 2004; Hu, Wood, Smith, & Westbrook, 2004; also see a collection of over 500 citations on <http://www.chat-bibliography.de/>). Kim, Kim, Park, and Rice (2007) compared overall IM use with other media, such as email, face-to-face interaction (FTF), and mobile phone. Chung and Nam (2007) explored self-efficacy-related predictors of overall IM use. As the current versions of IMs are loaded with many advanced features that provide audio and visual cues in addition to text messaging, an in-depth examination of IM use can reflect how adolescents might differently exploit individual features in building online friendships.

This study focused on the concepts of media richness and communication control to explain and examine (1) an IM's overall functionality and online self-presentation and friendship development, and (2) teenagers' use of an IM's individual features for online friendship development. Additionally, this study explored the relationships among richness, control, self-presentation and friendship development. With the highest number of users, MSN, the flagship of current free IMs (Boswell, 2008; Softpedia, 2007), was the focal interest of this study.

Media Richness

The concept of media richness has provided a foundation for understanding human behavior involving electronic communication media (e.g., Allen & Griffeth 1997; Carlson & Zmud 1999; Kahai & Cooper, 2003; Kock, 2004). (Due to space limit, the current literature review covers only the relevant concept of media richness without detailing media richness theorems that predict managers' media choice in task situations, which are not relevant in the social context of friendship development.) According to Daft and Lengel (1984, 1986), communication media fall along a continuum of richness. The richness of a medium comprises four aspects: (1) the availability of instant feedback, which allows questions to be asked and answered; (2) the use of multiple cues, such as physical presence, vocal inflection, body gestures, words, numbers, and graphic symbols; (3) the use of natural language, which can be used to convey an understanding of a broad set of concepts and ideas; and (4) the personal focus of the medium. The more a medium displays these attributes, the richer it is. With none or only few of these attributes, a medium is considered "lean." Therefore, face-to-face (FTF) is the "richest" medium because it has the capacity for immediate feedback, carries multiple cues, enables the use of natural language, and allows a personal focus; whereas written documents are the leanest.

Author and Chen (2004) liken media richness to communication immediacy in noting that rich media have greater personal information-carrying capacity than do lean media and, thus, facilitate interpersonal communication and relationship development. The richest face-to-face medium has the greatest potential for conveying personal information needed to facilitate friendship building. As Kock (2004) points out, humans are most accustomed to "natural" characteristics inherent in face-to-face communication processes for social interactions, implying that FTF could be the most advantageous channel for friendship building. Green et al. (2005), too, suggest that FTF interactions hold advantage in social interactions over mediated ones.

Logically, a new IM's rich features (e.g., webcam) that approximates face-to-face interaction, compared to a lean feature (e.g., text messaging), could provide a *potentially* more conducive social context for interpersonal relationship development.

Jacobson (1999) argues that cyberspace has obvious limitations as a stage for the presentation of self. The limitations of new media, instant messenger included, stem from the media's less-than-optimal capacity to transmit rich, natural information. Even with loaded features, new media are limited in conveying the same amounts and types of information as does FTF. For example, the absence of co-location renders physical contact or sense of smell an impossibility (Kock, 2004). In an interpersonal context, media's information-carrying capacity could affect the effectiveness of self-disclosure, whereby influencing reciprocity and trust (Henderson & Gilding 2004). For example, if a medium allows a teen user to disclose his/her physical features and visualize emotions, he/she might be able to solicit the like information from the person on the other end of the internet. In general, based on the concept of media richness, new media, compared to FTF, still seem limited in its social information-carrying capacity.

Communication Control

Hiltz and Turoff (1993) were among the first to discuss the importance of one's ability to control communication through text and asynchronic media. Asynchronicity, as opposed to instantaneity, releases pressure and stress, which often are a problem for FTF interactions that afford limited time intervals (Walther, 1996). Reduced anxiety could translate into more effective interpersonal interactions. In the case of instant messengers, users can even choose a person to message with. If one is unpleasant, a user can move on and try other individuals without having to be embarrassed or apologize for ending the communication. Electronic media

also allow a user to withhold true identity and, thereby decrease risks that may result from self-disclosure (Henderson & Gilding, 2004; Peter, Valkenburg, & Schouten, 2005). Even when a user commits a faux pas, he/she is able to re-enter an online community with a new screen name. Thus, many forms of electronic media provide individuals with greater message control than does FTF in respect to timing, pace of interactions, the types of cues, and amount of information (Green, Hilken, Friedman, et al., 2005).

For instant messengers, communication control refers to the ability to manage communication pace, the length of interaction time, response timing, using and switching among features for the purpose of fully expressing a user's intention, and presenting the desired images during an online interaction. An instant messenger that offers a high level of communication control should facilitate self-presentation and friendship development. Walther (1996) argues that computer-mediated communication provides opportunities for selective self-presentation, idealization, and reciprocation. As self-presentation is a mindful effort by social actors to project a desirable image to a potential friend online, communication control becomes a key capacity of a given medium.

Friendship Development

In the classical interpersonal communication literature, a full friendship development process typically can be understood as one in which a stranger evolves to an acquaintance, to a new friend, and then to a close friend (e.g., Canary, Cody, & Manusoy, 2008; Trenholm & Jensen, 2007). Teenage friendship development processes are no exception. Trust plays a central role in friendship development (e.g., Millar & Rogers, 1976; Knapp & Vanbelistic, 2008). A stranger is someone about whom an individual has no or little information, whereas an acquaintance is someone an individual has some superficial information about but is not familiar

with. Trust being irrelevant to the stage of stranger or acquaintance, friendship, however, must contain trust, albeit at varied levels. A new friend is someone an individual is getting to know and has an interest in becoming more familiar with while developing an initial sense of trust. A close friend then is one an individual knows quite well, has strong trust in and loyalty to. An MSN-using adolescent's online friendship development is a cumulative ongoing process in which he/she encounters new people, obtain information about people of interest, get to know them, and develop and maintain relationships. To evaluate an MSN teen user's status of friendship development at a given moment, the categories of people (e.g., stranger, acquaintances, new friends and close friends) that comprise the contact list, can be an appropriate indicator. The purpose of current study was then to examine how media richness, communication control, and MSN features may predict friendship development.

Richness, Control, Self-Presentation, and Friendship Development

Yet neither media richness nor communication control alone can adequately account for an IM's ability to facilitate effective communication for friendship development. Rich features, such as webcam and video conferencing loaded on advanced IMs, approximate face-to-face encounters. However, unless an IM affords a user precise control of these rich features (e.g., managing viewing angle and close-up size, adjusting volume, and flashing images), he/she could be revealing too much unintended personal information, which, in turn, may hinder a user from projecting the best self image online, arouse social anxiety, and hurt self-presentation.

Rich features such as webcam, if accompanied by appropriate control, can enable a user to freely present an image, partially or wholly, whenever he/she desires to do so. An IM equipped with rich features and a high degree of user-control, can facilitate self-presentation and possible future relationship development, particularly, in the early stage of an interpersonal

relationship when impression management is of utmost importance. If media richness gives adolescent users the ability to express self “thoroughly,” communication control then is about filtering outgoing messages to project self in the most desirable light, which does not necessarily require a maximum revelation of personal information.

Media richness and communication control together likely contribute to an instant messenger’s overall functionality, or the degree to which an IM can do for a user in social interactions. Such functionality typically is manifested in easy and enjoyable use, flexibility for switching among features, and low levels of apprehension. (e.g., Bertolucci, 2005; Boyce, 2008; Subrahmanyam, Smahel, & Greenfield 2006). Overall functionality should enhance the effectiveness of self-presentation and online friendship development. Hence:

H1: Both perceived media richness and message control positively contribute to MSN’s overall functionality.

H2: MSN’s overall functionality positively contributes to teenagers’ self-presentation, which, in turn, enhances their friendship development.

Richness, Control, and MSN Feature Use

To understand how media richness and communication control capabilities might affect teenagers’ use of MSN features, a brief explanation of MSN features is warranted. MSN was first introduced as a free instant messenger by Microsoft in 1999. Updated with many advanced features in 2000, MSN was renamed Windows Live Messenger. Currently MSN enjoys over 200 million unique users worldwide (MSN, 2008). MSN’s features that teenagers use consist of five standalone, primary ones in creating contact list, people search, messaging, webcam, and MSN Space; and five secondary features that accompany messaging (MSN, 2008; Author, 2007).

Contact List. Users can create their own contact list by placing people into different

categories, such as “best friends” and “classmates.” Users can rename, edit, and delete the list and place someone on the “Block List” to refuse instant messages.

People Search allows users to search for people based on criteria such as interest, hobby, and affiliation.

Messaging. This defining feature allows users to send and receive instant messages and regular emails. The body of a message primarily is text-based. Secondary features available for accompanying a text message include exchanging files, changing background color, inserting icons, using animations, and creating avatars/symbols below a user name.

Webcam. Users can connect their webcams to have conversations. They can also keep their webcams on while text-messaging.

MSN Space. Users can create a posting space to express their thoughts and opinions, or simply provide information and upload pictures and videos so others can view the content and leave comments. Most MSN Space users post pictures.

Of all MSN’s primary features, creating contact list and people search are unilaterally controlled by an individual user without any possibility of two-way communication with another user. Subsequently, media richness and communication control are relevant only to the remaining three primary features in messaging, webcam, and MSN space, that involve the possibility of simultaneous or delayed two-way communication. With the greatest potential for instant feedback, multiple cues, use of spoken language, and a personal focus, webcam is the richest feature, as it approximates face-to-face communication the most. Text messaging is much leaner than webcam communication even with the use of icons, animation, and avatars. Although equipped with the capacity for online diary, photos, and audio-video clips, MSN Space, unable to guarantee any instant responses from readers, is weaker in two-way communication. MSN Space

thus is leaner than webcam. MSN Space, usually filled with pictures, likely is richer than messaging in that teenagers tend to exchange text messages instantaneously without using the secondary richer features of animation, avatars, and icons (Author, 2007). The relative level of communication control for MSN's individual features is rather difficult to determine inasmuch as that concept has not been empirically studied. Likely, an IM's overall richness and control capacities can project a halo, a global nice feeling under which a user increases his/her use of an IM's various features.

Specifically, rich features, coupled with the basic text-based lean features, provide a number of ways for teenagers to display various aspects of self that otherwise are limited in their offline lives (Zhao, Grasmuck, & Martin, 2008). Indeed, research has discovered that adolescents often experiment with their online identities (Greenfield, Gross, Subrahmanyam, Suzuki, & Tynes, 2006). Gibbs, Ellison, and Heino (2006), too, observed that advanced rich features drew online relationship seekers to present themselves using a wide range of multimedia content, such as text-based descriptions, photographs, and video recordings; and to interact using both asynchronous and real-time communication tools, such as e-mail, instant messaging, and chat rooms. In the same vein, perceptions of MSN's media richness likely draw presentation-motivated teenagers to choose and use the available features.

Communication control is a key perception can shape IM use behaviors. Walther (1996) points out that computer-mediated communication places a great emphasis on control over verbal cues for effective online self-presentation. Recently, Manago, Graham, Greenfield, and Salimkhan (2008) found that teenagers preferred to use internet services that allowed them to control verbal and nonverbal communication to easily present self (i.e., "to come off the way you want to come off"). Thus perceptions of an IM's overall communication control can lead to

teenagers' use of that IM's features. The current of richness and control analysis leads to H3.

H3: Teenagers' use of MSN features is positively related too their perceptions of MSN's overall media richness and communication control.

MSN Feature Use, Self Presentation, and Friendship Development

Subrahmanyam, Smahel, and Greenfield (2006) suggest that teenagers enjoy using flexible, advanced internet features to create a media environment conducive for presenting desirable online images. Manago, Graham, Greenfield, and Salimkhan (2008) found that the characteristics of Internet communication, features, and the use of them, affected self-presentation. By the same token, MSN features (particularly the rich, multi-media ones) and the way teenagers use them, too, likely enhance the effectiveness of self-presentation. Research has demonstrated that self-presentations influence friendship development processes and outcomes (Vohs, Baumeister, & Ciarocco, 2005). By using a variety of available web features, individuals are able to create favorable images successfully for initiating and building relationships (Ellison, Heino, & Gibbs, 2006) Thus, the more one uses MSN, the greater the opportunities he/she potentially has for self-disclosure/self-presentation and other information exchange, which can help relationships progress (Yum & Hara, 2005). Teenagers' online friendship development can be examined in their assessment of the cumulative ongoing process in which he/she encounters new people, obtain information about people of interest, get to know them, and develop and maintain relationships. To that end, H4 was proposed.

H4: Teenagers' use of MSN features positively relates to the effectiveness of their self-presentation and friendship development.

Communication Topics, Richness, Control, Feature Use, and Friendship

An in-depth look into IM use and friendship development necessarily involves the

communication content participants actually exchange. In any interpersonal relationship, the disclosure of the sensitive self and other personal information, rather than non-sensitive topics (e.g., sports, fashion, and hobbies), is often said to increase intimacy and facilitate relationship development (Laurenccau, Barrett, & Pietromonaco, 1998; Reis & Shaver, 1988), online relationship included (McCown, Fischer, Page, & Homan, 2001). In a focus group study, teens reported using IM for everyday conversations with multiple friends that ranged from casual to serious and private exchanges (Shiu & Lenhart, 2004). Disclosing personal information can pose risks of ridicule and rejection in the initial friendship stages when people do not know each other well. Those risks, however, can be reduced on the Internet due to anonymity and users' ability to control communication (McKenna, Green, & Gleason, 2002). As users gradually get to know each other better, the function of anonymity diminishes; while communication control, used to project desirable images, becomes more and more pronounced as a friendship progresses (Zhao, Grasmuck, & Martin, 2008). On the other hand, richness, information-carrying capacity characterized by multi-media features, allows users to express their thoughts and ideas in thorough and multi-faceted manners (Greenfield et al., 2006). RQ1 was raised in this context.

RQ1: Do topics teenagers discuss on MSN relate to richness, control, feature use, and friendship development?

METHOD

Sample and Procedure

Nine assistant principals of public middle/high schools in all three geographic districts in Hong Kong were contacted. Five of them approved the survey questionnaire and supplied the time slots for data collection before the project deadline. Three schools, each located in one of the districts, were chosen. Three trained college-student research assistants collected data at

those schools. Students were told of voluntary participation and were asked to complete the questionnaire independently. No school personnel were present at the data collection once the questionnaires were distributed. Two hundred and sixty Forms 5-7 adolescents (i.e., equivalent to 9-12th grades in the US) completed questionnaires during class time. Two hundred and forty-eight valid questionnaires constituted the final convenience sample. One hundred and three were male and 145 female. The mean age was 16.75 years old, with 15 being the youngest and 20 the oldest.

Questionnaire and Measurement

The questionnaire was written originally in English and then translated into Chinese for data collection. For translation accuracy, two bilingual graduate students independently checked all items and worked out a few discrepancies. Then, five high school students who did not participate in the survey assessed the Chinese questionnaire for clarity, realism, readability, and language flow. All items for examined variables were created based on the literature review. Additional information regarding teen users' MSN contact lists was also collected.

Media richness/Information-carrying capacity. Research guided by media richness theory has often been faulted for operationalizing richness based on the tangible characteristics without user input. Critics feel that users' perceptions of the objective characteristics should be counted (Miller, 2006). Consequently, perceived media richness was used. Five items were created to measure users' assessment of MSN's richness in terms of its ability to convey expressions of feelings, intentions, and complex ideas; to communicate multiple cues; and to approximate face-to-face interaction. The rating scale ranged from 1 (strongly disagree) to 7 (strongly agree). Reliability analysis lead to a five-item scale with a Cronbach's alpha of .83. See Table 1 for specific items.

Communication control was measured by six items that tapped control over aspects of communication, such as intention, pace, length, feature use, image management, and response. The Cronbach's alpha was .86. The rating scale was from 1 (strongly disagree) to 7 (strongly agree). See Table 1.

MSN's *Overall functionality* was measured by five items that produced a Cronbach's alpha of .88. The five items covered ease of use, flexibility, effectiveness in expressing ideas, and alleviating apprehension. The rating scale was from 1 (strongly disagree) to 7 (strongly agree). See Table 1.

Self-presentation was measured by five items that examined the degree to which one could use MSN to project trustworthiness, uniqueness, a positive image, an attractive persona, and a special individual. The rating scale was from 1 (strongly disagree) to 7 (strongly agree). The Cronbach's alpha reached .91. See Table 1.

Friendship development was measured by six items with a reliability of .92. The six items probed how MSN helped users meet new people, develop friendships, obtain personal information, get to know others, maintain a strong tie, and keep a long-term relationship. The rating scale was from 1 (strongly disagree) to 7 (strongly agree). See Table 1.

MSN feature use. On a scale of 1 (rarely) to 5 (very frequently), respondents rated the use of each of the MSN features. The five main features consisted of creating contact list, people search, messaging, webcam, and MSN Space, whereas the secondary features included exchanging files, background color, icon insertion, animation insertion, and avatar presence.

Regarding general MSN use, respondents answered "For how many months have you been using MSN?" and "On average, how many hours do you spend using MSN per day?"

Communication topics discussed. Six topics generated in an early study (Author, 2007)

were used here. They were boy/girlfriend, family issues, schoolwork, mutual friends/schoolmates, hobbies, and future plans. An additional category, “other (specify)”, was added to capture themes possibly left out of the six topics. Respondents rated those topics on a scale of 1 (rarely discussed) to 7 (frequently discussed).

Additional Information. Respondents were instructed to recall the composition of their contact lists and relationship history. Because the term “friend” is used liberally and broadly in online communities with meanings ranging from stranger on the list to close friend (e.g., Ellison, Steinfield, & Lampe, 2007), each relationship label was defined based on the classical friendship progression to minimize possible confusion resulting from varied online uses of these labels. All additional questions are given below.

1. On your contact list, how many would you call strangers (i.e., those you have no or very little personal information about)?
2. On your contact list, how many would you call acquaintances (i.e., those you know the identity or have some superficial information about but have not developed a sense of trust)?
3. On your contact list, how many people would you call friends (i.e., those you more or less trust)?
4. On your contact list, how many of your friends are of the opposite sex?
5. On your contact list, how many would you call new friends (i.e., those you are getting to know and becoming familiar with, and are developing a sense of trust in)?
6. On your contact list, how many would you call close friends (i.e., those you trust tremendously, are loyal to, and can share secrets with)?
7. Of all your MSN friends, how many of them initially were strangers whom you first

met on MSN?

8. On average, how long would it take you to develop a friendship with someone you first met through MSN?

9. How many of your friends on MSN initially were people you already knew in school or elsewhere before interactions on MSN?

Post Hoc Focus Group

The relationship labels defined in the questionnaire were prescriptive, which may or may not have reflected the way teenagers actually used them. To gain a better understanding, a post hoc focus group of 10 high school MSN users who did not participate in the survey was recruited for discussions regarding the meanings of these relationship labels: stranger, acquaintance, friend, new friend and close friend. Then they were also asked to evaluate the definitions for these labels in the questionnaire.

RESULTS

Descriptive Findings: Teenagers' MSN Use Patterns and Contact Lists

Teenagers' MSN use patterns were examined to provide insights into how they interacted with others online. On average, respondents had used MSN for 24.35 months. A typical high school student user reportedly spent an average of 3.10 hours per day on MSN. The most frequently used feature was messaging ($M = 4.35$, $SD = .90$), followed by the accompanying secondary features of file exchange ($M = 4.35$, $SD = .90$), animation ($M = 3.99$, $SD = .88$), and icon insertion ($M = 3.65$, $SD = 1.20$). The least frequently used features were people search ($M=1.62$, $SD=1.03$), MSN Space ($M=1.90$, $SD=1.86$), webcam ($M = 2.12$, $SD = 1.15$), avatar ($M = 2.55$, $SD = 1.15$), and background color change ($M = 2.70$, $SD = 1.13$). In addition, moderate to low positive correlations surfaced among most of the feature use frequencies. See Table 2.

A typical teen user maintained a contact list averaging 90.75 unique individuals. On the contact list, 17.13% (15.55) were strangers, 32% (29) acquaintances, 43.66% (39.62) friends, and 7.25% (6.58) constituted the “other” category. Of the 68.62 acquaintances/friends, 29.69% (20.37) were of the opposite-sex. Of the 39.62 friends, 45.66% (18.09) were close friends, and 33.31% (13.2) new friends. Of the 68.62 acquaintances and friends, 21.07% (14.46) initially were strangers met online, and 51.1% (35.00) were ones users already knew prior to communication on MSN (some could have been people introduced by friends online and were not total strangers). A typical teen spent 1.37 weeks in converting a stranger to friend if a relationship developed.

Richness, Control, Self-Presentation, and Friendship Development (H1 & H2)

With two-tailed significance set at .05, Pearson’s correlational analysis was conducted to test H1 and H2. As predicted, both media richness and communication control, correlated at .64, had respective Pearson’s r ’s of .62 and .63 with MSN’s overall functionality. These data supported H1. Overall functionality displayed a correlation of .60 with self-presentation, which, in turn, positively correlated with friendship development ($r = .64$); which supported H2.

With the media characteristics of richness and control as exogenous variables, self-presentation as a mediating endogenous variable, and friendship as the endogenous variable, an exploratory path analysis was conducted via SPSS’ AMOS. The concern was whether richness and control had both indirect influence (via self-presentation) and direct influence on friendship development. As a result, the path analysis tested a reduced model (i.e., no direct link between richness/control and friendship development) against a fully saturated model that included both direct and indirect links from richness and control. A significant, maximum-likelihood (ML) Chi-square result ($\chi^2 [248, 2] = 70.76, p < .0001$) indicated that the fit between the reduced

model and the data was significantly worse than the fit between the full model and the data. Thus the full model held (see Figure 1), all path coefficients being statistically significant.

To further test the mediation effect of self-presentation, a bias-corrected and accelerated bootstrap method using 5,000 re-samples was performed, as such was recommended by Preacher and Hayes (2008, 2004). Their SPSS macro for mediation (2008) was used to generate statistical outputs. With richness set as the independent variable (IV), communication control the covariate, self-presentation the mediator, and friendship development the dependent variable (DV), the bootstrap procedure yielded a point coefficient estimate of .40 ($t = 6.39, p < .0001$) for the total effect of IV on DV; .22 ($t = 3.27, p < .0001$) for the direct effect of IV on DV; and .37 for the partial effect of communication control on DV ($t = 5.79, p < .0001$). Further, a 95% bootstrap confidence interval (.0938, .2906) indicated that the difference between the total and the direct effect of richness on friendship development (i.e., the indirect effect via presentation) was clearly greater than 0; which points to a significant mediation effect of self-presentation.

Then, communication control set as the independent variable and media richness the covariate, the same bootstrap procedure generated a point coefficient estimate of .45 ($t = 6.81, p < .0001$) for the total effect of IV on DV; .37 ($t = 5.79, p < .0001$) for the direct effect of IV on DV; and .22 for the partial effect of media richness on DV ($t = 3.26, p < .001$). A 95% bootstrap confidence interval (.0258, .1733) indicates that the difference between the total and the direct effect of communication control on friendship development (i.e., the indirect effect via presentation) is greater than 0; thus, the mediation effect of self-presentation was significant.

Richness, Control, Overall Functionality, and MSN Feature Use (H3)

Except for people search and contact list, which did not entail communication exchanges, all other MSN features were relevant to media richness and communication control. Frequencies

of using all these relevant features, except webcam, had moderately low positive correlations (i.e., from .14 to .42) with richness, control, and overall functionality. Webcam use frequency was found to positively correlate to richness (.28) and overall functionality (.19) but not control. Thus, H3 was largely supported. Table 3 shows all relevant correlations.

Additionally, the time involved in turning a nonfriend to friend positively correlated with richness (.19) (but not with control), overall functionality (.17), use of messaging (.17), and use of webcam (.15).

Feature Use, Self-Presentation, and Friendship Development (H4)

H4 predicted positive relationships among feature use, self-presentation, and friendship development. Eight of the ten feature use frequencies exhibited positive correlations with self-presentation and friendship development. The correlations ranged from .17 to .34. Two secondary feature use frequencies, file exchange and animation, also positively related to friendship development, but had no significant correlations with self-presentation. Thus, H4 received substantial but nonetheless partial support. See Table 3 for details.

Additional correlational analysis showed that 1) the total number of friends positively related to use frequencies of people search (Pearson's $r = .19$), messaging (.18) and its secondary feature of file exchange (.17), and webcam (.16). The total number of close friends correlated with use frequencies of messaging (.15) and its accompanying features of file exchange (.13) and animation (.15). The numbers of acquaintances and opposite-sex friends positively correlated with the use frequencies of people search (.15), webcam (.13), and MSN Space (.13). The number of new friends correlated only with use of webcam (.13) and MSN Space (.15). The number opposite-sex friends positively correlated with the use frequencies of people search (.21), webcam (.13), and MSN Space (.20). The number of new friends correlated only with the use

frequencies of webcam (.13) and MSN Space (.15). All reported correlations exceeded the two-tailed significance of .05.

Topics, Richness, Control, Presentation, Feature Use, and Friendship (RQ1)

Among the six discussion topics examined (boy/girlfriend, family issues, schoolwork, mutual friends, future aspiration, and hobbies), the discussion frequencies of all six topics but schoolwork positively correlated with media richness, control, overall functionality, self-presentation, and friendship development. The correlations ranged from .16 to .38. Schoolwork discussions correlated only with richness and overall functionality and showed no relationship with communication control, self-presentation or friendship development. Most of the topics, too, appeared related to MSN feature use. Schoolwork, however, correlated only with use of messaging and the accompanying features of file exchange and avatar. Discussions of family problems did not relate to messaging or most of its secondary feature use. See Table 4 for details.

Finally, topic discussion frequencies showed significant positive inter-correlations that ranged from .14 to .51 ($p < .05$), except in the case of the correlation between the discussions of boy/girlfriend and schoolwork.

Meanings of Relationship Labels

Post hoc focus group discussions yielded interesting findings regarding how teenagers used the relationship labels. Participants had no trouble defining “stranger” or “close friend.” A “stranger” on the contact list simply was someone whom a user did not know except for being aware of the existence of the screen name. A stranger would send “impersonal” mass mailings a teen user did not care to respond to. A “close friend” was someone a teen user trusted, shared secrets with, had deep feelings for, met frequently, communicated with via multiple channels (e.g., MSN, phone, SMS, and face to face), and/or had known for some time. However, the label

of “friend” evoked different interpretations. Two participants regarded anyone on the list as a “friend.” Another mentioned that a friend was someone “I exchange messages with.” Others expressed that some degree of trust, knowledge, caring and/or liking would have to exist in a friendship. Regarding “new friend,” the two students, who considered friends as all people on the contact list, predictably said that newly added people were new friends. Others indicated that a new friend was someone they did not, but wanted to know well, or someone they were ready to get to know and could trust to disclose some personal information to. Focus group members reportedly agreed in general that they did not have to meet an individual in person or see his/her photo to consider him/her a friend. For an “acquaintance,” participants usually would have “a little bit” personal information about him/her, were able to recognize the online identity, would engage in brief communication with him/her once in a while (e.g., acknowledging the recipient of group mailings), but did not have much interest in knowing him/her more. Two participants thought that new friends were like acquaintances.

When later asked to assess the relationship definitions used in the questionnaire, all participants said that labels (i.e., stranger, acquaintance, friend, new friend, and close friend) were clear-cut and they would not mistaken one for another in answering the related questions. This indicates that the questionnaire design using defined relationship labels was valid.

DISCUSSION

This study focused on the concepts of media richness and communication control to account for how presentation-motivated teenagers might use MSN features to build online friendships. Results indicate that both richness and control indeed left impact on teenagers’ use of MSN features, discussion topics, self-presentation, and the of efficiency of friendship development.

General Role of Media Richness and Communication Control

Richness concerns a medium's capacity to convey various types information cues (e.g., visual and audio) in a manner that approximates face-to-face communication. A rich medium is still less than optimum in terms of spontaneity and co-locational presence inherent in natural, face-to-face interactions, which, however, could produce anxiety and ineffective self-presentation. Communication control, on the other hand, provides one the ability to "edit" or "filter" communication so that he/she can selectively disclose self and maximize presentational effectiveness during an interaction. Both richness and control are important aspects of an IM's overall functionality. The path-analysis in Figure 1 shows that richness and communication control exert direct impact on self-presentation and friendship development. Likely, a high degree of media richness and communication control gives incentive to teen users to engage in communication for presentation and convey other information that leads to a friendship. For example, straightforward information exchange can reduce uncertainty and enhance friendship development. Of course, the direct link between self-presentation and friendship development clearly shows that the former likely is a basic precursor to the latter.

Richness, Control, and Use of MSN Features

The frequencies of using webcam and MSN Space both positively related to media richness; however, MSN Space had a low correlation with control whereas use of webcam showed no relationship to control. These results were not surprising as teenagers' use of rich features was more likely driven by these features' defining property of richness (i.e., information-carrying capacity) than by control. Messaging, on the other hand, allows users to go "lean" by exchanging text messages only or go "rich" by using secondary features such as animation, icon, and color change. As a result, use of messaging correlated almost equally with

richness and control. The positive inter-correlations among feature use frequencies could indicate that the greater the perceptions of overall media richness and communication functions, the more often they used MSN's individual features; or, a teen user's technical competence enabled him/her to use these features freely from one to another. Positive correlations between various use frequencies and self-presentation and friendship development provide empirical evidence for the view that the more one used MSN's features, the more effective self-presentation he/she had exerted, and, thus the more successful friendship development. Perhaps more frequent use of MSN features translated into more opportunities for self-presentation, and, thus, greater effectiveness in building friendships.

Richness, Control, and Communication Content

The content of communication may reveal further as to how friendships develop online. Unlike other social topics, the task-driven topic of schoolwork positively correlated with media richness and overall functionality, but had little to do with communication control, self-presentation, or friendship development. These findings are consistent with the original media richness theory (Daft & Lengel, 1984; 1986), which rested on the premise of efficiency-driven task communication. High information-carrying capacity (i.e., richness) and great overall functionality helped task communication such as schoolwork. On the other hand, communication control, highly relevant to strategic self-presentation, appeared to facilitate the conveyance of social and self-disclosure topics, such as boy/girlfriend, family affairs, mutual friends, future aspirations, and hobbies.

Further, use of rich features (e.g., webcam and MSN Space), facilitated the discussions of personal topics of boy/girlfriend, family problems, future aspirations and hobbies (but not schoolwork). Rich features, then, seemed to have served social purposes quite well.

Richness, Control, and Efficiency of Friendship Development

The descriptive findings regarding contact list composition and friendship history reveal that media richness contributed to the efficiency of teenagers' online friendship development. Teen users' time needed to turn a nonfriend to friend positively correlated with (1) richness but not with control and (2) use of messaging and webcam (see the additional findings following the testing of H3). Plausibly, the richer the feature, the greater the information-carrying capacity, the less time needed for self-disclosure and friendship development, particularly in the initial stages. Messaging, as the defining feature of any IM, must be used to communicate with online interacting parties. Understandably, messaging positively correlated with the time needed for developing friendships.

Rich features (e.g., webcam and MSN Space) did quite well in helping build first impressions and attracting acquaintances, new friends, and opposite-sex friends, but did not do much to foster close-friendship development (see additional correlations following H4 testing). Plausibly, rich features allowing large information flows of various cues (e.g., audio and visual) might have been conducive to quick superficial self-disclosure of physical appearances, yet insufficient for in-depth self-disclosure of the innermost thoughts and values for friendship upgrading. As a matter of fact, the total number of close friends related only to messaging, that showed a greater correlation with communication control than did rich features. Messaging, primarily text-based, on the other hand, reportedly provided MSN-using teenagers opportunities to exchange deep thoughts and thus contributed to the growth of close friendships.

Theoretical and Practical Implications

Theoretically, this study extends the applicability of media richness, a concept previously restricted in organizational task situations in which managers choose media for maximum

delivery efficiency, to media use in online social interactions. Communication control, which was mostly assumed but seldom tested in the computer-mediated-communication literature as a concept important to lean, asynchronous, and mediated exchanges, proves to be vital in rich, synchronic, simultaneous, and multi-mediated communication as well. The study finds that both richness and control, not each alone, contribute to presentation-driven online communication that leads to friendship development.

Practically, the current findings can shed light on how a teenager can choose and use an IM's various multi-media features to build relationships. For example, rich features can help teenagers to get to know each other quickly but only superficially; in-depth communication via messaging is likely needed if a teenager intends to develop a close friendship. Technologically, any sustainable upgrade for online social networking sites (e.g., messengers) must endeavor to enhance *both* richness and control capabilities.

Limitations and Future Research

The current study manifest several limitations. First, given the nature of a convenience sample, the present findings can be generalized only with caution, particularly to settings and populations dissimilar to the current context. Second, the one-shot survey design does not provide contextual information regarding how a relationship evolves. Future research can examine the processes of online friendship development via a longitudinal design. Third, respondents' recalls of numbers of strangers, acquaintances, friends, and close friends may not be accurate. Measures such as cross-referencing with those on the contact list can increase recall accuracy. Fourth, future research can also follow up on the current study by examining sequential use of media such as how a teenager may change mode of communication as a friendship develops, evolves, or disintegrates. Fifth, cultural impact on the link between IM use

and friendship development may also be a promising area for future investigation.

Finally, the relationship definitions helped respondents categorize their online contacts along the classical relationship progression of stranger, acquaintance, new friend, and close friend; which provided a generally accurate basis for analyzing online friendship development. However, such labels without clear-cut definitions could result in ambiguity as teenagers use these relationship labels in varied ways. The post hoc group discussions showed that some teen users liberally regarded everyone on the contact list as a friend. A few teens perceived “acquaintance” and “friend” in a similar manner. Thus, studies on online friendship will need to examine the actual meanings of each label and avoid taking for granted that the same label used by different individuals means the same thing.

Conclusion

Media richness and communication control are concepts that help explain teenagers’ use of MSN features. The current findings lend support to the impact of media richness and communication control on IM use and online friendship development. It appears that both, but not one alone, contributed to MSN’s overall functionality and assisted in self-presentation and friendship development in the current study. Media richness aided in both social and task communication, whereas communication control seemed to have contributed primarily to social, friendship-conducive communication. Use of rich features, such as webcam and MSN Space, seemingly facilitated the increase of acquaintances, new friends, opposite-sex friends, and, thus, the total number of friends. Primarily text-based messaging, however, helped with the progression toward close-friendship more than did rich features.

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Table 1

*Multiple-Item Measures Used**a. Media Richness/Information-Carrying Capacity*

- MSN allows me to express my feelings fully.
- MSN allows me to freely say what I intend to say.
- MSN allows me to explain complex/difficult ideas well
- MSN allows me to use multiple cues (e.g., text, audio, visual)
- MSN gives me a feel of face-to-face communication

b. Communication Control Capacity

- On MSN, I feel I have full control in what I intend to communicate.
- On MSN, I can control communication pace on MSN.
- On MSN, I can control the length of communication time
- On MSN, I can control my own image well on MSN
- On MSN, I can control the use of features at will.
- On MSN, I can control whether to respond to oncoming messages.

c. Overall Functionality

- MSN is easy to use.
- MSN is fun to use.
- MSN is flexible to use.
- MSN is effective for online communication.
- MSN alleviates my communication apprehension.

d. Self-Presentation

- With MSN, I can put myself in a positive light easily.
- With MSN, I can present an attractive persona of myself effectively.
- With MSN, I can appear in a trustworthy manner.
- With MSN, I can effectively present myself differently to different people.
- With MSN, I can show how special I am.

e. Friendship Development

- MSN helps me meet new people
 - MSN helps me develop friendships with new people
 - MSN helps me obtain others' personal information I am interested in.
 - MSN helps me know others well.
 - MSN helps me to maintain strong relationships with my friends.
 - MSN likely helps me maintain long-term relationships with my friends.
-

Table 2

Correlations among Frequencies of MSN Feature Use

MSN Features	1	2	3	<i>3a</i>	<i>3b</i>	<i>3c</i>	<i>3d</i>	<i>3e</i>	4
1. Creating Contact List									
2. People Search	.25**								
3. Messaging	.24**	-.03							
<i>3a. File Exchange^a</i>	.26**	.08	.48**						
<i>3b. Color Change</i>	.31**	.45**	.13*	.25**					
<i>3c. Icon</i>	.22**	.13*	.30**	.29*	.30**				
<i>3d. Animation</i>	.24**	.10	.29**	.38**	.39**	.47**			
<i>3e. Avatar</i>	.34**	.43**	.22**	.22**	.48**	.51**	.30**		
4. Webcam	.29**	.43**	.18**	.21**	.39**	.23**	.20**	.37**	
5. MSN Space	.27**	.46**	.10	.11	.31**	.25**	.15*	.46**	.47**

** indicates a correlation significant at the 0.01 level (2-tailed).

* indicates a correlation significant at the 0.05 level (2-tailed).

^a indicates that italicized ones are secondary features .

Table 3

Correlations between MSN Feature Use and Richness, Control, Overall Functionality, Self-Presentation, and Friendship Development

	Richness	Control	Overall Functionality	Self-Presentation	Friendship Development
<i>Use of MSN Features</i>					
1. Creating Contact List	NA	NA	.27**	.24**	.33**
2. People Search	NA	NA	.15*	.34**	.34**
3. Messaging	.33**	.30**	.42**	.20**	.28**
<i>File Exchange^a</i>	.24**	.26**	.30**	.10	.17**
<i>Color Change</i>	.18**	.20**	.29**	.19**	.28**
<i>Icon</i>	.32**	.21**	.38**	.18**	.32**
<i>Animation</i>	.16*	.18**	.31**	.11	.25**
<i>Avatar</i>	.32**	.19**	.27**	.28**	.28**
4. Webcam	.28**	.11	.19**	.25**	.29**
5. MSN Space	.36**	.14*	.26**	.27**	.23**

** indicates a correlation significant at the 0.01 level (2-tailed).

* indicates a correlation significant at the 0.05 level (2-tailed).

^a indicates that italicized ones are secondary features .

Table 4

Correlations between Topics Discussed and Richness, Control, Overall Functionality, Self-Presentation, Friendship Development, and MSN Feature Use

Topics	Boy/ Girlfriend	Family Problems	School/ work	Mutual Friends	Future Aspirations	Hobbies
Richness	.39**	.21**	.17**	.24**	.36**	.37**
Control	.27**	.16*	.12	.21**	.19**	.33**
Functionality	.22**	.15*	.24**	.27**	.22**	.36**
Self-Presentation	.29**	.25**	.11	.23**	.28**	.32**
Friendship Development	.35**	.22**	.06	.22**	.34**	.38**
MSN Feature Use Frequencies						
1. Creating Contact List	.19**	.19**	.11	.21**	.29**	.30**
2. People Search	.34**	.27**	-.05	.03	.28**	.17**
3. Messaging	.25**	.02	.18**	.26**	.12	.31**
<i>File Exchange^a</i>	.22**	.10	.19**	.24**	.20**	.24**
<i>Color Change</i>	.27**	.11	.04	.16*	.25**	.11
<i>Icon</i>	.26**	.07	.05	.19**	.22**	.28**
<i>Animation</i>	.23**	.18**	.04	.15*	.30**	.26**
<i>Avatar</i>	.21**	.11	.18**	.29**	.25**	.36**
4. Webcam	.32**	.18**	-.00	.11	.22**	.21**
5. MSN Space	.25**	.18**	-.02	.07	.21**	.16*

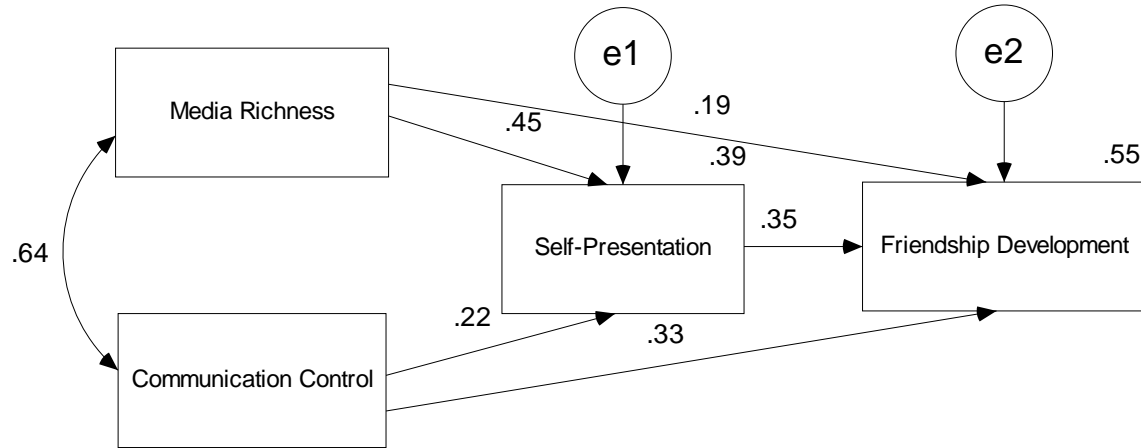
** indicates a correlation significant at the 0.01 level (2-tailed).

* indicates a correlation significant at the 0.05 level (2-tailed).

^a indicates that italicized ones are secondary features .

Figure 1

A Path-Analysis of Media Richness, Communication Control, Self-Presentation, and Friendship Development



Model Fit Summary (CMIN)

Model	NPAR	CMIN	df	p	CMIN/DF
Default model	12	70.760	2	.000	35.380
Saturated model	14	.000	0		
Independence model	8	448.660	6	.000	74.777

Sample size: 248,
Computation of degrees of freedom (Default model)
Number of distinct sample moments: 14
Number of distinct parameters to be estimated: 12
Degrees of freedom (14 - 12): 2
Chi-square = 70.760
Degrees of freedom = 2
Probability level = .000