An Exploratory Investigation into Instant Messaging Preferences in Two Distinct Cultures

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Abstract—The current trend of increasing instant messaging (IM) use and its potential growth motivate this study. It offers a novel exploration of users' preferences for IM in the context of the use of other traditional and new communication media: face-to-face, telephone, email, and short messaging service (SMS) in two distinct cultures: Australia and China. It examines the impact of demographics, media experience, media richness perception, and national culture on media preferences. Our results, based on a student survey conducted in the two countries, show that women prefer IM for communication activities that require more attention and personal presence and prefer email for communication activities that require less personal presence. Communication technology experience may predict the adoption of new technology, such as IM and SMS, but has no effect on media that are already widely adopted, such as email. Email was clustered with face-to-face and telephone as the most preferred media for any communication activity, while IM and SMS clustered together and were the least preferred media for communication. After controlling for demographics and media experience, we found significant cultural differences in IM, telephone, and email preferences. Chinese preferred to use IM and telephone, while Australians preferred to use email. The cultural impact on technology use is persistent.*

Index Terms—Communication technology cluster, cross-cultural communication, email, instant messaging (IM), media selection.*

The rapid development and diffusion of new communication technologies in recent years has offered people many more options for communicating in their workplace and personal life. Of these new communication technologies, instant messaging (IM) is one of the most rapidly proliferating communication technologies adopted [1]–[3]. According to a report from International Data Corporation, in 2005, more than 28 million business users worldwide used enterprise IM products to send nearly one billion messages a day [4]. The Radicati Group predicted the enterprise IM market to balloon to 349 million users in companies in 2007 (see [5]). This suggests that IM deserves detailed study.

However, due to its relative novelty as a communication medium, academic interest in IM is only recent and fairly sparse [6]–[9]. Although media selection theories offer some insight into the reasons people choose a specific medium

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over alternative media for communication, little empirical research has systemically examined users' perceptions or their behaviors (i.e., how they use and why they have adopted IM, although notable exceptions include [6] and [8]). Given the fast pace of technology development, this is not surprising. As stated by Flanagin and Metzger, "This rate of change, however, only underscores the importance of a rigorous examination of new communication technologies' development and use" [10, p. 154].

Furthermore, most IM-related studies have considered IM in isolation [7]. As O'Sullivan noted, use of any one technology should be considered in light of the repertoire of other media available to understand fully when, why, and how any single medium is used [11]. IM is often used in conjunction with other media, and this unusual relationship with other media is certainly deserving of further investigation [7]. In addition, despite the fact of increasing use of IM, little research has explored how the use of IM is assimilated into people's existing set of media behavior [12]. The study reported here contributes to the efforts to examine people's behaviors and their views of when they adopt IM and how they prefer this communication technology, in conjunction with face-to-face, telephone, email, and short messaging service (SMS).

Despite the fact that IM and other media have become common tools of communication in developed countries, little is known about how people use IM and other media for communication in different cultures. The use of IM and other communication technologies in organizations

has made it possible for organizations to expand their business across cultures. Global virtual teams—groups of people from different countries engaged in a common organizational task through electronic information and communication technologies (e.g., IM, email, video conferencing)—have become a new type of business team structure. Thus, understanding how people from different cultures use IM and other media for communication can be the difference between success and failure in implementing new information technology across cultures [13]. It can also increase the chance of improving organizational communication performance, especially for the cross-cultural communication of global virtual teams.

To be more specific, this study examines whether IM preference will be influenced by people's age, gender, media experience, and media-richness perception. This study also investigates how IM preference is being integrated into existing patterns of communication behavior. Finally, this study explores how culture affects IM and other communication media preferences after controlling for demographics, media experiences, and media-richness perception. To accomplish this, we collected data from two different cultures, Australia and China, to examine how IM and other contemporary communication media are preferred to accomplish different communication tasks.

In the following sections, we first explore various functions of IM as a communication medium. Then, we explore theories around communication media selection and technology cluster as they might help us to understand how IM is perceived and preferred over other media. We discuss the concept of national culture and its relationship with communication media next. Then, we describe the research method that we employed and the results of this research. Finally, we conclude with a discussion of the implications of the findings in terms of the new media environment.

TEXT-BASED INSTANT MESSAGING: DEFINITION AND PRIOR RESEARCH

The IM system discussed in this paper refers to internet-based, near-synchronous, text-only chat, with one-to-one or small-group communication among users on the same system. IM systems of various forms have gained high popularity during the past few years. IM uses a near-synchronous (see [14]) conversational tool by which the participants know that other participants are presently logged on, even though they are not co-located for face-to-face communication and are unable to take

advantage of the multimodality that face-to-face communication allows. Thus the time delay is much less compared to email interaction, and the message will be read within seconds—in this regard coming closer to spoken communication. Apart from this awareness functionality, IM is also unique in that its users often have certain levels of control over what can be "seen" by others [15]. For instance, IM applications will allow users to change their status to provide a more detailed view of their availability (e.g., busy, in a meeting, out for lunch, away from desk). Another reason for the increased popularity of IM is that as IM is almost synchronous and text-based; allowing group communication as well as one-to-one, it almost entirely combines the features of the telephone, email, and chat rooms into one [8]. The younger generation has already adopted IM [16]. But, IM is no longer just a facet of teenage life. It now speeds everything from naval operations to customer service [1]. According to analysts, corporate use of IM is proliferating far beyond early expectations, and IM is invading enterprises at a rapid rate [4].

The increasing popularity of IM use in the workplace has recently captured information systems researchers' attention [9]. Cameron and Webster found that IM was perceived to be rich on only one dimension of the media richness concepts measured: immediacy [6]. They also found that employees engaged in polychronic communication with IM took part in multiple forms of multitasking. Hameed, Mellor, and Badii found that more than half of their respondents preferred talking face-to-face over IM for developing interpersonal relationships [17]. Nardi, Whittaker, and Bradner found that IM was used for four major functions: quick question and clarification, coordinating impromptu work-related or phone meetings, coordinating impromptu social meetings, and keeping in touch [8]. Although Hung, Kong, Chua, and Hull found that IM was considered a highly synchronous communication medium, it was not considered as effective for convergence communication as for conveyance communication [7]. They also found that IM was mainly used for short, simple, and quick communications, as also suggested by Nardi et al. [8]. Quan-Haase, Cothrel, and Wellman found that IM was used extensively in a high-technology firm for exchanging work-related messages, coordinating and arranging meetings, and inquiring about colleagues' availability for discussion [18].

However, these studies have primarily focused on this technology alone and no others. As a communication tool, IM is often used along with other media. Thus, the availability and

use of other media may influence how IM is perceived along many dimensions [7]. In this study, we compare the preference for IM to other available media, including face-to-face, telephone, email, and SMS in order to understand people's use of communication technologies within a multiple-medium environment. SMS, a service for sending short text messages to mobile phones, is an asynchronous mode of communication. With the tremendous growth of mobile phone use, SMS has also gained popularity. According to MobileYouth, Americans sent nearly 48.7 billion SMS messages in the last 6 months of 2005, an increase of 50% from 32.5 billion in the first 6 months of 2005 [19]. As a technology for communication, SMS is easily brought within the realm of computer-mediated communication (CMC) [20].

Given that IM, email, and SMS all send electronic messages, they have several important characteristics in common. Each requires written communication by typing. Writing the message requires more physical effort and a longer time than speaking. Each message is presented in text only, and what can be expressed is constrained by the lean written system, which in this case is alphabetic. More than that, all of them lack the full range of paralinguistic cues, providing no verbal or social clues because communicators are not visually or auditorially present. The feeling of contact or social presence via each of them is lessened, and communication is likely to be described as less friendly, impersonal, and task-oriented [21]. However, all such types of communication disregard distance as a barrier since written communication is possible even with those physically separated in time and space. In terms of differences, IM is a near-synchronous medium as the interlocutors are online simultaneously, while email and SMS do not have that requirement.

Little IM research to date draws from a theoretical base [6]. As a new technology, IM enables people to communicate with others. Thus, traditional communication media selection theories may help to explain the purpose for which this new medium is being used, the task for which this medium is best suited, and people's perceptions of this medium [10].

MEDIA SELECTION THEORIES

According to Daft and Lengel, media vary in their capacity to transmit rich information [22], which refers to the ability of information to change understanding within a time interval. Communication media are ranked along a richness hierarchy based on criteria such as speed of feedback, the form of language employed (body, natural, and/or numeric), language variety, and personal focus [22], [23]. Media richness theory proposes that individuals seek to match the richness of a communication medium with the complexity of the communication task at hand for better performance. Studies have found that face-to-face communication is described as the richest medium and, therefore, is the most effective medium for reducing task equivocality, while email and memos, described as leaner, are preferred for less-equivocal tasks [23]. While this rational-choice perspective is supported by strong evidence, empirical and anecdotal evidences illustrate sometimes contrasting views on why new media are selected (e.g., [24], [25]). For instance, Rice and Shook [26] and Markus [25] found that, contrary to the prediction of media richness theory, top managers used certain lean media more often than did lower level managers. Research shows that email and other CMC technologies are used effectively for socioemotional tasks (e.g., [27]–[30]).

These inconsistent results of media richness theory for the new media suggest that although media attribute (media richness in this case) is an important concern, especially for managers and decision makers, it should not be our only concern in making sense of communication media selection [31]. This rational model of media choice has led to inadequate attention to the individual differences and social contexts in which media choice and usage decisions are made. Furthermore, Fulk, Schmitz, and Steinfield point out that rational explanation of media choice is limited by assumptions about the rationality and objectivity of decision makers [24]. Decisions about media do not occur in a vacuum; both decision makers and media are socially embedded within organizational settings; thus, media perceptions and choices are subjective and socially constructed [24]. These studies, therefore, suggest that examination of media attributes independent of the broader communication contexts in which they are used may not be enough [10]. As suggested by some researchers, individual differences, participants' media experience, and the sociocultural context surrounding them are also important in the assessment and selection of media, especially for new media (e.g., [12], [13], [32]–[36]). Thus, apart from media richness attribute, we also argue that individual differences, media experience, and cultural values will have an impact on how IM and other communication media are chosen. In this section, we focus on individual difference and media experience factors, and we discuss the cultural impact on media selection in the section after it.

Individual differences are important indicators of adoption of communication technology [37], [38]. They may facilitate or constrain the usage of communication technology. Fulk posits that those who are younger and more educated would be more receptive to a newer medium because younger and more technically sophisticated individuals may possess less anxiety in using the new technology and may be better trained [33]. Past studies on the effect of situational/demographic variables on the usage of email suggest that younger (age), better-educated (education), and experienced (extent of experience) users tend to prefer the use of email for communication to a greater extent than other users [39], [40]. Gefen and Straub found that women and men differ in their perceptions of, but not use of, email [41]. Nachmias, Mioduser, and Shemla found more boys than girls used the internet, with no significant differences in the extent and modes of internet use among different age groups [42]. In contrast, Zhang found that younger and better-educated people believed the internet to be more useful than other users did, with no significant differences in the perceptions of internet usefulness between male and female employees [43].

Carlson and Zmud's channel expansion theory suggests that as users gain experience with the medium, messages, and fellow participants, their perceptions will evolve [44]. In their study of the effects of learning experience with nine communication media, based on perception changes of media appropriateness, King and Xia found that an individual's specific experience with communication media affected perceptions of media appropriateness, and this positive effect of changes in learning experience was particularly salient for new media [35].

These studies, however, were conducted before IM gained popularity. Although the handful of available IM studies explained how and why people used IM in the workplace according to media selection theories, we do not have consistent and conclusive results of how IM is being perceived and preferred. As IM becomes more popular as a communication tool, a good understanding of people's preferences for IM is of importance for effective communication. Thus, the first goal of this study is to explore whether IM preference is associated with medium richness, individual differences, and/or medium experience.

RQ1. Is IM preference associated with medium richness, demographic characteristics, and/or medium experience?

TECHNOLOGY CLUSTER

While research into IM use is growing, the emphasis is often on the use of this new medium alone. As available communication media choices increase, it is important to consider how people integrate IM into existing patterns of behavior in complex communication environments. This may be determined by compatibility between communication technologies and existing social norms or patterns of communication behavior [45]. Perse and Courtright also suggest that new media technologies are most likely adopted if they are functionally similar to existing ones [46]. Rogers defines this phenomenon as "technology cluster" [45]. Namely, people may adopt a group of technologies that can be perceived as functionally interrelated. By adopting this technology cluster concept, two studies—conducted more than a decade ago when computers and emails were in the early adoption stage—clustered traditional media (e.g., face-to-face and telephone) and new media (e.g., email) separately [46], [47]. In these studies, communication technologies were clustered very clearly along technical attributes. However, a recent study contended that email was perceived to be functionally equivalent to traditional telephone, while face-to-face was still distinct in its usage [10]. The authors suggest that "newer media are transitioning toward the roles of more traditional ones due to their capability to improve or augment the capabilities of existing technologies" [10, p. 171]. As we discussed earlier, IM has some important technical attributes in common with other media, such as email and SMS. However, compared with email, IM is still new, and it is just recently becoming popular. How do people perceive the appropriateness of IM in relation to traditional and new media forms? How is IM being clustered along with other media technologies? Given the recent and widespread adoption of IM, coupled with the complex interdependence of communication media on each other, examining how IM is related to other existing media on their perceived preferences is a timely pursuit [10]. However, little research has explored how the use of IM is assimilated into people's existing set of media choices [12]. Given the limited research in this area, the following research question guided this study.

RQ2. How is IM preference related to other available media preferences?

CULTURE AND COMMUNICATION TECHNOLOGIES

Advanced information and communication technologies have made it possible for people to communicate across national boundaries. Motivated by Hall, who noted that "there is no one

aspect of human life that is not affected by culture" [48, p. 14], and others who suggest that behavior models do not universally hold across cultures [13], [49]–[52], we argue that people's preferences for IM and other communication media are subjective and are influenced to some degree by their national cultures.

Hofstede's original taxonomy describing culture along the dimensions of uncertainty avoidance, power distance, individualism/collectivism, masculinity/femininity, and long-/short-term orientation [50], [51], has been recognized as the most popular conceptualization of national culture [53]. Some researchers criticize Hofstede's work on the basis of methodologies used and the validity of the data. The central critique of his work is that it relies on interviews with IBM employees conducted between 1968 and 1973, thus raising serious questions about extending any of Hofstede's findings to national cultures (e.g., [54]). Yet, Hofstede's framework has been adopted and widely validated by more than 140 studies [55] and forms the basis for a significant proportion of the cross-cultural studies undertaken in various disciplines [56], [57]. In a recent cross-cultural study of information systems that examined how national culture, social presence, and group diversity may affect majority influence in group decision making, Zhang, Lowry, Zhou, and Fu show that Hofstede's construct of the individualism/collectivism dimension appears to still hold [58]. By adopting Hofstede's original scales, the authors found that Chinese participants were significantly lower on the index of individualism than US participants. Zhang et al.'s study supports Hofstede's claim in his updated work—that his cultural model is still valid in the digital age [59]. Hofstede's model is adopted as a theoretical framework for this current study.

Hofstede defines culture as "collective programming of the mind which distinguishes the members of one human group from another" [50, p. 25]. Numerous cross-cultural social psychology studies have demonstrated that culture and communication technology are closely related (e.g., [50], [60]). As communication technology allows people to communicate across distance and, therefore, across cultures, communication scholars have acknowledged the importance of culture on communication technology adoption and use. (Please refer to [53] for a recent review of culture in information systems research.) Those studies, however, did not examine the cultural impact on IM preference.

TABLE I
CULTURAL DIMENSION SCORES FOR THREE COUNTRIES*

Country	Uncertainty Avoidance	Power Distance	Individualism	Masculinity	Long-term Orientation
Australia	51 L**	36 L	90 H	60 H	31 L
China	60 M	80 H	20 L	50 M	118 H
USA	46 L	40 L	91 H	62 H	29 L

*Based on Hofstede [51], [61], Hofstede, Bond, and Luk [62]
**L = bottom third, M = medium third, H = top third,
among 53 countries and regions for the first four dimensions
and among 23 countries for long-term orientation.

Two countries of interest in this study, Australia and China, are quite different on all Hofstede's cultural dimensions. Table I sets out Hofstede's dimensions for Australia and China based upon a combination of values from Hofstede [51], [61] and the Chinese Value Survey (CVS) [62]. For comparison purposes, the scores on all five dimensions for the US are also listed; Australians score very similarly to the Americans. The substantial differences between Australia and China make the two countries likely to expose different media adoption and use behavior. Among these dimensions, uncertainty avoidance, power distance, and individualism/collectivism have the most direct bearing on diffusion, adoption, and use of communication media and, therefore, are the dimensions that will be discussed in connection with media selection theories [13], [53].

Hofstede defines uncertainty avoidance as the extent to which a society feels threatened by uncertain situations and avoids these situations by providing career stability, establishing formal rules, and not tolerating deviant ideas [50, p. 161]. In countries where uncertainty avoidance is low, people accept uncertainty and would feel "what is different is curious" [51, p. 119]. Thus, they tend to view the unknown as exciting and are more likely to try out new things. Cultures that score highly on uncertainty avoidance would have a feeling of "what is different is dangerous" [51, p. 119]. Thus, they may consider ambiguous or novel situations threatening or risky and, consequently, are more likely to reject novel things. As a result, they may identify new communication technologies, such as IM, as more risky and more threatening than sticking to existing patterns of their media usage. In their recent cross-cultural information-systems research review, Leidner and Kayworth found that uncertainty avoidance played

a significant role in determining how groups will potentially adopt and diffuse information and communication technologies [53]. The logic of this finding is that since information technology is inherently risky, those less comfortable with uncertainty will be less likely to adopt and use new technologies [53]. Analyzing consumption data for 56 countries with respect to Hofstede's dimensions and several hard factors, Yeniyurt and Townsend found uncertainty avoidance, among other dimensions, to be negatively correlated with the adoption of information and communication technologies like the internet and personal computers [57]. In a study surveying university students, Thatcher, Srite, Stepina, and Liu reported that students from countries high in uncertainty avoidance were less willing to experiment with new information technologies [63]. Apart from the impact on communication technology adoption, uncertainty avoidance was also shown to influence communication technology use. Straub demonstrated that the Japanese cultural proclivity to avoid uncertainty affected the way in which knowledge workers relied on traditional, information-rich media for communication work, rather than asynchronous, lean electronic media such as email and fax [13].

Power distance is the extent to which an individual accepts large differentials of power and inequality [50]. Cultures higher in power distance will be characterized by greater acceptance of inequalities, more autocratic leadership, and greater centralization of authority. Research shows that people from high power-distance cultures will be less innovative since people in such societies are encouraged to respect authority, follow directions, and avoid standing out through original thinking [57], [64]. In those societies, people with less power may feel that they have fewer resources or opportunities necessary to innovate; therefore, over time, they might be less prone to innovate with an information technology [63]. Comparing executive information systems (EIS) use among managers from Mexico, Sweden, and the US, Leidner, Carlsson, Elam, and Corrales found that EIS was more favorably perceived in countries with lower power distance and uncertainty avoidance than in countries high in power distance and uncertainty avoidance [65]. In a study examining the role of cultural difference in the acceptance of the internet, as moderated by socioeconomic variables, Yeniyurt and Townsend demonstrated that power distance and uncertainty avoidance hindered the acceptance of this new technology [57]. The concept of power distance has been incorporated in a large subset of empirical studies of group decision making in different forms in group support systems (GSS)

research (e.g., [66]–[69]). Collectively, the GSS research provides evidence that the benefits of GSS could provide an opportunity for group members from high power-distance countries to share their opinions frankly [67]. Therefore, power distance plays a moderating role during group decision making.

The individualism/collectivism dimension appears to be the most extensively employed dimension in cross-cultural communication-technology adoption and use research [53]. According to Hofstede, the individualism/collectivism dimension is a conglomeration of values concerning the relation of an individual to his or her collectivity in society [50]. Individualism is a preference for a loosely knit social framework wherein a person prefers to act as an individual rather than as a member of a group. Its opposite, collectivism, represents a preference for a tightly knit social framework in which individuals can expect their relatives, clan, or other in-group to look after them in exchange for unquestioning loyalty [70]. People in individualistic cultures emphasize the fulfillment of personal values and needs over and above those of groups [63]. As a result, people from those societies tend to have more favorable attitudes towards differentiation and uniqueness [71]. Empirical research indicates that a higher score in the individualism dimension has a positive relationship to the innovativeness of a country's consumers [72] and a positive relationship with internet-diffusion rates [57]. Utilizing Hofstede's cultural dimensions and comparing internet-adoption rates in the US, Japan, and other countries, la Ferle, Edwards, and Mizuno found negative correlations with uncertainty avoidance and power distance and, most significantly, positive correlations with individualism [73].

The individualism/collectivism dimension also influences the way people prefer media for communication. Individualistic cultures' high attraction to the relatively impersonal computer-mediated communication technology for communication is connected with the essential and product-specific aspects of cultural communication styles [74]. Hofstede suggests that high-context versus low-context communication style is considered "as an aspect of collectivism versus individualism" [59, p. 212]. Individualistic cultures tend to engage in low-context communication that is straightforward, explicit, and direct. In contrast, collectivistic cultures are likely to have highly context-dependent communication that is abstract, implicit, and indirect [48]. Hall demonstrates that a high-context communication style perceives the external environment, the situation, and nonverbal

behavior to be highly significant for the creation and interpretation of communication, whereas a low-context communication style believes that these factors are less important [48]. Due to their low-context communication style, Americans were found to find it much easier to convey their opinions and felt more able to explain themselves via asynchronous communication tools than did Asian participants [75]. In contrast, Tan, Wei, Watson, Clapper, and McKean [67] suggested that people from a collectivistic culture, such as Singapore, may see mediated media as a threat to group harmony because mediated media allowed loyalty and obligation to be challenged.

Collectively, these studies show that the degree of fit between social groups' cultural values and values embedded in the communication technology have emerged as an important construct for studying the relationship between values and communication technology adoption and usage [53]. These studies, however, did not consider IM. As a new messaging medium, it is unclear how culture influences people's preferences for IM for communication over other technologies after controlling for demographics, media experience, and media attribute factors. Given the limited research in this area, the following research question guided this study.

> **RQ3**. How do people from Australia and China differ in terms of IM preference after controlling for demographic variables, medium experience, and medium richness attribute?

RESEARCH METHODS

Samples and Data Collection　Data for this study were collected through a survey both in Australia and China. The participants were 97 second-year undergraduate students from a large university in Australia and 115 first-year MBA students in a large university in China, giving an overall sample of 212. Tables II and III provide frequencies and descriptive statistics for demographic variables.

All materials were translated into Chinese and then translated back, to ensure that the Chinese version of the questionnaire represented the intent and spirit of original documents and was not merely a literal translation. All participants completed the questionnaire in their native language. The questionnaire was completed in classrooms and required approximately 20 minutes to complete.

Measures　A questionnaire was designed to capture data required for this study (the Appendix provides a list of all questions used in this survey). Five communication media chosen in this study were

TABLE II
FREQUENCIES OF DEMOGRAPHIC VARIABLES

	Australia		China	
	Freq.	Percent	Freq.	Percent
Gender				
Male	73	75.3	73	63.5
Female	24	24.7	42	36.5
Age (range)				
20 and under	82	84.5		
21–25	5	5.2	10	8.7
26–30	7	7.2	105	91.3
31 and above	3	3.1		

TABLE III
DESCRIPTIVE STATISTICS OF DEMOGRAPHIC VARIABLES, MEDIA
EXPERIENCE, AND MEDIA RICHNESS

	Australia		China	
	Mean	SD	Mean	SD
Work experience (years)	1.89	3.59	5.58	1.65
IM use (years)	3.86	1.28	1.89	3.72
Email use (years)	5.54	2.12	3.87	5.37
SMS use (years)	2.63	0.71	2.30	0.80
IM richness	4.07	0.90	4.38	1.00
Face-to-face richness	6.41	0.69	6.25	0.56
Telephone richness	4.97	0.84	4.92	0.96
Email richness	3.48	1.02	3.53	1.12
SMS richness	2.65	0.93	3.06	1.25

IM, face-to-face, telephone, email, and SMS. These five media were commonly used by all participants. Media richness perception was measured with a four-item scale developed by D'Ambra and Rice [76]. The reliabilities of these scales were generally satisfactory (0.74, 0.67, 0.70, 0.65, and 0.71 for IM, face-to-face, telephone, email, and SMS respectively).

To measure how media were preferred in different situations, we chose six communication activities in which students typically engage to communicate with their peers and lecturers in their studies. These communication tasks were borrowed from D'Ambra and Rice's work [76] and were used in other media choice studies [77], [78]. All communication tasks were rephrased to fit the university context (see Table IV). For each communication task, media

TABLE IV
FACTORS AND LOADINGS OF COMMUNICATION ACTIVITY
EVALUATIONS

Activity Evaluation	Factor 1	Factor 2
Respond to a question by the lecturer concerning your group's work.	.865	
Reply to an enquiry from another group member regarding your group's progress.	.854	
Schedule a group meeting in two weeks.	.725	
Convince your group of the suitability of an idea that you have.		.839
Need to discuss a problem about your group with the lecturer in charge of the course.		.728
Want clarification from lecturer-in-charge for a critical issue of your group project		.654
Eigenvalue	3.00	1.04
Percentage of variance explained	50.1	17.27

preference was generated by asking participants to choose from the most preferred medium to the least preferred medium on a 5-point, equal-interval scale ranging from 1 (least-preferred medium) to 5 (most-preferred medium) [13], [78], [79]. Thus, the higher the number, the more likely the medium was to be chosen.

Each communication activity's equivocality was measured by using Goodhue's three-item scale [80]. Respondents were asked to assess each task's equivocality on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree); thus, higher values indicate more equivocality. The Cronbach alpha reliability was generally satisfactory, ranging from 0.72 to 0.91 across the six tasks.

Other main data captured in this study included participants' age group, gender, ethnicity, work experience, and access to media. Their media experience was measured by asking participants to provide the number of years they had used IM, email, and SMS on a regular basis.

Homogeneity of Each Cultural Group and Communication Environment To make a valid comparison between two cultural groups, it is necessary to establish the homogeneity of each cultural group of respondents in terms of their perceptions of and preference for the technologies. At the same time, it was also necessary to ensure that samples from two different cultures were matched so that the samples are similar in all respects except culture [81].

The sample in Australia was all ethnic Australian (white males and females). The Chinese respondents were all ethnic Chinese. Both samples had full access to the telephone, mobile, computer, and internet, provided either by the universities or themselves. All students were doing business-related programs, and they all had similar communication options available. Thus, it is reasonable to treat each group of students as one group of Australian or Chinese students. The differences found between these two cultural groups were age, work experience, and years of using IM, email, and SMS. These individual and media-experience differences will be included in subsequent analyses.

There is always an issue of using student subjects in information systems research. Students seem not to have enough work and communication experience compared to subjects from organizations. This study's use of students can be justified by the following rationales: The student subjects had many common communication media to access at the time of this study. They were all doing full-time study, which required them to take four to five courses concurrently to complete their degree in the required time frame. In addition, we deliberately chose students who engaged in at least one semester-long group assignment at the time of this study. Thus, they had enough opportunities to communicate with their group members or lecturers via different media. Collectively, students in this study had many opportunities to access different communication technologies in a natural and business-like communication environment.

RESULTS

Dimensionality of Communication Activities
To determine underlying dimensions in equivocality of six communication activities, the overall mean task equivocality for each communication activity was entered into a principal component analysis. Table IV shows the results of the factor loadings of the six communication activities. Three communication activities—responding, replying, and scheduling activities—loaded on the first dimension and explained 50% of the variance. The remaining three communication activities loaded on the second dimension and explained 17% of the variance. Thus, these six communication activities are a two-dimensional construct. To better describe the nature of these two dimensions, we adopted labels suggested by King and Xia [35]: nonreciprocal and reciprocal communication activities. King and Xia suggested that nonreciprocal communication activities require less attention from both sides,

TABLE V
Mean Rating by Preference for Media for Each Communication Activity and Two Subscales

Communication Activity	Country	F-t-F	Telephone	Email	IM	SMS
Clarification from LIC (CLIC)	Australia	4.49 (.93)	3.74 (.65)	3.61 (.87)	2.01 (.59)	1.17 (.37)
	China	4.69 (.64)	3.79 (.69)	3.35 (.81)	2.07 (.39)	1.10 (.48)
Discuss a problem with LIC (DLIC)	Australia	4.47 (.94)	3.63 (.77)	3.61 (.87)	2.14 (.35)	1.44 (.75)
	China	4.76 (.63)	3.75 (.67)	3.12 (.92)	2.15 (.54)	1.23 (.72)
Convincing your group members (CGM)	Australia	4.49 (.86)	3.47 (.94)	3.51 (1.04)	2.38 (.36)	1.16 (.86)
	China	4.61 (.71)	3.66 (1.15)	2.92 (1.04)	2.30 (.95)	1.54 (.80)
Respond to a question by the LIC (RLIC)	Australia	3.95 (1.06)	3.72 (.79)	4.10 (.87)	2.01 (.68)	1.22 (.50)
	China	4.09 (1.05)	3.84 (.88)	3.84 (.87)	2.04 (.36)	1.19 (.70)
Reply to an enquiry from group members (RGM)	Australia	2.92 (1.34)	3.79 (.87)	4.44 (.83)	2.36 (.89)	1.75 (.79)
	China	3.17 (1.57)	3.57 (1.24)	3.86 (1.02)	2.45 (.92)	1.95 (1.29)
Schedule a group meeting (SGM)	Australia	2.52 (1.35)	3.25 (.97)	4.67 (.73)	2.51 (1.09)	2.07 (1.21)
	China	2.67 (1.54)	3.38 (1.09)	4.11 (1.26)	2.60 (1.07)	2.18 (1.23)
Overall: Reciprocal communication activities	Australia	4.48 (.53)	3.61 (.50)	3.57 (.60)	2.17 (.51)	1.15 (.25)
	China	4.68 (.41)	3.73 (.53)	3.13 (.61)	2.17 (.45)	1.29 (.41)
Overall: Nonreciprocal communication activities	Australia	3.13 (.83)	3.59 (.58)	4.41 (.55)	2.29 (.55)	1.60 (.57)
	China	3.31 (.89)	3.59 (.70)	3.93 (.72)	2.37 (.52)	1.79 (.67)

while reciprocal communications require high personal presence or attention from both the communication sender and the recipient. The Cronbach alpha for the two factors were 0.80 and 0.68 respectively. The overall Cronbach alpha for the six communication activities was 0.80.

Preliminary Descriptive Analyses To understand how IM and other available media are preferred for various communication activities, Table V shows the mean rating of media-task preference in two different cultures. Table VI provides the individual ranking of media under each type of communication activity in two different cultures. These means are for descriptive purposes and were not used to answer research questions.

Overall, IM was not chosen as the most preferred medium for any communication activity. Actually,

IM and SMS were the two least preferred media in fulfilling the six communication activities. Face-to-face was the most popular medium and was rated highest for fulfilling most communication activities. The telephone was rated second. Email was the most popular for nonreciprocal communication activities, and it was less preferred for reciprocal communication activities, compared with face-to-face and telephone.

In decreasing order, the richness scores for each of the media were as follows: face-to-face, $M = 6.32$ $(SD = 0.63)$; telephone, $M = 4.94$ $(SD = 0.91)$; IM, $M = 4.23$ $(SD = 0.96)$; email, $M = 3.51$ $(SD = 1.08)$; and SMS, $M = 2.87$ $(SD = 1.13)$.

Findings Since research questions 1 and 3 were analyzed with the same technique and presented in

TABLE VI
MEAN RANKING OF FIVE MEDIA UNDER EACH COMMUNICATION ACTIVITY

	Rank	Reciprocal Communication Activities			Nonreciprocal Communication Activities		
		CLIC	DLIC	CGM	RLIC	RGM	SGM
Australia	1	F-t-F	F-t-F	F-t-F	Email	Email	Email
	2	Tel	Tel	Email	F-t-F	Tel	Tel
	3	Email	Email	Tel	Tel	F-t-F	F-t-F
	4	IM	IM	IM	IM	IM	IM
	5	SMS	SMS	SMS	SMS	SMS	SMS
China	1	F-t-F	F-t-F	F-t-F	F-t-F	Email	Email
	2	Tel	Tel	Tel	Tel/Email	Tel	Tel
	3	Email	Email	Email	---	F-t-F	F-t-F
	4	IM	IM	IM	IM	IM	IM
	5	SMS	SMS	SMS	SMS	SMS	SMS

one table, we provided the findings for these two questions first.

To answer RQ1 and RQ3, a hierarchical regression analysis technique was adopted. In using hierarchical regression analysis, the demographic variables, media use experience, and media richness perception were added as the first block. Cultural group, dummy coded by choosing the Chinese sample as a reference group, was added as the second block. (The Australian group was coded as 1, and the Chinese group was coded as 0.) This statistically controlled for the effects of control variables on the dependent variable, determining the proportion of variance attributable to culture [82]. For demographics, we included age, gender, and work experience in our analysis, since they were individual characteristics that differed significantly between these two cultural groups, and they are also significant factors identified in the literature. Since age and work experience were highly correlated in this study ($\gamma = 0.84, p < .001$), we omitted work experience in our subsequent analysis to avoid the potential multicollinearity problem between the age and work experience factors [83]. We obtained consistent results when we replaced age with work experience in our hierarchical regression analyses. To enrich our understanding of the effect of demographics, media experience, media richness perception, and culture on media preference and various communication activities, we also regressed the mean media preference score on the two communication activity factors identified earlier. Thus, all three scales of communication activities (i.e., full scale, all communication activities; reciprocal, three communication activities; nonreciprocal, three communication activities) were included in our regression analysis as dependent variables. To

save space, only the final regression runs for each medium are reported in Table VII, which presents standardized coefficients that are significant.

For IM, gender and IM experience were significantly related with full scale and reciprocal scale, while age was also related significantly to reciprocal scale. These results show that for communication tasks that require attention and personal presence, women prefer to use IM more than men; younger people prefer to use IM more than older people; the more the user is experienced in IM, the more he or she will use it. The first block explained 5% and 7% of the variances for full scale and reciprocal scale, respectively. For face-to-face communication, only age was significantly associated with the reciprocal scale. For another traditional medium, telephone, age was related significantly with full scale and nonreciprocal scale, while gender was significantly associated with full scale and reciprocal scale. The first block explained 6%, 9%, and 3% of the variances for full scale, reciprocal, and nonreciprocal scales, respectively. In terms of email, only gender was found to be significantly associated with full scale and nonreciprocal scale. This suggests that women prefer the use of email more than men for nonreciprocal tasks. The first block explained about 13%, 9%, and 8% of variances for full scale, reciprocal, and nonreciprocal scales. SMS experience was found to be significantly associated with its preference in three scales. This shows that the more the user is experienced in SMS, the more he or she will use this technology for communication. The first block explained about 13%, 10%, and 7% of variances for full scale, reciprocal, and nonreciprocal scales, respectively. For these five media, media richness did not demonstrate any significant relations with any media preferences, leading to the rejection of media richness theory.

TABLE VII
HIERARCHICAL REGRESSION RESULTS OF FIVE MEDIA:
FULL SCALE AND SUBSCALES OF MEDIA PREFERENCE ON
DEMOGRAPHICS, MEDIA EXPERIENCE, MEDIA RICHNESS
PERCEPTION, AND CULTURE

| Predictors	Full Scale	Reciprocal	Non-reciprocal
IM			
Block 1: Demographics, medium experience, and medium richness perception			
Age	--	-.25*	--
Gender	.15*	.15*	--
IM experience	.18*	.21**	--
Medium richness	--	--	--
Block 2: Culture			
Culture	-.27*	-.24*	--
Incremental R^2	.072**	.089**	.020
Change in R^2	.021*	.017*	.008
Face-to-face			
Block 1: Demographics and medium richness perception			
Age	--	.29*	--
Gender	--	--	--
Medium richness	--	--	--
Block 2: Culture			
Culture	--	--	--
Incremental R^2	.055*	.078**	.021
Change in R^2	.000	.000	.000
Telephone			
Block 1: Demographics and medium richness perception			
Age	-.33**	--	-.39**
Gender	-.27***	-.29***	--
Medium richness	--	--	--
Block 2: Culture			
Culture	-.38**	--	-.34**
Incremental R^2	.107**	.108***	.069**
Change in R^2	.044**	.013	.035**
Email			
Block 1: Demographics, medium experience, and medium richness perception			
Age	--	--	--
Gender	.16**	--	.17**
Email experience	--	--	--
Medium richness	--	--	--
Block 2: Culture			
Culture	.51***	.33**	.49***
Incremental R^2	.208***	.127***	.155***
Change in R^2	.077***	.032**	.071***
SMS			
Block 1: Demographics, medium experience, and medium richness perception			
Age	--	--	--
Gender	--	--	--
SMS experience	.25***	.19**	.21**
Medium richness			
Block 2: Culture			
Culture	--	--	--
Incremental R^2	.129***	.106***	.075**
Change in R^2	.002	.000	.002

Note: Gender: 1 = male, 2 = female;
Culture: China = 0, Australia = 1; N = 212; *p < .05, **p < .01, ***p < .001

TABLE VIII
AGGLOMERATION SCHEDULE FOR CLUSTER ANALYSIS OF
COMMUNICATION MEDIA

	Stage	# of Clusters	Combination	Distance Coefficient
Australia	1	4	1 & 2	7.379
	2	3	1 & 3	7.952
	3	2	4 & 5	10.198
	4	1	1 & 4	20.672
China	1	4	2 & 3	8.691
	2	3	1 & 2	9.673
	3	2	4 & 5	10.343
	4	1	1 & 4	21.041

After controlling for demographics, media experience, and media richness perception, we found significant cultural-level differences in terms of IM, telephone, and email preferences. Chinese respondents preferred the use of IM and telephone, while Australian participants favored email. The cultural variable explained about 2%, 4%, and 8% of variances for IM, telephone, and email full scales. The cultural variable was an especially powerful block in the regression equation for email.

To answer RQ2 and identify how IM preference is related to other media preferences, we conducted a cluster analysis of the communication media according to their perceived preference for each of the six communication activities. Because the aim of this research question was to identify homogeneous groups of media along functional dimensions (in this case, media preference) and not to identify a smaller number of underlying dimensions in the data, hierarchical cluster analysis was the preferred analytic strategy [10], [46]. Two criteria were used to determine the appropriate number of clusters. First, by applying a method similar to a scree test commonly used in factor analysis to determine the number of factors, we plotted the number of clusters against the distance coefficients. The point at which the curve flattens out is an indication of where to stop combining clusters since the new cluster yielded little new information. Second, after the number of clusters was identified by this initial procedure, each of the clusters was examined to determine its theoretical relevance. Based on these criteria, we conducted hierarchical cluster analyses with our data for each culture and overall. A consistent
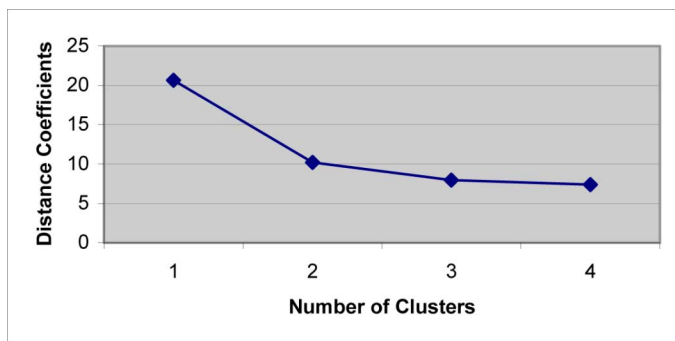
(a)
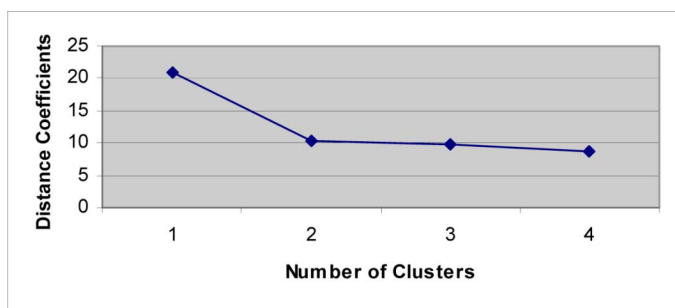
(b)

Fig. 1. (a) Scree plot for media preference (Australia). (b) Scree plot for media preferences (China).

two-cluster result was produced for each country and overall. Table VIII provides the agglomeration schedule and Figs. 1(a) and (b) show the scree plots for each cultural media cluster. Cluster 1 contained face-to-face, telephone, and email (i.e., two traditional media and one mature new technology). Cluster 2 consisted of IM and SMS, two newly adopted communication media.

DISCUSSION

Our primary interest in this paper was to study IM preferences, alongside other available communication media, in two distinct cultural groups. The principal finding of our study was that media preferences were affected not only by demographics and media experience, but also by cultural values users hold, especially for new communication technologies.

We did not find age as a major significant factor on computer-mediated-communication technology preferences, although prior research shows that a younger generation is more likely to adopt and use technologies than older users (e.g., [43]). The only reported difference was found in IM preference for reciprocal tasks, in which younger people preferred

the use of IM more than older users. The lack of significance of age for communication technology use may be explained by students' narrow age range in our study. However, our findings did demonstrate that gender had significant impact on IM, email, and telephone preferences. Our finding of women preferring the use of IM and email more than men are consistent with recent survey reports, in which women as a group spend significantly more time on IM than men, and women are also more likely than men to be daily emailers [84], [85]. Those surveys found that women believed that using communication technology was a very useful means to keep in touch with family and friends. This view is also supported by Leung's IM study in which female college students were found to chat longer and more frequently than male students for reasons of sociability [86]. If viewing total time available to media use as a limited resource, it would not be surprising to find that the increased preference for IM and email is related to the decreased preference for traditional and functionally similar media, such as telephone ($\gamma = -0.32, p < .01$; $\gamma = -0.26, p < .01$, for correlations between IM and telephone preferences and between email and telephone preferences respectively). Research suggests that when a new technology is viewed as more desirable than an old medium, users will reduce the time devoted to traditional media that are functionally similar [87], [88].

We found that IM experience was related to its preference, especially for communication activities that require receivers' attention or presence. This result reinforces past findings (e.g., [32], [35]), suggesting that experience in a medium is an important precondition for adoption and use of the technology. This view was further supported by participants' SMS preferences reported in this study. An individual's preference for a medium varies widely according to one's experience of using that medium. This is particularly notable for new communication technologies, such as IM and SMS. However, in this study we did not find a positive relationship between media experience and email preference. This is actually not a surprising result. In their study comparing IM and email, Chen, Yen, and Huang also found that email experience did not seem to affect its usage [89]. After more than a decade, email has been widely adopted and has evolved from a "new" technology to an "essential" communication medium in most people's workplaces and personal lives. Over time, users' experience with email may have been extensive and habitual. As a result, users may subconsciously consider email as one of the "traditional" media and habitually opt for it [89].

Unlike the prediction of media richness theory, this study found that perceived media richness was not associated with media preference. Based on the factor analysis results, the six communication activities used in this study loaded into two factors: reciprocal and nonreciprocal tasks. Even though media used in this study were ranked in decreasing order of face-to-face, telephone, IM, email, and SMS in terms of their richness, we found that face-to-face, telephone, and email were the three primary media chosen to accomplish communication activities. Face-to-face interaction was the first preferred medium for reciprocal tasks that require more personal attention, and email was favored for nonreciprocal tasks which require less attention. IM and SMS were never considered as the first preferred media in any situation. This lower rating for the preference of IM may reflect unfamiliarity and unrefined use of the technology for communication [32]. The result we obtained for IM preference echoes what happened to email at the time it was introduced, when Rice noted that "stable and higher assessments of email might await greater diffusion and familiarity" [47, p. 479]. Thus, our results reinforce that the stable and higher assessment of IM might also wait for greater diffusion and familiarity.

Although not a primary purpose of our study, our identification of clusters of communication media can further support our explanation of why IM and SMS are not the most preferred media for any communication situation. In contrast to prior research, in which email clustered either apart from traditional media (e.g., face-to-face and telephone) or aligned with telephone [10], [46], [47], this study found email clustered with face-to-face and telephone. IM and SMS clustered together yet largely apart from the other three media. Rice observed that new media with high "substitutability" (those whose functions can be replaced by other media) showed their change over time in terms of users' perceptions of their appropriateness [47], [90]. King and Xia found that people tended to consider traditional media as more appropriate for most of the communication tasks, even after new media were introduced [35]. Based on Rice, King, and Xia's findings, along with our clusters of technologies, it is likely that users from our study have integrated email into their daily repertoire of communication tools and use it to fulfill various communication needs just as they use other traditional media [10].

Taken together, these results indicate that the familiarity and experience of new technology is more important in determining how people use the new technology at its early adoption stage. Uses of communication technologies may change over the various phases of the technology-adoption process. It will be interesting to see whether the almost certain increase in use of IM for communication will influence people's preference for communication over time.

Another major finding of this study is that there are differences in terms of media preferences between the two cultural groups studied. Our results indicate that Chinese respondents—from a culture characterized by higher power distance and uncertainty avoidance, collectivism, and high-context communication style—prefer the use of IM and telephone. Australian participants—members of an individualistic, low power distance, low uncertainty avoidance, and low context culture—favor email more than their Chinese counterparts. This result is also consistent with prior research that found power distance and uncertainty avoidance have a significantly negative relationship and that individualism has a significantly positive relationship with technology adoption and usage. With a low-context communication style, Australian participants may feel more comfortable with the arm's-length formalism and few nonverbal cues of lean media, such as email [91]. There are some plausible explanations for Chinese preferring IM more than their Australian counterparts. High-context or collectivistic cultures such as China place more value on feedback and social cues in communication [48]. They are group-oriented. In such cultures, a larger portion of the message is left unspecified and is accessed through the context, nonverbal cues, and between-the-lines interpretation of what is actually said or written ([92], as cited in [93]). The synchronous nature of IM provides opportunities for Chinese participants to interact with each other and get feedback quickly.

We found that age, gender, and medium experience together explained more variance than culture in IM preference. SMS experience was found to be the only factor that explained the approximately 13% variance of preference for SMS. However, culture was found to explain much more variance in email preference than in IM preference (7.7% versus 2.1%). Our results show that culture plays a significant role in communication technology adoption and use, and such impact is persistent and even stronger as media become widely adopted, as suggested in this study.

IMPLICATIONS FOR PRACTICE

IM is increasing in popularity in the workplace as a communication tool to support collaborations

across distance and across cultures; therefore, understanding how people from different cultures perceive and use IM and other communication technologies and how people with different cultural values use IM in conjunction with other technologies would have significant implications for organizations. Our findings demonstrate that preferences for IM and other communication technologies differ not only among users but also among cultures. Moreover, they show how such differences in technology use vary at the different stages of adoption and use of the technology. Such knowledge is of importance to organizational managers in terms of communication technology adoption and use.

The results of this study clearly suggest that it is not appropriate to apply the same strategy to promote adoption and use of new communication technologies in general, and IM in particular, at different adoption stages. When attempting to introduce a new communication technology into markets, attention must be given to enhancing users' experience of and familiarity with technologies. The important role of media experience suggests that in the new media environment, it is important to go beyond media characteristics [10] and consider users' experience and familiarity in the new medium when assessing its choice and usage. Appropriate training in using IM may help people gain experience and encourage the widespread adoption and use of IM. However, as Flanagin and Metzger suggested, new communication technologies would eventually become folded in with other traditional media [10]. Our data show that as people increasingly habituate to using email, their experience of using email may not be that important anymore. Our study suggests that email can be functionally equivalent to more traditional media. A corollary is, then, that IM may also be found to be folded in with other traditional media in the future.

Gender differences in IM and email preferences also suggest that technology companies may apply different marketing strategies to promote adoption of communication technology for men and women. In addition, organizations may need to be aware that the same mode of communication may be perceived differently by the sexes [41]. To avoid misunderstandings of the communication, gender-affected social meanings relevant to IM and email in the workplace should be better understood [94].

Our findings demonstrate that reactions to IM and email media for communication are influenced by cultural values. Examining cultural impact on IM and other communication technology preferences increases our understanding of differences in communication technology adoption and use between Australia and China. It also provides guidelines in predicting communication technology adoption and use in other countries. The findings suggest that a new communication technology may be introduced first into countries with lower power distance, lower uncertainty avoidance, and higher individualism, such as the US or Australia, because those countries are more ready to adopt new technology than countries with higher power distance, higher uncertainty avoidance, and higher collectivism, such as China. By doing so, organizations can not only raise the chances of acceptance for new technology, but also minimize the consequences of risks associated with new technology [95]. If organizations attempt to introduce communication technology in higher power distance, higher uncertainty avoidance, and collectivistic cultures, it is important to position the new communication technology as a continuous innovation that does not require radical changes in existing communication patterns [72]. Moreover, organizations should make efforts to mitigate the perceived risks of the new technology. They could provide various kinds of support; for instance, they could provide testimonials from successful early adopters, detailed demonstrations, free training, and incentives for early adopters. Otherwise, it may be that the benefits of the technological innovation will not offset the burdens of cultural changes and a difficult and prolonged adaptation [13].

Cultural values have impact not only on the adoption of communication technologies, but also on the usage patterns for communication. The significant impact of culture on IM and email, especially the diminishing effect of media experience and persistence of cultural values on email preference, demonstrate that culture's influence on technology use is persistent. Organizations that operate internationally may face major tasks in enhancing cross-cultural communication effectiveness for both real and virtual communication environments. Thus, organizations need to be aware that when IM is being widely adopted as one of the communication tools, a cultural impact on IM preference may still exist, or even get stronger. People from high-context and low-context cultures would have different preferred media for communication. When Australian organizations intend to collaborate with Chinese organizations, it is important to understand that Chinese people would not be inclined to choose asynchronous media if there were other richer media available for use. Asynchronous media omit sources of understanding, intentions,

and feelings present in synchronous interaction, which are essential for building relational trust among Chinese people. Because of the lack of other social cues, such as visual, nonverbal, contextual, and physical cues, Chinese people will likely need even greater trust or mutual understanding on the part of participants in virtual communication [91]. For any cross-cultural collaboration team to be successful, team members may be encouraged to create communication protocols early in the team's life so that team members can build a shared understanding of when to use which communication media or what the choice means and, thus, increase the likelihood of collaborative success across cultures [12], [96].

LIMITATIONS AND FUTURE RESEARCH DIRECTION

Several limitations and opportunities for future research are noteworthy. One limitation of this study is that the data were collected from students with similar background because of the challenges in the nature and execution of this study. Students may have less experience in using technologies for collaborations and solving complex organizational problems than people in other organizations. However, there is no evidence that technology-use patterns on campus differ from those in other organizations. Recent research has shown that students and workers essentially have the same values and beliefs [97]. As a new technology, IM is adopted widely by younger generations. Furthermore, we deliberately chose students who were engaged in at least one group assignment during the time of this study where frequent communication was required to complete the assignment. Nevertheless, the research could be replicated to examine these findings across a wider range of individuals in different environments to enhance its generalizability.

The IM discussed in this study was text-based technology, which was the primary feature used by most users [89]. Now popular services, such as AOL, MSN Messenger, Yahoo! Messenger, and Apple's iChat allow voice messaging, file sharing, and even video chat when both users have cameras. Thus, future research may be needed to compare how IM is preferred compared with other media when a rich set of features is added.

The data for this research is cross-sectional rather than longitudinal. Our study has shown that different factors influence the newly adopted IM and widely adopted email. Thus, a longitudinal research design collecting IM perception and use data at different diffusion-process stages would further our understanding of how uses of IM

evolve as users become more familiar with it. A longitudinal study examining how the impact of cultural values evolves with respect to IM preference would provide additional insight into the phenomenon. Nevertheless, this study has identified the importance both of experience using communication technology and of cultural values on communication technology preferences.

In this study, national culture was operationalized using dimensions and scores provided by Hofstede. Although some studies have lent support to the stability of these dimensions, limitations inherent in Hofstede's work remain a plausible explanation for the lack of strong support for the findings on national culture, and care should be taken in interpreting the results. Another culture-related limitation of this study is that we treat culture as a monolithic construct, preventing us from examining the relative impact of each individual dimension on media preference. Future research is needed to disaggregate the effects of culture into its cultural dimensions and include them in theoretical models in order to enhance our conceptual understanding of the phenomenon.

Another area of concern regarding this study is common method bias. Because all data were collected at the same point in time via a paper-based questionnaire and the respondent providing the measures of all variables is the same person, a common method bias may be introduced, inflating relationships artificially [98]. This confound cannot be entirely dismissed, although several procedural remedies may have lessened the impact of common method bias. First, anonymity was guaranteed to respondents to avoid possible bias in the data. Second, we assured respondents that there were no right or wrong answers and that they should answer questions as honestly as possible. Third, most variables required for our analysis were objective personal characteristics, and all variables collected in the questionnaire were collected via completely different item characteristics, such as different types of questions and different response formats. Finally, when we collected respondents' perceptions of media richness, communication task equivocality, and media preference for each task, we actually asked those three questions in reverse order. We believe that by doing this we at least alleviated some common contextual cues that influence the retrieval of information from memory and the correlations among these measures [98].

Finally, it is not our intention to suggest that individual differences, media experience, media richness perceptions, and culture are the only factors to influence media preference. Certainly,

other potential factors identified in the literature do play a significant role in technology adoption and use. However, the results of this study suggest that age, gender, media experience, and culture should be considered along with other variables.

The limitations discussed above notwithstanding, our intention was to shed light on the patterns of IM preference across different cultures to ascertain whether culture in fact influences usage patterns after controlling for demographics, media experience, and media richness perceptions. Through this process, we were also able to compare how IM preference is related to usage of other available media. Although we collected data from only two countries, we hope that the current study provides variables that will be useful in predicting IM and other technology preferences in other countries. Further, the cultural dimensions may be useful in predicting the adoption and use of future communication technologies. It would be valuable to follow up with a study that examines whether similar patterns of adoption and use could be seen within countries across a wide range of communication technologies at different adoption stages.

CONCLUSION

This research effort is an initial step in documenting how IM is being perceived and preferred in conjunction with other traditional and new media in different cultural contexts.

With increased globalization and the advance of information and communication technology, understanding how people integrate IM into existing patterns of behavior in complex communication environments can have significant implications for productivity and efficiency of individuals and organizations [12]. When marketing communication technology and when considering its effects, managers should consider the cultures of their users no less than their individual differences and technology experience. When communicating across cultures, people should be aware of cultural differences in communication patterns no less than media attributes and other factors. Future research efforts need to examine individuals' media perceptions and preferences in different organizational contexts, in different cultures, and with a wide range of technology to more fully understand the relationship between technology use and national culture. These would provide a more comprehensive understanding of the implications of culture's influence on technology use.

APPENDIX

Figs. 2, 3, and 4 provide the instruments used in this study.

REFERENCES

[1] S. M. Cherry, "IM means business," *IEEE Spectrum*, vol. 39, no. 11, pp. 28–32, Nov., 2002.

1a	If communicators are unclear about something or do not understand it, **IM** allows them to ask questions and obtain answers as they arise.
1b	**IM** allows communicators to add meaning to what they want to say by using as many cues (body language, voice, tone, etc) as possible.
1c	**IM** allows communicators to be flexible with the way words are used in order to increase understanding.
1d	If communicators feel very strongly about something (positively or negatively), **IM** allows them to show their feelings.
2a	If communicators are unclear about something or do not understand it, **FTF** allows them to ask questions and obtain answers as they arise.
2b	**FTF** allows communicators to add meaning to what they want to say by using as many cues (body language, voice, tone, etc) as possible.
2c	**FTF** allows communicators to be flexible with the way words are used in order to increase understanding.
2d	If communicators feel very strongly about something (positively or negatively), **FTF** allows them to show their feelings.
3a	If communicators are unclear about something or do not understand it, **TEL** allows them to ask questions and obtain answers as they arise.
3b	**TEL** allows communicators to add meaning to what they want to say by using as many cues (body language, voice, tone, etc) as possible.
3c	**TEL** allows communicators to be flexible with the way words are used in order to increase understanding.
3d	If communicators feel very strongly about something (positively or negatively), **TEL** allows them to show their feelings.

Fig. 2(a).   Questions measuring media richness 1–3.

4a	If communicators are unclear about something or do not understand it, **EMAIL** allows them to ask questions and obtain answers as they arise.
4b	**EMAIL** allows communicators to add meaning to what they want to say by using as many cues (body language, voice, tone, etc) as possible.
4c	**EMAIL** allows communicators to be flexible with the way words are used in order to increase understanding.
4d	If communicators feel very strongly about something (positively or negatively), **EMAIL** allows them to show their feelings.
5a	If communicators are unclear about something or do not understand it, **SMS** allows them to ask questions and obtain answers as they arise.
5b	**SMS** allows communicators to add meaning to what they want to say by using as many cues (body language, voice, tone, etc) as possible.
5c	**SMS** allows communicators to be flexible with the way words are used in order to increase understanding.
5d	If communicators feel very strongly about something (positively or negatively), **SMS** allows them to show their feelings.

Note: All items were on a scale of 1 (strongly disagree) to 7 (strongly agree).

Fig. 2(b).   Questions measuring media richness 4–5.

1	Respond to a question by the Lecturer concerning your group's work.
2	Reply to an enquiry from another group member regarding your group's progress.
3	Schedule a group meeting in two weeks' time.
4	Convince your group of the suitability of an idea that you have.
5	Need to discuss a problem about your group with the Lecturer-in-Charge of the course.
6	Want clarification from Lecturer-in-Charge for a critical issue of your group project.

Fig. 3.   Communication activities used to measure media preferences.

1	This task is not well defined.
2	This is a non-routine task.
3	This is the task I have never dealt with before.

Note: All items were on a scale of 1 (strongly disagree) to 7 (strongly agree).

Fig. 4.   Questions measuring task equivocality.

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