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Internet Communication Versus Face-to-face Interaction in Quality of Life

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Abstract This study seeks to understand the role of the Internet in quality of life (QoL). Specifically, it examines the question of whether Internet communication serves, like face-to-face interactions, to enhance quality of life. It is hypothesized that the use of the Internet for interpersonal communication can improve quality of life among Internet users, just like face-to-face communication in everyday life. Sample survey data were collected in four Chinese cities, namely Hong Kong, Taipei, Beijing, and Wuhan, to serve as replicates to test the hypothesis. The Satisfaction with Life Scale (SWLS) of Diener (1984) was used to measure quality of life in the four cities. It was found that contrary to our expectation, Internet communication cannot predict quality of life while face-to-face communication with friends and family members can. The result was the same across the four Chinese cities. Possible reasons for this finding are examined and discussed.

Keywords Quality of life · Internet communication · Interpersonal relationship · Satisfaction with life · Social support · Social interactions

1 Introduction

Communication is crucial to people's well-being. "To communicate is to be human" is a cliché for communication students. Humans, like other organisms, cannot survive without interacting with their environment. Getting information from outside is crucial to one's existence and growth. Society is a sum of relationships which are formed with the aid of communication. Our relationships at home, work, and play affect our state of well-being.

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Poor relationships are a source of pain while amiable relationships are a source of joy. Wellman and Wortley (1990) found that strong social ties usually lead to better social outcomes than weak ties. Contacts with neighbors, friends, and family, and participation in social groups, have been found to improve people's level of social support, fulfillment of their own relationships, making sense of life, self-esteem, commitment to communities, and psychological and physical well-being (Cohen and Wills 1985; Diener et al. 1999; Putnam 1995, 2000; Thoits 1983; Williams et al. 1981).

2 Internet for Interpersonal Communication

With advanced information and communication technologies (ICTs), especially the Internet, many see great potential in the use of mediated communication in broadening people's social experiences and involvement which will further strengthen social ties. As the Internet allows people to communicate with family members, friends, coworkers, and strangers in distant places, across cultures and without time constraints, it can help to strengthen people's social relationships and form new relationships (Parks and Roberts 1998). A study in 2006 showed that nine in ten American teens (aged 12–17) were wired, and 89% of them used the Internet to send or read email while 75% sent or received instant messages. However, face-to-face time still surpassed screen time for teens. The average youth aged 12–17 reported spending 10.3 h a week with friends doing social activities outside of school and about 7.8 h talking with friends via technology such as telephone, email, instant messaging (IM) or text messaging (Lenhart et al. 2007).

Some studies have shown that social disengagement is associated with poor quality of life and diminished physical and psychological health. When people have more social involvement, they are happier and healthier, both physically and mentally (Cohen and Wills 1985; Gove and Geerken 1977; Putnam 1995). Putnam (2000) points out that American social capital declined from the mid-1960s to the 1990s but, at the same time, many forms of Internet services, including instant messaging, chat rooms, multiuser games, and auctions, serve to build "virtual social capital" for Internet users. With stronger relationships and social support, one's psychological well-being and perceived quality of life can be expected to improve.

On the basis of this expectation, Kraut et al. (1998) conducted a study to examine the social and psychological impact of the Internet on a sample in 1995–96 during their first 1–2 years online. They used longitudinal data to examine the effects of the Internet on social involvement and psychological well-being. Quite unexpectedly, they found that greater use of the Internet was associated with declines in participants' communication with family members in the household, declines in the size of their social circle, and increases in depression and loneliness.

The authors offered two explanations for their findings. The first is time displacement and the second is the displacement of strong ties by the use of the Internet. The first explanation conceives that the time that people devote to using the Internet might substitute for time previously spent engaging in social activities. The Internet is similar to other passive entertainment activities such as watching TV or listening to music, which could lead to social withdrawal and a decline in psychological well-being. However, Kraut and his colleagues found that interpersonal communication was the dominant use of the Internet among the sample studied. Internet use does not seem to displace people's engagement in interaction with others.

They turned to the displacement of strong ties for an explanation for their findings. They considered that by using the Internet, people were substituting poorer quality social relationships for better relationships, i.e., substituting weak ties for strong ones (Granovetter 1973; Krackhardt 1994). Many of the online relationships, especially the new ones, were found to be weak ties rather than stronger ties. Online friendships were likely to be more limited than friendships supported by physical proximity. They reasoned that online friends were not embedded in the same day-to-day environment, and were less likely to understand the context for conversation, making discussion more difficult (Clark 1996). Moreover, online groups were usually devoted to specific topics of interest, narrowing the scope of discussion and support. Support groups for real life problems were relatively much fewer online. In other words, the authors considered that the "quality" and "support" of Internet communication were inadequate compared with offline interpersonal communication to enhance psychological well-being.

A 3-year follow-up of 208 respondents of their study in 1998, interestingly showed that negative effects dissipated (Kraut et al. 2002). They found that depressive symptoms significantly increased with Internet use during the first period, but significantly declined with Internet use during the second period. They also reported a second longitudinal study in 1998–99 of 406 new computer and television purchasers. This sample generally experienced positive effects of using the Internet on communication, social involvement, and well-being. However, using the Internet predicted better outcomes for extroverts and those with more social support, but worse outcomes for introverts and those with less support.

The authors offered three explanations for the differential effects of Internet communication in the two periods and the two studies: maturation of participants between the early and late phases of the study, differences in samples between the two studies, and changes in the Internet itself. Among the three explanations, they considered a change of the Internet as the most parsimonious explanation. They argued that from 1995 to 1998, the number of Americans with access to the Internet at home more than quadrupled. As a result, many participants' close family members and friends were likely to have obtained Internet access. The ease with which people could communicate with their strong ties increased with the transformation of the Internet into a "hospitable" place (Kraut et al. 2002).

In a study done in 2004, Boase and his colleagues (2006) found that even with the flourishing of the Internet, people still commonly communicated with their social ties in traditional ways, in addition to the use of the Internet for social communication. They found that in-person encounters were most widely used, followed by landline phone, cell phone, email, and IM communication. Far from being a medium that connects weaker ties in superficial ways, email was used more for maintaining core rather than significant ties. Core ties are more often relied upon for seeking help than significant ties. But significant ties are composed of people more than acquaintances and can, at times, become important players in help-seeking. Boase and his colleagues (2006) found that people not only socialized online, but they incorporated the Internet into seeking information, exchanging advice, and making decisions. Americans may now have only one or two extremely close relationships, but dozens of core and significant ties in the "networked" community. Four years later in 2008, a similar study on social isolation and new technology found that in-person contact remained the dominant means of communication with core members; emails, instant messaging, and social networking websites supplemented this dominant mode of communication (Hampton et al. 2009).

In another study on the role of the Internet in families, it was found that 33% of Internet users said that the Internet had improved their connections to friends "a lot", and 23% said

it had increased the quality of their communication with family members by a similar amount. Young people in particular took advantage of the social side of the Internet. Nearly half (49%) of the 18–29 year olds said that the Internet had improved their connections to friends a lot. On the other hand, 19% of employed Internet users said that the Internet had increased the amount of time they spent working in home (Wellman et al. 2008).

3 Use of the Internet for Interpersonal Communication and Quality of Life

The present study seeks to understand the role of Internet communication in quality of life. Specifically, it examines the question of whether Internet communication can replace face-to-face interaction in enhancing quality of life. It is hypothesized that "the use of the Internet for interpersonal communication can improve quality of life among Internet users, just like face-to-face communication."

The hypothesis is diagrammatically presented in Fig. 1.

Sample survey data were collected in four Chinese cities, namely Hong Kong, Taipei, Beijing and Wuhan, to serve as replicates to test the hypothesis. These four cities were chosen for three reasons. First, they are Chinese societies which differ from American society with regard to culture. These samples are good for a test of the generalizability of theories about Internet communication in different cultural settings. Second, Hong Kong and Taipei are more economically advanced than Beijing and Wuhan. A comparison of the differences in results can shed light on the impact of stages of economic development on the role of the Internet. Third, when the study was conducted in 2002–03, all four societies had quite a good penetration of the Internet and computers. The survey showed that more than 60% of residents in all four cities already had computers, and half or more of them had used the Internet at the time that the study was conducted (see Table 1).

Previous studies have shown that Internet users tend to communicate with people they have already known rather than with strangers. For example, a study (Leung 2001) on the use of ICQ showed that the majority of users reported that they chatted with classmates (41.9%) most often, followed by ordinary friends (34.1%), boy/girlfriends and family members, cyber friends, and anonymous contacts. A study on Internet ties (Boase et al. 2006) also

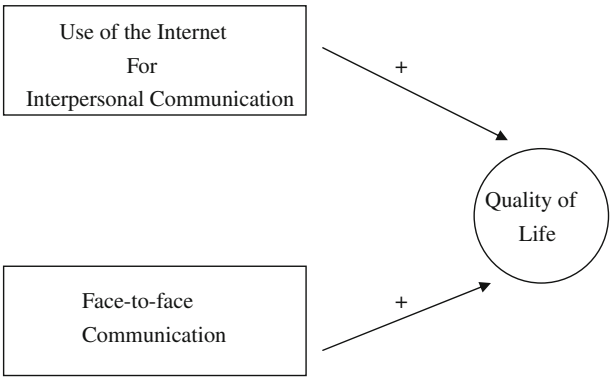

Fig. 1 Hypothesized relationship between use of internet for interpersonal communication, face-to-face communication, and quality of life

Table 1 % Ownership of computer & use of internet in 4 Chinese cities, 2002–03 (*N*)

	Hong Kong	Taipei	Beijing	Wuhan
Computer ownership	75% (524)	87% (456)	67% (657)	62% (682)
Internet subscription	66% (461)	78% (410)	51% (487)	50% (549)
Use of internet	56% (388)	63% (328)	54% (508)	71% (776)

found that the relationships maintained through online communication are only rarely with an entirely new set of individuals. Instead, Internet users usually communicate with the same set of friends and family members. With the growth of the Internet, more strong ties will be present online. The four Chinese cities, with more than 60% of Internet penetration at the time they were studied, should have had a reasonably good number of family members and friends as strong ties with whom Internet users could communicate online. It avoids the problem of the lack of strong ties in the initial stage of Internet penetration as in Kraut et al.'s study in 1995–96. After controlling the Internet penetration factor, we should expect to see a positive impact of using Internet communication on people's psychological well-being and perceived quality of life, like the findings of Kraut's study in 1998 (Kraut et al. 2000).

The four Chinese cities under study, namely Hong Kong, Taipei, Beijing, and Wuhan, vary not only in size, but also in levels of development. Hong Kong has a population of approximately 7 million, and the average monthly per capita income in 2006 was US$1,344 (RMB$10,713). Taipei has a population of 2.6 million and the average monthly income per capita was US$1,099 (RMB$8,759) in 2006. Beijing has a population of approximately 16 million. Its size fluctuates daily due to the out- and influx of people to and from various parts of China and the world. In 2006, the average monthly per capita income of Beijing's residents was US$178 (RMB$1,419). Wuhan, a city on the Yangtze River in Central China, has a population of 8.9 million. Its monthly per capita income in 2006 was US$113 (RMB$904) (Ni 2007, pp. 682–685,687; Hong Kong Government 2008; Department of Budget, Accounting and Statistics 2008; Beijing City Administration Portal 2009; Wuhan Statistics Bureau 2008). In terms of economic development, Taiwan and Hong Kong are close, while Beijing and Wuhan trail behind.

4 Methodology

4.1 Sample and Sampling Procedure

In 2002–03, the investigators of the four cities conducted household surveys with probability samples to examine the uses of ICTs in the four cities, and the opinions of the residents about a series of questions, including quality of life, social support, uses of the Internet, displacement of media, leisure activities, etc.. In the present study, the authors focus on the role of Internet communication vis-à-vis face-to-face communication in quality of life in the four cities.

In all four places, respondents aged 15 or above were sampled. In each household, the person who most recently had his or her birthday was requested for a face-to-face interview. The questionnaires issued in all four cities were standardized with some modification based on the local situation. For example, Taipei, Beijing, and Wuhan used very similar categories of education which include "No Education, Primary, Junior High, Senior High, Technical, and Tertiary or Above". Hong Kong, however, used the categories of

"No Education, Primary, Form 1 to Form 3, Form 4 to Form 5, Matriculation, Tertiary or Above". The reason for this is that Hong Kong inherited a British education system which had only 5 years of secondary education and 2 years of a matriculation course before entering university. Similar modifications were made by different cities in the categories of Occupation, Income, and Housing Type to suit the local situation and usage. The questionnaires for the four cities were very similar, and efforts were made to allow for comparison as far as possible. Pre-tests were done before interviewing the sampled respondents.

In Hong Kong, data were gathered from a probability sample of 1,192 respondents, using a face-to-face structured interview during the months of October to December 2002. Respondents were eligible members of randomly generated households from the records of the Census and Statistics Department of Hong Kong. Interviewers were trained university students. A total of 238 households were discarded when interviewers found the premises to be vacant, used for non-residential purposes, found no one at home after three visits, or encountered foreigners who were ineligible for this study. Of the 954 qualified households, 696 successfully completed the questionnaires, resulting in a 73% response rate.

In Taipei, the multistage cluster sampling method was used. With the aid of the Statistical Bureau of Taiwan's Executive Council, the investigator randomly sampled 1,350 households from various areas of Taipei listed in the census record. Then 1,350 individuals were randomly selected from the name list of people aged between 15 and 65 in these households. The respondents were interviewed face-to-face between November 2002 and January 2003. Sixty university students were hired to conduct the interviews. Due to inaccuracies in the Statistical Bureau's record, many of the sampled respondents could not be located. Finally, the survey succeeded in interviewing 528 respondents at a response rate of 39%.

In Beijing, multistage cluster sampling was also used. The investigator first randomly selected four of the six districts of Beijing city, 1,500 households were then randomly selected from the four districts. The survey in Beijing was conducted in January 2003. The response rate was 67% with 998 respondents successfully interviewed.

In Wuhan, the same multistage cluster sampling method was used. In each of the seven districts of Wuhan city, two small residential areas and one work unit (including schools) were randomly selected. 176 people were then chosen from these sampled clusters, except in Hongshan District where 194 people were selected. A total sample of 1,250 people was obtained. The survey was conducted between December 2002 and January 2003. The interviewers successfully completed 1,099 questionnaires with a response rate of 88%.

4.2 Measurement

In the study, we used the Satisfaction with Life Scale (SWLS) of Diener (1984) to measure quality of life in the four cities. The 7-point scale ranges from "strongly disagree" to "strongly agree". It contains five items which include: "In most ways my life is close to my ideal", "The conditions of my life are excellent", "I am satisfied with my life", "So far I have gotten the important things I want in life", and "If I could live my life over, I would change almost nothing".

The measure for the use of the Internet for interpersonal communication is a 5-point Likert-type scale composed of three items. They are "using the Internet to communicate with people you didn't know before", "using the Internet to communicate with people you know", "using the Internet to disclose things deep in your heart". The answers range from "never" to "very often". The Cronbach's Alpha is 0.77. The measure for face-to-face

communication is also a 5-point Likert-type scale containing the question "how often do you talk to your family or friend for 10 min or more?" The answers range from "never" to "very often".

5 Results and Discussion

5.1 Sample Profile

Table 2 shows the demographic profile of the samples in the four cities. The Wuhan sample contained a larger proportion of youngsters than the other three cities. Fifty-four percent of the Wuhan respondents were aged 15–24, while the proportion of the same group in the other three cities ranged from 20% to 25%. Gender distribution in the four cities was quite even, with a few more female respondents in Hong Kong (53%) and Taipei (54%). With regard to marital status, 65% of Wuhan respondents were single (including divorced and widowed), while approximately 40% of respondents in the other three cities were single. In terms of education, Wuhan respondents had the highest proportion of university/tertiary graduates (48%) and Hong Kong had the lowest (24%) among the four cities. Overall, the samples of the four cities over-represent, to a certain extent, the highly educated and young people.

Table 2 Distribution of age, gender, marital status, & educational levels in four cities

	Hong Kong (%)	Taipei (%)	Beijing (%)	Wuhan (%)
Age group				
15–24 (%)	20	21	25	54
25–34 (%)	22	18	25	19
35–44 (%)	30	22	21	13
45–54 (%)	20	24	16	10
55 + (%)	9	15	12	4
Total *N*	696	528	937	1,099
Gender				
M (%)	47	46	51	48
F (%)	53	54	49	52
Total *N*	696	528	969	1,094
Marital status				
Single (%)	41	40	39	65
Total *N*	692	527	925	1,085
Education				
No schooling/kindergarten (%)	1	1	1	1
Primary (%)	13	10	3	1
Junior secondary (%)	20	7	15	8
Senior secondary (%)	33	27	26	23
Matriculation/technical (%)	9	21	24	20
Tertiary/university (%)	24	35	31	48
Total *N*	693	523	998	1,084

5.2 The Use of the Internet for Interpersonal Communication

It is interesting to note that among different age groups, those aged 15–24 constitute the highest proportion of people using the Internet for interpersonal communication. Of the 28.5% respondents who most often or often use the Internet for interpersonal communication, 19.1% belong to the 15–24 age group (Table 3). Single and highly educated people also use online communication much more often than married and lower educated people. Among the people (28.4%) who very often or often use the Internet for interpersonal communication, 23.7% are single, and 16.6% have received tertiary/university education. Gender, however, does not make much difference in the frequency of Internet use for interpersonal communication; 15.0% of male and 13.4% of female respondents most often or often engage in online communication (Table 3).

Table 4 shows that use of the Internet for interpersonal communication in the four Chinese cities is quite common. In all four cities, more than half of Internet users sometimes or often/very often use the Internet for communicating with people. Wuhan (76%) and Beijing (67%) tend to have more people using the Internet for this purpose than Hong Kong (52%) and Taipei (51%) (Table 4). As regards face-to-face communication, over 80% of people in the four cities sometimes or often/very often engage in this mode of communication. Hong Kong and Taipei even have more than 90% of people at least

Table 3 Demographic groups communicating online *most often/often* (aggregate sample of four cities)

Demographic groups	%	*n*
Age group (*total N = 1,436*)		
10–14	0.1	2
15–24	19.1	274
25–34	6.6	96
35–44	1.4	20
45–54	1.1	15
55+	0.2	3
Sub-total	28.5	410
Gender (*total N = 1,445*)		
M	15.0	217
F	13.4	195
Sub-total	28.4	412
Marital status (*total N = 1,422*)		
Single (including divorced/widowed)	23.7	337
Married	4.7	66
Sub-total	28.4	403
Education (*total N = 1,431*)		
No schooling/kindergarten	0	1
Primary	0	0
Junior secondary	1.3	19
Senior secondary	6.1	87
Matriculation/technical	4.4	63
Tertiary/university	16.6	237
Sub-total	28.4	407

Table 4 Use of internet for interpersonal communication & frequency of talking face-to-face with family members/friends for 10 min or more in four Chinese cities (*N*)

	Hong Kong		Taipei		Beijing		Wuhan	
	Often/v. often	Some-times	Often/v. often	Some -times	Often/v. often	Sometimes	Often/v. often	Some-times
Use of internet for interpersonal communication	15% (44)	37% (106)	20% (47)	31% (74)	33% (121)	34% (125)	36% (204)	40% (227)
Face-to-face communication	70% (484)	23% (160)	65% (340)	26% (136)	56% (533)	32% (299)	53% (574)	34% (368)

sometimes engage in face-to-face interaction with family members or friends for 10 min or more.

5.3 Insignificant or Negative Impact of Online Communication on Quality of Life

Contrary to our expectation, Table 5 indicates that Internet use for interpersonal communication cannot predict people's quality of life, while face-to-face interaction with friends and family members can. The result was the same across the four Chinese cities.

In a regression analysis of the aggregate data of all four cities, we found that the use of the Internet for interpersonal communication has a negative impact on people's quality of life. The β was $-.40$ significant at .001 level. A further analysis of each of the four cities shows the same negative effect for Hong Kong and an insignificant effect for the other three cities. The use of the Internet for interpersonal communication has a negative impact on Hong Kong people's quality of life with β of $-.56$ which is significant at .001 level. The betas in the analysis of Taipei, Beijing, and Wuhan are insignificant but all show negative directions (see Table 5).

On the other hand, the frequency of talking to family or friends face-to-face for 10 min or more has a positive impact on quality of life. Regression analyses on aggregate data of four cities, or data for individual cities all show positive effects with significance at the level of .001 or .01 (Table 5).

Based on these results, we can conclude that the use of the Internet for interpersonal communication cannot replace face-to-face communication in improving quality of life. The hypothesis is not supported.

An obvious explanation is that online communication is different from offline face-to-face communication. Kraut et al.'s explanation of "quality" difference, especially the scarcity of strong ties in Internet communication, may be invoked to account for the negative effect of online interpersonal communication on one's perceived quality of life. As communication is not deep, relationships formed or maintained on the Internet will not be strong. Hence, Internet communication cannot play a positive role in improving quality of life among people.

However, as previously mentioned, the four Chinese cities under study had relatively high penetration of the Internet at the time of study in 2002–03 and there should be a reasonable number of strong ties on the Internet. A small number of strong ties may not be a primary reason for the negative effect of Internet communication on the psychological well-being of these four Chinese societies. In addition, when we ran a regression of the

Table 5 Regression of internet use for interpersonal communication & face-to-face communication on quality of life

	USE of internet for interpersonal communication		FREQUENCY talking face-to-face to friends/relatives for 10 min or more	
	β	SE	β	SE
Quality of life (Satisfaction with Life Scale)				
All cities	−.40***	.09	.77***	.07
Hong Kong	−.56**	.20	.76***	.13
Taipei	−.13	.21	.41**	.16
Beijing	−.03	.21	.66***	.15
Wuhan	−.03	.15	.56***	.11

** $p < .01$, *** $p < .001$

item "using the Internet to disclose things deep in your heart" on quality of life, we found that the impact was still significantly negative ($\beta = -.25$, SE = .08, significant at .001 level). People who often disclose things deep in their heart on the Internet tend to experience low quality of life. In other words, the lack of "depth" of communication or strong ties on the Internet may not be a reason for the negative effect of online communication on quality of life either. The negative finding shows that despite relatively high penetration of the Internet and the presence of strong ties, the use of the Internet for interpersonal communication cannot increase people's psychological well-being in the four Chinese societies.

The adverse effect of online interpersonal communication on quality of life may be due to factors other than lacking strong ties or depth of communication on the Internet.

It is possible that the use of the Internet for interpersonal communication is a result of certain characteristics of the Internet users. For example, those who always use the Internet for interpersonal communication may be a group of socially isolated or disadvantaged people who have experienced isolation or exclusion in face-to-face interaction in everyday life. If this is really the case, we should expect to see a negative correlation between the use of the Internet for interpersonal communication and social interactions or social support. The less social interaction or social support one has, the more likely one will engage in online interpersonal communication.

In the data subsets of Wuhan and Hong Kong, the researchers had included questions pertaining to social interactions and social support. We can, therefore, use the data to investigate further if the frequent users of online communication are composed primarily of socially isolated and disadvantaged people. The investigators of Beijing and Taipei did not include questions about social interactions and social support in their survey because these questions were not designed as core questions for the comparative study; investigators of the four cities had the option of using or not using these questions. We combined the relevant data of Wuhan and Hong Kong to form an index of "social interactions" and "social support".

The index of "social interactions" consists of four items: "you have social interactions with others in leisure time", "your leisure helps you develop close relations with other people", "your leisure helps you understand other people better", and "during leisure time, you will keep company with others". The answers to these items are given on a 5-point scale ranging from "almost no all the time" to "almost yes all the time". The index of social support is composed of five items. They are "you have someone who will listen to

you when needed", "you have someone with whom you can talk about your private life and problems", "you have someone to comfort you when needed", "you have someone to advise you when needed", and "you have someone to give you suggestions to solve problems". The answers to these items are given on a 5-point scale ranging from "never" to "all the time". The Cronbach's Alpha for the social interaction index is 0.75 and that for social support is 0.88.

A correlation test shows that the relationships between online interpersonal communication and "social interactions" and "social support" are positive instead of negative. The more social interactions and support one has offline, the more likely one will use the Internet for interpersonal communication. The socially isolated or disadvantaged are less likely to engage in online interpersonal communication. For the Hong Kong data, the Pearson r of online interpersonal communication and social interactions is 0.25 which is statistically significant at 0.01 level. The relationship between online interpersonal communication and social support is 0.17, which is also statistically significant at 0.01 level. For the Wuhan data, the result is similar. The Pearson r of online interpersonal communication and social interactions is 0.21, significant at 0.01 level, while the correlation between online communication and social support is 0.22, significant at 0.01 level (Table 6).

These results show that socially isolated people or people having little social support do not always engage in online interpersonal communication. On the contrary, people who enjoy social interactions and social support offline are more likely to use the Internet for interpersonal communication. This finding indicates that the negative impact of online interpersonal communication on quality of life cannot be attributed to the Internet users who are socially isolated or lacking social support because these people do not use the Internet for interpersonal communication as often as those who have social interactions and social support.

Another possible explanation for the negative impact of online interpersonal communication on quality of life can be sought from the nature of online communication vis-à-vis face-to-face communication.

According to Birdwhistell (1970), about 65 percent of the social meaning of a situation in a two-person setting is conveyed nonverbally. A very large part of information in any human communication is derived from nonverbal cues. Without sufficient support of nonverbal cues, Internet communication cannot fully perform the function of face-to-face communication. In face-to-face communication, the exchange of emotions occurs without one's awareness of it. These emotions, be they love, hatred, or anger, elicit a sense of warmth and "human-ness" which are conducive to deeper understanding and development of relationships among the communicating partners. The Internet cannot convey the

Table 6 Correlations among use of internet for interpersonal communication, social interactions, social support, & quality of life (Pearson *r*)

	Hong Kong		Wuhan	
	Social interactions	Social support	Social interactions	Social support
Use of internet for interpersonal communication	0.25**	0.17**	0.21**	0.22**
Quality of life	0.08**	0.33**	0.29**	0.14**

** $p < .01$

"warmth" of face-to-face communication. Maintaining good human relationships is important to people's lives; it is a form of social capital which can help or obstruct people's personal growth and well-being.

There is a set of "cue-filtered-out" theories (Culnan and Markus 1987), which point to the lack of nonverbal cues, emotional information, and reduced interactivity on the Internet as reasons for the impersonality of online communication (Daft and Lengel 1984, 1986; Rice 1984; Short et al. 1976; Siegel et al. 1986). Due to the inadequacy of nonverbal cues, Internet communication is less socially oriented and personal than face-to-face communication. These theories explain well the less frequent use of online communication among the socially isolated and disadvantaged, because online communication is less apt for social interactions and the build-up of social support. The Internet cannot serve as a substitute for face-to-face communication.

Face-to-face communication demands the effort and engagement of participants to succeed and be maintained. The efforts made by participants indicate certain degrees of respect and appreciation of the communicating partners. Internet communication, on the other hand, can be interrupted at any moment or conducted with intermittent delays. Internet users are not required to have immediate responses, and mind their facial or nonverbal expressions when they are online. These differences between online and offline interpersonal communication contribute to different types of social interactions and support, and subsequently perceptions of life quality.

Meanwhile, it should be noted that there is a positive relationship between quality of life and social interactions as well as social support. For the Hong Kong data, the Pearson r between social interactions and QoL is 0.08 which, albeit small, is significant at the 0.01 level. The Pearson r between social support and QoL is 0.33, which is quite high, and also significant at the 0.01 level. The result in the Wuhan data is similar. The Pearson r between social interactions and QoL is 0.29 while that between social support and QoL is 0.14. Both are significant at 0.01 level (Table 6).

The negative impact of online interpersonal communication on quality of life may be explained by the fact that people who enjoy social interactions and support offline, often engage in online interpersonal communication for some reasons, such as supplementing offline interactions or communicating with strangers. However, they find such online communication less satisfying in terms of providing social interactions or support like that which they have obtained offline. As a result, the online users have a low rating on the impact of online interpersonal communication on quality of life.

6 Conclusion

In conclusion, this study shows that the use of the Internet for interpersonal communication is not the same as offline face-to-face communication in enhancing quality of life. Online communication has an adverse effect on people's perceived life quality. The relative lack of strong ties or in-depth quality in Internet communication cannot be a reason for the negative effect of online communication on life quality because the four Chinese societies already had high penetration of the Internet and subsequently a good presence of strong ties when the study was done. Moreover, a test of the predictive relationship between "disclosing things deep in their heart on the Internet" and quality of life still shows an adverse effect. This indicates that the presence of "in-depth quality" is not essential to improving perceived quality of life.

The authors propose that the absence of nonverbal cues, lack of warmth, and less demand for engagement in Internet communication, which results in impersonality, shallow interactions, and difficulty in building social support, are reasons for the negative contribution of online communication to perceived quality of life. A further analysis shows that offline social interactions and support are positively related to perceived life quality. If online communication can enhance social interactions and support, its impact on quality of life should be positive, and people having less offline social interactions and support should want to engage in online communication to compensate for their relative lack of offline social interactions and support.

The data analysis, however, shows that this is not the case. The socially isolated and disadvantaged are found to be less likely to use the Internet for interpersonal communication. In other words, the socially isolated and disadvantaged do not find online communication useful for social interactions and the building up of social support. In a nutshell, the negative impact of online communication on quality of life may be explained by its relatively weak role in enhancing social interactions and social support due to its lack of nonverbal cues, emotional information, and interactive rigor compared with face-to-face communication.

Having said that, this does not mean that Internet communication cannot be used to develop close relationships or social support. For example, Walther (1996) argues that computer mediated communication can be interpersonal, just like face-to-face communication, when users have time to exchange information, build impressions, and compare values. He further argues that computer-mediated communication is "hyperpersonal" when users can create impressions and manage relationships more positively than they might be able to conduct face-to-face communication, such as to selectively self-present and edit, to construct and reciprocate representations of their partners without the interference of environmental reality. However, what Walther describes are exceptions rather than rules in common people's use of the Internet for interpersonal communication. In general, under normal circumstances, people engage in online communication in a sub-interpersonal, if not impersonal, manner. The finding of the negative role of online communication on life quality in the present study primarily addresses the general use of the Internet under normal circumstances. The inadequacy of the Internet in building up social support and substituting the face-to-face interactions, which are rich with cues, seems to be the main reason for the adverse impact of online communication on perceived life quality.

As the finding of a negative impact of online communication on quality of life is consistent across all four Chinese cities, we may conclude that level of social and economic development does not have a significant impact on the use and role of new communication technology in improving quality of life. It is likely that once a modern technology has become affordable and accessible to the common people, the level of social and economic development will no longer constitute an obstacle for the use of that technology. After reaching certain level of penetration, modern technologies, such as television and the Internet, may have a class-leveling effect on society. A digital divide appears only when the technology is not accessible to some due to resource constraints and/or technological illiteracy. In the case of the Internet, the cost for accessibility and demand for technological literacy are reasonably low, particularly when it is widely available in schools and public libraries. The widespread use of the Internet in the four Chinese societies overcomes the constraints imposed by different levels of development, without giving special advantages to the more developed Hong Kong and Taiwan, and harming the less developed Beijing and Wuhan in the use of the Internet in improving life

quality. All four Chinese cities exhibit the same adverse effect of online communication on perceived quality of life.

This finding helps to highlight the importance of social interactions on a personal basis in human societies. Even with more development in visual communication online, such as MSN and Skype, *non-mediated* face-to-face communication and interpersonal touch will remain important in developing long-term relationships and mutual support among people. The present study contributes to alerting quality of life researchers, despite the many wonders of modern technologies, to pay attention to the basic fabric of society—interpersonal relationships—and examine people's daily life interactions and social support more closely.

This study has its limitations. It does not include psychological and social variables such as personality, self-esteem, motivation, isolation, alienation, ties, and social capital, nor the variables related to people's daily life in work, study, and leisure. Because of this deficiency, this study is limited in arriving at a more comprehensive understanding of the role of Internet communication in a wide variety of people's daily activities. It is proposed that further studies should include these variables, and monitor closely the impact of instant messaging technology on offline face-to-face interactions. These authors believe that mediated communication, in whatever form, can only approximate to daily life interactions which are unique in their own right. Internet communication is only one among many modes of communication facilitating the development of human relationships which are basic to the well-being of humans.

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