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Multiple determinants of life quality: the roles of Internet activities, use of new media, social support, and leisure activities ☆

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Abstract

The quest for quality of life (QoL) is a growing concern for individuals and communities seeking to find sustainable life satisfaction in a technologically changing world. Industry, consumer groups, academics, and policy makers have sought to better understand how the Internet contributes to or detracts from society. This study examined the effects of Internet activities, new media use, social support, and leisure activities on perceived quality of life. Correlational results showed that Internet activities, such as using the Internet for sociability, fun seeking and information seeking, and new media use, correlate positively with various dimensions of social support. However, use of the Internet, especially for sociability, and computer use were inversely linked to QoL. Furthermore, hierarchical regression analysis revealed that affectionate, positive social interaction, and emotional and informational social support, received from either online or offline sources, are the strongest determinants of quality of life. More important, QoL can also be enhanced if suitable amounts of time are spent on media-related activities, namely, less time on using the Internet for intimate self-disclosure and in playing computer games, and more time on listening to music on CD/MD/MP3. Finally, participating in community or religious activities for leisure was also a significant predictor of QoL. Implications regarding policy formulation to improve life quality are discussed.

Keywords: Internet; Quality of life; Social support; Leisure activities

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1. Introduction

Over the past decade, the Internet has changed the way people work, play, learn, and communicate. Today, there is a scarcely an aspect of our life that is not being affected by the torrent of information available on the hundreds of millions of sites crowding the Internet, not to mention its ability to keep us in constant touch with each other via electronic mails (Henderson, 2001). The Internet adds a new entry to the list of older mechanisms such as the telephone, postal mail, TV, radio, and newspaper, all of which import communication and information into the household. In fact, many view the growth of the Internet and e-commerce as a global megatrend along the lines of the printing press, the telephone, the computer, and electricity. Since these relatively recent developments, technology in much of the world has just about taken over our lives.

The quest for quality of life is a growing concern for individuals and communities seeking to find sustainable life satisfaction in a technologically changing world (Mercer, 1994). Globalization and rapid advances in information technology offer us vast, unprecedented opportunities to improve life quality. Yet, this opportunity may also be burdened with undesirable consequences. With the Internet, people—living in the most plugged-in and mechanized society in history—may be working harder than ever. Rather than creating time for leisure, our technology is creating ways that make it possible to undertake more work at home. Cellular phones, palmtops, and Internet access devices may be making it virtually impossible to escape our jobs. Technology may diminish our leisure time, not increase it (Anderson and Tracey, 2001). Does using the Internet make people happier or unhappier? Is the Internet empowering, to which specific groups of people, and under what circumstances? Does virtual community erode face-to-face community? These are some of the key questions social scientists are exploring today.

Previous research in assessing life quality have included selected attributes such as 'access to leisure activities,' 'amount of non-work time,' 'telework,' and 'use of new media technology' (Kernan and Unger, 1987; Leung, 2004; Moller, 1992; Wei and Leung, 1998), among others. However, little research has been carried out to further explore the potential relationship between the Internet and QoL. For the time being, both theoretical and empirical researches on the impact of the Internet are still in their infancy. This study examines the possible influence of the Internet with particular emphasis on the roles of Internet activities, use of new media, social support, and leisure activities on quality of life.

2. Theoretical frameworks

2.1. Quality of life

Quality of life, a cognitive judgmental process, is defined as "a global assessment of a person's life satisfaction according to his chosen criteria" (Shin and Johnson,

1978). Diener (1984) suggested that the judgment of how satisfied people are with their present state of affairs is based on a comparison with a standard, which each individual sets for himself or herself. It is not externally imposed. Although many people see wealth, health, employment, leisure, personal life, and fame as desirable, different individuals may place different values on them. As defined by Argyle (1987), "[the] meaning of happiness is a state of joy or positive emotion; or the satisfaction with life as a whole, or with work, leisure, and other parts of it." Therefore, quality of life is a measure of overall life satisfaction, rather than a summation of life satisfaction across specific domains.

In reviewing the quality of life literature, two constructs have been used to explain the determinants of life satisfaction or quality of life: subjective and objective perspectives (Diener, 1984). The subjective construct hypothesizes that perceived quality of life is influenced by personality or dispositional factors (e.g., optimism, pessimism, isolation, self-worth, and neuroticism). On the other hand, the objective construct proposes that life quality is affected by environmental or situational factors (e.g., family, job, leisure, neighborhood, community, and satisfaction with standard of living). According to the objective determinants of life quality, people's quality of life tends to be a direct function of their evaluations of important life domains such as *social support*, *leisure activities*, and *standard of living* of overall life (e.g., Andrew, 1986; Andrews and Withey, 1976; Diener, 1984). Satisfaction or dissatisfaction with standard of living is likely to spill over to influence subjective well-being. Therefore, the greater the satisfaction with one's standard of living, the greater the satisfaction with life and vice versa. Here, standard of living is usually meant as "being materially better off" than a typical family (Andrews and Withey, 1976; Diener, 1984; Prenshaw, 1994).

To maintain or to have a high standard of living, technologies and innovations have always played a major role in the past (McPheat, 1996). Household technologies introduced around the middle of the last century, such as television, refrigerators, air-conditioners, vacuum cleaners, and clothes dryers, are permanently embedded in society. Even more taken-for-granted are changes in workplace technology such as the use of mobile phones, faxes, and e-mails. The impact of the Internet on society as a whole has been debated continuously since its widespread use in the 1990s. Industry, consumer groups, academics, and policy makers have sought to better understand how the Internet contributes to or detracts from society. Communications media are so fundamental to society that new media forms have the capacity to reshape our work, leisure, lifestyle, social relationships, national and cultural groups and identities in ways that are difficult but important to predict. As the Internet continues to expand its technological capabilities and global penetration, one of the most pressing questions is: Does the Internet have a positive or negative effect on life quality? As shown in Fig. 1, this study examines, from an objective perspective, the impact of *social support*, *leisure activities*, and *standard of living* (as supported and maintained by the use of information technologies such as the Internet) on quality of life.

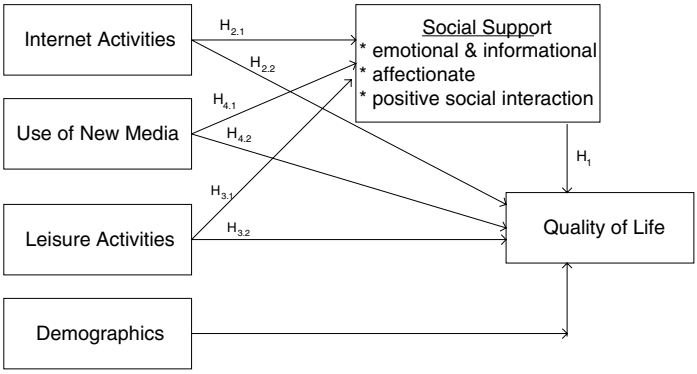

Fig. 1. An objective model explaining quality of life.

2.2. Social support

In a review of social indicators research, Cobb (1976) gave social support the first definition as "information leading the subject to believe that he or she is cared for and loved, that he/she is esteemed and valued, and he/she belongs to a network of communication and mutual obligation." Other scholars defined social support as "interpersonal transactions involving affect, affirmation, aid, encouragement, and validation of their feelings" (Abbey, 1993; Kahn and Antonucci, 1980). House (1986) gave a third definition that social support involves "the flow between people of emotional concern, instrumental aid, information, or appraisal."

Existing measures of social support are rather varied because of the different definitions of social support and the lack of a clear conceptualization of the construct (Cohen and Syme, 1985; Donald and Ware, 1984). However, recent research has generally attempted to measure the *functional components* of social support because functional support is the most important and can be of various types providing: (1) *emotional* support which involves caring, love, and sympathy, (2) *instrumental* support providing material aid or behavioral assistance and referred to by many as tangible support, (3) *information* support offering guidance, advice, information, or feedback that can provide a solution to a problem, (4) *affectionate* support involving expressions of love and affection, and (5) social companionship (also called *positive social interaction*), which involves spending time with others in leisure and recreational activities (Sherbourne and Stewart, 1991).

Although the Internet has become an important resource for information and entertainment, little is known about the ways in which individuals use this technology for social support. In what way do communication technologies play a role in influencing "mediated social support" and, in turn, relate to a variety of outcomes in life quality? Recent research found that Internet-based support groups—including newsgroups, message boards, and listservs for specific medical conditions—have been successful in improving some intermediate patient outcomes in clinical trials involving Alzheimer's caregivers (Brennan et al., 1995; Gallienne et al., 1993) and in

patients with AIDS (Brennan et al., 1991). These studies have demonstrated that the use of a computer-based communication system reduced self-reported isolation in an AIDS trial and led to greater perceived confidence in the ability to care for family members in the Alzheimer's caregivers' study. Internet-based peer support groups for depression have also been found providing information and support, in which heavy users of the Internet groups were more likely to have resolution of depression during follow-up than less frequent users (Houston et al., 2002). Similarly, in addition to research focused on the impact of the Internet on disabled people, past study also investigated social support in the computer-mediated environment for well-bodied people and found that older adult Internet users reported higher satisfaction with Internet providers of social support; and greater involvement with an online community was predictive of lower perceived life stress (Wright, 2000).

It is impossible to consider all the variables from the subjective and objective perspectives in assessing quality of life for any individual. The list of possible indicators is endless. One solution is to see which of them increases the objective quality of life within the domain of mediated social impact by information technologies. Furthermore, building from Putnam's (1995) conceptual links between quality of life, community involvement, and social capitals, further research has demonstrated that frequent and increasing use of the community computer network and the Internet significantly influence social capital formation (Kavanagh and Patterson, 2001). Therefore, we expect that:

H_1: Social support is positively associated with QoL.
$H_{2.1}$: Internet activities (especially for sociability) are positively associated with social support.
$H_{2.2}$: Internet activities (especially for sociability) are positively associated with QoL.

2.3. Leisure activities

As reviewed earlier, one important objective determinant of life quality is leisure activities. In studying leisure, scholars like to ask whether *place-centered* leisure activities, which take place in urban parks, or sporting and entertainment venues, contribute more to a person's self-reported quality of life or whether QoL is primarily influenced by *people-centered* factors such as *social interaction*, sense of achievement, and level of satisfaction with one's leisure lifestyle. Social interaction is a central component of leisure activities (Auld and Case, 1997) and the most positive experiences people report are usually those with friends (Csikszentmihalyi, 1997). In a study that examined the relative importance of selected place and people-centered leisure attributes in predicting quality of life, Lloyd and Auld (2001) found that the people-centered leisure activities were the best predictor of quality of life. In particular, the domain of social support from family, friends, and marriage has the most effect on life quality and social leisure activity has the most positive influence on QoL for a diverse range of social groups (Siegenthaler and Vaughan, 1998). Moreover, previous research has demonstrated a positive relationship between engaging in

leisure activities such as sports (Wankel and Berger, 1990) and fitness exercises (Dowall et al., 1988) and improved life quality. Foong (1992) explained that these significant relationships are due to the "salutary consequences" of social interaction with other people resulting from engagement in active leisure. This study will use both *people-centered* as well as *place-centered* indicators to assess leisure activities. As a result, we hypothesize that:

$H_{3.1}$: Leisure activities are positively associated with social support.
$H_{3.2}$: Leisure activities are positively associated with quality of life.

2.4. Impact of the Internet and new media

Extensive qualitative and quantitative evidences also supported the Internet's potential that home Internet access enabled the informationally disadvantaged or low-income families to experience powerful emotional and psychological transformations in identity (self-perception), self-esteem, personal empowerment, a new sense of confidence, and social standing or development of personal relationships on the Internet (Anderson and Tracey, 2001; Bier and Gallo, 1997; Henderson, 2001). The appropriate use of computers, mobile phone, online newspaper, and online forum, etc. can help to promote self-sufficiency, psychological empowerment, lifelong learning, and rehabilitation (Bier and Gallo, 1997; Hu and Leung, 2003; Wellman and Haythornthwaite, 2002). Wright (2000) found that greater involvement with the online community was predictive of lower perceived life stress for older adults. A trend toward decreased loneliness and improved psychological well-being among older adults was observed when e-mail and Internet access was provided (White et al., 1999). Based on these findings and the theoretical frameworks reviewed, we propose two additional hypotheses and ask one research question:

$H_{4.1}$: Use of new media technology is positively associated with social support.
$H_{4.2}$: Use of new media technology is positively associated with QoL.
RQ: To what extent can Internet activities, use of new media, and traditional media use affect quality of life when other influences, such as social support, leisure activities, and demographics are considered simultaneously for Internet users?

3. Method

3.1. Sample and sampling procedures

Data were gathered from a probability sample of 1192 respondents, using a face-to-face structured questionnaire interview during the months of October–December 2002. Respondents were eligible members of randomly generated households from the Census and Statistics Department in Hong Kong. If there was more than one eligible respondent living in the household, the person who was between the ages of 15 and 64 and had had the most recent birthday was interviewed. Interviewers were

trained university students. A total of 238 households were discarded when interviewers found them to be vacant, for non-residential use or ineligible, had no response after having visited more than three times, or were simply refused by the respondents. Of the 954 qualified households, 696 successfully completed the questionnaires, resulting a 73% response rate.

The sample consisted of 46.7% males and 53.3% females. The mean age was 36.8 with 30.3% who were in the 35–44 age group, 21.6% in 25–34, 20% in 15–24, 19.7% in 45–54, and 8.5% were in 55–64. This age distribution very closely resembled the 2001 population census in Hong Kong. Of the 696 respondents, 41.9% were high school graduates, 24% college graduates, 19.5% had completed junior high, and 13.4% only had grade school education. In terms of income, the mean was at the income bracket of US$2565–$3205 a month, with 16.9% earning less than US$1282 a month, 21% between US$1282 and $1923, 13.6% between US$1924 and $2564, 12.8% between US$2565 and $3205, 17.6% between US$3206 and $5128, 9.9% between US$5129 and $7692, and 8.3% more than US$7692 a month. Over 38% were managers, administrators, professionals, or associate professionals, 19.4% clerks, 14.3% service or sales workers, 10.8% craft and related workers, 9.8% had elementary occupations, and about 5% were plant and machine operators and assemblers.

3.2. Measurements

Quality of life. To measure quality of life, the Satisfaction with Life Scale (SWLS) developed by Diener et al. (1985) was employed. With good internal consistency and high reliability, SWLS is narrowly focused to assess global life satisfaction and does not tap related constructs such as positive affect or loneliness. Respondents were asked about their agreement with a five-item scale using a 5-point scale with "1" = strongly disagree, "2" = disagree, "3" = ordinary, "4" = agree, and "5" = strongly agree. The five items include: (1) in most ways my life is close to my ideal; (2) the conditions of my life are excellent; (3) I am satisfied with my life; (4) so far I have gotten the important things I want in life; and (5) if I could live my life over, I would change almost nothing. Reliability alpha was high at 0.83.

Social support. To assess social support, a battery of 19 items within four subscales developed by The Rand and Medical Outcome Study (MOS) teams was adopted with slight modification. The five original dimensions of social support were further reduced as items from emotional support and informational support were highly correlated and considerably overlapped. Therefore, emotional and informational support was merged into one. As a result, the four subscales were "tangible," "affectionate," "positive social interaction," and "emotional or informational" supports. It was recommended that the subscale scores rather than the total score be used (McDowell and Newell, 1996). Moreover, items from the tangible support subscale were excluded because tangible support refers mostly to medical or health related assistance from friends or close relatives rather than being affective or emotional related. Respondents were asked how often each of the support items, measured in the remaining three dimensions, is available to them if they need them either from the online or offline world. A 5-point scale was used including

Table 1
Factor analysis of social support

How often is each of the following kinds of support available to you if you need it?	Mean	SD	Factors		
			1	2	3
Emotional and informational					
1. Someone whose advice you really want	3.58	0.83	0.77		
2. Someone to give you good advice about a crisis	3.54	0.89	0.77		
3. Someone to give you information to help you understand a situation	3.57	0.86	0.71		
4. Someone to turn to for suggestions about how to deal with a personal problem	3.47	0.95	0.61	0.41	
Positive social interaction					
5. Someone to get together with for relaxation	3.63	0.84		0.80	
6. Someone to do something enjoyable with	3.56	0.86		0.78	
7. Someone to do things with to help you get your mind off things	3.35	0.90		0.67	
Affectionate					
8. Someone who shows you love and affection	3.69	0.87			0.86
9. Someone to love and make you feel wanted	3.61	0.91			0.69
10. Someone who comforts you sincerely (hugs you)	3.64	0.90		0.44	0.65
11. Someone you can count on to listen to you when you need to talk	3.72	0.84	0.42		0.53
Eigenvalue			6.41	0.80	0.69
Variance explained			58.27	7.27	6.26
Cronbach's alpha			0.86	0.83	0.84

Scale used: 1 = none of the time, 2 = a little of the time, 3 = some of the time, 4 = most of the time, and 5 = all of the time; $N = 388$.

"1" = none of the time, "2" = a little of the time, "3" = some of the time, "4" = most of the time, and "5" = all of the time. Principal components factor analysis in Table 1 extracted three factors and explained 71.8% of the variance. The three factors were "emotional and informational support" with alpha = 0.86, "positive social interaction" (alpha = 0.83), and "affectionate" (alpha = 0.84).

Leisure activities. Respondents were asked how often they engage in five popular people-centered and place-centered leisure activities in Hong Kong including: talking to family and friends face-to-face for more than 10 min, playing mahjong, participating in community or religious activities, physical exercise, and window shopping. A 5-point scale was used with "1" = never, '2" = seldom, "3" = sometimes, "4" = quite often, and "5" = very often.

Internet activities. Respondents were asked how often they use the following Internet activities: learning from the Internet, searching for information, reading news online, listening to music, playing games, surfing for leisure and entertainment,

Table 2
Factor analysis of Internet activities (Internet users only; $N = 387$)

How often do you use the following Internet services?	Mean	SD	Factors			
			1	2	3	4
Fun seeking						
1. Playing games on the Internet	2.59	1.26	0.79			
2. Listening to music on the Internet	2.93	1.22	0.77			
3. Surfing for leisure and entertainment	3.36	0.98	0.69			
Sociability						
4. Talk about things of your inner world to other people on the Internet	2.05	1.02		0.78		
5. Communicate with somebody you knew before on the Internet	3.42	1.08		0.77		
6. Communicate with somebody you did not know before on the Internet	2.16	1.09	0.51	0.54		
Information seeking						
7. Searching information on the Internet	3.70	0.86			0.79	
8. Reading news on the Internet	3.07	0.93			0.69	
9. Learning from the Internet	2.82	0.90			0.67	
e-commerce						
10. To get service on the Internet (e.g., paying bills)	2.81	0.62				0.86
11. Purchasing on the Internet	2.74	0.64				0.83
Eigenvalue			3.32	1.56	1.17	1.04
Variance explained			30.16	14.13	10.66	9.42
Cronbach's alpha			0.71	0.70	0.58	0.62

Scale used: 1 = never, 2 = seldom, 3 = sometimes, 4 = often, and 5 = very often.

purchasing, using services on the Internet (such as paying bills, account transfer, booking tickets, etc.), communicating with somebody you did not know before, communicating with somebody you knew before, and talking about aspects of your inner world to other people. A 5-point Likert scale was used with "1" = meaning never, "2" = seldom, "3" = sometimes, "4" = often, and "5" = very often. After excluding two items, principal components factor analysis with Varimax rotation yielded four factors with eigenvalues greater than 1.0, explaining 64.37% of the variance. As shown in Table 2, these factors are fun seeking, sociability, information seeking, and e-commerce with alpha ratings equaling 0.71, 0.70, 0.58, and 0.62 respectively.

New media use. Respondents were asked how much time they spent on the eight most popular new media technologies in their leisure time, namely, Internet use, computer use, ICQ, e-mail, and talking on the phone in minutes per day and playing computer games, listening to CD, MD, MP3, and watching VCD and DVD in minutes per week.

Traditional media use. Four traditional mass media variables were included in the analyses: printed newspaper reading, TV watching, magazine reading, and radio

listening. Respondents were asked to report the time on average spent on these media in a normal day. Newspaper reading, TV watching, and radio listening were measured in minutes per day while magazine reading was measured in minutes per week.

4. Results

4.1. Hypotheses testing

H_1 predicted that social support is positively associated with quality of life. As expected, correlation results in Table 3 showed that emotional and informational ($r = 0.36$, $p < 0.001$), positive social interaction ($r = 0.40$, $p < 0.001$), and affec-

Table 3
Correlation analyses of all criterion variables and social support and quality of life

	Social support			Quality of life (QoL)
	Emotional and informational	Positive social interaction	Affectionate	
Internet activities				
Fun seeking	0.11*	0.16**	n.s.	n.s.
Sociability	0.11*	n.s.	n.s.	−0.16**
Information seeking	0.11*	n.s.	0.12*	n.s.
E-commerce	n.s.	n.s.	0.11*	n.s.
New media use				
Internet use (min/day)	n.s.	n.s.	n.s.	−0.16**
Computer use (min/day)	n.s.	n.s.	n.s.	−0.13*
ICQ	n.s.	n.s.	n.s.	n.s.
e-mail	n.s.	n.s.	n.s.	n.s.
Talking on the phone	0.14***	0.14**	n.s.	n.s.
Playing computer game	0.11**	0.14**	n.s.	−0.08****
Listening to CD/MD/MP3	0.15***	0.23***	0.21***	0.18**
Watching VCD/DVD/LD	n.s.	n.s.	n.s.	n.s.
Social support				
Emotional and informational	–	–	–	0.36***
Positive social interaction	–	–	–	0.40***
Affectionate	–	–	–	0.47***
People-centered leisure activities				
Talking with family or friends face to face	0.24***	0.27***	0.33***	0.25***
Playing mahjong	n.s.	0.11*	n.s.	n.s.
Participating in community or religious activities	0.14***	n.s.	n.s.	0.13**
Place-centered Leisure Activities				
Physical exercise	0.10**	n.s.	n.s.	0.11*
Window shopping	0.11**	0.22***	0.11*	n.s.

Notes: ****$p <= 0.1$; ***$p <= 0.05$; **$p <= 0.01$; *$p <= 0.001$; $N = 388$.

tionate ($r = 0.47$, $p < 0.001$) dimensions of social support were significantly correlated to quality of life. This suggests that people, who have strong social support available when they need it, such as affirmation, aid, encouragement, information, affect, and validation of their feelings, are those who enjoy a high quality of life. Thus, H_1 received strong support from the data.

$H_{2.1}$ predicted that Internet activities are significantly linked to social support. In the four main categories of Internet activities, results in Table 3 indicated that fun seeking, sociability, and information seeking were significantly related to the emotional and informational dimension of social support (each with $r = 0.11$, $p < 0.05$). This means that people who often receive advice in crises in the real world are those who are active on the Internet talking about aspects of their inner world with friends and strangers, relying heavily on the Internet for advice and information to help them understand their personal problems, playing games, listening to music, and surfing the web. Secondly, fun seeking was also significantly related to the positive social interaction dimension of social support ($r = 0.16$, $p < 0.01$). This indicates that people who enjoy a large social network for interaction and relaxation offline are those who are active game players and fun seekers on the Internet. Thirdly, bivariate relationships between information seeking and e-commerce and the affectionate dimension of social support were also significant ($r = 0.12$, $p < 0.05$ and $r = 0.11$, $p < 0.05$ respectively). This suggests that people who have a large circle of friends providing them with love and affection in the offline world are also those who are active on the Internet seeking information, advice, and receiving support. Therefore, $H_{2.1}$ is largely supported.

Contrary to what $H_{2.2}$ hypothesized, that Internet activities are positively associated with life quality, results in Table 3 showed that sociability was negatively linked to quality of life ($r = -0.16$, $p < 0.01$). Such a finding indicates that people who spend a lot of time disclosing their "inner world" to others on the Internet are those with a lower assessment of their overall life quality. This relationship could be explained in that when people spend a lot time talking about their personal feelings online, this may take away time from more valuable activities offline, including social contact, sleep, leisure activities, or reading books. Therefore, $H_{2.2}$ is not supported.

$H_{3.1}$ proposed that leisure activities would influence social support. Results in Table 3 showed that emotional and informational social support are significantly related to people-centered leisure activities such as talking with family and friends face-to-face ($r = 0.24$, $p < 0.001$) and participating in community or religious activities ($r = 0.14$, $p < 0.001$). This means that, at the time of crises, people tend to obtain information and advice by engaging in face-to-face conversation with other people and/or by actively involving in religious or community activities. In addition, people also find informational and emotional social support through place-centered leisure activities, e.g., physical exercise ($r = 0.10$, $p < 0.01$) and window shopping ($r = 0.11$, $p < 0.01$). Similarly, when people get together for relaxation and fun for positive social interaction, people tend to talk with family and friends ($r = 0.27$, $p < 0.001$), play mahjong ($r = 0.11$, $p < 0.05$), and to go window shopping with friends ($r = 0.22$, $p < 0.001$)—a popular place-centered leisure activity in Hong Kong. As expected, people who receive a lot of affection and love for social support

are those who often engage actively in people-centered, face-to-face chat with family and friends ($r = 0.33$, $p < 0.001$) and place-centered window shopping ($r = 0.11$, $p < 0.05$). Thus, $H_{3.1}$ is largely supported.

$H_{3.2}$ proposed that leisure activities would influence quality of life. As anticipated, talking with family and friends face-to-face ($r = 0.25$, $p < 0.001$) and participating in community or religious activities ($r = 0.13$, $p < 0.01$) in people-centered leisure activities are significantly linked to quality of life. Furthermore, physical exercise or sports ($r = 0.11$, $p < 0.05$), a place-centered leisure activity, was also found significantly liked to QoL. Hence, $H_{3.2}$ received strong support.

$H_{4.1}$ predicted that use of new media technology is positively associated with social support. Correlational results in Table 3 showed that, of the eight new media technologies commonly used in daily life, emotional and informational social support was significantly linked to talking on the phone ($r = 0.14$, $p < 0.001$), playing computer games ($r = 0.11$, $p < 0.01$), and listening to CD/MD/MP3 ($r = 0.15$, $p < 0.001$). This shows that people who can receive advice and information about a crisis when they need them are those who tend to spend a lot of time on the phone seeking counsel, guidance, or encouragement; others receive emotional and informational social support through computer gaming and listening to or sharing music with online/offline friends. Similarly, positive social interaction and social support were also significantly related to talking on the phone ($r = 0.14$, $p < 0.01$), playing computer games ($r = 0.14$, $p < 0.01$), and listening to CD/MD/MP3 ($r = 0.23$, $p < 0.001$). These findings indicate that people who receive social support by getting together and doing something enjoyable with friends are those who often like to talk on the phone, play games with computers, and listen to CD/MD/MP3. Finally, people who receive a lot of love, affection, and hugs in real life are those who also listen to music online regularly to release social pressure ($r = 0.21$, $p < 0.001$). As a result, $H_{4.1}$ received partial support.

$H_{4.2}$ predicted that use of new media technologies is positively associated with quality of life. Results showed that only three out of eight new technologies and QoL were significantly linked. Surprisingly, use of the Internet and use of computer were negatively related to QoL ($r = -0.16$, $p < 0.01$ and $r = -0.13$, $p < 0.05$ respectively); while watching VCD/DVD/LD for entertainment and life quality were positively linked ($r = 0.18$, $p < 0.01$). Therefore, $H_{4.2}$ received little support.

4.2. Predicting quality of life

Finally, to compare the relative influence of Internet activities, use of new media, and traditional media use on quality of life when other factors, such as social support, leisure activities, and demographics are considered simultaneously for Internet users, a hierarchical regression analysis was run. Results in Table 4 show that sociability was a significant predictor ($\beta = -0.11$, $p < 0.05$) under the Internet activities block. However, the negative correlation indicates that the people who spend more time communicating their inner thoughts to other people on the Internet are those who tend to have a lower level of life quality. The first block accounted for 2% of the variance.

Table 4
Stepwise regression of Internet activities, new media use, traditional media use, social support, leisure activities, and demographics on quality of life (QoL)

Predictor variables	β	ΔR^2
Block 1: Internet activities		
Fun seeking	n.s.	
Sociability	−0.11*	
Information seeking	n.s.	
E-commerce	n.s.	0.02
Block 2: New media use		
Internet use (min/day)	n.s.	
Computer use (min/day)	n.s.	
Talking on the phone	n.s.	
Playing computer game	−0.14**	
Listening to CD/MD/MP3	0.18**	
Watching VCD/DVD/LD	n.s.	0.08
Block 3: Traditional media use		
TV watching	n.s.	
Newspaper reading	n.s.	
Magazine reading	n.s.	
Radio listening	n.s.	0.00
Block 4: Social support		
Emotional and informational	0.13**	
Positive social interaction	0.23***	
Affectionate	0.35***	0.20
Block 5: Leisure activities		
Talking with family or friends face to face	n.s.	
Playing mahjong	n.s.	
Participating in community or religious activities	0.08*	
Physical exercise	n.s.	
Window shopping	n.s.	0.01
Block 6: Demographics		
Gender (female = 1)	n.s.	
Age	0.16**	
Education	n.s.	
Monthly household income	0.11*	0.03
R^2		0.36
Final adjusted R^2		0.34

Notes: Figures are standardized beta coefficients from final regression equation with all blocks of variables included for the entire sample.
****$p <= 0.1$; ***$p <= 0.05$; **$p <= 0.01$; *$p <= 0.001$; $N = 388$.

Use of new media technologies were entered into the equation next. Results showed that playing computer games ($\beta = -0.14$, $p < 0.01$) and listening to CD/MD/MP3 ($\beta = 0.18$, $p < 0.001$) were the only two significant predictors. The negative link between playing computer games and QoL reveals that the violent nature of most computer games has led people to view computer games as a negative force in affecting their self-evaluation of life quality. Quality of life was also predicted by

heavy listening to CD/MD/MP3. This indicates the effect of a wide range of music on users' well-being. These two variables contributed 8% of the variance. However, traditional mass media had no significant impact on life quality.

The three dimensions assessing social support were the next entries in the equation. Affectionate ($\beta = 0.35$, $p < 0.001$), positive social interaction ($\beta = 0.23$, $p < 0.001$), and emotional and informational ($\beta = 0.13$, $p < 0.01$) dimensions contributed significantly to the regression equation and explained a total of 20% of the variance. Five variables from the leisure activities block were entered next. Participating in community or religious activities ($\beta = 0.08$, $p < 0.05$) was a significant predictor that accounted for another 1% of the variance.

Demographic predictors were entered last and it was found that age ($\beta = 0.16$, $p < 0.01$) and monthly household income ($\beta = 0.11$, $p < 0.05$) were significant. The equation explained 34% of the variance in total with the first three blocks of media-related predictors contributing a significant proportion of 10%. This suggests that while social support dimensions were the strongest predictors, appropriate use of the Internet and new media technologies do have an impact on quality of life.

5. Discussion

5.1. Social support and QoL

This study has shown that people with strong social support, such as affirmation, aid, encouragement, and affect, available to them when they need them either from the online or offline world reported a higher quality of life. This finding means that receiving support from strong ties increases life quality. This is consistent with past research that lower levels of perceived social support, satisfaction with social contacts, and participation in social activities were all found to be related to poorer psychological well-being or life quality (House, 1986). Conversely, when people have high levels of emotional support, mediated entirely by the perception that one has someone to call on when they need to, they expect to live longer (Ross and Mirowsky, 2002). Furthermore, hierarchical regression results confirmed that affectionate, positive social interaction, and emotional and informational dimensions of social support were all significant predictors of QoL and explained the majority of the variance.

5.2. Internet activities and social support

Internet activities, such as using the Internet for sociability, fun seeking, and information seeking, were found to be positively related to various dimensions of social support. These imply that people who communicate their inner world with friends and strangers online and rely heavily on the Internet for advice and information to help them understand personal problems are those who often receive guidance and assistance in times of crisis. This finding is in line with past research which indicates that individuals who regularly offer advice and information offline

receive more help more quickly when they ask for something in the online world (Rheingold, 1993; Wellman and Gulia, 1999). Wellman and Haythornthwaite (2002) also found that those who have more "real" support receive more Internet support. Thus the receipt of support happens synergistically online and offline.

5.3. Internet activities and QoL

However, contrary to what was originally hypothesized, using the Internet for sociability and their overall assessment of quality of life were inversely linked. There are several possible explanations. First, many of the social relationships people maintain online are less substantial and less sustaining than relationships that people have in their actual lives. Second, more time spent online may take away from more valuable activities, including social contacts offline, sleeping, or reading books. Third, online communication is a less adequate medium for close social communication than the telephone or face-to-face interactions it displaces. Fourth, computer-mediated relationships are usually superficial with easily broken bonds. This finding is in line with previous research suggesting that relationships maintained over long distances through the Internet erode personal security and happiness (Kraut et al., 1998). In the end, the Internet is useful for linking people to information and social resources which are unavailable in people's closest local groups (e.g., professional groups), but may be poor for deep feelings of affection and obligations. Thus, the weak social ties supported by the Internet network are likely to be more limited than friendships supported by physical proximity. As a result, this negative relationship may lead to a decrease in the assessment of life quality.

5.4. New media use and social support

It is also interesting to note that frequencies of participation in new media activities, such as talking on the telephone regularly, playing games on the computer, and listening to music on CD/MD/MP3, showed positive relationships with social support, especially in the emotional/informational and positive social interaction dimensions, among Internet users. These mean that use of new media technologies, such as the telephone, computer, and CD/MD/MP3, may service various needs such as companionship, entertainment, and relaxation (Wachter and Kelly, 1998). In past research, companionship has been linked to the direct effects model of social support (Antonucci, 1990). In other words, people might receive advice, information, suggestions, relaxation, and various types of social supports derived from a wide range of new media activities.

5.5. New media use and QoL

Interestingly, use of ICQ, e-mail, and talking on the phone did not significantly influence QoL as expected (see Table 3 for details). In fact, use of the Internet and computer were negatively linked to QoL. These findings may mean that heavy use of the Internet and computer, such as playing computer games and use of the Internet

for sociability purposes, may actually degrade quality of life if these technologies were used excessively or used for unhealthy reasons. Furthermore, with the Internet, we are living in the most plugged-in society in history. Rather than creating time for leisure, computer and the Internet may have created ways by which we can do more work while we are away from the office. Similarly, cellular phones, e-mails, and Internet access devices are making it virtually impossible to escape our jobs. As a result, technology may be diminishing our leisure time, not increasing it. In a study of the impact of TV, Brock (2002) also found that excessive or frequent TV viewing contributes to a number of issues, including fractured family time, poor reading and academic performance, increased violence, inactive lifestyles, and obesity. However, TV-free individuals fill their newly discovered free time with a variety of hobbies, community involvement, conversation, reading, writing, cooking, and playing (Sirgy et al., 1998). By turning off the TV and taking back their time, they gained more communication with children and spouses, improved marriages, experienced less conflict among siblings, and increased community involvement (Brock, 2002; Kubey and Csikszentmihalyi, 1990).

In sum, as shown in the results from the hierarchical regression analysis that the extent to which the QoL of the individual can be enhanced does in part hinge on a suitable amount of time spent on media-related activities, namely, less time on using the Internet for intimate self-disclosure, less time in playing computer games, and more time on listening to music on CD/MD/MP3.

5.6. Leisure activities, social support, and QoL

Finally, although past research indicates that the people-centered leisure attribute, especially leisure satisfaction, was the best predictor of quality of life and place-centered attributes failed to influence life quality (Lloyd and Auld, 2001), most bivariate relationships in this study, however, between people-centered and place-centered leisure activities and social support, as well as quality of life, were found significant. These results are consistent with findings by McCormick and McGuire (1996) that the primary leisure attribute that creates and maintains life quality is not exclusively person-centered or place-centered leisure activities, but their *interaction*. This means that people who engaged in social activities more frequently and who are more satisfied with the psychological benefits they derive from leisure, regardless of people-centered or place-centered, experienced a higher level of perceived quality of life (Lloyd and Auld, 2001). Despite these results, however, the hierarchical regression analysis revealed that participating in community and religious activities was the only people-centered leisure activity predictor which contributed significantly to the objective assessment of living quality when the influences of Internet activities, new media use, social support, and demographics were controlled.

Furthermore, it is also interesting to note that socioeconomic status, indicated by age, gender, education, and income variables, only contributed a total of 3% incremental variance in the 34% total explained, while social support accounted for 20%, media-related activities 10%, and leisure activities 1% of the variance. This suggests that economic status is not a key determinant in predicting life quality in this data.

6. Conclusion

To conclude, this study has demonstrated that social relationships and social supports are potent variables that can enhance quality of life. This suggests that happy people may be those who receive and give love, affection, sympathy, guidance, advice, information, and social companionship which involves spending time with others in leisure and recreational activities. As a result, well-connected people, both online and offline, with strong socially supportive relationships would contribute greatly in both quality and quantity of life (House, 1986). Furthermore, use of the Internet and some new media technologies do play important roles in enhancing life quality, especially in music listening from CD/MD/MP3 and non-pathological use of computer games, ICQ, or chat rooms on the Internet. However, the addictive potential of the Internet with harmful consequences could silently run rampant in our schools, our universities, and our homes. These are the new societal challenges that must be addressed through education. Only when parents and teachers recognize Internet addiction as a true disorder and offer ways to combat it can schools and parents start regaining the benefits certain applications of the Internet has unwittingly taken away. This research supports the need for the formulation of problem deterrence policies to prevent excessive non-productive use of the Internet if a high and sustainable quality of life can be maintained.

Furthermore, while many genuinely appreciate the wonder of technology and the accommodations it continues to provide, many still find it disconcerting that technology may have created an environment for even greater intrusion, expectations, and stress. For example, many workers today are perhaps concerned that with their mobile phones, e-mails, and Internet at home, their work may appear to be a 24-hour job intruding into every other aspect of their lives. In the past, it used to take a day or two for a memo to reach the employee—now we have instant e-mail, which demands an instant response. In fact, the long hours' culture is seriously undermining the quality of family life.

Where technology takes us from here is an issue that is widely discussed. It is also an issue that is hotly disputed. While technological change will always occur, there will always be a section of the society, which is unable to accept the change comfortably. With changes so widespread and dramatic as those brought by the Internet, the associated social changes are also very important. Not everybody is included in the advantages brought by the Internet and those included may not be included evenly. Nevertheless, regardless of the positives and negatives, the Internet will clearly continue to be part of contemporary life. It is hoped that we use it wisely so that we remain vigilant about how we should use the Internet to truly bring about a better quality of life.

7. Limitations of the study

On the whole, each of the theoretical constructs—social support, leisure activities, together with Internet activities, new media use, and demographics—performed

reasonably well in helping to explain their self-assessment of life quality. However, several limitations must be noted. First, this study did not directly consider the original causal relationships among Internet activities, use of new media, social support, leisure activities, and quality of life. We recognize that the impacts of the Internet on social support and QoL may be bidirectional. Furthermore, nothing in the data allows causal conclusions. Therefore, longitudinal studies will be better equipped to address this cause-and-effect issue. Future studies may address the reverse causal linkages in additional to the impact of the forward direction of causality. Second, lack of information regarding the purpose of the use of e-mails, telephones, ICQ, and types of content viewed on the Internet greatly reduce the ability to relate how these technologies enhance quality of life or how much of the positive psychological effect was due to the use of the Internet and how much was due to the social interactions offline. Third, qualitative, interpretative methods were lacking to fully explore the diversities of meanings attached to personal assessment of life quality and social support by different people. Future research should address whether the increasing the number of relationships on the Internet is related to increased feelings of connection with society. Further, studies on the impact of media-related technologies on quality of life should focus on gender differences and cross-national comparisons in future.

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