Instant Messaging Usage and Interruptions in the Workplace

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ABSTRACT

The goal of the present study is to explore IM interruption by relating it to media choices and purposes of IM use in the workplace. Two major media choice concepts were: media richness and social influence; while four purposes of IM use were: organization work, knowledge work, socializing, and boundary spanning activities. Data (N = 283) were collected via a combination of convenience and snowball sampling of "computer-using workers" in Taiwan, based on the Standard Occupational Classification system published by the Taiwan government. Results indicated that media choice works better than purpose of IM use to explain IM interruption. Among them, social influence was the best predictor to IM interruption in the workplace. In addition, instant feedback and personalization provided by IM, and IM usage for the purposes of knowledge work and socializing, also relate to IM interruption in the workplace.

1. Introduction

The invention and adoption of new communication technologies has allowed individuals around the world to overcome geographic and time limitations to interact with each other. However, Rogers (1988) indicated that the major challenge for modern organizations derives from the invention and use of new technologies because technological innovation must reconstruct (restructure) and/or destroy (destructure) the present organizational information processing system. Previous studies have also shown that the working environment of office workers is full of interruptions (Fonner & Roloff, 2010, 2012). Is the present and accessible nature of new technology an important source of interruption in the workplace? Past research has suggested that one must understand how new technology is used to understand its effect in the workplace (Fulk, Schmitz, & Steinfield, 1990). Therefore, the present study investigates the use of Instant Messaging (IM) in the workplace and its correlation with IM interruptions through two core concepts of media choice theories: "media richness" and "social influence".

The investigation of media choice in the workplace extends back to the 1980s. Within the framework

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of organizational information processing and symbolic interactionist perspective, (Daft & Lengel, 1984, 1986; Daft & Weick, 1984; Trevino, Daft, & Lengel, 1990) proposed a theory that each communication medium maintains a different richness and capacity to deliver various types of content with differing complexities and promotes the establishment of a shared meaning and value system among the members of an organization. After evaluating the characteristics of a medium and the required communication tasks, a personal attitude forms that guides one's media selection behavior. However, the exposition of media selection behavior in organizational settings, based on the concept of media richness, has been strongly questioned by communication scholars, particularly Fulk, Schmitz, and Steinfield (1990). These scholars argued that all human behavior occurs in a social world; therefore, the media selection behaviors of organization members are not affected by a single media attribute. From the perspective of the social information processing theory, Fulk, Schmitz, and Steinfield (1990) suggested that individual attitudes drawn from recognizing an organization's environment, particularly the attitudes and behaviors of colleagues, are the main factors that influence the media selection process (Steinfield, 1986). Since then, media richness and social influence have become important concepts to explain media choices in the workplace (Chang & Johnson, 2001).

To date, few studies have explored IM usage in the workplace from the perspective of media richness or social influence. Therefore, this study aims to examine the reasons for IM usage and its correlations with interruption from the media richness and social influence perspectives, thus allowing a more profound understanding of IM's role in the interactive process of delivering information and creating ideas in an organization. In addition, previous research mostly considered IM interruptions as invasive behaviors by referring to communication events that were unexpected and initiated by others. Such events interrupted the progression of a task, thus leading to a break in ongoing work, and individuals were forced to use extra time to complete their tasks (Jett & George, 2003). This "time famine" situation, caused by an interruption in the interpretation of time management (Perlow, 1999), made some scholars define interruption as "frequent occurrences that often have distressing consequences for employees" (Carton & Aiello, 2009, p. 169). This type of intrusive interruption occurs frequently (Hall, Pedersen, & Fairley, 2010) and has most often been the focus of IM interruption studies (Rennecker & Godwin, 2003, 2005). Thus, this study also considered IM interruptions to be intrusive.

Moreover, in addition to research on IM interruptions, many other studies on IM usage in the workplace have explored the purpose for its usage (Cho, Treir, & Kim, 2005; Isaac et al, 2002; Quan-Hasse, Cothrel, & Wellman, 2005). The results of these studies have indicated that the purposes for IM usage are diverse (Cho, Treir, & Kim, 2005). Among these purposes, socializing is a high concern of business owners (Wu, 2012). Therefore, the present study also discusses the purposes for IM usage in the context of media richness and social influence.

Therefore, based on the two media choice concepts and the findings from prior studies on the purposes for IM usage, the present study explores the reasons for IM usage, the purposes for IM usage and their relationship with interruptions respectively. This study attempts to continue the tradition of examining media choice in the workplace, deepen the discussion of media richness and social influence, and supplement the deficiencies in current IM-related research. With the popular-

ization of the Internet, smart phones, and other mobile devices, many social media software platforms, such as Facebook, LINE, and Skype, have adopted IM functionality and communication features between two or more users through text, files, audio, or video. The results of this study are not only helpful to understand more about IM usage by office workers but also provide preliminary observations for management teams to guide the practical use of increasingly rich communication media in their organizations.

2. Literature Review

2.1. Media richness

Daft and other scholars (Daft & Lengel, 1984, 1986; Daft & Weick, 1984) considered an organization an information processing system. The organization's employees select an appropriate communication medium based on the level of uncertainty and ambiguity of their work; thus, media richness was developed as a key concept to understand the information capacity of a medium. A rich media type can deliver information through expressions, eye contact, posture, dress, and tone and consider the distance and location of the users during the interaction. These communication details can provide feedback and screening and help determine the attitudes of the interacting partners to maintain their attention in the interaction or terminate the dialogue.

From the perspective of the symbolic interactionist, Trevino, Daft, & Lengel (1990) discussed the relationship between an organization's media choice and media richness. An organization is a dynamic and interactive web, in which the members establish a shared value system through their interactions. The organization members collectively develop basic assumptions and understandings regarding their words, behaviors, and actions. When seeking consensus through consultation and feedback, selecting an appropriate medium to address uncertainty and ambiguity in the messages becomes crucial. Therefore, when the level of uncertainty and ambiguity is high, using a rich, more personal communication medium (e.g., face-to-face communication) is more efficient than using a less rich, impersonal communication medium (such as a written statistical chart) (Trevino, Lengel, & Daft, 1987).

Each media type has a different degree of richness depending on the following four criteria that are based on individual perception: first, whether the medium provides instant feedback to facilitate rapid consensus; second, whether the medium delivers information with multiple cues, such as body language and tone, to facilitate the interpretation of the message; third, whether the medium uses natural language to facilitate the transmission of delicate and subtle messages, rather than a form such as a digital chart; and fourth, whether the medium creates a personal focus that describes needs, emotions, and feelings to the recipient (Trevino, Daft, & Lengel, 1990, p. 75).

Many previous studies describing the characteristics of IM are available. For example, IM allows users to instantly and synchronously communicate with individuals on their friend list. In addition to one-on-one communication, multiple users can dialogue simultaneously, and when a user cannot interact with individuals online, he/she can send an offline message (e.g., Jacobson, 2008). IM

is often considered a hybrid media because it can be used for not only informal communication, which is similar to spoken language, but also for formal statements of record or file transfers (Cho, Treir, & Kim, 2005).

However, few studies are available on IM characteristics from the perspective of media richness. One study was conducted by Waldeck, Seibold, and Flanagin (2004). They found that, in the process of socialization in organizational settings, employees tend to obtain information using a medium with significant richness. The other study by Cameron and Webster (2005) used the media richness theory to investigate why employees use IM at work. However, the results showed that the majority of respondents believed that IM was not a rich media. Of the four criteria for the media richness assessment, only the instant feedback result was rated relatively high.

2.2. Social influence

Fulk, Schmitz, and Steinfield (1990) strongly questioned the assumptions of media richness. First, they indicated that many empirical studies do not support the concept of media richness because e-mail, which is a medium with relatively low richness, is often used in communications containing highly interpersonal content (such as conflict settlements and negotiations) (Rice & Love, 1987; Steinfield, 1985; Markus, 1988). Second, these researchers' own study observed that the attitudes and behaviors of one's colleagues toward media use is a main factor that affects media selection in the workplace (Steinfield, 1986). Thus, based on the social information processing theory (Salancik & Pfeffer, 1978), Fulk, Schmitz, and Steinfield (1990) proposed that social influence is the main factor in media selection. The social information processing theory of Salancik and Pfeffer (1978) was originally proposed to define overall job attitudes and task designs of an organization. The basic assumption of the theory is that individuals will adjust their own attitudes, behaviors, and beliefs to adapt to their social environment; namely, to understand the cause of an individual's behavior, one must examine information from the social environment in which the individual is situated. Individuals express their attitudes and needs based on the available information in their social environment because the social context provides clues to interpret an event and the necessary information for individuals to form an appropriate attitude and opinion.

Thus, the social information processing theory emphasizes that the nature of work or a task is constructed instead of given. When the related information is not available, individuals must communicate with others and develop a stable system of consciousness through communication. Individuals evaluate their information sources based on their interpersonal relationships: the closer the relationship with an individual, the more their opinions are applied to understand one's own situation. Therefore, individuals learn appropriate attitudes and behaviors from their social context, and the information with the most direct effect is from one's colleagues (including supervisors) for the following two reasons: first, because many stimulations occur at work when individuals are unsure of how to react, and their colleagues' opinions and attitudes provide clues on how to respond to complex situations; and second, an organization's employees may initially exhibit a friendly attitude toward their colleagues to show that they have integrated into the working environment, which gradually becomes their own attitude as time passes. Accordingly, Fulk, Schmitz,

and Steinfield (1990) believed that media usage in the workplace are mostly co-constructed through an individual's mutual interactions, in which the most important influences are the comments, attitudes, and behaviors of an individual's colleagues and supervisors (Fulk et al., 1987, p. 537).

Only a few have investigated media usage from the social influence perspective. For example, Quan-Hasse, Cothrel, and Wellman(2005) investigated the process of social influence through the theory of social translucence of technology based on employees' IM usage at a high-tech software and service company. The social translucent technology theory was designed to compare computer-mediated and face-to-face environments, thus emphasizing that individuals use social information to guide their behavior in face-to-face interactions (Erickson & Kellogg, 2000). Quan-Hasse, Cothrel, and Wellman(2005) observed that employees spontaneously activated IM immediately after arriving at the office. IM conveyed an individual's "availability" because it was important for colleagues and friends to know that they were available online. One employee noted, "IM not only provides the opportunities to collaborate; it also plays a role in the collaborative process" (P. 9). The personal information displayed in IM allowed others to perceive the possibility of collaboration; therefore, IM became a standard channel to connect with others in the organization. Thus, the culture of a new type of communication and cooperation was constructed with many problems solved through the employees' active participation.

From the social influence perspective, Stephens and Davis (2009) investigated the electronic multi-tasking behavior of employees at a conference, in which employees used personal digital assistants (PDAs), mobile phones, or other communication technology connected to the Internet. The results confirmed that when an organizational employee observed others electronically multi-tasking at a meeting and realized that their behavior was acceptable in the social environment, the employee increased his/her electronic multitasking behavior in meetings.

2.3. Purposes for IM usage

The reason for using IM by organization members has been analyzed through media richness and social influence, whereas the purpose of IM is to communicate content to other organization members. Early studies on the purpose of IM usage were conducted by Handel and Herbsleb (2002) and Isaacs et al. (2002) tested an IM system called Hubbub, developed by AT&T, and analyzed the content of 139 conversations of 28 Hubbub users. The results showed that more than 90% of the conversations were job-related (91.4%), of which 31% concerned the arrangement or coordination of work procedures. Similarly, Handel and Herbsleb (2002) examined an IM system called RVM, developed by a multinational telecommunication company, to observe IM usage in four working groups (each working group included 4–28 members) from different organizations in different countries (UK and Germany). Among the 4,242 analyzed conversations, approximately 70% were job-related (69%), whereas approximately 15% concerned non-job-related topics such as greetings and jokes. Approximately 90% (87%) of the job-related conversations were related to knowledge about the work, and less than 10% were about procedural planning (8%).

Based on the above studies, Cho, Treir, and Kim (2005) classified the purposes of IM usage in organizational settings into three categories: organization of work, activities of knowledge work, and socializing. The organization of work included administrative matters such as asking about availability and establishing and announcing meetings. Knowledge regarding work included matters related to problem solving, information exchange, and requesting suggestions to reach a consensus and enhance mutual knowledge to facilitate task completion. Socializing referred to social dialogue that was not related to the job. Using these three major categories, the authors analyzed the IM conversations of two employees at a Korean tire manufacturing company and observed that the employees mostly used IM for knowledge regarding work (50 and 67%), whereas IM usage for other purposes varied (33% for socializing and 17% for organization of work for one employee; 25% for socializing, and 8% for organization of work for the other employee).

In addition, Cho, Treir, and Kim (2005) investigated whether IM enhanced the boundary spanning activities (BSAs) of employees and compared differences in IM usage across organizational boundaries, such as within a department, across departments, and across organizations. The results showed that employees communicated more via IM with employees in the same department, indicating IM does not promote cross-organizational or cross-departmental behaviors. Cho et al. argued that because the IM-connecting network is a relatively close personal online community, only individuals who knew one another were included; therefore, the authors concluded that IM does not contribute to the development of external business partners or new working relationships. However, after individuals become acquainted with one another (after passing a minimum threshold), relationships can be enhanced through IM.

Studies by Quan-Hasse, Cothrel, and Wellman(2005) also identified the above three categories for the purpose of IM usage in the workplace. In terms of BSAs, Quan-Hasse, Cothrel, and Wellman(2005) compared the usage frequencies for three communication media, IM, face-to-face/telephone, and e-mail, at three different working distances: within a working group, within an organization, and outside the organization. The results showed that within a working group and within an organization, the usage frequencies for e-mail and IM were higher than that of face-to-face/telephone, whereas for communication outside the organization, the frequency of e-mail usage was highest. Although the geographic distances within a working group and within an organization were similar, the employees chose to use computer-mediated e-mail and IM, which demonstrated the “local virtualities” phenomenon suggested by Quan-Hasse, Cothrel, and Wellman(2005); namely, a group of individuals in close geographic proximity communicate with computer-mediated tools to generate a dense network of cooperation. This “local virtualities” phenomenon could be accounted for from the perspective of social influence. That is, within a working group or within an organization, communication media, such as e-mail and IM, can provide individuals with sufficient opportunities for mutual cooperation or the opportunity to obtain job-related information and feedback.

Based on the above discussion, this study investigated the purposes of IM usage within an analysis framework of four purposes: work of organization, activities of knowledge work, socializing, and BSAs.

2.4. IM interruptions

What is an interruption? O'Conail and Frohlich (1995) recorded work performed by two professionals over one week and defined an interruption as "a synchronous interaction which is not initiated by the recipient, is unscheduled, and results in the recipient discontinuing their current activity" (p. 262). This definition has been adopted by most scholars that study IM interruptions (Garrett & Danziger, 2008; Rennecker & Godwin, 2003, 2005). IM users typically receive IM messages without warning, and the presence of an IM is typically accompanied by a sound or picture to remind the recipient to respond to the message. Therefore, an IM interruption is often an unexpected communication event that is initiated by others that interrupts an originally established workflow; thus, an individual stops working on or loses focus on the current task (Jett & George, 2003).

According to the information processing and the symbolic interactionist perspectives, IM is a mechanism of information processing for organization members to establish a shared system of meaning in an interactive process of consultation and feedback. In addition, IM intervention appears to be a product that involves continuous consultation and feedback by organization members in the process of seeking consensus. However, will IM interruption be different because of the different degrees of perceived IM media richness? Previous studies on IM interruptions from the perspective of media characteristics showed two different results: first, IM does not interrupt work.

Nardi, Whittaker, and Bradner (2000) observed and interviewed 20 employees from three organizations regarding their IM usage, and they observed that the media features of IM provided better control for message recipients. They argued that the common face-to-face or telephone communication methods often caused a fundamental asymmetry in conversation. Namely, during phone or face-to-face communications, the message sender mostly decides the time and subject of the conversation and receives an instant response, whereas the recipient is forced to respond to the topic as directed by the sender; thus, it is easy to interrupt the message recipient (p. 5). Nardi, Whittaker, and Bradner (2000) suggesteded that IM can balance the asymmetry of this interaction because it provides the opportunity to "negotiate conversational availability" between the message recipient and sender. The recipient can decide whether to instantly respond to an IM message using the functions of a delayed response, by showing the status bar as busy, or by the "plausible deniability of presence," which is also acceptable to IM users. These observations, that IM interruptions are less disruptive than telephone or face-to-face communications, were also supported by subsequent studies. For example, the above study by Quan-Hasse, Cothrel, and Wellman(2005) analyzing high-tech software and service companies observed that employees used face-to-face/telephone interactions less frequently because these two communication media were more likely to interrupt the ongoing tasks of colleagues than IM.

The second result from previous studies on IM interruptions from the perspective of media characteristics is: IM interrupts work. Rennecker and Godwin (2003) indicated that IM might lead to interruptions through its three media characteristics: status display, the pop-up recipient notification, and polychronic communication. They argued that although IM offers users several methods to control the frequency and time of interruptions (for example, by displaying "busy" in the status bar or delaying a response), these IM characteristics extend the amount of time and geographic scope for users to be contacted

and thus increase the chance of a "spontaneous interaction," which constitutes an "interruption."

However, from the perspective of social influence, organization members learn the proper methods of acquiring information from a social context; therefore, if an individual's colleagues believe that using IM will cause an interruption, then IM is an interruption and vice versa. Prior empirical studies yielded the two likely results as well: first, IM is an extra communication tool and can interrupt work. Herbsleb et al. (2002) observed IM usage for 17 months in six work groups from different organizations and found that most employees considered IM a superfluous communication tool and that the use of IM was "further encroaching on their time to do real work" (p. 176). Cameron and Webster (2005) also argued that IM is a redundant communication medium for an organization. According to the authors' results from 19 respondents at four organizations, more than one-half of the respondents thought that the media characteristics of IM were interruptive, and the most common complaint regarding IM was "the tendency for IM messages to break one's concentration while focused on anther task" (p. 97).

The second results demonstrated by prior empirical studies in terms of IM and interruptions is that IM is an integrated communication tool and does not interrupt work. Garrett and Danziger (2008) argued that IM is not a source of interruption at work; rather, IM is a good communication management tool for the workplace. For the message sender, IM provides a more unobtrusive method to determine someone's availability compared with face-to-face interaction or telephone communication. For the message recipient, sending a message to announce his/her own status, ignoring a message, or not immediately processing an IM message are all acceptable social behaviors. In addition, IM also allows users to more easily integrate job-related and job-unrelated communications by passing on a simple greeting between friends or family to maintain communication with one another without spending a long time maintaining contact after work (Nardi, Whittaker, & Bradner, 2000)

3. Research Questions

Based on the above discussion, the present study will first investigate the reasons for IM usage and its correlation with interruptions based on media richness and social influence. Whether the functions provided by IM, including the status display, pop-up recipient notification, informal communication similar to oral speech, and polychronic communication, generate more perceived richness in the aspects of instant feedback, multiple cues, natural language, and personal focus, and therefore, cause interruptions. Or, IM provides an opportunity to "negotiate conversational availability" between the recipient and sender, and the recipient can respond with "plausible deniability of presence".

At the same time, according to social influence, media choice is made after the majority of organizational members have reached a consensus regarding the remarks, attitudes, and behavior that is appropriate in the social environment. Therefore, if an individual's supervisor and colleagues use IM at work and construct a new organizational culture using IM, such as that described by Quan-Hasse, Cothrel, and Wellman(2005), is it more likely to make IM usage an interruption?

In addition, previous studies have suggested that the two media concepts have their own applicable objects (e.g., Chang & Johnson, 2001; Trevino, Webster, & Stein, 2000; Webster & Trevino, 1995).

Media richness can better explain traditional media (such as telephone and face-to-face communication), and social influence can better explain computer-mediated media (e.g., e-mail). Therefore, in terms of IM, does media richness emphasize the characteristics of the media or does social influence dominated by supervisor and colleague conversations better explain IM's correlation with interruptions? Accordingly:

RQ 1: What is the relationship between the reasons for IM usage (media richness and social influence) and IM interruptions? Which concept can better predict IM interruptions?

In terms of the purposes for IM usage, is organization of work, knowledge work, socializing, or BSAs related to interruptions at work? Does relaxed social chatting interrupt individuals less than information exchanges for completing a task? Do cumbersome planning arrangements interrupt individuals more than BSAs? Accordingly:

RQ 2: What are the correlations between the purposes of IM usage (organization of work, activities of knowledge work, socializing, and BSAs) and IM interruptions? Which purpose can best predict IM interruptions?

Finally, this study proposed two reasons and four purposes for using IM. Can the "why" explain the reasons for using this medium, or can the "why" explain the purposes of using the medium better explain IM interruptions? Accordingly:

RQ 3: Do the reasons for using IM or the purposes of using IM better predict interruptions?

4. Research Methods

4.1. Design and sample

In this study, the research participants were employees in Taiwan who "used a computer." They were sampled from the major occupational categories used by the Directorate-General of Budget, Accounting, and Statistics (DGBAS), Executive Yuan, Taiwan in 2010.[1] Since employees in categories

1) The ten major occupations included the following: (1) representative, administrator, business executive, executive officer, and manager; (2) professionals: researcher, engineering scientist, biological or medical professional, accountant, lawyer, etc.; (3) technicians and associate professionals: professional and administrative assistants in physics, engineering, biology, medicine, etc.; (4) service staff: office, customer service personnel, etc.; (5) service workers and shop assistants: personal services, security, model, sales, and exhibition sales personnel; (6) agriculture, forestry, fishery, and animal husbandry staff: growers, animal breeders, farming operators, etc.; (7) technical workers and related staff: mining, engineering, precision instruments, handicraft, printing, and other related personnel; (8) machine operators and assembly workers: operators, drivers, equipment trans-shipment workers; (9) non-technical workers and laborers: hawkers and service workers; (10) servicemen.

5–9 of the 10 categories, including occupations in the fields of agriculture, equipment, and labor, had minimal opportunity to access a computer and the Internet at work, only five of the occupational categories were included in the study. These categories included elected representatives, executives and managers, professionals, technicians and associate professionals, service staff, and servicemen.

Because of limited resources, the present study employed the convenience and snowball sampling method to recruit research participants. This sampling method was also used in previous studies on media usage in organizations (Stephens & Davis, 2009; Timmerman, 2002). The questionnaire survey was administered for approximately nine weeks from late April to late in June 2010. Either an electronic or a paper version of the questionnaires was distributed and collected based on the respondents' requests. Altogether, 283 valid questionnaires were collected, including 131 paper and 152 electronic versions. Among the 283 questionnaires, the highest proportion was from professionals (39.6%) followed by service support staff (27%), technicians and professional assistants (22.5%), elected representatives, supervisors, and managers (9.8%), and servicemen (0.4%). This pattern of distribution of professions was the same for both paper and electronic versions of the questionnaires. The overall results are shown in Table 1.[2)]

4.2. Measurement

4.2.1. General information

The general information included gender, occupation, years of service, duration of IM usage each day, and the duration of each IM usage. Among the respondents, approximately 60% were females (61.8%) and 40% were males (37.8%), the length of service for approximately 60% of the respondents was less than 5 years (59.0%), the time of IM usage each day was less than one hour for approximately 40% of the respondents (39.6%), and the time of each IM usage was less than 10 minutes for the majority of respondents (45.2%). The overall pattern of demographic backgrounds and time for IM usage were the same for both paper and electronic versions (The overall results are reported in Table 1).

2) Because the number of IM users in each industry in Taiwan was not available, statistics from "The occupation classification and practitioners' status of employment during the 98 years of the Taiwan Republic of China," published by DGBAS in 2010, was originally used in this study. The sampling in the formal questionnaire was based on the actual proportions of workers in the occupational categories. Although the employment demographics for servicemen were not available, the other proportions included elected representatives, executives, business executives, and managers (9.4%), professionals (19.58%), technicians and professional assistants (46.64%), and service support staff (24.42%). However, in the actual sampling process, we observed that the proportions of the actual number of IM users and total population in each occupation were not matched. In the distribution process, we recorded the number of IM and non-IM users in the five occupational categories (see the table below), and the highest proportion of IM users were professionals.

	Representative	Professional	Technician	Service staff	Servicemen	Total
IM user	28 (77.8%)	113 (81.3%)	64 (74.4%)	77 (71.3%)	1 (14.3%)	283 (76.4%)
Non-IM user	8 (22.2%)	26 (18.7%)	22 (25.6%)	31 (28.7%)	6 (85.7%)	93 (23.6%)
Total	36 (100%)	139 (100%)	86 (100%)	108 (100%)	7 (100%)	376 (100%)

Table 1. Demographics of IM users

	Frequency	%
Gender		
Male	107	37.8
Female	175	61.8
Missing	1	.4
Occupation		
Managers	28	9.9
Professionals	113	39.9
Technicians and associate professionals	64	22.6
Service staff	77	27.2
Servicemen	1	.4
Years in service		
<1 year	59	20.8
≥1 and <5 years	108	38.2
≥5 and <10 years	71	25.1
≥10 and <15 years	18	6.3
≥15 and <20 years	23	8.1
≥20 years	3	1.1
Missing	1	.4
IM usage per day		
Under 1 hour	112	39.6
1-2 hours	66	23.3
2-3 hours	42	14.8
3-5 hours	23	8.1
More than 5 hours	40	14.1
IM usage each time		
Under 10 minutes	128	45.2
11-20 minutes	68	24.0
21-30 minutes	31	11.0
More than 30 minutes	47	16.6
Missing	9	3.2

N = 283

4.2.2. Media richness

The present study measured the four media richness indicators with six items (α =.80) based on the scales developed by previous media usage studies in Taiwan (Liu & Ku, 1997; Su, 2004). The items were selected and revised to fit the current context. The items are listed in Table 2.

4.2.3. Social influence

The present study measured social influence with eight items (α =.84) based on the scales developed

by previous media usage studies in Taiwan (Liu & Ku, 1997; Su, 2004). The items were selected and revised to fit the current context. The items are listed in Table 2.

Table 2. Scale items and descriptive statistics for media richness, social influence and interruptions

Scales	N	Mean	SD*
Media richness α = .80	273	3.51	.60
I can often get instant feedback using IM.	283	3.59	.84
I often use IM to provide instant feedback to others.	282	3.62	.85
IM can provide rich language cues to convey my thought.	283	3.33	.89
IM can provide a variety of communication cues.	282	3.81	.78
I can feel the interacting partners' emotions using IM.	282	3.30	.89
I can fully express my emotions using IM.	276	3.43	.85
Social influence α = .84	282	3.38	.63
My supervisors consider IM useful.	282	3.09	.98
My supervisors consider IM convenient.	282	3.18	1.00
My supervisors often use IM to interact with me.	282	2.59	1.14
My supervisors like to use IM.	282	2.88	1.09
My co-workers consider IM useful.	282	3.90	.71
My co-workers consider IM convenient.	282	3.96	.66
My co-workers often use IM to interact with me.	282	3.59	.87
My co-workers like to use IM.	282	3.86	.76
Interruptions α = .66	279	3.06	.69
I often receive messages from IM at work.	282	3.48	.85
I am often interrupted by incoming IM messages at work.	280	3.22	.92
When I receive messages from IM while working, I leave everything at hand and respond to the messages at once.	283	2.49	.89

* Standard deviation

4.2.4. Purposes for IM work

Sixteen items were used to measure three purposes for IM usage based on Cho, Treir, and Kim (2005). These include 9 items for organization of work, 6 items for activities of knowledge work, and 1 item for socializing. The respondents were asked to check all the appropriate answers for the purposes of their IM usage in the office based on 16 provided items (multiple choice). BSAs were measured in four categories: 1) colleagues in the same department, 2) colleagues in a different department, 3) work-related personnel from a different company, and 4) friends and family. The respondents were asked to check the appropriate answers for their most frequent IM communication partners (single choice). The details of the items are listed in Table 3.

The results showed that the main purpose of IM usage was knowledge work (39.2%) followed by organization of work (34.6%) and socializing (9.6%). BSAs were mostly with friends and family (34.7%) followed by work-related personnel across different companies (26.4%), colleagues in the same department (22.3%), and colleagues in different departments (16.5%) (Table 3).

Table 3. Purposes of IM usage

	Frequency	%
Organization of work	602	34.6
Availability check	94	15.6
Follow-up	98	16.3
Face-to-face meeting coordination	44	.7
Informal meeting coordination	45	.7
Leave memo	151	25.0
Switch media in the middle of conversation	35	.6
Ask for the phone number of a third party	40	.7
Broadcasting to several IM receivers	64	11.0
Phone call arrangement	31	.5
Knowledge-related activities	683	39.2
Sharing information related to task completion	86	12.6
Document transfer	158	23.1
Quick Q&A	111	16.3
Problem solving	85	12.4
Discuss information or topics related to the job	119	17.4
Simple request	124	18.2
Socializing	167	9.6
Boundary spanning	242	13.8
Colleagues within the same department	54	22.3
Colleagues across different departments	40	16.5
Work-related contacts across different organizations	64	26.4
Friends and family	84	34.7
Missing	41	2.4
Other	7	0.4

4.2.5. Interruptions

Three items were developed to measure interruptions in this study (α =.66) based on the single measured indicator used by Garrett and Danziger (2008), which was the respondents' degree of agreement with the statement, "I have rarely not been interrupted at work." The items are listed in Table 2.

All question items concerning media richness, social influence, and interruption scales used five-point Likert-type items, wherein 1 indicated total disagreement and 5 indicated total agreement.

5. Results

RQ1 concerns the relationship between the reasons for media use and IM interruptions. First, since a regression analysis could explain and predict the strength between variables, a regression

analysis was conducted to investigate the relationships between the four aspects of media richness and IM interruptions. The results showed that instant feedback (Beta=.21, p<.001) and personal focus (Beta=.14, p<.05) had significant predictive power for IM interruptions, whereas multiple cues (Beta=.08, p>.05) and natural language (Beta=.04, p>.05) were not significant. The overall variance of media richness in explaining interruptions was 3%, which showed a significant correlation with IM interruptions (Beta=.18, p<.01). In terms of social influence, both supervisors (Beta=.34, p<.001) and colleagues (Beta=.31, p<.001) predicted IM interruptions; additionally, the overall variance of social influence in explaining IM interruptions was 16%, thus indicating that social influence significantly predicted IM interruptions (Beta=.41, p<.001) (Table 4). Next, a multivariate regression analysis was conducted to investigate the relationship between IM interruptions and media richness and social influence. The results showed that social influence (Beta=.38, p<.001) predicted IM interruptions at work better than media richness (Beta=.06, p>.05).

Table 4. Regression analysis between media use theories and interruptions

Media richness and interruptions				
	Beta	R^2	Adjusted R^2	Sig. Of F Change
Media richness	.18**	.03	.03	.003
Instant feedback	.21***	.05	.04	.000
Multiple clues	.08	.01	.00	.185
Natural language	.04	.00	.00	.547
Personal focus	.14*	.02	.02	.018
Social influence and interruptions				
	Beta	R^2	Adjusted R^2	Sig. Of F Change
Social influence	.41***	.17	.16	.000
supervisors	.34***	.11	.11	.000
coworkers	.31***	.10	.09	.000

*p<.05 **p<.01 ***p<.001

RQ2 concerns the relationship between the purposes of IM usage and IM interruptions. A multivariate regression analysis was used to explain and predict this type of relationships. The results of the multivariate regression analysis showed that among the four purposes for using IM, knowledge regarding work (Beta=.14, p<.05) and socializing activities (Beta=.16, p<.05) significantly predicted IM interruptions. That is, the IM interruptions were more obvious when IM users used IM to exchange knowledge regarding work and chat socially. The detailed data are shown in Table 5.

RQ3 concerned the relationship between the reasons and purposes of media usage with IM interruptions. A hierarchical regression analysis was conducted whereby the reasons and purposes of media usage were input into the regression analysis respectively. This type of analysis could explain the explaining power of each set of variables. The results showed that in the first block, the reasons for IM usage explained 16.4% of the variance in IM interruptions with an adjusted explainable variance of 15.6%, whereas of the two reasons, only social influence (Beta=.38, p<.001)

showed a significant predictive power for IM interruptions. In the second block with the purposes of IM usage, the explainable variance only increased by 1.4%. Thus, the variables for the purposes of IM usage could not predict interruptions, and only social influence (Beta=.36, p<.001) could significantly predict IM interruptions at work. Therefore, the reasons for media usage predicted IM interruptions in organizational settings better than the purposes of IM usage. The detailed data are shown in Table 6.

Table 5. Multivariate regression analysis between purposes IM use and interruptions

	Zero-order correlations	Beta
Organization of work	.03	.02
Knowledge-related activities	.13*	.14*
Socializing activities	.11*	.16*
Boundary spanning activities	-.05	-.07
R^2		.04
Adjusted R^2		.02
R^2 Change		.04
Sig. of F Change		.051

*p<.05

Table 6. Hierarchical regression analysis between media use, IM-use purposes and interruption

	First Block	Second Block
Media use		
Media richness	.06	.05
Social influence	.38***	.36***
Purpose of IM use		
Organization of work		.01
Knowledge-related activities		.06
Socializing activities		.11
Boundary spanning activities		-.07
R^2	.164	.178
Adjusted R^2	.156	.156
R^2 Change	.164	.014
Sig. of F Change	.000	.442

***p<.001

6. Discussion

In this study, office workers in Taiwan were investigated for the reasons for IM usage (media richness and social influence), the purposes of IM usage (organization of work, activities of knowledge work, socializing, and BSAs), and their correlations with IM interruptions. The results indicated that the reasons for IM usage could better predict IM interruptions at work than the purposes of

IM usage. Among the reasons for IM usage, social influence from supervisors and colleagues best explained IM interruptions; namely, if an organization's employees used IM because of the influence of supervisors and colleagues, the employees experienced more IM interruptions. In addition, the media richness theory was also correlated with IM interruptions, particularly through the aspects of instant feedback and personalized focus. That is, if an organization's employees used IM because of it provides instant feedback and sends personalized messages, such employees would also experience more IM interruptions.

For the purposes of IM usage, the results showed that knowledge regarding work was the most common purpose of using IM, which was consistent with the results from previous studies (Cho, Treir, & Kim, 2005; Handel & Herbsle, 2002; Isaacs et al., 2002). For the correlations with IM interruptions, only two purposes, knowledge regarding work and socializing activities, showed a strong relationship with IM interruptions; that is, when an organization's employees used IM to exchange work-related knowledge or engage in social chatting activities, they would experience more IM interruptions.

In addition, the study sampled respondents from 5 occupational categories. A post hoc analysis revealed that occupational categories of the sample did not affect the overall findings. The results showed that social influence (Beta=.41, $p<.001$) predicted IM interruptions at work better than media richness (Beta=.18, $p<.01$). IM interruptions still were more obvious when IM users used IM to exchange knowledge regarding work (Beta=.14, $p<.05$) and chat socially (Beta=.15, $p<.05$). Lastly, the reasons for media usage predicted IM interruptions in organizational settings better than the purposes of IM usage. Social influence is the strongest predictor for IM interruptions (Beta=.41, $p<.001$).

The overall findings will be discussed with implications for future studies in three areas: the reasons for IM usage, the purposes for IM usage, and IM interruptions.

6.1. The reasons for using IM

This study observed that the remarks, attitudes, and behaviors of employees' supervisors and colleagues regarding IM usage were the most important predictive variables for IM interruptions at work. Therefore, in a social environment where supervisors and colleagues often make positive comments regarding IM, where employees' superiors and colleagues use IM, and the experience of using IM is frequently discussed with supervisors and colleagues, such employees experience more IM interruptions. From the perspective of social influence, information that frequently appears in the social environment becomes the cognitive signals for the proper attitude of an organization's employees. When supervisors and colleagues show positive attitudes regarding the use of IM, IM interruptions become a component of the common construct of social significance. The process of such interruptions can be considered a rationalization process of the organization's employees (Salancik & Pfeffer, 1978). Through the support of the collective construction of the social environment, personal behavior is rationalized. Individuals develop an acceptable rationale for their behavior so that such behavior becomes meaningful. An important reason for making IM interruptions a component of one's job is that all of the individual's colleagues have demonstrated the same attitudes and

needs. With organizational norms where supervisors and colleagues all interact using IM, employees activate IM first thing at work, connect to the standard contact network of the company, and show their status as "available" to set themselves in the state of "always-on", as described by Quan-Hasse, Cothrel, and Wellman(2005). Such employees thereby experience more IM interruptions.

Additionally, the "local virtualites" phenomenon proposed by Quan-Hasse, Cothrel, and Wellman(2005) can also explain why social influence shows a greater influence on IM interruptions. If a group of individuals in close geographic proximity (in the same office) interact using a computer-mediated tool, a dense network of cooperation is generated among them. Because of the interactive effect of this dense network of cooperation and its social influence, individuals learn about their colleagues' needs, values, and demands when they interact, and IM usage is more likely to interrupt their work.

Compared to IM choice because of social influence among employees in an organization, the results showed that IM choice because of media richness associated with fewer IM interruptions. Among the four aspects of IM richness, only instant feedback and personal focus showed a higher correlation with IM interruptions. Notably, the descriptive statistics showed that the multiple communication cues provided by IM caused the highest score on the richness assessment (mean=3.81) but not instant feedback (the mean for these two questions were 3.59 and 3.62) or personal focus (the mean for these two questions were 3.30 and 3.43) (Table 2). Therefore, from the perspectives of information processing theory and symbolic interactionism, instant feedback that can instantly interrupt one's workflow and personal messages that can enhance one's personal sense of social presence increase the likelihood of disturbances for organization members and thus increase the degree of interruptions in personal feelings. However, although the media characteristics of IM can easily interrupt employees' workflows, if an individual can control and manage the media characteristics of IM in the process of consultation, feedback, and the construction of meaning (Nardi, Whittaker, & Bradner, 2000; Quan-Hasse, Cothrel, & Wellman, 2005), even if the individual perceives that IM has the most abundant multiple communication clues, he/she should not experience significant IM interruptions.

For practical implications, the present study suggests that instead of worrying about employees being lazy and idling because of IM media richness, the management team of an organization should try to utilize the social influence established by interactions among its employees and construct a new organizational culture of using IM for communication and problem solving. With the increasing richness and diversity of various communication media, such as social networking websites and smart phones, instead of tight control, organizations should take advantage of the media characteristics to establish a new organizational culture that encourages its positive use. Under social influence, even a consensus on media richness must be established through organizational interactions (Markus, 1994).

6.2. Purposes of IM usage

Overall, the IM purposes investigated in this study were not correlated with IM interruptions. Namely, the reasons for employees of organizations to choose to use IM can better predict the extent of IM interruptions than the communication purposes of using IM. Therefore, from the perspective

of social information processing, the organizational attitude and behavior of IM usage constructed by all members of an organization determines the nature of the work. In this case, the individual purpose of IM usage was not important.

In terms of BSAs, previous studies have shown that IM usage does not promote BSAs (Cho, Treir, & Kim, 2005; Quan-Hasse, Cothrel, & Wellman, 2005). However, the results of this study showed that in addition to family and friends, work-related personnel from different organizations were the major communication partners followed by colleagues in the same department and colleagues in a different department (Table 3). It seems that office workers in Taiwan often participate in BSAs with different organizations using IM and have fewer BSAs within their department. However, what is the content of such BSAs?

This study further conducted a chi-square analysis of the communication partners of BSAs in combination with the other three purposes of IM usage, and the results showed that the communication partners were not significantly correlated with organization of work (x^2=4.36, df=3, p>.05); yet, they were significant with activities of knowledge work (x^2=10.65, df=3, p<.05) and socializing (x^2=43.82, df=3, p<.001). That is, for IM usage with the purpose of activities of knowledge work, the communication partners were mostly job-related personnel, regardless of whether the partners were from the same department, different departments, or different companies. For the purpose of social activities, the communication partners were mostly friends and family. Therefore, although face-to-face communication was important to coordinate complex cases of cooperation and problem-solving in the workplace, long-distance teamwork using new technology has become a widely accepted mode of operation. IM users have various different types of communication channels and can develop a specific channel that best suits their needs.

In addition, although the results of the study showed that the frequency distribution for the purposes of using IM was identical to previous studies (Cho, Treir, & Kim, 2005; Isaacs et al., 2002; Handel & Herbsleb, 2002), the previous studies were all based on the analysis of actual collected dialogue from IM users. The present study was based on a self-reported questionnaire to investigate the purpose of IM usage. Therefore, to play the role of "good subjects" and meet the "demand characteristics" (Wimmer & Dominick, 2002), the respondents might have been reluctant to check "socializing" as the IM usage purpose, thus resulting in a higher probability of activities of knowledge work being identified. Simultaneously, did this effect also influence the distribution of the interaction partners identified by the respondents so that the actual proportion of friends and family was higher? For future studies, the IM interaction content of the organization employees could be obtained to investigate the relationships between IM interruptions and the purposes of IM usage for BSAs, organization of work, activities of knowledge work, and socializing.

For practical implications, the results of this study should be a relief for management. Although both knowledge regarding work and socializing interrupts work, if one compares the results to the reasons for IM usage, the interruptions caused by IM for the purposes of IM usage were not significant. In other words, if the social influence of IM usage for the employees in an organizational setting is properly managed, it is not important whether the employees work or chat using IM; that is, the purpose of IM usage remains controlled.

6.3. IM interruptions

Similar to many other studies of IM interruptions, this study also considered interruption an invasive behavior, although not enough attention was paid to both its positive and negative consequences (Jett & George, 2003). Rennecker and Godwin (2003) suggested that the determination of whether an IM interruption causes a positive or negative effect on an individual's productivity depends on the individual work content at the time of the IM interruption and the content of the interruption itself. The authors provided six observations: first, the IM interruption is less likely to have a negative effect if a user is familiar with the work content at the time of the IM interruption; second, a longer and more frequent IM interruption has a greater chance of causing a negative effect; third, an IM message related to work content is more likely to have a positive effect; fourth, an IM interruption is less likely to have an adverse effect if an IM user is close to completing his/her task; fifth, the more complicated the individual's work, the greater the negative effect of an IM interruption; and sixth, the longer an interruption is, the more negative the effect on individual productivity. Further studies should clarify the interactions that these six interruption variables have on social influence, media richness, organization of work, knowledge regarding work, socializing and BSAs.

Additionally, because this study considered interruptions as invasive behaviors, three progressive questions were developed to measure an IM interruption, from "I often receive messages from IM at work" (mean = 3.48) to "I am often interrupted by incoming IM messages at work" (mean = 3.22) to "I leave everything at hand and respond to the messages at once" (mean = 2.49). Although the overall mean for the scale was 3.06, a careful review of the score of each of the questions showed that the consistency among the employees regarding a state of progressive interruption gradually declined with mean scores from 3.48, 3.22 to 2.49. The distribution of the mean scores indicated that the organization's employees might receive IM messages often, but the messages might not necessarily interrupt their ongoing work, or IM messages might interrupt their ongoing work, but the employees do not drop everything to interact on IM.

To understand the differences among these three types of IM interruptions, this study conducted a hierarchical regression analysis to investigate the correlation of each interruption question with the reasons and purposes of IM usage. The results showed that for the interruption question of "I often receive messages from IM at work," the social influence (Beta=.35, $p<.001$) and media richness (Beta=.15, $p<.05$) and socializing (Beta=.14, $p<.05$) showed the highest correlations. For the interruption question of "I am often interrupted by incoming IM messages at work," the social influence (Beta=.26, $p<.001$) and socializing (Beta=.06, $p<.05$) showed the highest correlations. Finally, for the interruption question of "I leave everything at hand and respond to the messages at once," only social influence (Beta=.27, $p<.001$) predicted this interruption type.

Therefore, for each of the three different interruption cases, social influence was the strongest predictive variable of IM interruption. In addition to social influence, media richness and the purpose of social activities were also correlated with interruptions: if the employees in the organization used IM for social activities because of the media richness of IM usage, these employees felt interrupted when "I often receive messages from IM at work." If the employees in organizational settings

often used IM to socialize, they were more likely to feel interrupted when "I am often interrupted by incoming IM messages at work." Thus, there were different types of interruptions, and future research can offer a more detailed discussion and analysis of interruption as a research concept, including methods for its measurement (Jett & George, 2003).

In short, the social influence from colleagues and supervisors allows IM to more easily become an interruption of one's ongoing task. However, IM has sufficient immediacy and provides enough personal clues to allow the members of an organization to discuss job-related knowledge so that the two sides of a conversation or a group can share needed text, images, or files. The results show that, although IM can interrupt ongoing tasks, in a workplace with the commonly used media of communication, IM may indeed provide users an opportunity to "negotiate availability," and the ability to receive feedback and share information makes IM different from other types of communication. However, further study is required to determine whether such interruptions have different impacts on the overall operations of an organization. Therefore, more detailed studies based on the type of IM interruptions will provide a more precise understanding for management teams to facilitate an organization's overall operations.

Although this is the first study that has attempted to systematically link the relationships between the reasons for IM usage, the purposes of IM usage, and the employees' IM interruptions, the results can only provide suggestive observations instead of a typical conclusion. According to the results of this study, future research may continue with the observations of different subjects, environments, and times (Cook & Campbell, 1979) to better understand the use and interruptions caused by the increasingly rich communication media in organizations.

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