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# Testing the Task-Media Fit: The Effects of Task Equivocality on Social Presence of Mobile Video-Mediated Communication

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## ABSTRACT

Since social presence theory was introduced, many researchers have tried to apply it to various technology-mediated communication media, including E-Mail, videoconferencing, and instant messengers. Yet few researches have investigated the influence of mobile video-mediated communication (VMC) on the social presence despite prevalence in business practices. In this paper, a research model is developed to test the relationship between the mobile VMC (*video telephony* and *video chatting*) and the level of social presence. And the task equivocality, whether it's an intellectual task or a negotiation task, is also considered as moderating variables, based on the task-media fit proposition. Hence, *mobile video chatting* could be suggested as an alternative media of *mobile video telephony* for less equivocal informative tasks according to this study.

## Keywords

Mobile video-mediated communication, video telephony, video chatting, social presence, task-media fit, task equivocality.

## INTRODUCTION

When 3G mobile communication was launched to markets, mobile telecommunication service providers expected video telephony would be the killer application of 3G mobile communication and invested huge amount of money into the promotion of the video calling service. However, the market demand has been still low; the usage rate of mobile video telephony is under 10 percent (ET News, 2008).

There could be many reasons for the slow adoption of video telephony which includes usage fees, self-efficacy, technical incompatibility with their handset, etc. In this research, however, we would like to focus on the reason why and when people want to use mobile video communication rather than to discuss why people don't use them. About 50% of subjects use video telephony service for "small talk", which is related to social emotional calls, and audio becomes more public with video calls than audio-only calls (O'Hara et al., 2006). Therefore, we can assume that high social presence, which can make users feel high-level of emotional co-presence with the counterpart, may result in positive attitude toward the mobile video calling and chatting service; furthermore, mobile video chatting, the less well known service, could be a substitute of video telephony in some circumstances, such as calling in public spaces.

In this vein, the research motivation lies in investigating when users want to use which media between mobile video calling and mobile video chatting based on social presence and task-media fit. The objective of this research is to examine which combination results in greater level of social presence; video telephony (video-plus-voice) or video chatting (video-plus-text)? We chose these two specific media in order to generate the practical implication for mobile telecommunication service providers which serve video telephony/chatting, as well as the theoretical contribution in terms of social presence theory that is well applicable for relation-oriented video-mediated communication (VMC). The level of task equivocality is also considered to verify if a specific combination of media is more suitable for a certain type of task on the basis of the task-media fit hypothesis from media richness theory.

The main research questions of this study are as follows:

- Do mobile video telephony and mobile video chatting have different impact on the level of social presence that users perceive?
- Which media combination is more suitable for a certain task (high equivocality or low equivocality) in terms of social presence?

**THEORETICAL BACKGROUND**

**Mobile Video Telephony and Mobile Video Chatting – Research Issues**

Mobile operators aggressively started its video calling service as commercializing 3G mobile service. Despite the great advantage of having a telephone conversation as looking at the opponent’s face anywhere and anytime, the market demand of video telephony is still low (ET News, 2008). Wired video telephony caused lackluster consumer demand mainly due to high price and poor quality (Schnarrs and Wymbs, 2004). However, the situation changed in 3G mobile world thanks to technological improvement which allows high-speed data service. How amazing talking over the phone as seeing someone’s eyes could be! Unlike this initial naïve expectation, Korean major mobile operators have just started announcing full-browsing mobile internet be its killer application for 3G; in other words, they are forced to admit the failure of video calling service (Yonhapnews 2008). It appears consumers are simply not interested in video calling as a mass-market communication service so far. In this vein, we claim that mobile video telephony focus on a niche market rather than trying to becoming a communication commodity like mobile voice calling. In other words, mobile video chatting is a good alternative service targeting a specific market for users who want to feel higher social presence.

Mobile video telephony is the service available in most 2.5G/3G handsets. Mobile video chatting service is not available in every handset but in most 3G handsets, and there are no additional usage fees when you are using video telephony service. These two media have similar but slightly different media richness in terms of the following for dimensions (“Table 1”).

<b>Dimensions of Media Richness</b>	<b>Video Telephony (Video + Audio)</b>	<b>Video Chatting (Video + Text)</b>
Multiple Cues	High	Moderate
Immediate Feedback	High	Moderate
Language Variety	High	Low
Personal Focus	High	High

**Table 1. Media Richness and Mobile VMC**

**Social Presence: Presence as Social Richness**

Social presence can be defined as perception of real involvement in communication and can be stimulated by physical presence, voice inflection, body gesture, words, or graphic symbols (Steinfeld, 1986). Other definitions include “being with another” (Biocca et al., 2003), and “social richness” aspect of presence (Lombard and Ditton, 1997). Media Richness theory has similar views with Social Presence Theory. According to Media Richness Theory, communication channels are categorized by the degree of richness in terms of four criteria: (1) instant feedback, (2) multiple cues, (3) personal focus, and (4) language variety (Daft and Lengel, 1986). Therefore, in richness hierarchy, face-to-face communication is above the telephone medium, and telephone is above the written media, which was empirically proved by D’Ambra, Rice and O’Connor (1998). Media without social presence may be perceived to be cold, interpersonal, and inadequate for social interaction (Kettinger and Grover, 1997). A stronger impression of social presence shows after an audio-visual task-based interaction than after one based on audio only (Short et al., 1976). Similarly, removal of visual cues through computer-mediated communication may help to lower social presence. (Sia et al., 2002)

According to Biocca et al.’s classification (2003), measuring social presence can be used when (1) to explore the design goals/social motivation of users, (2) to assess the performance of “Social Presence” technologies such as wireless telecommunication and avatar-based e-commerce, and (3) to explore the larger issues (e.g. psychological mechanism). Based on the second perspective above, Qui and Benbasat (2005) investigated the effects of text-to-speech voice and 3D avatars on the perception of social presence. Contrary to the authors’ expectations, however, there were no significant effects of either the voice technology or avatars on the perceptions of social presence. One of the possible reasons the authors suggested is the task-media fit which will be considered as a contingency variable in this study.

**Task-Media Fit Hypotheses**

Central proposition of media richness theory can be summarized as this question: “Does the use of richer rather than leaner media for equivocal tasks improve actual performance?” (Daft and Lengel, 1986) There have been a few empirical studies to attempt to prove this relationship; however, most of them found no support for task-media fit hypotheses. Partial support was proved for the media richness theory with regard to perceptual satisfaction, but no support in objective performance measures (Valacich et al., 1994). Also in Dennis and Kinney’s research (1998), matching media richness to task equivocality did not improve performance; similarly, no task-medium interaction effects on either decision quality or decision time (Suh, 1999).

Then, unlike the previous studies involving actual performance, the task-media fit may be working in relation-oriented socio-emotional communication, which will be examined in this study. Because we are focusing on socio-emotional calls by mobile VMC, we don’t measure objective performance but assess social presence as a surrogate variable for media’s performance and user satisfaction. As you can see the “Figure 1”, the optimal media richness requirements for each task type and situation are likely to be different (McGrath and Hollingshead, 1993). Overly rich or lean communication environments will not be performed as effectively as when done in the “best-fitting” one.

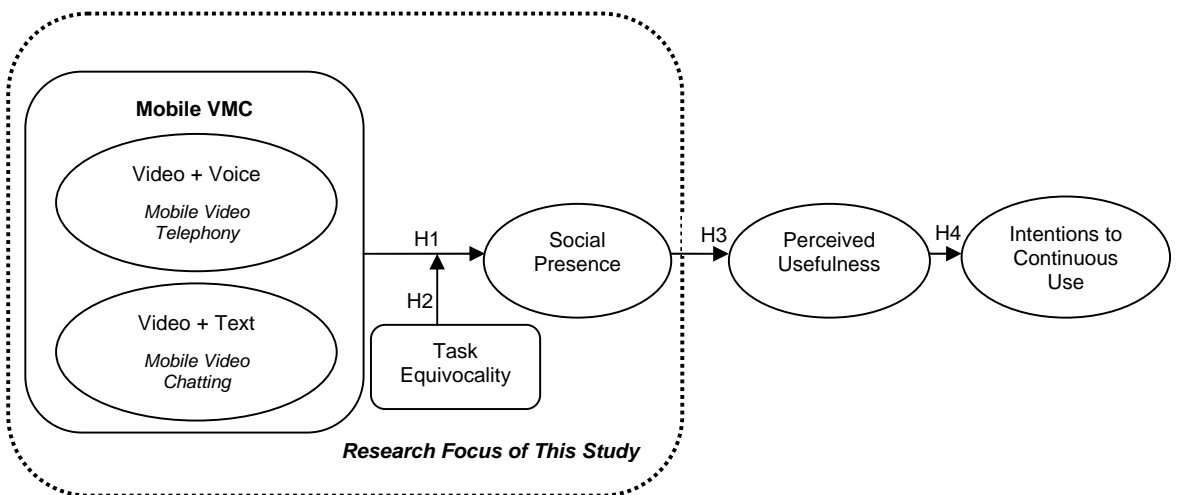
Increasing potential richness required for task success	Communication Media			
	Increasing potential richness of information →			
Task type (s)	Computer Text Systems	Audio Systems	Video Systems	Face-to-Face Communications
Generating ideas & plans	Good fit	Marginal fit Info too rich	Poor fit Info too rich	Poor fit Info too rich
Choosing correct answer: intellective tasks	Marginal fit Medium too constrained	Good fit	Good fit	Poor fit Info too rich
Choosing preferred answer: judgment tasks	Poor fit Medium too constrained	Good fit	Good fit	Marginal fit Info too rich
Negotiating conflicts of interest	Poor fit Medium too constrained	Poor fit Medium too constrained	Marginal fit Info too lean	Good fit

Source: McGrath and Hollingshead

**Figure 1. Task-Media Fit Hypothesis (Suh, 1999)**

**RESEARCH MODEL AND HYPOTHESE**

Through the extensive literature reviews, the research model was developed as following “Figure 2”:



**Figure 2. Research Model**

**Mobile Video-mediated Communication and Social Presence**

In "person-oriented" or social tasks, a medium's multiplicity of cues or its social presence-not its richness-may be important (Dennis and Kinney, 1998), and different types of communication cues produce different levels of social presence. (Sproull and Kiesler, 1986). According to Latane (1981), communication cues that typically yield higher social presence are those that convey immediacy. That is, based on media richness theory, 'video telephony' seems to be richer than 'video chatting' in terms of multiple cues, immediate feedback, and natural language; hence, we can assume that as follows:

*H1: Mobile video-mediated communication will have a stronger effect on social presence when it is associated with voice than when associated with text.*

**Task Equivocality as a Moderator of Social Presence**

Five primary task-related factors that may affect performance are *equivocality, uncertainty, routineness, complexity, and emotional content* (Daft and Lengel, 1986). A number of studies have been done in order to test task-media fit hypotheses on the basis of equivocality; they chose a negotiation task for highly equivocal one, and an intellectual task for a less equivocal one (Dennis and Kinney 1998; Suh, 1999; Valacich 1994).

The research focus of this study is to test if the level of social presence is moderated by task equivocality, not to assess actual performance. Hence, we can generate the following hypotheses, H2a and H2b, according to media richness and task-media fit as you can in "Figure 1". It has not been empirically proven under the mobile VMC context and required to be tested here.

*H2a: Mobile video telephony will be more strongly associated with social presence than mobile video chatting in an equivocal (negotiating) task.*

*H2b: Mobile video chatting will be more strongly associated with social presence than mobile video chatting in an unequivocal (intellective) task.*

**Impact of Social Presence on Behavioral Intention**

To give further implications, especially for practitioners, TAM (Davis, 1989) is adopted. Perceived ease of use that is not distinctive between video telephony and video chatting is not included in the model.

*H3: Social presence positively influences perceived usefulness of mobile VMC.*

*H4: Perceived usefulness of mobile VMC positively influences users' intentions to use the media continuously.*

**RESEARCH METHOD**

**Experiment Design**

An experiment will be used as a major method because the apparatus, handsets in this context, should be controlled for confirming validity of the research.

A 2\*2 lab experiment will be carried out as you can see "Table 2". About 60 subjects who will consist of 30 teams will be divided by two groups and randomly assigned to less equivocal tasks (Session 1 and 2) or highly equivocal tasks (Session 3 and 4). Two members of the same team should friends/acquaintances and regularly communicate with each other. During the experiments, they must locate other rooms where they cannot see/hear each other. The same model of 3G wireless handsets, which is able to support both video calling and chatting, to each participant with detailed written (or oral) description of task scenarios. After each session, participants should fill in questionnaires regarding their perception of social presence, equivocality, complexity, demographic characteristics and mobile VMC usage.

Task Type (Between Subjects)	VMC Combination (Within Subjects)	Video plus Voice (Mobile Video Telephony)	Video plus Text (Mobile Video Chatting)
Task A		Session 1 (Task A')	Session 2 (Task A'')
Task B		Session 3 (Task B')	Session 4 (Task B'')

**Table 2. A Plan for Experimental Design**

**Task A (Low equivocality: an informative task for socio-emotional purpose)**

The task representing low equivocality is defined as an informative task for socio-emotional purpose under this research context. Purely intellectual tasks, such as Scholastic Aptitude Tests (Dennis and Kinney, 1998) or inheritance-tax calculation (Suh, 1999) problem, are neither suitable nor applicable for mobile VMC, so informative tasks will be appropriate for the study.

Roughly, Task A would possibly be the tasks conveying information about when and where to meet each other; one subject has only ‘when’ information, but another knows about only ‘where’ to meet. Task A’ and A” must be very similar in terms of equivocality but have slightly different topics. It will not be measured whether the answers are correct or not.

**Task B (High equivocality: a negotiation task for socio-emotional purpose)**

The possible tasks representing high equivocality would be about buying the right products (e.g. bags or clothes) through negotiation when pictures of the products, price, texture, or fabrics are given. Like Task A, it will not be considered whether the subjects reach a consensus on their decision or how fast they reach an agreement.

**Manipulation Check**

The task must be differentiated by its equivocality, not complexity. Although both tasks are developed through a careful pilot test on their level of equivocality, the manipulation checking questions of “Table 2” (*equivocality* and *complexity*) will be asked after the experiment for ensuring the validity of the research process.

**Measurement of Variables**

After each session, the questionnaire-based surveys to measure social presence, equivocality, and complexity will be done.

Variable	Measurement	Source
Social Presence	[Semantic Differential] I felt that the interaction with the counterpart was... 1. Impersonal - Personal (e.g. Impersonal 1---2---3---4---5---6---7 Personal) 2. Cold - Warm 3. Distant - Close 4. Dehumanizing - Humanizing 5. Colorless - Colorful 6. Inexpressive - Expressive 7. Unemotional - Emotional 8. Insensitive – Sensitive [Sliding Scale] 1. To what extent did you feel able to assess your partner’s reactions to what you said?—Able to assess reactions, not able to assess reactions. 2. To what extent was this like a face-to-face meeting?—A lot like face to face, not like face to face at all. 3. To what extent was this like you were in the same room with your partner?—A lot like being in the same room, not like being in the same room at all. 4. To what extent did your partner seem “real”?—Very real, not real at all. 5. How likely is it that you would choose to use this system of interaction for a meeting in which you wanted to persuade others of something?—Very likely, not likely at all. 6. To what extent did you feel you could get to know someone that you met only through this system?—Very well, not at all.	Short et al., 1976 de Greef and IJsselsteijn, 2000 Nowak and Biocca, 2003 <i>(Modifications are required according to the research context.)</i>
Equivocality	1. Different people could have different opinions about the best solution for this task.* 2. Most people would clearly agree on what information is important and unimportant for this task. 3. The information needed to solve this task can be interpreted differently by different people.* 4. More than one reasonable solution exists for the problems faced in this task.* 5. The information needed to complete this task can be found in books. 6. The rules and criteria for solving this problem are clear and can be found in books.	Dennis and Kinney, 1998
Complexity	1. This was a simple task to complete. 2. This was a difficult task to complete.*	Dennis and Kinney, 1998

	<p><b>Scoring Equivocality and Complexity:</b> All 7-point Likert scales scored 1 for “strongly agree” and 7 for “strongly disagree.”</p> <p>*Starred items indicate reverse scoring. High scores indicate high presence of measured construct.</p>	
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Table 3. Survey Items

### RESEARCH NEXT STEPS: DATA COLLECTION AND ANALYSIS

The samples will consist of heterogeneous people who are currently subscribing 3G mobile services and using 3G handsets available for video telephony and video chatting. Because they must use the same model of handsets for internal validity, the subjects would be collected from an online community of the users of a certain model of cell phones (i.e. brand community).

Based on the result of the experiment and the questionnaire survey, statistical analysis using ANOVA and multiple regression analysis (SPSS) will be conducted.

### CONCLUSION

It is a timely and relevant research at this moment when mobile video telephony failed to get attention from users, unlike telecommunication providers' initial expectancy it could be the killer application of the 3G mobile telecommunication service. In this study, mobile video chatting, the relatively less promoted service can be suggested as a reasonable alternative solution of mobile video calling for some users and some contexts. To conclude, the practical implication will be successfully generated for mobile telecommunication service providers who serve video telephony/chatting, as well as the theoretical implication in terms of social presence theory well applicable for relation-oriented VMC, through the study.

This research can be extended to the goal-oriented context by considering communication satisfaction or performance. Also, 'privacy concern' seems to be a determinant of behavioral intentions to use mobile video telephony, and this construct could be examined in future studies.

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