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# THE INFLUENCE OF SOCIAL PRESENCE ON USER-TO-USER SUPPORT PROCEDURES

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# THE INFLUENCE OF SOCIAL PRESENCE ON USER-TO-USER SUPPORT PROCEDURES

*Research in Progress*

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## Abstract

*More and more companies allow users to bring their own IT devices to the workplace. As a result, an increased heterogeneity of hard- and software makes it challenging to deliver central IT support. Therefore, employees might increasingly rely on the help of their colleagues. In such a user-to-user support scenario, traditional communication media such as text chat and telephone are used. In this context, we set out to investigate the effects of social presence, i.e. the feeling of human warmth, in a laboratory experiment. While this feeling of human contact is assumed to be important in an increasingly digitized world, our findings could not confirm this hypothesis. In contrast to the media richness theory, our study shows that audio compared to text chat has no impact on social presence and no subsequent effect on trust. However, we could confirm the relationship of social presence on enjoyment and show that trust leads facilitates information gathering. Our findings may be limited due to the use of an answer script of the human support playing a colleague as counterpart for the participants. We relate our shortcomings to theory and provide potential avenues for future experimental studies on user-to-user support.*

Keywords: user-to-user support, individual information systems, social presence, enjoyment, trust.

## 1 Introduction

Information technology has gained enormous importance in the life of many individuals. This development has triggered researchers to question the traditional assumption of IS research that users tend to resist new technologies. In particular young people are supposed to be inherently tech-savvy and happy to use a variety of different IT tools like smartphones, laptops, and the installed software at the same time (Vodanovich et al., 2010). Beyond demographic aspects, literature has acknowledged other factors that influence an individual's capability to work in the digital environment (Wang et al., 2012). Enabled by this increased digital literacy and the falling costs of technologies, people meanwhile create complex information systems that are suited to their individual needs and preferences (Baskerville,

2011). In many cases, individual information systems overlap into the business realm (Ortbach et al., 2013). More precisely, people often apply their privately acquired familiarity with IT to their job. In terms of the IT consumerization trend, it is argued that companies should make use of this employee behaviour to gain productivity, employee satisfaction and innovation benefits (Harris et al., 2012). Typically, strategies to harness such benefits include granting employees more autonomy. An example are bring-your-own-device (BYOD) strategies that allow employees to choose the technology that they want to use for work (Miller et al., 2012; Hopkins et al., 2013). Moore (2011, p.2) argues that creating such more engaging systems represent “the next stage of Enterprise IT” that will foster collaborative and distributive work.

Providing efficient IT support is one of the most important disadvantages of IT consumerization for organisations (Niehaves et al., 2012). End user autonomy in terms of IT choice will most likely create a more heterogeneous IT environment, with a greater variety of hardware and software tools used within and outside company borders (D’Arcy, 2011). Gens et al. (2011, p.4) note that “more devices, times more apps, equals exponentially more complexity for IT to support”. This complexity will challenge traditional support procedures that are often standardized or outsourced to an external provider in order to save costs. In contrast, an increased tech-savviness of the workforce will facilitate support in cases where users solve their IT-related problems on their own, or help each other out. This enables companies to decentralize support in whole or in part completely to the business in form of user-to-user support (Andriole, 2012). While there is a plethora of research that investigates the role of user-to-user support in online communities (e.g. Von Hippel and Lakhani, 2003), there is only little research that deals with its value for internal company support processes. McLure Wasko and Faray (2005; 2000) showed in their studies that such internal communities of practice facilitate knowledge transfer between individuals as long as the participants see certain benefits for the community or themselves to share their knowledge. Companies can provide this necessary framework conditions and, furthermore, facilitate a direct technology-mediated interaction between the involved employees by using online communications software. Since contacts and competences are usually transparent inside company walls, users with support questions may directly address them to colleagues that are known as experts in this field. Thus, we argue that efficient technology-mediated user-to-user support structures will be more and more requested by organisations to cope with the heterogeneity of hard- and software, partly driven by trends like IT consumerization and BYOD.

When it comes to technology mediated user-to-user communication and interaction processes, the concept of social presence, i.e. the feeling of human warmth, is considered as important and has gained increased attention in IS research (Short et al., 1976; Walter et al., 2013). There is an “ever-increasing use of social presence technologies and expansion of social interactions” (Biocca and Harms, 2002, p.2), i.e. collaborative work environments or teleconferencing interfaces. People strive for human contact to satisfy their need to belong (Baumeister and Leary, 1995). As a consequence, it is worth investigating how social presence influence interpersonal relations, the working atmosphere, and finally job performance in distributed teams. In our research-in-progress paper, we combine the concept of social presence with the case of an IT support scenario. More precisely, we want to answer the following research question:

**RQ<sub>1</sub>:** How does social presence influence the performance of technology-mediated user-to-user support conversations?

The remainder of this research-in-progress paper is organised as follows. In the next section, we derive hypotheses and our research model on basis of previous studies and related work. In section 3, the experimental design is outlined. In the next section, results are shown followed by section 5, the discussion, limitations and outlook towards the follow-up study.

## 2 Related work and development of hypotheses

### 2.1 Communication types

Social presence was first defined by Short et al. (1976, p.65) as “the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships”. They considered social presence as a subjective quality of the communication medium and measured how warm, sociable, sensitive, and personal a communication channel is perceived.

The majority of experimental studies take a consumer focus when analysing social presence (Zhu et al., 2010; Hess et al., 2009; Qiu and Benbasat, 2009). Most studies in the domains of team, live help, and recommendation agents (RA) suggest that there is a dependency between the use of different communication media and social presence. In general, there is a lack of experimental studies on social presence that focus on internal company processes. One example is a study by Straub and Karahanna (1998) who showed that knowledge workers are keenly aware of the discrepancy between different media and tend to adjust their media choice with respect to the task and the expected need of social presence for a particular interaction.

Social presence is determined by the richness of the medium and the way it is used and perceived when in communication with others. Hess et al. (2009) stress the importance of vividness as a determinant of social presence. Vividness has been described as “the ability of a technology to produce a sensorially rich mediated environment” (Steuer, 1992, p.10). Literature suggests that media with higher richness results in higher social presence (Sallnäs, 2005; Yoo and Alavi, 2001; Bente et al., 2008). Hess et al. (2009) provide evidence that vividness positively influences social presence. Only Qiu and Benbasat (2005) and Zhu et al. (2010) were not able to verify this connection with regards to their data. As a result of these studies, a voice chat is expected to raise the perception of social presence compared to text chat. Thus, we hypothesize:

**Hypothesis 1 (H1):** Using audio as communication medium will result in higher social presence than using text chat.

### 2.2 Enjoyment

In the context of IS, enjoyment has been defined as “the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated” (Davis et al., 1992, p.1113). Enjoyment has been used as indicator of intrinsic motivation (Puca and Schmalt, 1999). In other words, enjoyment is geared to relish the pure action of doing something without being motivated by the expected outcome.

The influence of social presence on enjoyment has been investigated in several studies in the field of IT and communication, e.g. regarding recommendation agents (RA) (Qiu and Benbasat, 2009) and websites (Cyr et al., 2007; Hassanein and Head, 2005). For the most part, this relationship has been shown to be positive. The most clear-cut evaluation between the general concept of presence and enjoyment is made by Lombard and Ditton (1997), who argue that enjoyment is “perhaps the most prominent psychological impact of presence”(p.19). Based on the above, we follow:

**Hypothesis 2 (H2):** Social presence will be positively related to enjoyment.

Technology acceptance studies have investigated impacts of enjoyment on ease of use (e.g. Venkatesh 2000; Yi and Hwang 2003). Moreover, Sun and Zhang (2006) have compared the bidirectional nature of the relationship between enjoyment and ease of use. They argue for the direction of enjoyment on ease of use in studies related to technology acceptance.

In contrast to acceptance studies, which focus on entire systems, our study focuses on user-to-user communication. Thus, a construct is needed to capture the difference from system-based ease of use. Past literature, for instance, has used the concept of message clarity to assess the comprehensibility of conversations (Kahai and Cooper, 2003). Therefore, we define a new construct based on ease of use and message clarity named “ease of contact” (EOC) which is defined as the perceived convenience and satisfaction of the interaction with another communication partner mediated by IT. Hence,

**Hypothesis 3 (H3):** Enjoyment will be positively related to ease of contact.

## 2.3 Trust

In interpersonal interaction, trust is defined as “reliance upon the communication of another person in order to achieve a desired but uncertain objective in a risky situation” (Giffin, 1967, p.104). If trusted, a person (trustor) relies on another party (trustee) to behave as predicted. As a result, the complexity of social interactions is tremendously reduced (Gefen and Straub, 2004). Thus, trust “creates the social environment in which businesses can function” (Gefen and Straub, 2003, p.9). The multidimensionality of trust manifests in different beliefs towards a trustee (Mayer et al., 1995): competence (“ability of the trustee to do what the trustor needs”), benevolence (“motivation to act in the trustor’s interests”), and integrity (“trustee honesty and promise keeping”) (McKnight et al., 2002, p.337).

Studies in the field of e-commerce suggest that social presence positively influences trust (Cyr et al., 2009; Gefen and Straub, 2004). More findings can be drawn from studies with social agents (e.g. RA). Experiments with different types of media, i.e. text, text-to-speech, and human voice, have increased social presence. Moreover, a positive effect on trust using RA was shown (e.g. Qiu & Benbasat 2009). While social agents are non-humans per se, in some cases there are treated similar to humans (Wang and Benbasat, 2005). The rationale behind the trust building mechanism is based on social cues. The more social cues are present, the more trust is likely to develop. The reason for this relationship is twofold. First, if more social cues are present it is more difficult to hide untrustworthy behaviour. Second, more social cues allow for an easier assessment of trusting beliefs (Gefen and Straub, 2003). Based on the previous results in the field, we hypothesize:

**Hypothesis 4 (H4):** Social presence will be positively related to trust.

Findings from the field of e-commerce point to a relationship between trust and ease of use (Pavlou, 2003). It is argued that having trust in a business partner simplifies the transaction coupled with increased levels of ease of use. “Trust [...] reduces the need to understand, monitor, and control the detailed actions” (Chircu et al. 2000, p. 712). This reduces transaction costs and the effort to come to agreements (Ring and Van De Ven, 1994). In detail, when the other party is perceived as competent, benevolent, the information can be considered as relevant and communicated with good intentions. Moreover, if the other is seen as having integrity, the sender of information can be considered as honest and predictable. In this case, new information does not need to be re-evaluated in terms of credibility. The communication process is facilitated. Thus, we posit:

**Hypothesis 5 (H5):** Trust will be positively related to ease of contact.

Figure 1 depicts our research model.

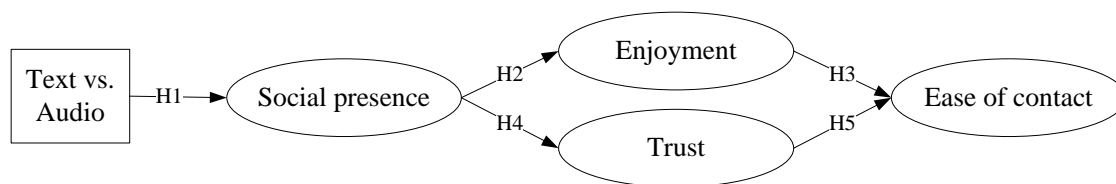


Figure 1. Research Model

### 3 Research Method

The laboratory experiment employs a between-subjects research design including two experiment conditions, namely text chat and audio chat. The experiment was performed by 56 subjects, of which 87.5 % were students with an average age of 24.5 years ( $SD=5.64$ ). 62.4 % of the subjects were males. The subjects were randomly assigned to one of the two experiment conditions. The selection of one out of seven office printers for their company was chosen as experimental task. The idea was inspired by choosing a digital camera from Qiu and Benbasat (2009). However, to match the environment of user-to-user support, we adapted the task towards a business context and replaced the digital camera by an office printer. To exclude any influence due to preferences towards a certain brand, seven fictional printers with a set of 14 features (e.g. colour printing, scanner, print speed, and consumables) were made up on basis of original data sheets of major printer companies. At the beginning of the experiment, the subjects had no information about the requirements by which they had to select one of the printers. Moreover, the subjects lack information concerning the importance of these specifications. To gain more information, they had to contact a previously unknown “colleague”. This “colleague” was played by a trained experimenter who did the full set of experiments. Depending on the experiment group, subjects used either voice-over-IP or text chat feature of Skype to make contact. In order to ensure an unbiased design for the conversation between the different subjects and the “colleague”, a script with answers for all expected questions was created. The script contained pre-defined responses for the feature requirements and covered additional questions. For instance, for answer concerning the printing resolution the supporter always answered: “The printing resolution should at least be 2400x600 dpi.” For questions regarding the scanning resolution, the support reacted with “That is not important. Only the scan function itself matters”. Furthermore, the script contained a set of actions (e.g. “I might be able to help you with another question.”). The attendants were paid 10€ for their participation as a flat fee. Moreover, they had a ten percent chance of a 50€ bonus when they successfully completed the experiment, i.e., provided a well-reasoned argumentation for their printer selection. All conversations were transcribed. Overall, the participants had 30 minutes to work on the task. No subject reported any shortage in time in the post-questionnaire.

All items were measured with a seven-point Likert scale. To measure social presence we adapted items by Al-Natour et al. (2011). Similarly, items for measuring enjoyment were adapted from van der Heijden (2004). Trust was measured by using items by Gefen (2000). Due to the task-centred nature of the experiment with initial contact, we hypothesised that, in terms of the trusting beliefs, competence would play a major role. Hence, we included competence measurement items from McKnight et al. (2002). EOC was intended to provide an indicator of subjects’ objective performance throughout the experiment. Therefore, we adapted ease of use items from technology acceptance model (TAM) by Davis (1989) and satisfaction of group support systems by Reinig (2003). To control for the objective character of EOC, we measured several objective criteria, such as interaction time, number of asked questions about the printer, number of addressed printer features. Moreover, we performed a qualitative analysis of the transcripts as well as the subjects’ explanation to select a particular printer. Our preliminary analysis indicates that EOC is a well predictor of these objective performance criteria.

Regarding the data analysis, we performed a one-way ANOVA to evaluate the impact of the treatment conditions on social presence. Then, we used SmartPLS Version 2.0.M3 (Ringle et al., 2005) to analyse the structural model. The algorithm and parameter settings correspond to the default values of SmartPLS if not recommended differently by the guidelines provided by Hair et al. (2012).

## 4 Results

Contrary to expectations, there was no statistically significant difference between the experiment groups ( $F(1,54)=0.575$ ,  $p=0.452$ ). The treatment conditions text chat ( $N=35$ ,  $Mean=3.9913$ ,  $SD=1.21$ ) and audio chat ( $N=21$ ,  $Mean=3.7389$ ,  $SD=1.20$ ) did not influence the amount of social presence. Comparing means, social presence was even slightly higher in the text chat condition. Hence, H1 is rejected.

In the assessment of the structural model, all reflective items with loadings  $\leq 0.40$  were dropped. For items having an outer loading less than 0.70, but higher than 0.40, it was analysed if a deletion increased composite reliability (CR) and the average variance extracted (AVE) above their threshold as recommended by Hair et al. (2013). Since all latent variables already fulfilled the requirements on consistency reliability and convergent validity (Table 1) as measured by composite reliability ( $\geq 0.70$ , but  $\leq 0.90$ ) and the AVE ( $\geq 0.50$ ), respectively, no indicators had to be removed (Bagozzi and Yi, 1988; Hair et al., 2012). Discriminant validity was checked using the Fornell-Larcker criterion and achieved by all constructs. The criterion is used to test if the latent variable explains more variance in its indicators than it correlates with any other construct. Hence, one has to compare the square root of the AVE (depicted in Table 1 in bold text on the diagonal) with the correlations with all other latent variables (Fornell and Larcker, 1981).

Latent Variable	CR	AVE	ENJOY	EOC	SOCIAL	TRUST
ENJOY	0.8484	0.5868	<b>0.7660</b>			
EOC	0.8909	0.6235	0.1925	<b>0.7896</b>		
SOCIAL	0.8788	0.6021	0.6414	0.1386	<b>0.7760</b>	
TRUST	0.8359	0.6433	0.0459	0.6290	0.0027	<b>0.8021</b>

Table 1. Consistency Reliability, Convergent Validity, and Fornell-Larcker Criterion

The structural model evaluation (Figure 2) reveals that social presence ( $b=0.641$ ,  $t=9.725$ ) significantly predicted enjoyment, supporting H2. In contrast, the expected relationship between social presence and trust could not be verified ( $b=-0.003$ ,  $t=-0.030$ ). Hence, H4 was rejected. Nevertheless, trust had a strong effect on EOC ( $b=0.621$ ,  $t=6.944$ ), whereas enjoyment did not significantly contribute to EOC ( $b=0.164$ ,  $t=1.625$ ). Consequently, H5 was confirmed while H3 was not. The amount of variance explained in enjoyment was 41.1%. Social presence accounted for zero per cent of the variance explained in trust. Jointly, enjoyment and trust explained 42.3% of the variance in EOC.

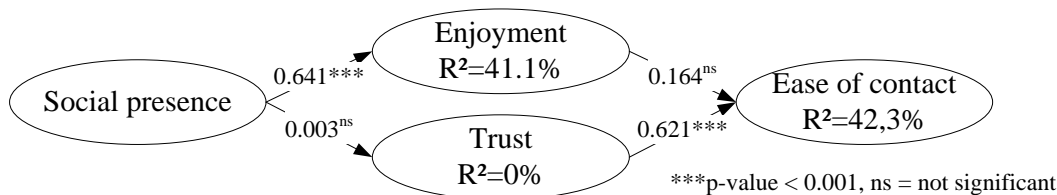


Figure 2. Structural Model Results

## 5 Discussion and Conclusion

In this research-in-progress paper we aimed to analyse the influence of social presence in a user-to-user support setting. Therefore, we conducted a laboratory experiment that simulated a technology-mediated conversation between an employee that needs help for a business problem and another em-

ployee that is able to give help for this particular problem. In line with previous experimental studies, we built two experiment groups differentiating audio and text chat. However, the results of the statistical analysis only partly confirm our theoretical model. In particular, there was no significant difference between the treatment groups. Based on our findings, we see several potential avenues to modify the experiment to achieve more consistent results.

Regarding H1, we assume that the unexpected finding is mainly caused by the predefined answer script of the support. Answers were only concise and offered little room for in-depth interactions or small talk. The support was mainly restricted to passive behaviour and waited for feature-specific questions. Moreover, many participants expected the support to provide additional background information, e.g. the department the printer was to be purchased for. In addition, the support tried to end conversations once no further questions were asked. Our assumptions about the negative influences of the script were supported by the length of interactions. In the text-chat condition, the longer subjects were in contact with the support, the higher was the perceived social presence. Surprisingly, in the audio condition, the inverse correlation holds true and social presence decreased for longer audio chats. Thus, the negative impact of the script seems not to be as apparent in the text condition as in the audio condition. We assume that the script created a feeling of talking to a social agent, i.e. receiving unnatural responses. As subjects knew that the support was human, this might lowered the perception of support's extroversion and agreeableness (antecedents of social presence) (Isbister and Nass, 2000; Hess et al., 2009). In the text chat condition this effect on social presence did not exist because a more passive behavior is considered to be more appropriate for a text-chat than for audio-chat. Apparently, instant messaging was mirrored better by the script, since social cues were consistent with the general use of the medium.

As regards H2, the positive effect of social presence on enjoyment is clearly confirmed. It appears that regardless of the treatment condition subjects had fun when the support was perceived as highly present. Consequently, this study shows that this relationship can be taken for granted as suggested by Lombard and Ditton (1997). However, no effect of enjoyment on EOC (H3) can be supported by our data. There are several reasons which might explain this shortcoming. First, previous research around the TAM suggested that enjoyment only influences ease of use over time. Initially, self-efficacy dominates over enjoyment (Venkatesh, 2000). Only after repeated use of a system, enjoyment gains influence and becomes a significant antecedent of ease of use. While our experiment is designed as initial contact, the subjects had might not been able to get a persistent picture of the interaction with the support. Second, the focus on the task might have diminished the influence of enjoyment on EOC. Although most subjects reported high levels of enjoyment, this had no major influence on EOC and the related objective performance criteria. In this sense, we think that the business setting of our study accounts for the less important role of enjoyment for successfully accomplishing the task. For the effect of social presence on trust (H4) and subsequently on EOC (H5), mixed results were found. While social presence had no importance to determine trust, trust substantially influenced EOC. For the former relationship, this is likely to be related to the above mentioned strictness of the script. The high correlation between trust and ease of contact stresses this task-centred nature of the experimental design. If the support was trusted, a participant could simply take the information as relevant, true and credible. This resulted in a higher perceived EOC.

Despite the mentioned shortcomings, our experimental result can further inform existing theory. First, the rejection of H1 clearly highlights the difference between social presence and media richness theory (MRT). MRT ranks different communication media according to their information richness, assigning the highest value to face-to-face conversations (Daft and Lengel, 1984;1986). Our results show that richer media is not necessarily associated with more social presence. Instead, each medium allows for different levels of social presence. Additionally, richer media seems to be associated with expectations concerning the nature of the conversation, for instance, small talk. If a medium is not used as expected, i.e. behaving too passive, social presence is reduced. Second, our experiment has implications for designing communication experiments that target social presence. We show that the design (e.g. by



using an answer script) is a complex endeavour where the line between human support and social agents might become blurred. As practical implications, our study highlights that more vividness does not automatically lead to higher EOC. Too static and robotic verbalisation might make human actors be perceived as programmed social agents. In times of constantly increasing automation and usage of RAs, users will more and more misinterpret such conversational shortcomings. Therefore, companies that still employ real human operators must act carefully with message standardisation, even if messages are only partly standardized. Moreover, our study shows the importance of trust in a user-to-user support scenario to foster EOC.

This research-in-progress is subject to a number of limitations. First, like most experimental studies it suffers from restrictions concerning generalizability due to the research methodology (Yoo and Alavi, 2001). While the clear and controlled experiment design allows for high internal validity, generalisation and comparability to other settings (external validity) is limited (Loewenstein, 1999). Specifically, the role of the answer script might cause limited generalizability to practice. Second, the majority of subjects were students. While students represent the upcoming generation of employees, most of them have not yet acquired much experience in business conversations. Third, the study was only able to capture an initial conversation interaction. In business settings, people collaborate on a daily basis over long periods of time. Consequently, this study misses long-term considerations concerning the effects of social presence, enjoyment, and trust.

Due to the limitations of this study, future research is needed, for example, to eliminate the drawbacks of the answer script. Scripts have already been used by previous studies, for example in the live help domain (Qiu and Benbasat, 2005) or RA (Wang & Benbasat 2007). The latter study includes one script example for each of their type of answers using different explanations (how, why, and trade-off explanations). In this study “how” explanations give the line of reasoning of the RA. “Why” explanations “justify the importance and purpose of an RA’s questions to consumers” (Wang and Benbasat, 2007, p.224). The last type “trade-off” explanations offer objective knowledge. Moreover, we found that in our study the given answers provided by the answer script were comparably shorter to other studies where answers included detailed and consecutive sentences (Al-Natour et al., 2011; Hess et al., 2009). In addition, Al-Natour et al. (2011) and Hess et al. (2009) used various scripts, e.g. extraversion vs. introversion. Extraversion was shown to positively influence social presence. This implementations, in comparison to the more introverted ones, use more active, enthusiastic, and strong statements which express a self-confident counterpart demanding action. These are based on positive statements enriched by self-references (Hess et al., 2009). Al-Natour et al. (2011) call this suggestive guidance, directive speech acts, and the expression of higher confidence levels.

In line with this previous research and taking up the findings of the present study, we aim to redesign our script at being more extraverted and better fitted. This also goes along with the need of the conversation partner to be more active, i.e. ask questions on his own initiative and be open to small-talk conversations. In doing so, we think that we can even further enhance the external validity for the relevant case of user-to-user support.

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