Designing electronic feedback – Analyzing the effects of social presence on perceived feedback usefulness ☆

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ABSTRACT

Feedback interventions, i.e. actions taken by (an) external agent(s) to provide information regarding one's task performance, are an important element in motivating and raising performance. Especially the perceived feedback usefulness determines its positive effects. In today's digitalized world, feedback is more often given electronically, i.e. computer-mediated or even automated by computer systems. Those feedback interventions' effect on perceptions resulting from the difference of communication media is essentially considered by the concept of social presence. However, information systems (IS) research lacks a structured evaluation of possible design choices of feedback media, their influence on the social presence and subsequent effect on the perceived feedback usefulness. To close this research gap, we conduct a laboratory experiment with 43 participants in which we analyze six different design choices for feedback media. We applied a 2×3 experimental design covering the feedback source (human, non-human feedback) and media richness (text, audio, and video). We show that social presence directly and mediated by the perceived trustworthiness of feedback on simple IT-based tasks impacts perceived feedback usefulness. Our study concludes by outlining opportunities for future research and practical implications for human and non-human (i.e. automated) feedback.

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1. Introduction

Feedback intervention, *i.e. (an) action(s) taken by (an) external agent(s) to provide information regarding one's task performance* (Kluger and DeNisi, 1996), is a central influencing factor for motivation and task performance (Moss and Martinko, 1998; Kluger and DeNisi, 1996; Geister et al., 2006; Ilgen et al., 1979). In this context, the perceived feedback usefulness, i.e. the degree to which a person believes that the feedback helps to increase his or her performance on a particular task, is one of the most important aspects (Brett and Atwater, 2001; Earley, 1986). Perceived feedback usefulness is highly considered in feedback research in general (Froehlich et al., 2010; Strijbos et al., 2010). Besides feedback from humans, automated feedback given by an information system is an important factor in evaluating user performance (Oinas-Kukkonen and Harjumaa, 2009). In addition, it is expected to increase learners' engagement as it is "an important system design element that serves as a form of reinforcement" (Nah et al., 2013, p. 102).

When an agent gives electronic feedback, a feedback medium is involved. The perception of such a medium is essentially considered under the concept of social presence. Social presence, i.e. the feeling of human warmth and being with another (Short et al., 1976; Biocca et al., 2003), is important in the context of feedback due to three main reasons: First, feedback is given more often electronically, i.e. through computer-mediated communication or even by computers themselves. For example, due to increasing mobile work and more flexible work schedules personal contact and, thus, face-to-face interaction between employees and their supervisors is more and more reduced (Lister and Harnish, 2011; Kirkman and Mathieu, 2005). While important and long-term oriented feedback sessions such as annual performance reviews will likely continue to be given in personal face-to-face settings, brief *performance evaluations on routine or simple tasks* may be more time and cost efficiently given using electronic feedback (e.g. via email, audio or video calls). The effect on perceptions resulting from the difference of communicating either face-to-face or via such different electronic media, is essentially considered by the concept of social presence (Burke and Chidambaram, 1999; Warkentin and Beranek, 1999; Short et al., 1976). Second, studies found that social presence is an important construct influencing the usefulness of a system (Cyr et al., 2007; Hassanein and Head, 2007; Gefen and Straub, 1997). Regarding computer-mediated feedback, previous studies analyzed, for instance, the role of

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feedback on usefulness when acting in multiplayer graphical role playing games (Martino et al., 2009) and found significant differences in perceived usefulness when comparing e-mail and voice-mail implementations in a student–teacher setting (Keil and Johnson, 2002). In addition, related studies from the field of e-commerce and real estate found that using recommendation agents (RA) leads to differences in the perceived social presence when applying different media richness levels and humanoid embodiments (e.g. Hess et al., 2009; Qiu and Benbasat, 2009). However, while feedback interventions are also informational in nature, they are more personal than the described recommender scenario. Therefore, the effects on usefulness may be different from existing findings. Third, understanding social presence in the context of feedback is necessary to inform the design of information systems that will increase the perceived feedback usefulness. Besides feedback from humans, current information systems, based on the characteristics of simple IT-based tasks, may evaluate a user's performance and give feedback automatically (Oinas-Kukkonen and Harjumaa, 2009). Analogous to the human communication options, information systems may also provide feedback in various levels of richness, e.g. text, audio (text-to-speech) or video (e.g. virtual agents). Many studies have evaluated effects and perceptions of feedback along different types of feedback, for example, with respect to positive or negative feedback (e.g. Lim et al., 2005; Mayer and Davis, 1999) or characteristics of the person who gives feedback (e.g. Brewer et al., 1996).

While the interface design of feedback systems is very important for Human-Computer Interaction studies, only a small number provides user evaluations of their designs (Froehlich et al., 2010). IS research currently lacks a systematic evaluation of design choices for feedback systems in their ability to influence perceived social presence. Moreover, there is a considerable gap of research in addressing the direct or mediated influence of perceived social presence on the perceived feedback usefulness. To close this research gap, this study focuses on two major research questions (RQ):

(1) How do specific design choices for feedback systems influence the perception of social presence?
(2) How does perceived social presence influence the perceived usefulness of electronic feedback?

The remainder of this paper is structured as follows. First, we will outline related work on feedback and social presence theory (Section 2). Then, we will develop our research model for investigating the effects different information systems designs have on perceived social presence of feedback as well as for determining the role of social presence for creating more trustworthy, enjoyable and useful electronic feedback (Section 3). In Section 4, we set out our research methodology followed by a presentation of our quantitative results (Section 5). These results will then be discussed in Section 6. Our paper concludes with an outline of limitations and future research opportunities.

2. Related work

2.1. Background on feedback research

Feedback has been subject to investigation in psychology for more than 100 years. It is seen as a highly relevant management instrument to improve the company culture and the overall motivation of employees (Moss and Martinko, 1998; Ilgen et al., 1979). Moreover, feedback techniques are constantly under review leading to developments of feedback technologies such as 360 degree feedback (Baker, 2010). Besides the field of organizational studies and management, feedback has been extensively studied

in the field of education (Hattie and Timperley, 2007). Ilgen et al. (1979) understand feedback intervention as a specific communication process where the communicated message comprises information about the recipient and the recipient's perception of it depends on factors like personal characteristics, the feedback source as well as the nature of the message (Ilgen et al., 1979). In early works, feedback has been commonly differentiated from guidance and evaluation. According to Wiggins, feedback is a value-neutral statement and just gives information about past actions. This is similar to the notion of "knowledge of result" (KR) (Salmoni et al., 1984) which refers messages in the form of "your last answer was correct". Evaluation on the other hand judges task performance against a standard (Wiggins, 1997). This means that the feedback itself includes a performance rating that shows the recipient how well he or she performed the task. Regarding this, researchers have coined the term "knowledge of performance" (KP) (Strijbos et al., 2010; Ammons, 1956) which included the mentioned aspects and extend the concept of KR. Going one step further, guidance referred to a setting also suggests possible actions for improvement (Wiggins, 1997). However, most studies today consider both guidance and evaluation as integral parts of feedback (Mory, 2003). For the purpose of this study we follow Kluger and DeNisi' definition of feedback interventions as "actions taken by (an) external agent(s) to provide information regarding some aspects of one's task performance" (p. 255). Within this definition both the notion of KR as well as additional evaluative statements (KP) are included. In addition, the provision of information always includes some kind of communication.

Generally, one can differentiate feedback into task feedback and external feedback where the former is defined as response-produced, i.e. a direct result or natural consequence of task execution, while the latter is produced by another person or a computer and, thus, is added to the task environment (Goodman, 1998). Here, a common distinction is between positive and negative feedback interventions referring to whether the performance appraisal is positive or negative (Kluger and DeNisi, 1996; Belschak and Den Hartog, 2009). In addition to these classifications, researchers have provided a variety of other feedback classes. For instance, Dempsey and Wager (1988) distinguish between immediate feedback given as fast as (technically) possible and delayed feedback where the information is given after a certain delay interval.

2.2. Social presence and feedback

Regarding feedback, perceived usefulness, i.e. the degree to which a person believes that the feedback helps to increase his or her performance, is regarded as the most important factor (Brett and Atwater, 2001; Earley, 1986). If people feel that a feedback is useful, they are more likely to change their behavior accordingly and both learning and motivational effects are higher (Brett and Atwater, 2001). In this context, the level of possible social interaction between the receiver of the feedback and the supervisor is important (Van De Vliert et al., 2004; Brewer et al., 1996). Kluger and DeNisi (1996) proposed that cues of the feedback intervention highly influence the motivational effect of the feedback. These cues include social ones like facial expressions or voice. In line with this finding several authors have stressed the fact that feedback interventions cannot be regarded on their own but have to be considered in their individual context, i.e. the feedback environment (e.g. Steelman et al., 2004) which also includes the feedback channel. Thus, both the channel through which feedback is given as well as the way the communication is established is important for the impact it may have on motivation. Especially if the feedback itself contains personal information or critic, it is