THE IMPACT OF SOCIAL PRESENCE ON TEAM PERFORMANCE IN SOCIAL NETWORKING PLATFORMS

Paul Meyer, Institute of Information Systems, Information Engineering Unit, University of Berne, Switzerland, paul.meyer@iwi.unibe.ch
tel. +41-31-631-3170, fax. +41-31-631-3809,

Prof. Dr. Jens Dibbern, Institute of Information Systems, Information Engineering Unit, University of Berne, Switzerland, jens.dibbern@iwi.unibe.ch

Abstract

Next to the extensive use of social networking platforms (SNPs) for communication and relationship building with friends and relatives, SNPs are also increasingly used for enhancing collaboration at work. SNP usage at the workplace is fundamentally different and it is unclear how SNPs can improve collaboration as well as in what way their designs should be modified and adapted to collaboration settings. This research identifies specific SNP functions that enhance social presence as particularly beneficial for collaboration. Consequently, two designs of SNPs, one with high social presence and one with low social presence, are outlined and its impacts on collaboration are discussed. A framework is constructed that illustrates how social presence in SNPs can improve team performance through enhancing transactive memory within teams (intra-group collaboration) and relational capital across teams (inter-group collaboration). In addition, it is outlined how this framework could be evaluated in an experimental setting of teams working on a complex group task.

Keywords: social networking sites, social presence, team collaboration, transactive memory, relational capital
1 PROBLEM STATEMENT

Not only has the usage of social networking platforms (SNPs) exploded (e.g. Facebook has over 500 mil. active users (Facebook 2011)), but SNPs have also evolved from mere member directories to complex tools with a myriad of add-on functions (e.g. news feeds, chat, group discussions). Most of these functions are directed towards providing social cues about other users in the platform, i.e. they convey social presence.

In leisure time usage of SNPs like Facebook these functions satisfy the human need for self-representation, communication and curiosity (Gross et al. 2005). Particularly heavily used is the “What am I doing?” news feed, which keeps users aware about what has happened in others’ private lives or what is on those others’ minds. Awareness through status updates may induce a feeling of connectedness (Köbler et al. 2010), increases common ground and intensifies relationships between users (Zhao and Rosson 2009). Leisure time SNPs (like Facebook) can leverage social capital (Ellison et al. 2007) and news feed tools like Twitter can enhance knowledge sharing among participants (Krishnamurthy et al. 2008).

In view of the numerous benefits that SNPs can provide in leisure time use, the tools are increasingly adopted and used at the workplace. First and foremost the benefit of SNPs are seen in improving collaboration through enhanced interpersonal relationship building (DiMicco et al. 2009). Numerous companies have reacted to this trend by allowing e.g. Facebook at work, implementing their own SNPs (e.g. IBM (DiMicco et al. 2008)) or buying new SNP solutions from start-up companies like Yammer (Arrington 2010). Whereas many of the platforms that are specifically designed for work usage are restrained to mere member directories, Yammer includes most of Facebook’s functions including news feeds as well as various new collaboration functions. In light of these developments, Gartner research (2010) predicts that SNPs will replace email as the primary vehicle for interpersonal communication in companies as well as that news feed usage in companies will become the norm (Gartner 2010).

Up to date, only a few exploratory studies exist about news feeds in collaboration settings. The first results indicate that usage of social presence functions in work contexts is very different than in private contexts (DiMicco et al. 2009; Meyer and Dibbern 2010; Riemer and Richter 2010). In contrast to the predominantly intrinsically motivated leisure time user, the work user focuses on using feeds for maximizing her work performance (Meyer and Dibbern 2010). In line with that, feed messages exchanged at work are predominantly work-related (Meyer and Dibbern 2010; Riemer and Richter 2010). Although studies indicate that there is potential for building social capital for knowledge sharing (Meyer and Dibbern 2010; Zhao and Rosson 2009) and coordination (Meyer and Dibbern 2010) through increased social presence, there are no quantitative studies that show whether and how the social presence conveyed by SNPs can influence performance of teams at work.

While there is little knowledge about how social networks should be designed for enhancing collaboration and in particular whether social presence functions like news feeds can benefit such a design, the goal of this dissertation project is therefore to investigate possible designs of SNPs that foster collaboration. Within the scope of a wider project this paper analyzes the effects of SNPs with augmented social presence (e.g. with news feeds) and SNPs with reduced social presence in collaboration settings. This dissertation project will therefore attempt to answer the central research question:

How can social presence functions in social networking platforms improve performance of teams?
THEORETICAL FOUNDATIONS

For analyzing SNP usage for collaboration, this section will start with illustrating the concept of social presence and showing how SNPs support social presence. Afterwards, an overview will be given on how teams collaborate. This research will distinguish collaboration in task-knowledge coordination within teams as well as knowledge sharing across teams. Collaboration within teams (intra-group) will be explained through the lens of transactive memory. Collaboration across teams (inter-group) will be analyzed from a social capital perspective.

2.1 Social presence in SNPs

Although SNPs are an asynchronous and lean medium, they effectively provide the user with cues about social context of other users in the platform – or in other terms – they augment the perceived social presence of other users. Social presence is the “degree to which a medium allows an individual to establish a personal connection with others” (Short et al. 1976). Shen and Khalifa (2009) conceptualize social presence as a multidimensional construct subsuming awareness (e.g. cues about what other users are doing), cognitive presence (e.g. cues about what other users are thinking) and affective social presence (e.g. cues about what other users are feeling).

Social presence can be both, socially constructed as well as media-dependent (Yoo and Alavi 2001). From a media-dependent perspective it can be shown that software artifacts can highly influence social presence (Yoo and Alavi 2001). In a study about an online community Shen and Khalifa (2009) demonstrate how functions for social presence can positively influence perceived social presence of community members. Social presence functions in online communities can be grouped in features for self-representation, deep-profiling and virtual co-presence (Ma and Agarwal 2007; Shen and Khalifa 2009). As a special form of online communities, Table 1 applies these function categories to SNPs.

<table>
<thead>
<tr>
<th>Artifact Category</th>
<th>Definition</th>
<th>Social Presence Enhanced SNPs</th>
<th>Conventional SNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual co-presence</td>
<td>“Artifacts that induce a subjective feeling of being together with others in a virtual environment” (Ma and Agarwal 2007)</td>
<td>Signaling of online status, News feeds</td>
<td></td>
</tr>
<tr>
<td>Self-representation</td>
<td>“The means by which the focal person presents herself online”(Ma and Agarwal 2007)</td>
<td>Profile configurable by user, Friend list, Past news feeds</td>
<td>Profile only with name and photo, Friend list</td>
</tr>
<tr>
<td>Deep profiling</td>
<td>“The digital organization of social information with which community members can identify the focal person”(Ma and Agarwal 2007)</td>
<td>Member directories</td>
<td>Member directories</td>
</tr>
</tbody>
</table>

Table 1. Community artifacts supporting social presence (Ma and Agarwal 2007)

A very important social presence artifact is the news feed – a stream of short messages that keeps the user informed about her network friends’ activity in the SNP. User activity in all other artifacts (e.g. adding of friends, change of profile photo, uploading of files) are constantly tracked and displayed in the stream. A user has to register for the feeds of another user by adding that user to her friend list. Although the average user in Facebook for instance has 130 network friends which are often located all over the globe (Facebook 2011), feeds are an effective and efficient tool for tracking what these friends are doing, thinking or feeling (Köbler et al. 2010; Meyer and Dibbern 2010; Riemer and Richter 2010; Zhao and Rosson 2009). The more SNP users engage in reading and writing feeds, the more likely they are to report a feeling of connectedness with the users on their friends list (Köbler et al. 2010).

Given the many functions of SNPs that transmit social presence to the user, it is posited that simple online discussion group forums which lack these functions can convey less social presence than SNPs.
2.2 Intra-group task-knowledge coordination and transactive memory

Intra-group collaboration refers to the collaboration within a team (e.g. a project team or a department). Teams are characterized by a group of people with a common goal. Work is distributed in teams by dividing larger tasks into smaller subtasks and assigning these subtasks to team members. In this process members begin, based on their competencies, to take responsibility for and specialize in certain task types. The more tasks have to be divided and distributed the more each team member will be associated with a certain role in the team. Thus, every individual gradually learns about what competencies, knowledge and roles their team members have. Wegner (1987) conceptualized this meta-memory about who knows what in the group as transactive memory – a memory that grows with every task division “transaction”. Transactive memory does not adhere to a single person, but to the whole group. Individuals in a group may not only have complementary characteristics like complementary knowledge, but also complementary knowledge location information, i.e. an individual may not know who has the knowledge to carry out certain tasks, but she can ask another team member who will provide her with the information. Hence, an individual cannot be fully aware of the complementarities in the team, as each individual only sees the team from its own perspective. Transactive memory is therefore more than just the sum of the individual memories. In teams with well-developed transactive memory, it is clearly determined which individual takes the responsibility for which knowledge domain, such that the distribution of knowledge in a team is not left to chance (Wegner 1987). Teams with a well-developed transactive memory typically have high levels of coordination among team members, credibility of team members knowledge and expertise and specialization of team members in knowledge domains (Lewis 2003; Moreland and Argote 2003). Past research posits that transactive memory has greater impact on team performance than group cohesion, motivation and social identity (Liang et al. 1995; Moreland et al. 1996; Moreland and Myaskovsky 2000).

2.3 Inter-group knowledge sharing and relational capital

Inter-group knowledge sharing denotes the provision or receipt of general overviews, specific requirements, analytical techniques, progress reports and project results across teams (Cummings 2004). Research has emphasized the importance of knowledge sharing partners in other departments of functional units, because of the positive effect of knowledge exchange with such “ties” on individual performance (Hansen 2002; Szulanski 1996; Tsai 2001). The knowledge exchange is typically based on a strong mutual relationship, in which relationship partners renounce to the gains of free-riding due to the influence of social capital (Coleman 1994; Putnam 1995). Social capital can be defined as the \"sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit\" (Nahapiet and Ghoshal 1998, p. 243). Research in different disciplines highlights the importance of social capital for pro-social behavior. Researchers have therefore often used social capital as an explanatory lens for collective action, community involvement and other social achievements which rival concepts such as human or financial capital could not explain (Coleman 1994).

Social capital can be broken down into structural, cognitive and relational capital (Nahapiet and Ghoshal 1998). Structural capital represents the structural linkages or connections between individuals. Cognitive capital reflects the shared mental models, meanings or representations among relationship partners. Relational capital refers to the characteristics of the relationship itself, where relationship partners have a strong identification with each other, feel the obligation to participate in the relationship and are guided by implicit or explicit interaction norms (Nahapiet and Ghoshal 1998). This research will in particular investigate the role of relational capital in SNPs. Relational capital will be conceived as composed of source credibility and reciprocity. It has been shown, that each of these constructs can positively affect knowledge sharing in offline as well as online settings and within as well as across teams (Kankanahalli et al. 2005; Ko et al. 2005; McLaren-Wasko and Faraj 2005).
3 THEORETICAL FRAMEWORK

![Research model diagram]

**Figure 1. Research model**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Measure/Manipulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Presence</td>
<td>Degree to which a medium allows an individual to establish a personal connection with others (Short et al. 1976)</td>
<td>SNP with news feeds and configurable profiles vs. SNP without news feeds and static profiles</td>
</tr>
<tr>
<td>Coordination (Intra-group)</td>
<td>Ability of a team to coordinate tasks among its members (Lewis 2003; Moreland and Argote 2003)</td>
<td>Based on (Lewis 2003)</td>
</tr>
<tr>
<td>Credibility (Intra-group)</td>
<td>Beliefs about a team members expertise (Lewis 2003; Moreland and Argote 2003)</td>
<td>Based on (Lewis 2003)</td>
</tr>
<tr>
<td>Specialization (Intra-group)</td>
<td>Degree to which individual team members specialize in a knowledge domain (Lewis 2003; Moreland and Argote 2003)</td>
<td>Based on (Lewis 2003)</td>
</tr>
<tr>
<td>Reciprocity (Inter-group)</td>
<td>Feeling of mutual indebtedness that drives perpetual mutual support among inter-group ties (Shumaker and Brownell 1984)</td>
<td>Based on (McLure-Wasko and Faraj 2005)</td>
</tr>
<tr>
<td>Credibility (Inter-group)</td>
<td>Beliefs about an inter-group ties expertise (Lewis 2003; Moreland and Argote 2003)</td>
<td>Based on (Lewis 2003)</td>
</tr>
<tr>
<td>Team Performance</td>
<td>Group grade</td>
<td>Grades assigned by external lecturer</td>
</tr>
</tbody>
</table>

**Table 2. Definitions of model constructs**

3.1 Social presence and transactive memory

Coordination is the ability of a group to coordinate tasks among its members (Lewis 2003; Moreland and Argote 2003). For coordinating actions with others, actors need awareness of who knows what and who does what (Brandon and Hollingshead 2004). However, providing this awareness is especially challenging in online contexts, where team members are distributed and communication is constrained to the capabilities of the medium (Cramton 2001). Teams can partially adapt their coordination to the challenges of virtual settings, however coordination remains more difficult than in co-located settings allowing for face-to-face interaction (Orlikowski 2002).
Co-presence artefacts in SNPs can close the awareness gap. In particular the usage of Facebook feeds indicates how SNPs as a very lean medium can be adapted to convey awareness about the activities of others. In work contexts SNP users can use feed updates to keep their team members aware about what task they are currently working on, how much progress they have made or whether they have free resources to take on a new task.

For instance Meyer and Dibbern (2010) found that the major part of feed updates in a research team using Twitter was about the team member’s group-task related activities, availability for synchronous interaction like meetings or chat and updates on how to organize in the group. When asked about their intentions for writing feed updates, users responded among other things that they wanted to show that effort was made as well as to get feedback from other members on a completed task. In turn, they stated that their intentions for reading feed updates were mainly to be up-to-date about the developments in the team in a whole and in particular to be aware about the activity and availability of team members whose tasks were entangled with their own tasks.

In addition, this research theorizes that self-presentation artifacts can provide general awareness about who has the skills, knowledge and permission to carry out a certain task. Members of career networks (e.g. LinkedIn; Xing) for example provide co-users with elaborated descriptions about their expertise and functions in their organizations in the form of curriculum vitae, membership to special interest groups, etc.

**Hypothesis 1a:** Teams using a SNP with functions for social presence will have a higher degree of coordination than teams using a conventional SNP.

In this research credibility of team members is defined as the beliefs about a team members expertise (Lewis 2003; Moreland and Argote 2003). Beliefs about others are often negatively influenced by uncertainty or incomplete information. Misunderstandings in electronically-mediated teams seem to occur more often than in conventional teams (Cramton 2001). In online communities with low social presence, information about the other team members is scarce. Beliefs about other members are influenced by the representation of the social context: e.g. a member’s co-presence as well as self-representation in a system. The more information these representations can convey, the better an individual can judge whether another team member may hold credible knowledge. Awareness about who knows what thus also implies knowing who holds credible knowledge in a specific field.

**Hypothesis 1b:** Teams using a SNP with functions for social presence will have a higher level of credibility than teams using a conventional SNP.

Specialization is the degree to which individual group members specialize in a knowledge domain (Lewis 2003; Moreland and Argote 2003). Specialization of a team member in a specific skill or field of knowledge can take place through chance (e.g. a team member is assigned to a certain task, because she has free resources) or by virtue of the profile or role of the individual in the team (Wegner 1987). In this research it is assumed that specialization is a communicative process carried out by the whole team, i.e. the team members have to reach a consensus about who specialized in what functions or who takes over which tasks. This communicative process can be influenced by attention focusing. Attention focusing refers to the directing or manipulating of an individual’s information processing (Te’eni 2001). Within the team, it is thus assumed that team members can influence the way tasks are divided and assigned to specific team members by focusing the team’s attention on the relevant skill or knowledge set of a particular team member. The attention focusing can be carried out using social presence functions. For instance, team members might describe their expertise in their profiles for framing the team’s conception about their knowledge and skill sets.

**Hypothesis 1c:** Teams using a SNP with functions for social presence will have a higher degree of specialization than teams using a conventional SNP.
3.2 Social presence and relational capital

People that use electronic means for knowledge sharing generally form online communities around special topics of interest (Brown and Duguid 2001; Wenger 1998). Thus, when building relational capital they look for knowledge sharing partners that work on similar tasks, but also have complementary knowledge. The higher the shared understanding among knowledge sharing partners, the more knowledge is exchanged (Ko et al. 2005). Consequently, a prerequisite for establishing and maintaining a relationship with a knowledge sharing partner is an awareness of the expertise of others and a knowing who is doing what (Borgatti and Cross 2003). However, in electronically-mediated settings, awareness of others is normally not conveyed by the medium. In online communities, social presence functions can mitigate this problem by keeping users of SNPs aware of opportunities to assist each other and share information as well as establish and sustain ties between participants that were working on similar tasks (Meyer and Dibbern 2010).

Credibility of inter-group ties is defined in this research as beliefs about an inter-group ties expertise (Lewis 2003; Moreland and Argote 2003). It is hypothesized that the social context (e.g. network friends) can be a proxy for the credibility of a person. The more network friends a user has in common with another user, the higher might be the credibility of that user. Thus, social presence artifacts like friend lists might also increase the awareness about who knows whom and thus make a person with many network friends more valuable or trustable for others.

**Hypothesis 2a:** Teams using a SNP with functions for social presence will have a higher degree of credibility among inter-group ties than teams using a conventional SNP.

The norm of reciprocity is the idea of “tit for tat” and is characterized by a feeling of mutual indebtedness that drives perpetual mutual support among individuals (Shumaker and Brownell 1984). A strong norm of reciprocity facilitates knowledge sharing with (inter-group) ties and was shown to impact on helpfulness of knowledge exchanged in online communities (McLure-Wasko and Faraj 2005). The converse of adhering to the norm of reciprocity is free-riding. Free-riding is a salient problem in online communities (Adar and Huberman 2000; Butler 2001). Free-riding is especially common in anonymous online communities, where it is hard for users to establish a personal relationship with others (e.g. Adar and Huberman 2000). Social presence in the form of identity cues can increase knowledge contribution and satisfaction in online communities (e.g. Ma and Agarwal 2007). Moreover, norms can be enforced by acknowledgement of others (Hertel et al. 2003). We assume that social presence functions enhance social interactions leading to the enforcement of interpersonal norms.

**Hypothesis 2b:** Teams using a SNP with functions for social presence will have a higher degree of reciprocity among inter-group ties than teams using a conventional SNP.

3.3 Transactive memory, relational capital and performance

Past research has underpinned that the team performance is positively influenced by transactive memory (Kanawattanachai and Yoo 2007; Liang et al. 1995; Moreland et al. 1996; Moreland and Myaskovsky 2000) and in particular by coordination, credibility and specialization (Lewis 2004). Moreover, research about social capital has claimed its positive effect on individual and organizational performance (Cross and Cummings 2004; Hansen 1999; Szulanski 1996).

**Hypothesis 3:** A high degree of transactive memory will improve team performance.

**Hypothesis 4:** A high degree of relational capital will improve team performance.

4 RESEARCH DESIGN

This research will follow a two-group experimental design. The experiment will have all parts of a classical design (random assignment, posttest, control group, treatment group) except a pretest
Neuman 2003). The variable to be manipulated will be social presence. There will be two treatment groups:
- treatment group SNP* will be using a social presence-enhanced SNP as described in Table 1 (high social presence)
- treatment group SNP will be using a conventional SNP as described in Table 1 (low social presence)

Both platforms run on an internal server of the university. For enabling distributed teamwork all platforms will also integrate a team-document space, where documents can be edited and commented by team members.

4.1 Subjects

The subjects will be bachelor students attending a lecture on knowledge management. All students are in a particular age range (at most 20-25 years) and attend the lecture for the first time. The students will be assigned randomly to teams of three students. In each treatment group will be circa 20 teams or 60 students.

4.2 Procedure

Each team’s task is to solve a knowledge management teaching case with two assignments. In total they will have five weeks to complete the assignments. Assignment A will be to roughly specify a knowledge management system for the company described in the case. Next to the case description itself, three papers will be made available to every team in the system. Each paper elaborates on a theoretical lens that can be applied to assignment A. Teams are encouraged to exchange perspectives on the papers and their application to the case with other teams. After two weeks the lecturer will check with every team, whether the task was understood correctly and whether the best-suited theoretical lenses where chosen to answer the case. Assignment B will be to make recommendations for managing the usage of the previously specified knowledge management system. Like for assignment A, two theoretical papers will be provided for solving assignment B. The assignments will be answered in a separate document within the platform. At the end of the team work the students will have to fill out an online questionnaire. For completing the teaching case, each student group will receive either passed or failed. Group grades are assigned by an external lecturer, not identical to the author of this paper. For creating more competition among the groups, the best three groups are chosen to win a price.

4.3 Measurement and Analysis

All model constructs and controls will be measured using a questionnaire instrument. The effectiveness of the treatment will be controlled by measuring perceived social presence (cognitive social presence, affective social presence and awareness) (Shen and Khalifa 2009). The variables transactive memory and relational capital will be measured using scales from literature (Lewis 2003; McLure-Wasko and Faraj 2005). Team performance will be measured on the basis of the group grades. The questionnaire will also contain controls for demographic variables, prior experience in knowledge management, prior experience in group work and offline interaction. Data analysis will be conducted using partial least squares as a method for structural equation modeling (Chin 1998; Chin and Newsted 1999).
References


