USING TASK HISTORIES TO SUPPORT PERSON-TO-PERSON KNOWLEDGE EXCHANGE

Extracting and using Contextual Overlap and Levels of Expertise to Connect Knowledge Workers

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Abstract: Knowledge within organizations is increasingly distributed, which raises the challenge to connect the right individuals for knowledge exchange when needed. In this contribution we analyze this challenge in detail and propose a concept to connect the right individuals by relying on the task histories of the knowledge workers. We first investigate relevant theoretical models such as transactive memory theory, social capital theory for knowledge exchange and a model based on socio-motivational and problem solving theory to find relevant constructs. We then analyze the relevant state-of-the-art to find that all approaches have some limitations with respect to the theoretical models. Our proposed solution to the challenge builds on using task histories for the matching, and we show how it can be used to determine contextual overlap and level of expertise – the first one is an adequate indicator for willingness to interact while the second one is an indicator for ability to have a fruitful interaction. We then describe a case study in which we employed our concept in a three month timeframe with 93 individuals. A survey after the case study shows that our assumptions concerning the relevance and benefit of context overlap are substantiated.

1 INTRODUCTION

With the increase in relative importance of knowledge for the success of a company there also is a change in the role the single individual plays. Nowadays, workforce increasingly consists of *knowledge workers* and hence suitable support of their work becomes more important (Davenport, 2011). According to Drucker (1988) knowledge workers are specialists in their profession who govern their work on their own adapting their performance to feedback from their environment.

However, owing to the increasing diversification and radical advancements in knowledge, knowledge workers' specialization is naturally limited to certain areas – there are no universal geniuses like Leonard DaVinci anymore. Hence an organizations is often seen as "[...] a society of knowledge workers who are interconnected by a computerized infrastructure" (Holsapple, 1987) and a fundamental challenge for organizations lies in the systematic coordination of knowledge in this network (Quinn, 1992).

Leveraging the potential of this network of knowledge workers can be done in two stereotypic ways (Davenport, 2011): Either, the general goal is to give knowledge workers access to as many and as diverse sources of information, including fellow knowledge workers, and assume that they will handle and integrate the information autonomously. Or, alternatively, the information delivered to the knowledge worker is governed to a larger degree by structured processes and systems.

While structured delivery is well-suited for tasks that follow a routine, pursuing a free access model assumes that knowledge workers know what information they can use, how to manage it and how to find it. However, "[…] workers may know how to use technology tools, they may not be skilled at searching for, using, or sharing the knowledge." (Davenport, 2011) and hence if possible some structure should be imposed to guide the knowledge workers. This also applies when accessing

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knowledge by interacting with others that serve as source of help for a concrete challenge, i.e. in *person-to-person knowledge exchange*.

However, owing to specialization and the resulting diversification of knowledge in companies, finding suitable experts is a challenge, further fueled by geographic distance, time-zone differences and large pools of potential candidates typically found in larger organizations. Therefore, the limited human attention puts a natural limit to the ability to collaborate (Qureshi, 2006) while at the same time a knowledge worker's attention becomes a crucial resource that should be handled with care when searching for interaction partners (Ye, 2008).

Suitable solutions should therefore induce only small effort for the knowledge seeking individual and at the same time, in a global view, should limit the attention consumed for possible interaction partners. Both taken together can increase the likelihood of two knowledge workers exchanging information and hence contribute to fostering knowledge exchange in organizations.

The remainder of this contribution is structured as follows. In chapter 2 we discuss relevant theoretical models that describe person-to-person knowledge transfer processes. In chapter 3 we investigate approaches currently employed in corporate settings to facilitate person-to-person knowledge transfer. We especially relate them to the constructs of the theoretical models discussed in chapter 2 and indicate where they face challenges. Chapter 4 describes our concept for addressing the challenges found in chapter 3 that also complies with the constructs described in the theoretical models. A discussion about the conceptual design choices of the concept is dealt with in chapter 5. The subsequent chapter describes the evaluation of our concept in a case study, while chapter 7 concludes the contribution with a summary of results and an outlook to further research.

2 THEORETICAL BASIS FOR PERSON-TO-PERSON KNOWLEDGE EXCHANGE

When knowledge is exchanged from person to person a social process between the two actors starts. Therefore, to understand the antecedents and constituting steps in this social process, appropriate models from sociology and psychology that describe this process need to form the basis for any further design. For our discussion we will rely on one model from social psychology, another from sociology and a third one from cognitive psychology.

2.1 Transactive Memory Systems

According to the theory's originator *transactive memory systems* can be described as "[...] a set of individual memory systems in combination with the communication that takes place between individuals" (Wegner, 1985). Individuals use others as their "external storage" by remembering pointers to those that possess relevant knowledge, i.e. by establishing know-who, instead of remembering the procedural or factual knowledge itself. Transactive memory system (TMS) theory also encompasses processes that determine who is responsible to store new knowledge on behalf of the group and processes to later disseminate it within the group.

While the theory tries to explain knowledge transfer processes between individuals, its unit of analysis are groups that consist of individuals acquainted to each other. Especially the necessity of individuals to assume responsibility for the group necessitates a binding element that socially motivates the individual to contribute. In the original TMS theory this binding element is personal acquaintance, i.e. an established social fabric that manifests in strong relationships between a group's individuals. In non-co-located, dispersed organizations, close relationships across team or department are very rare, which is why personal acquaintance may not act as a binding element.

Appropriate approaches for supporting person-to-person knowledge exchange need to have a *suitable surrogate for those strong interpersonal relationships* that still allows to establish a form of TMS.

2.2 Social Capital Theory

Social capital (see for example (Lin, 2001) for an overview) relates to an individual's previously established connections to (known) others, their strength and reliability and the individual's ability to take benefit out of this network. The theory has been adapted to explain knowledge exchange processes (Nahapiet, 1998) which subsequently has been applied to empirically study this process in electronic networks of practice (Wasko, 2005; Law, 2008). Here, the original concept of social capital had to be relaxed. While in its original form for social capital to build up, it is necessary to know the other individual so that later one's own effort for an individual may be reciprocated by this individual,

electronic networks of practice are effectively anonymous and individuals do not know each other. Therefore, in electronic networks of practice other constructs surrogate for this. Statistical evidence could be found among others for the following constructs (Wasko, 2005; Law, 2008): 1) The more communication threads an individual has with others the more likely he is to contribute, which is subsumed under the concept *network centrality* 2) During interactions the more one can rely on a *shared language* the higher the willingness to contribute 3) The more an individual can identify with the network or more precisely *identify with the interaction partners* in this network the more likely he will contribute.

Approaches that foster knowledge exchange have to adopt these three aspects.

2.3 Model based on Problem Solving and Cognitive Motivation Theory

Olivera et al. (2008) developed a model to describe how and why people contribute in distributed organizations through IT-mediated means. They argue that to understand the contribution behavior, two strands of theories have to be combined: theories of *problem solving* (Newell, 1972) and *cognitive motivation* theories (Kanfer, 1990). The model distinguishes three subsequent mediating mechanisms. The first, *awareness*, relates to a person recognizing an opportunity to contribute. In the second, *searching and matching*, the individual determines whether and how his knowledge is sufficient to help another individual. The third mechanism, *formulation and delivery,* deals with formulating and communicating the individual's knowledge to help the other. Each of these mechanisms inflicts costs for the individual who can possibly help. The necessary overcompensation of these costs is described by constructs from cognitive motivation theory. The relevant ones are: S*elf-enhancement,* that is fueled by e.g. liking to express one's expertise (Wasko, 2000) and living up to one's self-identity (Constant, 1996); *Exchange motivations* which is the equivalent to expectation of (individual or generalized) reciprocity as discussed in relation to social capital theory; *Instrumental motivation* which refers to rewards such as recognition.

Appropriate approaches to support person-to-person knowledge exchange should hence try to *support the aforementioned three mechanisms and build upon the three means of motivation*.

3 STATE-OF-THE-ART IN PERSON-TO-PERSON KNOWLEDGE EXCHANGE

In light of the theoretical models describing the antecedents and constituting steps of person-to-person knowledge exchange, in this chapter we want to investigate the properties of contemporary approaches supporting person-to-person knowledge exchange.

There are diverse approaches and tools that quite directly or more indirectly fall under the umbrella term Knowledge Management. Binney has arranged them according to a spectrum from transactional systems to innovation-supporting systems (Binney, 2001) while others, e.g. (Böhmann, 2002) suggested to use the SECI model (Nonaka, 1994) to impose structure on the set of approaches and tools. Using the respective structure's dimensions and contrasting those with the situation we look at – person-to-person knowledge transfer, for complex, highly-adaptable, knowledge-intensive tasks in a distributed setting – we find that three approaches fall into a comparable category with respect to our research: Yellow Page Systems, Expert Recommender Systems, and Knowledge Networks.

3.1 Yellow Pages Systems

A *yellow page system* (YPS) contains lists of the individuals in an organization along with their competencies, knowledge and skills in those areas that are relevant to the organization. A knowledge seeker may search for required knowledge and will be presented with those individuals that match the request. If the system contains levels of proficiency, the result may also be ranked. The profiles contained in the system are often manually maintained, while some data may be extracted from directory services (Krcmar, 2010) or Human Capital Management systems (Gronau, 2004). Also, keeping those profiles up-to-date is normally a manual process.

TMS' backbone are interpersonal relationships that in distributed settings need to be surrogated by other means. The query mechanism in YPS typically only operates on the level of expertise to find relevant matches, neglecting the previous relationship between actors and hence there is no obvious surrogate for interpersonal relationships. On the other hand, the application of social capital theory on knowledge exchange suggests that many communication threads increase likelihood to contribute. YPS have no means to increase this

number nor is it typically tracked. Also, shared language, another positive influence for knowledge contribution according to social capital theory, is not part of the matching of knowledge requester and potential helper. Identification with potential others is not part of the matching, but result lists of queries may contain affiliation and other socio-metric information that may serve this purpose. In terms of socio-cognitive and problem solving theory, YPS have no means for creating awareness on the side of the potential helper for requests of a knowledge seeker – it follows a pull interaction schema. However, match of request and expertise tends to be high, if the profiles are up-to-date. YPS include no measures that facilitate the formulation of responses, though. Also, the motivation factors such as self-identity are not specifically supported by the matching delivered by YPS. Reciprocity on the other hand is often a motivator in YPS settings as the individuals are acquainted after the interaction.

Many of the aspects that theory predicts to be important for supporting person-to-person knowledge exchange are not present in YPS. Along with the relatively high effort for keeping YPS up-to-date, they seem to leave room for improvement.

3.2 Expert Recommender Systems

Expert recommender systems (ERS) can be seen as the next evolution step of YPS. Tasks such as profile generation and mediation of communication are automated. ERS help in the following way: When someone seeks an expert, he wants to know if there is an expert that can answer the user's questions, but also what level of expertise the user has and how it compares to others, if there are others that also fulfill the criteria and how the person can be reached (Seid, 2003). The automation of expert determination is achieved by deriving levels of expertise in relation to queried knowledge items from sources that may be scanned for expertise evidence. Those sources can be communication-based, such as e-mail messages, document-based, such as websites or electronic documents stored on intranets or interaction-based where software usage is utilized as source of expertise evidence.

Many of the aspects that theory predicts to be important are however not present in ERS. Considering suitable surrogates for TMS' interpersonal relationships, ERS do usually not include means for this. The query mechanism in ERS typically only operates on the level of expertise to find relevant matches, neglecting the previous relationship between actors and hence there is no obvious surrogate for interpersonal relationships. Only few attempts can be found to somewhat remedy this downside e.g. (Serdyukov, 2009). On the other hand, the application of social capital theory on knowledge exchange suggests that many communication threads increase the likelihood to contribute. ERS have no means to increase this number nor is it typically tracked. Also shared language, another positive influence for knowledge contribution according to social capital theory, is typically not part of the matching of knowledge requester and potential helper, again with only few exceptions. As was true for YPS, identification with others is not part of the matching, but results of queries may contain affiliation and other socio-metric information that may serve this purpose. In terms of socio-cognitive and problem solving theory, ERS have no means for creating awareness on the side of the potential helper for requests of a knowledge seeker – it also follows a pull interaction schema. However, match of request and expertise tends to be high, if the expertise extraction mechanism fits the users' expectations. ERS include no measures that facilitate the formulation of responses, though. Also, the motivation factors such as self-identity are not specifically supported by the matching delivered by ERS. Reciprocity on the other hand is often a motivator in ERS settings as the individuals are acquainted after the interaction.

Many of the aspects that theory predicts to be important for supporting person-to-person knowledge exchange are also not present in ERS, while due to its decreased effort they appear more promising than YPS.

3.3 Electronic Networks of Practice

Electronic networks of practice (ENP) are a geographically distributed group of individuals that are engaged in a shared practice. However in contrast to other forms of knowledge networks, the group of individuals can be large, virtually limitless in size, the individuals are loosely knit, but may not know each other at all nor necessarily do they expect to ever meet face-to-face (Brown, 2001; Wasko, 2005). By relying on IT-mediated communication, ENP allow quick and effortless access to a broad source of expertise through a wide variety of knowledge carriers (Teigland, 2003).

In relation to TMS' backbone – interpersonal relationships – the interactions in an ENP support the creation of weak ties. Those ties are far less reliable and pronounced than those between acquainted individuals; however, they are a suitable

surrogate for distributed setting where people normally never meet face to face. In contrast to the two previous approaches, ENP do not offer explicit mechanisms to find suitable interaction partners. It is rather up to the individual to find relevant individuals or, more often, relevant outlets within the ENP, such as a forum concerned with his knowledge request. Social capital theory's indication that many communication threads are beneficial can be supported in ENP, as many of them feature mechanisms to be informed by updates in parts of the ENP, e.g. forums, which are relevant to the individual. This measure can also increase awareness of knowledge requests on the knowledge bearer's side. In ENP, shared language establishes over time and with more and more interactions. The same holds for the ability to identify with others that also increases over time while being a member of the ENP. However, the challenge of identifying with individuals without previous interaction history remains, especially since socio-metric information is often not available in ENP. Another challenge lies in matching available and requested expertise: If the requester does not know where or who to ask he is hindered and if the question is addressed to the wrong individuals, answers are unlikely and effort is wasted on the side of all affected individuals. Requests for knowledge and responses are also not associated with the work context of neither requesting nor replying individual and hence to some degree decontextualized, which may affect ease of request and response formulation. Reciprocity is often present in ENP - in its generalized form, though. Also self-identity, another motivation factor, may be reinforced by the ENP itself, as other like-minded individuals are likely to find one's interactions in the ENP.

While many of the social factors of the theoretical models can be matched onto features of ENP, there remain challenges such as facilitating the searching, finding and matching of interaction partners or limiting consumption of awareness.

4 TASK HISTORY AS BINDING ELEMENT

The theoretical models discussed in chapter 2 described the mechanisms that allow knowledge transfer to happen mainly from the point of view of the contributor, i.e. the knowledge bearer helping the knowledge seeker. The knowledge request was treated as a given prerequisite. However *understanding the knowledge seeker's intention* is relevant as well. Seid (2003) analyzed which circumstances lead someone to consult an expert. First, someone might need access to information that is not documented. Second, someone might not be able to exactly specify what he needs to know, rather the dialogue with an expert acts as the process to facilitate information acquisition. Third, someone might want to utilize an expert to be more efficient. Someone with advanced expertise can handle tasks faster than novices can: Therefore, relying on the expert improves the initial individual's efficiency. Fourth, often users do not want a context-free, general piece of information but rather need a contextualized, situated interpretation of more general knowledge that the expert might poses. Fifth, someone might simply prefer relying on social interaction instead of using anonymous media like documents. Therefore, *sufficient levels of expertise* on the side of the potential helper is important for the knowledge seeker and hence for the knowledge transfer to start and to be successful.

On the other hand, next to being able to help, the helper needs to be *willing to help* and the requester needs to be *willing to ask* this individual for help. TMS address this aspect by stressing the importance of established interpersonal relationships. In social capital theory identification with others and use of shared language expresses this aspect. The cognitive psychology model expresses this aspect in the constructs self-identity and recognition. In a distributed setting interaction partners are unacquainted and do not have a previous history of interactions. Nevertheless, an appropriate mechanism to determine suitable interaction partners that reflects the constructs of those theoretical models is necessary.

As both, ability and willingness to help, are relevant for knowledge exchange to happen on the knowledge bearer side, and both willingness to accept help and ability to understand the offered help are necessary on the requester side, a suitable glue needs to be found. We suggest using the *histories of tasks performed* by and knowledge bearers as this binding element.

History of tasks refers to the tasks a knowledge worker is currently engaged in or has been performing in the recent past. Nowadays, large portions of a company's operations are supported by information systems and a large extend of knowledge work is as well. In some organizations that are customer service-focused up to 75 % of a knowledge worker's tasks are IT-supported (Makolm, 2007). Therefore the current and previous task context of a knowledge worker is often

adequately reflected in IT system use that can be extracted from the logs that those systems create for administrative purpose.

The history of tasks can serve both purposes that we elicited to be important: ability and willingness to engage in knowledge transfer for both, knowledge seeker and knowledge bearer. The more often a knowledge worker has performed a specific task, the higher the chance that he has proficiency in performing the task. Therefore the number of times a knowledge worker performs a task, can be used to determine his proficiency related to this task – an assumption that is often taken as valid (Seid, 2003). On the other hand, the history of tasks, especially its very recent or current part, gives indication of the knowledge worker's current work context. If the work context of the knowledge seeker and the one of the knowledge bearer overlap, they are more likely to engage and benefit from interaction. This assumption is backed by fundamental results from socio-psychology, with one of its clearest results being, that one likes others that are similar to oneself (Zimbardo, 1983) and that we identify with those that are similar to us (Tajfel, 1986; Turner, 1987). Other psychological results further support this aspect. Similar attitudes were shown to predict interpersonal attraction (Byrne, 1971) and joint interest and mutual trust also correlate (Ziegler, 2007).

While not nearly as expressed, this contextual overlap is a surrogate for the interpersonal relationships that TMS has as its backbone, for a setting in which personal acquaintance is scarce or non-existent. Also the relevant constructs of social capital theory can be supported. Being in similar work context increases the ability to rely on the same task-specific terminology and hence use of shared language is possible, as is the identification with the other as reasoned above. Context overlap also translates nicely to the constructs used in the model relying on problem solving and socio-cognitive theory. When work contexts overlap, the knowledge bearer can more easily determine how his knowledge matches with the request and the likelihood that it does is higher, as the request relates to what he currently does or has done just recently. Also, being in similar work contexts facilitates formulation of responses as it is possible to rely on shared terminology. The motivational aspects of the model map to context overlap as well. Being recognized as expert is a strong motivator that is even higher when the recognition comes from individuals that are similar to one. This is in line with social comparison theory (Festinger, 1954) that states that we want to be better than our reference group of similar peers. Similarly, self-identity is more pronounced when one can help in areas that are relevant to oneself, which applies for tasks that one is currently doing or has done just recently.

5 EXPERTISE VS. CONTEXTUAL OVERLAP

In the previous chapter we have argued that task history may serve the purpose of identifying levels of expertise and at the same time may act as surrogate for determining willingness to interact due to similarity in task context and hence situation and previous history. Finding suitable interaction partners essentially is a filtering task, as otherwise requests for help could just be broadcasted to all individuals in an organization. When filtering, the question shifts to determining which dimensions to filter on and which filter values to set for them. As we argued, level of expertise as well as contextual overlap are relevant and form the two dimensions we may use for filtering. Figure 1 illustrates the four different ways to configure the filtering values.

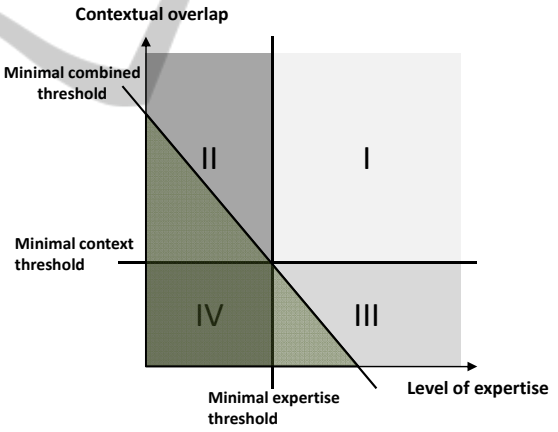

Figure 1: Filtering thresholds operating on contextual overlap and level of expertise.

One way to filter out non-suitable individuals lies in choosing only those that exhibit a minimum level of expertness. This minimum value can be absolute, e.g. only individuals who have performed a task more than ten times, or it can be relative to the knowledge seeker, e.g. only individuals that have performed a task at least five times more than the knowledge seeker. If an individual is below this threshold (rectangle II and IV), he is filtered out, while the ones that are above are eligible but we may choose to rank them according to the second dimension and only consider a fixed number of them

that have most contextual overlap.

Another way to filter lies in defining a minimum value of contextual overlap to find those individuals that are possibly willing to interact with the knowledge seeker and that also can do so with only small effort because their mental models are alike. Again, the ones that are below the threshold (rectangle III and IV) are filtered out, while the remaining ones are all eligible, but we may choose to rank them according to the first dimension and only consider a fixed number of them that have highest levels of expertise. However, this may induce the problem that also arises in expert recommendation systems. Experts with much higher levels of expertise face a mental challenge when interacting with (relatively seen) laypersons. Their mental models about the relevant topics are "compressed", single facts are aggregated into larger chunks and abstractions are used to condense the relevant knowledge. To help, experts have to unpack these chunks, which is a high mental effort as they must undo their previous learning to understand the requester's problem context (Bromme, 2004).

A third way of filtering combines the thresholds defined on the level of expertise dimension and on the contextual overlap dimension. In this case, those individuals that have insufficient expertise (rectangle III and IV) and those that do not share sufficient context (additionally rectangle II) are filtered out, while the ones in rectangle I are suitable candidates.

A final way of filtering lies in defining a combined threshold that takes into account level of expertise and contextual overlap at the same time. Individuals who are very similar to the knowledge seeker but have only low levels of expertise may be suitable, while also individuals that do not share much commonalities with the knowledge seeker but are very knowledgeable may be suitable candidates as well. Therefore, in both cases one dimension might compensate the lack in the other. However, individuals that neither have a sufficient contextual overlap nor sufficient levels of expertise (darker area in the lower left part) are filtered out.

6 APPLICATION OF CONCEPT

To evaluate the concept of using histories of tasks to foster knowledge exchange between knowledge workers, we implemented a prototype that utilized the concept and applied it in a case study. Within the timeframe of three month we sought to foster knowledge exchange among the knowledge workers that were executing knowledge-intensive tasks in an SAP system. More precisely, the 93 case study participants were tasked to design a company's organizational setup in the SAP system – a complex system configuration task with multiple options and the challenge to master the system and its interactions in addition. We offered an interface in the operational system that combined features of expert recommendation systems and knowledge networks where the overlap in task context served as the glue (see Figure 2). The similarity of tasks was determined in analogy to the discussion in chapter 4: We analyzed the history of transactions, the SAP concept of tasks, to find those individuals that have common task contexts and find those that are, relatively seen, experts whenever an individual seeks support from within a certain task context.

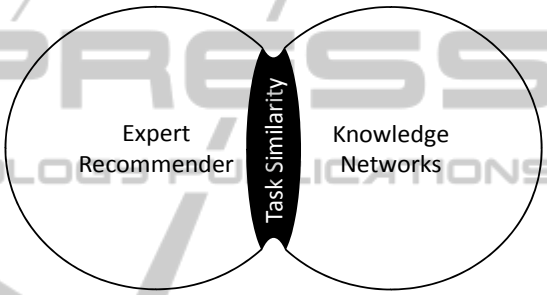

Figure 2: Using task similarity to combine Expert Recommendation and Knowledge networks.

The prototype worked as follows. Whenever an individual wanted to interact with another to find help for solving a challenging problem, he could, directly in the SAP system, call up a program. There, the individual would formulate a question and send it out without specifying recipients. In the background, the program then distributes the request to the "right" individuals, based on the current context of the requester and the features, i.e. context and level of expertise, of the receivers. Only those that are suitable (see previous chapter for filtering options) were informed that their expertise was being asked for along with the message itself. The response of the knowledge bearers was also automatically distributed, so that the individual could focus on response formulation knowing that the requester was in a similar context.

We implemented additional functionality into the prototype, e.g. a forum to collect past interactions with task-oriented structuring, facilitated message creation, notification systems for possibly relevant messages and other features. In this contribution we only focus on and describe those that deal with the core concept of using histories of tasks for determining levels of expertise, contextual overlap

and their perceived value for the participants.

7 EVALUATION

After the three month case study, we surveyed the participants to find out about their perceived value of the concept we applied. Among other items that related to the additional features of the prototype, we included a number of items that asked for the participants' perception of contextual overlap and level of expertise. We received 18 fully filled surveys. This corresponds to a return rate of roughly 20 % - a normal value for online surveys.

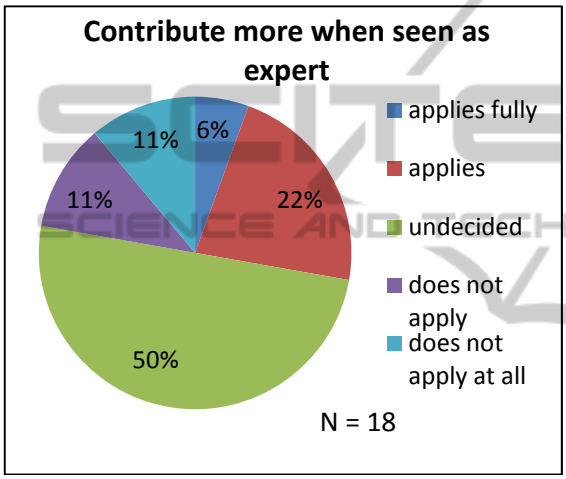

Figure 3: Influence of being seen as expert on contribution behavior.

The socio-cognitive model indicated that reputation was a strong motivator to respond to requests for help. We utilized the concept of level of expertise as one filtering dimension. Also the prototype indicated to the receiver of requests that he was determined as expert and therefore received the request. Consequently, we wanted to find out how being seen as expert influences the individual's motivation. The results as shown in Figure 3 indicate, that for about 28 % of the respondents being seen as expert increases the likeliness to contribute, while for 22 % it does not and 50 % were undecided on the effect. Apparently, gain in reputation does not motivate all participants likewise.

We also wanted to see what the influence of the second dimension we used, contextual overlap of requester and responder, would be on the contribution behavior. Figure 4 illustrates that roughly four out of ten survey participants felt that they would respond more often if the work contexts match. Interestingly, this is a higher value than for being seen as expert and suggests that contextual overlap is more important for the potential responder than the level of expertise.

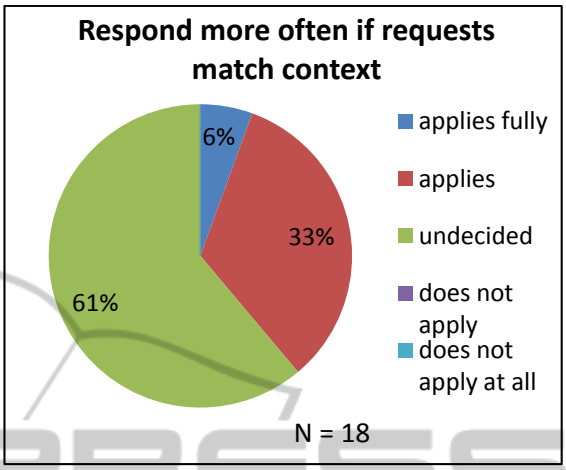

Figure 4: Influence of context match on contribution behavior.

In our argumentation in chapter four we further argued, that a shared context not only increases the willingness of individuals to respond to requests but also that the shared context facilitates the interaction. We especially argued that the shared context allows relying on shared terminology that facilitates the formulation of messages.

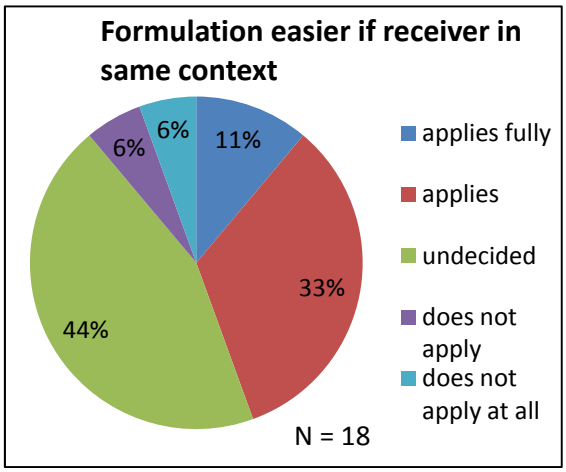

Figure 5: Facilitation effect of similar context on request formulation.

In our survey we also asked whether it is easier for the knowledge seeker to formulate requests for help, when knowing that the potential receivers will be in a similar context. As illustrated in Figure 5, 11 % of the survey respondents strongly agreed that it is easier to formulate requests in this case and another

33 % agreed, while only 6 % did not or strongly not think so, respectively. This indicates that for a large portion of participants, knowing that the receiver is in a similar work context helps them in communicating their request and starting an interaction with them.

Similarly, we wanted to determine the possible facilitation effect on the responders' side. Figure 6 shows whether the survey participants thought that knowing about the similar context of the initial requester would help them in formulating answers to the knowledge request. While half of the responses indicated that the participants were undecided whether or not this knowledge would help them in formulating answers, 28 % agreed it would and 17 % strongly agreed. With nearly half of the respondents indicating the value of knowing the contextual circumstances of the receiver as being high, this appears to be a relevant feature.

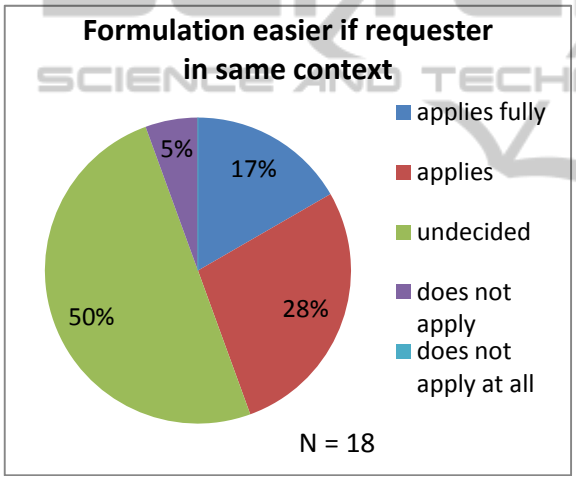

Figure 6: Facilitation effect of similar context on answer formulation.

Independent of the facilitation effect and the increased willingness to interact, we also asked the survey participants whether they perceived the overlap of work context with their interaction partners as generally valuable. Figure 7 shows that while 50 % were undecided whether or not they perceived this match to be important, 33 % did and 11 % did so strongly yet only 6 % indicated that they did not. The inclusion of context overlap in the mediation mechanism therefore seems to be a suitable design choice.

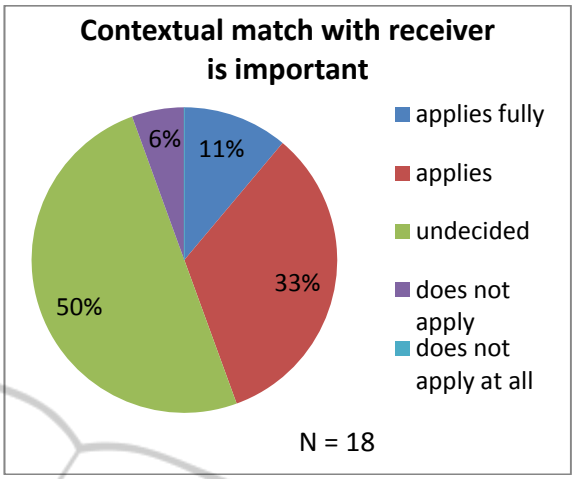

Figure 7: General importance of contextual match.

8 CONCLUSIONS

In this contribution we addressed the challenge of connecting knowledge workers to foster knowledge exchange. Starting with three theoretical models that describe the antecedents and process of knowledge exchange we determine those constructs that apply for our setting: distributed, non-acquainted knowledge workers that interact across temporal, physical and organizational borders. Subsequently, we looked at state-of-the-art approaches that support this setting and contrasted those approaches with the constructs of the theoretical models to find that the contemporary approaches do not support all constructs. We hence suggest using a different concept that relies on the history of tasks at its core. Using this concept we describe how it can be used to determine willingness and ability to support fellow knowledge worker. Then, we described how we implemented the concept in a case study with 93 individuals and describe the results we could obtain by surveying the individuals after the three month case study. We found that contextual match is at least as important for the participants as the level of expertise when interacting with other knowledge workers. Also the survey results support our expectation that formulation of messages among knowledge workers is facilitated by contextual overlap. Additionally, the participants found it important to have a work context match with their unknown interaction partners and indicated that knowing that there is a contextual overlap motivates them to contribute more. Our results appear promising, but may be substantiated by replicating the case study setting with more individuals and by

using different host systems for embedding new prototypes and organizational settings to better understand its limitations and benefits.

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