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Gerlinde Koeglreiter
School of Information Systems Deakin University Melbourne, Australia, gerlinde.koeglreiter@yahoo.com.au

Luba Torlina
School of Information Systems Deakin University Melbourne, Australia, luba.torlina@deakin.edu.au

Ross Smith
School of Business Information Technology RMIT University Melbourne, Australia, ross.smith@rmit.edu.au

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Gerlinde Koeglreiter
Luba Torlina
School of Information Systems
Deakin University
Melbourne, Australia
Email: gkoe@deakin.edu.au, luba.torlina@deakin.edu.au

Ross Smith
School of Business Information Technology
RMIT University
Melbourne, Australia
Email: ross.smith@rmit.edu.au

Abstract

This paper reports a case study of a Community of Practice (CoP) of tertiary educators in information technology (IT), who seek ways to obtain adequate IT support to match their particular work environment. A facilitated workshop sought to bring members of the CoP and a key representative of the central IT department together with the aim of creating common ground for improved communication and collaboration. Subsequent individual interviews explored perceptions, boundaries and potential boundary spanning opportunities. While literature argues that shared domain knowledge and associated language should alleviate boundary issues, we found that in some circumstances it might intensify them.

Keywords

Communities of Practice, Intra-organisational Boundaries, Knowledge Management, Technology Support, Relationship Management

INTRODUCTION

Based on the premise that valuable organisational knowledge is created in groups, in this paper we study organisational knowledge work through the lens of organisational boundaries and knowledge interfaces between informal Communities of Practice (CoPs) and formally structured organisational units.

Establishing knowledge interfaces between groups of knowledge workers is important for an organisation. These interfaces determine how information flows and how the activities of different organisational entities are linked in organisational action, who can access knowledge, and how it is accessed, shared and acted upon. Organisational knowledge can, therefore, be viewed in terms of clusters of knowledge workers with their collective knowledge and group boundaries. These clusters communicate with other clusters of knowledge workers who hold collective knowledge through boundary interfaces, boundary objects and boundary actors.

In order to be effective, such interfaces should be developed with a focus on the most recent trends in knowledge management (KM). According to Tsui (2005) there are three main trends in KM practice. First, we should expect an increasing alignment of KM technologies/solutions with process management tools. Second, there is the emergence of personal networks in a society. These personal networks are manifest as personal knowledge grids and social networks, which have already become effective tools for identifying the concentration and flow of knowledge. Third, KM becomes increasingly 'on-demand', which requires "the rapid deployment of relevant tools and systems for ad hoc, intensive and inter-organisational collaborations" (Tsui 2005, p. 4). While the first trend deals with streamlined access to relevant information, re-useable assets and institutionalised practices, the second and the third trends require more flexible and informal approaches.

In this paper we report work towards understanding and seeking resolution to the problems that involve 'boundary spanning' or creating communication interfaces between the organisational entities. In particular, we focus on issues concerning the comparative effectiveness of institutionalised and informal practices aimed at spanning organisational boundaries, with a view to improving knowledge work in an organisation.

We discuss an intervention, undertaken within a broader program of an action research (AR) study, which has attempted to build a dialogue between two parties (an informal CoP and a centralised organisational provider of information technology (IT) services) by bringing them together to discuss the issues standing between them.

The following research questions are addressed in this paper:

- In what way do formal organisational boundaries impact the knowledge work of an informal CoP?

- What are the underlying issues that need to be addressed to improve communication and collaboration between the CoP and the wider organisation?

The paper is structured as follows: The next section explores the concepts of boundaries and boundary spanning in organisations, as addressed in the literature. The "Research Approach" then outlines methodologies applied for data collection and analysis. The "Institutional Context" section provides an overview of the organisational setting and discusses the issues of different thought worlds. The "Results" section summarises the three-stage data collection process employed. In the "Discussion" section we relate findings to the initial problem situation; as well as outlining essential learning from the problem diagnosis and intervention. Finally, in the "Conclusion" section we summarise and provide insights into how the identified issues might be tackled.

BOUNDARIES AND BOUNDARY SPANNING IN ORGANISATIONS

In this section we discuss both organisational and group boundary issues in the context of CoPs, as explored in the present literature, and as required as a basis for interpreting the outcomes of an intervention to address the problem situation.

Organisational Boundaries

Wenger (1998, p. 103) identifies a number of aspects of organisational boundaries, including CoP identification through creating group boundaries, the need for spanning those boundaries, and the notion of creating CoP history through articulation with the rest of the world. Wenger sees this articulation taking place through *boundary spanning activities*, involving *boundary objects* and *boundary roles*.

Boundary spanning activities can be thought of in terms of facilitating communication and information flows. Boundary spanning may occur on a formal level involving individuals on higher hierarchical levels (Aldrich and Herker 1977) or on an informal level (Manev and Stevenson 2001; Tushman and Scanlan 1981) through establishing social networks (Cross and Parker 2004, p. 76).

Boundary objects are objects that are shared and shareable across different problem solving contexts. Categories of boundary objects include repositories, standardised forms and methods, objects or models (simple or complex representations), and maps of boundaries that represent the dependencies and boundaries that exist between different groups (Carlile 2002).

Boundary spanning roles are the link between the environment and the organisation. Individuals in boundary spanning roles must be strongly linked internally and externally to gather and disseminate information. Tushman and Scanlan (1981) identify boundary spanning individuals as people, who are frequently consulted on work related matters as internal communication stars. They further name communication stars that have substantial communication with areas outside their unit as gatekeepers (Tushman and Scanlan 1981).

We view a CoP as a vehicle for bottom-up knowledge management, in particular because of its capacity to support the effective communication of knowledge that is otherwise difficult to externalise (Iandoli and Zollo 2007, p. 109). For work to make sense a CoP has to connect to others in an organisation and to their environment. The facilitation of such boundary spanning efforts can involve both formal and informal activities.

Formally established organisational units normally engage in formal collaboration with other organisations. The investigated CoP while operating essentially at an informal level, is also involved, as a part of an organisational unit, in formal relationships with a university's IT department (ITD).

The formal mechanism for interaction with ITD is the IT helpdesk, where call centre staff follow standardised procedures for solving known problems or recording a problem description for follow-up by. Middleton and Marcella (1997) argue, however, that standardisation of IT helpdesk work in academic institutions is almost impossible, because of the non-standard tasks users are involved in. While the IT helpdesk proves to be very effective for formally established organisational knowledge processes, general user support, and for solving recurring technical problems, complex requirements and problems such as those faced by the CoP require more direct communication with experts.

The interaction of a CoP with externals seeks to obtain advice and form opinions on specific problems via an informal advice network and process. This might go as far as extending membership of the CoP to those external people (Koeglreiter et al. 2006). Previous research has shown that the CoP under study advocates strongly informality within the group (Koeglreiter et al. 2006). In the reported study, we have found that the CoP also seeks informal links to entities outside the CoP i.e. other departments such as ITD for ad hoc on-demand access to IT experts to support innovative teaching projects.

It has been recognised that informal interaction and social networks play an important role in organisational knowledge work. First, social networks compensate for the information which is not communicated through formal channels (Kautz 2005). Second, meaningful contribution energises individuals particularly in expert-to-expert networks (Cross et al. 2003). Informal contexts are more likely to feature the values which must be nurtured to build an energy-friendly culture: playfulness, trust and realistic optimism (Cross et al. 2006). Informality is especially important at the early stages of innovation, when setting formal agendas has a less inspiring effect (Cross et al. 2006). Third, when networks are aligned rigidly with hierarchy levels and organisational structures they allow considerably less exposure to new concepts and information, and hence restrict innovation limiting relationships to formal reporting. While the notion of boundary spanning has been based on the formal level (Brown 1966), studies have revealed that some members of social networks also act in boundary spanning roles on an informal level (Cross and Parker 2004, p. 76).

We consider formal structures highly efficient for standard procedures (i.e. reporting a computer problem to the IT helpdesk), but argue that where there exist no formal procedures for exceptional cases, informal links might effectively tackle these issues. There is also a need for alternative communication channels which allow more direct contact with the experts and hence compensate for shortcomings in the formal communication channels.

Group Boundaries

Social boundaries are created by individuals and groups through social identification. Social identification encompasses the perceived membership of individuals in distinct self-inclusive real or imagined social groups, named the 'ingroups', which are distinct from other groups, named 'outgroups' (Gefen and Ridings 2003). Social identification theory involves two processes: categorisation, defining the ingroup-outgroup boundaries; and self-enhancement, where the group member assesses the members of the ingroup with regard to attitudes and actions more favourably than other groups (Gefen and Ridings 2003). Ingroup relationships in CoPs are characterised by collective mind, a high level of trust, social ties, informality, shared expertise and innovation leadership (Koeglreiter et al. 2008).

For CoP members it is important to develop trust, and to feel safe, particularly when exposing vulnerability (Cross and Parker 2004), for example in situations of sharing experiences of failure that might be considered embarrassing in more formal structures. A further form of trust is related to people's ability, expertise and competence to do a job and know what they are talking about (Cross and Parker 2004). Gefen and Ridings (2003) have observed that user acceptance of new IT is related to perceptions of service quality, trust, and equitable social exchange and can be promoted by IT personnel responsiveness. In the present study, competence-based trust plays an important role for collaboration between the CoP and ITD.

Social ties reflecting trust are distinctive for CoPs and include honesty and commitment to others, and assist in establishing a common wavelength, a shared mindset and thought world, a shared language reducing the chance of misunderstandings, essentially transforming individuals into one collective mind (Carlile 2002). Prusak and Weiss (2005) attribute social aspects, such as trust and relationship capital to organisational culture, arguing that these might have a considerable effect on knowledge management.

It is important to note that relationships not only exist between individuals in a CoP, but also with other groups, key players and stakeholders. To obtain community recognition, support and resources required for their work, the CoP has to span boundaries with the wider organisation including their immediate working environment, management, and other departments.

Physical, social, and political aspects are constraints that cause increased knowledge transaction costs within an organisation by obstructing the process of accessing, finding right knowledge resources or talking to the right people, due to rigid hierarchy (Prusak and Weiss 2005). In the following sections we discuss how a rigid approach to communication may impede effective collaboration between the CoP and ITD (see "Results").

Information Flows across Boundaries and Knowledge Transformation

Traditionally, KM in organisations has focused on formal initiatives, building systems for collecting, storing and sharing documents and codified knowledge (Prusak and Weiss 2005). This approach is based on a belief that organisational KM is, at its core, a managerial task and should be approached top-down. More recently knowledge workers' perspectives have been recognised as important to knowledge management (Prusak and Weiss 2005). This view has emphasised informal and social aspects of knowledge management, such as building trust, managing relationship capital, and establishing informal networks for expertise location. These activities are all essential to facilitate information flows and knowledge creation across departmental boundaries and thus require adequate communication channels.

Brown (1966) identifies two potential problems with the classical view of external information being directed to decision-making levels of policy, management, and operating according to expertise and function. First, if the

function is assigned a secondary mission to deal with information that doesn't match resources or expertise available, information might never get to the appropriate channel (Brown 1966). Second, in organisations, where information flows between decision-making levels and intelligence-mechanisms are highly programmed, little new information can be expected to flow across an organisational boundary (Brown 1966). Such programmed information structures reduce the number of interfaces to external entities to a minimum and make information boundaries difficult to span.

In some circumstances direct communication between ingroups and outgroups is crucial to ensure the whole context of information is passed to the correct channels. Labianca et al. (1998) found that a third party may exacerbate an intergroup-conflict situation in personal or other informal relations by adding or omitting contextual or other important information for whatever reason.

Daft and Weick (1984) consider organisations as interpretation systems. Interpretable information may be acquired through formal (systems) or informal (personal contact) processes. Organisational interpretation is performed on a collective level and is defined as the process of translating events and developing shared understanding and conceptual schemes (Daft and Weick 1984).

While Daft and Weick (1984) attribute the interpretation process to management levels (top-down process), we argue that interpretation can apply to individuals or groups on any organisational level (i.e. a bottom-up process) (Koeglreiter et al. 2006). We argue that organisational life includes a continuous cycle of knowledge creation based upon interpretation of explicit information and human behaviour, as exposed in boundary spanning activities.

It has been acknowledged that effective externalisation and sharing of knowledge requires a common language (Burstein and Linger 2003). 'Common' or 'shared' language not only involves syntactic aspects, but also a semantic component that gives meaning to information (Nonaka and Takeuchi 1995). This is related to the concept of interpretation. The semantic aspect is manifested in thought worlds and (organisational) culture.

To span boundaries involving cultural differences, Carlile (2002) introduces the concept of knowledge transformation by trying to "resolve the negative consequences, by individuals from each function [being] willing to alter their own knowledge, but also [being] capable of influencing or transforming the knowledge used by the other function". In the present study we investigate bridging the two different thought worlds of the academic culture of the CoP and the service oriented culture of ITD.

We argue that this transformation of knowledge involves understanding each other's practice. Pawlowski et al. (2000) claim that it is a challenge for IT professionals to learn practice – acquire practice-specific knowledge as well as cross-practice knowledge. If this is so, professionals supplying IT services in tertiary institutions need to learn how to provide technical support not only for everyday activities, but also for testing new technologies required for curriculum development, educational experimentation, creativity and innovation.

In summary, the above described issues of trust, language, hierarchy, and cultural differences all impact upon boundaries, both on the organisational and group level, that may be considered problematic in certain contexts and create a need to introduce boundary spanning activities. In the following sections we concentrate on investigating the formal boundary spanning activities of ITD, and the perceptions of the CoP that wishes to create direct links to ITD staff, which they see as a more effective informal connection to an expert network.

RESEARCH APPROACH

The data collected, analysed and reported in this paper, is drawn from a workshop and semi-structured interviews with the educators who form the CoP, and with those in organisational roles whose responsibilities impact members of the CoP. We have been following the CoP over a period of time in an Action Research mode, conducting interventions and observing changes and developments of the group and its environment.

This particular study was triggered by the learning experience of a previous study revealing a communication problem between the CoP and ITD. To address this problem a workshop was conducted involving members of the CoP and a representative of ITD. We have employed a modified boundary spanning approach, built upon the 're-categorisation' approach of Gefen and Ridings (2003). Re-categorisation involves inclusion of outgroup members into an extended ingroup, where all members share an 'obvious' similarity. In this study we have attempted to promote re-categorisation by conducting a meeting, bringing together the CoP as the ingroup and, as the outgroup participant, a representative of ITD sharing an 'obvious similarity' of technical background. De-categorisation is described as dissolving the ingroup-outgroup boundaries, through interaction on a personal, rather than group, level (Gefen and Ridings 2003).

CoP members sought de-categorisation through direct contacts with particular staff within ITD deemed able to understand and assist in the situations where the formal process of contacting the IT helpdesk is not seen by CoP members as being effective. In the workshop, a representative of each party semi-formally presented the typical

challenges of their day-to-day work life. Following these presentations, an open forum was held, where current and ongoing issues were discussed.

The workshop was then followed by semi-structured interviews, with all participants, reflecting on their individual impressions of the workshop outcomes and their perceptions of the way forward. The enthusiasm expressed in the workshop and interviews gave a strong indication that the basis for a dialog between the CoP and ITD had been created, and in a real sense issues had been resolved. Approximately 18 months later, a series of follow-up interviews were held to establish whether the situation had indeed changed.

All of the above contacts were audio-recorded, transcribed, and analysed using an approach based upon thematic qualitative analysis (Miles and Huberman 1994).

INSTITUTIONAL CONTEXT

The CoP under study is a group of academic staff teaching information systems at an Australian University. The group has prime interest in technical aspects of information systems, engages in frequent informal conversations about their work, about technical projects in their teaching area, and they regularly socialise. Some of the relationships within the CoP are also based on semi-formal teaching team structures. The identification of this group as a CoP is described in an earlier publication (Koeglreiter et al. 2006).

The knowledge activities of this group aim primarily at achieving a higher level of skills and effectiveness in their work – improving teaching practice. The role of academic staff is critical in the teaching process, and represents the frontline of interaction with the primary University 'customers' – students. As a consequence, it can be argued that the University's success depends heavily on the knowledge work of this and similar CoPs, and subsequently on the extent to which that knowledge work is supported by relevant infrastructure and services.

The group members not only teach technically focused subjects, but also have substantial technical hands-on expertise in those areas. The CoP's specialisation in technical subjects requires that they access intensively the University's technical infrastructure, to develop and test curriculum material, including laboratory exercises and the design of student assignment materials. This includes non-routine knowledge work and experimentation involving computer-based resources and IT infrastructure. ITD, however, arguably has at best a limited capacity to recognise the special teaching requirements of the CoP.

Communication between the CoP and external units, such as ITD, include negotiations regarding access to organisational IT infrastructure and knowledge resources (e.g. applications, services, servers, etc.).

ITD is generally responsible for the network infrastructure maintenance, desktop support (staff, lecture theatres, computer laboratories), and the maintenance of University wide teaching and learning and administration systems. ITD includes approximately 80 staff and is hierarchically organised into a number of management levels. Interaction with users occurs primarily via an IT helpdesk as a first point of contact and might be extended to other support levels, depending on the complexity of the individual support situation.

ITD provides a standard IT/IS environment and caters for core administrative tasks. ITD support primarily focuses on network infrastructure maintenance and desktop support. There is limited support for experimentation with technology or independent configuration. The CoP is dependent on ITD for providing experimentation environments, which ITD labels as non-standard requests.

Despite the shared knowledge domain of IT, thought worlds of the two parties differ in terms of practice and conceptual considerations, such as views on how this knowledge should be used. The CoP takes a visionary stance that explores avenues of technical innovation to improve teaching practice and provide students with a rich learning experience. In contrast, ITD is concerned with pragmatic ways of problem solving aiming at improving efficiency of their service, specifically creating standardised large-scale services, effectively attending to standard repetitive requests. These different thought worlds lead to distinguishable subcultures within an organisation, which may create knowledge barriers and impair communication between organisational units and individuals.

RESULTS

In this section we summarise results from the intervention, built upon the three data collection opportunities: the workshop that brought the parties together; the initial reflective interviews with the participating CoP members and the ITD representative; and the follow-up interviews that were conducted 18 months after the workshop.

Workshop

An intervention in the form of a facilitated workshop was conducted, which sought to bring the CoP, other staff of the School, and a key representative of the ITD, together. Each of these parties was given the opportunity to explain their role, and to refer to the challenges they encountered. By focusing on the theme of challenges in their day-to-day work life, the presenters took equally a vulnerable position, engaging in non-threatening dialogue.

Indicative of the nature of the discussions that took place, CoP members expressed their frustration about the rigidity of structure within ITD, the lack of response to urgent teaching needs, lack of flexibility and poor communication.

CoP members attested that the formal communication channel to ITD through the IT helpdesk had been problematic, because the focus at the IT helpdesk is upon immediate problem resolution, rather than understanding underlying systemic problems. CoP members claimed that chance meetings on an informal basis have proven to be more effective.

The ITD representative confirmed that he was aware of the ongoing communication problems and reported that a number of initiatives to improve communication across the University were already in progress.

A CoP member made an interesting suggestion to bridge communication problems, involving ITD employing a boundary spanning person, who would engage proactively and directly with academic staff in the University. Ideally this person should have an academic background, as a prerequisite for in-depth understanding of the academic world and its challenges.

Initial Interviews

In the course of initial interviews, the questions posed to the participants addressed workshop impressions and considerations about linkages between the CoP and ITD. The participants were also asked about the boundary issues they encountered and discussed during the workshop, and their expectations and learning in the workshop.

The formal communication channel to ITD is the IT helpdesk via phone, which is perceived by CoP members to be a bureaucratic process lacking transparency. The following quote confirms a sense of insufficient competence-based trust, which might be rooted in experiences of IT helpdesk staff demonstrating a limited understanding of the complexity of the CoP's non-standard requests. This might be interpreted as an example of a situation where, through this limited information being forwarded by the IT helpdesk to other levels in ITD, the nature of requirements/problems become distorted. The use of the term 'chasing' also indicates an energy-draining process of following-up and in some cases explaining the same request over and over again:

> *"[ITD] told us, it's all got to go through the helpdesk. We tend to feel that the helpdesk could still be a bottleneck. [...] They are not really concerned about your problem. [...] I mean, if you can't contact anyone there directly, unless you go through the helpdesk and they call you back, it puts it all in their control. How do we know, that we are actually going to hear back from them? How do we know, the right person is going to call us back. We have to trust them. So, by stipulating their policy, it means we are all still chasing them and I don't believe that that's going to be effective communication."*

To overcome the perceived limited ability of the IT helpdesk to address complex non-standard requests, CoP members saw a compromise in written communication, which allows them to describe the issue in its full complexity. This original and undistorted information can then be passed through to other support levels in ITD, eventually reaching someone with sufficient expertise to understand and act upon the request.

As indicated in the above quote, CoP members seek direct 'expert-to-expert' communication, circumventing the IT helpdesk altogether. There is some history of occasional informal contacts with specific experts within ITD, some of which are positive, because of the ability and willingness of the ITD staff member to relate to the CoP's practice. Others haven't been as fruitful:

> *"Certain people have got a reputation of not listening. Like [ITD staff member1] is quite good. If he came out, he is one that I know who would be quite good. If [ITD staff member2] came out, I don't think it would be very good, I don't think it would be productive."*

Unfortunately the CoP is not in a position to choose individuals to talk to and so a mismatch of expectations has developed over the years. This was confirmed by the ITD representative, who identified a need to manage expectations and is prepared to engage in a dialogue assisting clarification:

> *"I think there has been a mismatch in expectations [...]. A [School] might have placed specific expectations on ITD but are unable to articulate them in way that ITD understands. So they are*

talking at this level and ITD is up here or down here […]. So it's part of ITD's plan is to try to assist the organisations within the University with their future planning and being less reactive and being more pro-active."

The issue of boundary spanning was also explored extensively in the interviews. Formally, a third party, the Faculty IT group, represents the needs of staff within the Faculty to ITD. However, the interviews have shown that there is also a lack of competence-based trust towards the Faculty IT group, who are perceived to formally have a different function and no resource capacity for extra tasks.

"He (Faculty IT Manager) is there […] to support admin. That's the [ITD] line, that I believe [...] is the unwritten sort of statement of what they support […] - he has declared openly, as far as I am aware, that he doesn't support T/L he only supports internal admin systems. […] I believe, that […] the Faculty rep did not adequately represent our needs to [ITD] either. He acted as a block of our requests going to [ITD]. It was like he was censoring communication in a way. He was vetoing our needs. I find that particularly sensitive in an academic environment because how do any of them dare to presume that they have the right to decide what we can and can't teach."

The ITD representative understood the dilemma of disconnection from practice of customers and supported the idea of direct links by formally participating in the CoP's activities:

"There are probably people within ITD who should definitely be […] involved in that CoP because that's their job and there are those like myself who have represented ITD and got enough out of it to understand it from a personal perspective. It was good to be involved in something like that. So, a service level manager or a business services manager who are tasked with liaising with customers should be members of that CoP."

In summary, CoP members have indicated that they would prefer direct personal contact with experts within ITD, but they are instructed to initiate contact through the IT helpdesk, which is deemed to complicate the process. The ITD representative confirmed that ITD had not been able to respond to the CoP's needs in the expected way - it is suggested that ITD staff liaise with the CoP by participation in the CoP.

Eighteen Months Follow-up Interviews

To determine whether the situation and relationships had indeed changed in the long term, as was expected at the conclusion of the period of intervention, we followed up with the CoP and the ITD representative, through an interview program, approximately 18 months after the initial workshop.

During these 18 months significant organisational changes had taken place, both in the School the CoP is located within, as well as in ITD. ITD had gone through a number of iterations of restructuring. The School had faced a trend of declining student demand for pure IT courses, and responded by centring its teaching more closely upon business-focussed information systems, arguably de-emphasising the teaching of technical skills.

In discussions with CoP members it became clear that they had accepted the strategic decision to emphasise business-focussed information systems studies. As such there was reduced time to spend on the development and delivery of technology-focussed subject matter. Consequently, there was a reduced need for the CoP to utilise ITD services. CoP members, however, had even more deeply held preferences to work autonomously on technical matters, where they possessed the capability.

"I could have got onto [ITD] about that, but that wasn't a high priority for me - an annoyance really. […] I think some of the [ITD] issues we had in the past have paled into nothingness compared to things to budget cuts that we are facing again for next year and dropping demand from students and all those issues."

On the other hand, the ITD representative, when interviewed 18 months later, described a number of initiatives that were being introduced and improved. These initiatives include boundary spanning roles, boundary spanning activities and boundary objects and considerably increase ITD knowledge sharing with other departments.

To address the issue of boundary spanning roles according to the IT infrastructure library (ITIL) review (Berkhout et al. 2000, p. 15), relationship managers within ITD had been appointed that contact IT representatives of the Faculties, who were expected to be fully informed on all technical teaching and learning requirements throughout the Faculty. The number of relationship managers is very limited however, and so it is not possible to contact lower levels within the Faculty. An exception may be made for CoP members, but the preference is that the first point of contact be the Faculty IT representative:

"And there is only a limited number of us who are relationship managers and I think we have to focus at the faculty level in order to sustain it."

To address this resource problem ITD intends to limit their boundary spanning efforts:

> "[…] faculties and divisions are actually accountable for deciding what projects need to be done by ITD. And we'll just be the implementers of whatever is decided. So the responsibility [of ITD] for defining all these requirements will probably be removed."

A new information initiative is aimed at publishing a services and product catalogue that lists all services and products available from ITD (i.e. a boundary object). An accompanying service level agreement clarifies expectations on timeframes and the extent of services provided. Further a redesign and restructure of the ITD Web site is planned, to make it easier to use for all staff and students. Changes of technical environments will be published to the entire University a year in advance.

Existing venues that can be interpreted as boundary spanning activities include email lists and meeting forums, such as an IT representatives' group, an IT support interest group, the printer and desktop advisory group, and the computing laboratories advisory group.

While it is tempting to see these initiatives as addressing the CoP's expressed needs, one might note a number of factors which reduce the effectiveness of ITD's boundary spanning efforts. Most of the initiatives represent improved information services. The others aim at providing a feedback loop for improving everyday repetitive services (desktop, printing, student labs).

We identified three main issues surrounding ITD's boundary spanning initiatives: First, as established through the interview program, members of the CoP had not heard of these initiatives, long after they were introduced. This is in accord with the CoP concern that ITD is talking to the wrong people. Second, reducing the role of ITD to implementers, removes them even further from the practice of academics. Third, the channels for collaboration and support for innovative teaching based on experimentation with technology had not yet been established. CoP members still do not have direct contact with ITD.

> "We haven't approached [ITD], because we don't know who to go to and ask, because it's a non-standard request and we don't know their response. […] We don't know where to start."

Formally, contact for any exceptional, non-standard requests is assigned to the Faculty IT group, but the CoP members repeated that the Faculty IT group doesn't have the expertise or authority to assist with the CoP's specialised projects. This is the reason why they have sought to contact ITD directly, but still there is no direct communication alternative to the IT helpdesk.

DISCUSSION

The following sections discuss the findings reported above in relation to concepts from the literature introduced earlier in the paper, so facilitating the extraction of lessons for on-going practice.

Multi-dimensional boundaries

A formal approach to boundary spanning might lack transparency, due to hierarchical communication levels (Prusak and Weiss 2005) that might obstruct top-down knowledge flows. The present study has revealed a boundary triangle involving ITD, the CoP, and the Faculty IT group as the three parties (Labianca et al. 1998). It has been observed in the present case that formally appointed ITD relationship managers have restricted their communication to the Faculty IT support group with a consequence that little information is flowing downwards to the CoP.

It has been observed that the CoP seeks to establish direct expert-to-expert links. In accord with Brown (1966), the CoP perceives the third parties (in the present case the Faculty IT group and IT helpdesk) as sometimes distorting or even blocking information. The programmed information structure (Brown 1966) of the IT helpdesk is essentially focussed on quickly solving a problem or passing it on to someone else rather than trying to analyse deeper systemic problems. The Faculty IT group acts in a similar manner. In order to address more complex technology based projects initiated by academics, direct links need to exist between academic and ITD staff who have extensive expertise in this area, and who also have the capacity to transform their knowledge (Carlile 2002) and to learn about the complexity surrounding technical problems/requirements. This then assists in creating competence-based trust (Gefen and Ridings 2003) as the basis of a knowledge sharing friendly culture (Cross and Parker 2004).

Boundary Spanning Skills and Thought Worlds

The selection of boundary spanning roles with CoPs requires not only excellent communication skills but also a high level of competence in the practice of both parties and the capacity to follow through. ITD viewed Faculty IT Managers as representatives of their faculties and consequently tasked them with requirements engineering

and business analysis. However with the centralisation of IT infrastructure, the formal role of IT Managers was that of a technical administrator and consequently the analytic skill set required for requirements engineering and business analysis in a complex environment might not exist. ITD's expectation of the Faculty IT group as communication stars or gatekeepers (Tushman and Scanlan 1981) can therefore be seen as a mismatch of expertise resulting in information not getting to the right channels (Brown 1966).

Boundary spanning is not only a communication effort, but also requires a bridging of thought worlds. While the two parties share a common language in the form of a technical jargon, semantics giving meaning to information (Nonaka and Takeuchi 1995) are different due to different interpretations (Daft and Weick 1984) according to the two different organisational cultures/thought worlds. Bridging the pragmatic thought world of ITD with the thought world of academics is a challenge. The parties need to transform their knowledge (Carlile 2002) and learn about each other's practice and the associated requirements/demands. Sharing an 'obvious similarity' and dissolving ingroup-outgroup boundaries via personal involvement proved to be an effective initial step. However, persistence and readiness of both parties to be continually involved is crucial for long-lasting result.

Organisational Dependencies

Boundary spanning is influenced by organisational developments. Brown (1966) argues that organisational structure constitutes boundaries that might be challenging to span. In this particular case, the CoP encountered major challenges when their immediate environment was re-structured following a dramatic strategy change. Similarly, a change of leadership in ITD might also have had an effect on efforts of boundary spanning. To be successful, boundary spanning requires an ongoing commitment on both sides.

Boundary spanning can only be effective if it is well resourced (Brown 1966). This study has shown that ITD Management understood the problems and aspirations of the CoP and demonstrated a reaction by introducing relationship manager. However, the lack of resources on the ITD side did not allow for direct expert-to-expert links (Kautz 2005) but selective communication with higher levels (Faculty IT) was the consequence. ITD's intention of withdrawing further from interdepartmental interaction by reducing their function to one of an implementer and operator of technology also gives an indication that ITD seeks to move further from the innovative practice of academe, leaving the task of requirements specification to the Faculty IT group. The effectiveness of this position is problematic however, as enormous pressure is put on the IT groups at Faculty level, initially employed as technical administrators who are now expected to acquire a skill set for academic 'business analysis' and 'requirements engineering'.

Ambiguity and long term effects

Boundary spanning can be ambiguous. While ITD considered the introduction of relationship managers a major breakthrough in communication, the CoP had never heard of these new positions and still felt that nothing had changed. ITD also had created a boundary object (Carlile 2002) by publishing a service level agreement document on their Website detailing the products and services ITD provides to the rest of the organisation. Again the CoP was not aware of this. Therefore a combination of formal and informal boundary spanning mechanisms should be employed: Helpdesk, regular formal meeting forums, Web sites, direct expert-to-expert links, and dedicated boundary spanning roles within both parties. Ongoing commitment and regular engagement of both parties may help to recognise needs for collaboration and tune-up communication processes in the long run.

CONCLUSION

This paper has identified a number of considerations where highly specialised professionals, in this case a CoP of academics, collaborate with IT service departments. A shared knowledge domain does not necessarily assist boundary spanning efforts, but may pose additional challenges.

In this study it has become apparent that a solution of the issue of boundary spanning is resource intensive. It requires a considerable amount of time for informal conversations to take place in order to learn practice and to understand the challenges and problems of both parties. In addition, boundary spanning efforts can be ambiguous, where one party is convinced that a mechanism is in place, whilst the other party sees this completely differently. This study shows that neither sufficient resources nor an effective mechanism is in place to formally span boundaries between the support function (ITD) and those who most need the support (the CoP). ITD had attempted to institutionalise and regulate interaction with external parties by formally appointing relationship managers that were supposed to communicate with very specific people in the organisation. Formal pre-programmed boundary spanning activities are limited in terms of types and modes of activities conducted, audience included, and topics discussed. In this particular case, knowledge flows are inhibited through this formal process. This shortcoming might be addressed by building direct informal links between the CoP experts and the experts in ITD.

Effective organisational KM requires informal structures and communication channels to be in place to compensate for imperfect formal communication structures. This is not to say that all communication structures should be informal. Rather, we see formal structures and activities as a fundamental component for creating transparency across the organisation. Formal structures are effective where regular flows of defined types of information are needed, such as codified knowledge embedded in procedural documents.

Drawing upon the above, several strands of future research are highlighted:

- Given that effective organisational KM requires informal structures and communication channels to compensate for imperfect communication structures (which are essentially top-down/bottom-up) research is needed into approaches to facilitate the flow of knowledge "laterally" through the organisation.

- KM literature advocates the view of technology as an enabler for knowledge work needs. In the results reported it becomes clear that this notion needs to be extended to consider organisational entities and individuals that exercise power (provide, control, maintain etc.) over organisational technology. Behaviours that support the enabling role of technology should be further investigated.

- This study has revealed that IT departments strongly adhere to standard procedures, taking a generalised view of users and their capabilities throughout the organisation. For CoPs to effectively and meaningfully contribute to the organisation, their speciality needs to be recognised by support departments. Research is needed to examine more flexible user support models in IT departments. .

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