Agarwal, N.K. & Poo, D.C.C. (2008). Capturing tacit knowledge across different domains: Knowledge community (K-Comm). In A. Mitra (Ed.) Special Issue on KM, *International Journal of Business Information Systems, 3*(6), 668-685. https://doi.org/10.1504/IJBIS.2008.018997

Capturing tacit knowledge across different domains: Knowledge Community (K-Comm)

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Abstract: Capturing tacit knowledge is one of the major challenges faced by Knowledge Management Systems (KMS). Most such systems try to capture employee knowledge pertaining to a specific domain of organisational interest. However, every employee has much more to contribute apart from knowledge in a particular area. The sum total of his/her skills, interests and experiences make for rich knowledge. Our research focuses on maximising the knowledge potential of every employee across different domains. We have developed a system to identify an individual's knowledge areas, based on his/her strengths, experiences and passion. It will enable an individual to contribute and share knowledge with other individuals. When applied to the organisation, it should help increase the span of knowledge areas reachable by KMS, and make them more effective. We move from a scenario where there are few experts towards one where everyone is an expert, and has something to share.

Keywords: Knowledge Community; K-Comm; knowledge areas; tacit knowledge; Knowledge Management; KM.

Reference to this paper should be made as follows: Agarwal, N.K. and Poo, D.C.C. (2008) 'Capturing tacit knowledge across different domains: Knowledge Community (K-Comm)', *Int. J. Business Information Systems*, Vol. 3, No. 6, pp.668–685.

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1 Introduction

Knowledge Management (KM) embodies the following concepts – intellectual capital, knowledge creation, transfer, sharing and dissemination, organisational learning, organisational culture and communities of practice (Arroyo and Chang, 2004). Gurteen (1998) defines KM as "an emerging set of organisational and operational principles, processes, organisational structures, applications and technologies that help knowledge workers dramatically leverage their creativity and ability to deliver business value". Davenport and Prusak (1998) have listed five objectives for KM – to foster an awareness of the value of knowledge; to identify key knowledge workers; to recognise creative potential; to generate clear knowledge creation goals; and to value knowledge not just for economic purposes.

Today, knowledge is increasingly being recognised as the most important asset in an organisation. The emergence of new technologies has undoubtedly churned out a new generation of KM initiatives that do more than just manage the physical repositories of the organisation. The knowledge base of an organisation has already extended beyond paper documentations – tangibles that can be easily catalogued manually. Now, this same knowledge base has been redefined into three common forms of knowledge (Laudon and Laudon, 2004) – the structured internal knowledge, also known as explicit knowledge, such as product manuals or research reports; the external knowledge of competitors, products and markets, which includes competitive intelligence; and informal internal knowledge, often known as tacit knowledge. Tacit knowledge has often been cited as the most valuable of the three, yet it is also the most difficult to capture and codify (Laudon and Laudon, 2004).[1]

Tacit knowledge often appears unimportant and mundane to the person who has it. Many times, the possessor of the knowledge does not even realise that somebody else would not have that knowledge. Such knowledge, though, if shared with somebody in need of it, would provide immense benefits to the receiver. In an organisational setting, it can potentially lead to cost and time savings and an increase in productivity.

Most KM systems used in organisations today aim to capture that knowledge of employees that is relevant to the domain that the company specialises in. Mostly, this is technical knowledge or 'best practices' for doing certain things learnt over time in a company. However, every employee has much more to contribute apart from knowledge in a particular area. The sum total of his/her skills, interests and experiences (acquired in a set of circumstances unique to the particular employee) makes for very rich knowledge with immense potential to be tapped into.

Our research looks at KM from a community perspective spanning the World Wide Web – focusing on maximising the knowledge explicating and sharing the potential of every individual across different domains. Also, the idea of knowledge is extended beyond organisational or work-related knowledge to include all types of knowledge residing within an individual – the underlying basis being that no knowledge is mundane and every individual has something to contribute. Thus, what is obvious and trivial to one person may be highly useful to another. Our aim is to be able to identify the tacit knowledge areas residing in an individual, based on his or her strengths, experiences and passions. The KM system must be able to capture and codify this tacit knowledge residing in an individual across different domains and experiences. The knowledge will then be shareable to a 'knowledge community'. Such an inclusive approach, we posit, will help explicate the tacit knowledge in different areas residing within individuals. When applied to the organisation, it should help increase the span of knowledge areas reachable by KM systems, and make them more effective. We move from a scenario where there are a few experts towards one where everyone is an expert, and has something to share.

The idea is simple. Instead of focusing on a particular domain or technical area, we will focus on all possible knowledge that resides in a person. For instance, there is a person X, who is 75 years old and has held a number of portfolios in major companies. He has travelled to different countries. X was born in Singapore in 1930. So X's knowledge areas would include (among others) family (experiences, views), jobs (experience in different areas/fields), countries (Singapore, Malaysia, other countries), *etc*. From these areas and experiences, X would have certain areas/issues (core knowledge areas) that he has been good at (expertise), knows a lot about or feels strongly about. These core areas are the ones that X would be able to contribute to (and would be most useful for) in the knowledge community. Similarly, another person Y would have a different set of knowledge across different domains/hobbies/experiences. A teenager Z, 15 years old, would also have a lot to share (growing up, issues in school, between friends, *etc*.). So in essence, every person has knowledge to contribute, to share and a different set of core areas – the difference may just be in the domain(s) and intensity. It is this amalgamation of core areas that will provide for a rich Knowledge Management Community – where you not only have access to information shared over time (repository), you also have access to a diverse and growing set of experts in core areas whom people can consult and seek advice from.

It will provide for a feeling of self-worth in every individual, a feeling of usefulness to others/community/society and, at the same time, a ready place (and access to experts) to seek whatever answers one might be looking for. The end product will be a growing community of experts in different domains (core knowledge areas), an increasing knowledge base across different domains, and people seeking answers to questions across different domains.

To study the approach, we have implemented a Knowledge Community (K-Comm) that aims to serve as a KM system capturing an individual's tacit knowledge across different domains.

This approach should not be confused with virtual internet communities that cater to the ordinary internet users and are not affiliated with any particular business organisations. Examples are online groups, discussion forums and blogs, which have grown remarkably popular. However, while they do engage in the process of knowledge transfer, they fail to capture knowledge in a codifiable manner, particularly owing to

their haphazard structure. Furthermore, they tend to focus on specific domains, largely dependent on the directives of the founders of these communities. On the other hand, sites such as All Experts (experts.about.com) rely on people volunteering to contribute and do not utilise the tacit knowledge residing in every individual.

1.1 Key objectives

The key objective of the research project is to develop a KM system to capture and codify the tacit knowledge residing in an individual across different domains and experiences. This knowledge will then be shareable and accessible through a community portal.

The tasks include exploring ways to map the tacit knowledge of every individual into several core areas, ways to make knowledge transfer and codification easy and straightforward, and mechanisms to convert every individual's tacit knowledge to explicit knowledge. The KM system developed must incorporate mechanisms for individual knowledge captured across several domains and facilitate the mapping of the knowledge-seeker to the knowledge source (the repository, as well as the appropriate knowledge-provider(s)). On a social front, it should enhance the community spirit, as well as cultivate a sense of self-worth in every individual.

In Section 2, we discuss issues related to KM. Section 3 highlights the emergence of virtual communities in the internet. In Section 4, we discuss the design and implementation of the KM system K-Comm. Section 5 briefly discusses the application of K-Comm in an organisational setting, followed by conclusions and future work in Section 6.

Let us now look at KM concepts.

2 Knowledge management: collaborating to share knowledge

Let us look at the concepts of knowledge and its management in some detail.

2.1 Knowledge

Knowledge is an entity that encompasses both the codified and the un-codified content that may or may not lead to effective action in a given context and is embodied in both animate and inanimate objects. Knowledge is a perspective, a critical insight, an analytical tool, an asset, and a distinct capability that can be put into action within a firm or an individual (Liyanage and Jones, 2002). In recent years, organisations have looked again at the importance of enabling KM, not as a peripheral but as a necessity for future growth.

The essence of knowledge itself does not change, be it viewed from a company's perspective or a community's perspective. It is the extensibility of the knowledge base that varies from a stipulated set of domains specified by a company's directives to one that stretches from a myriad of domains, across a multitude of ages, nationalities, occupations, *etc*. Knowledge, as a community asset, is one that is contributed by everyone – restricted more by how much each individual is able and willing to share.

2.2 Knowledge management systems

KM systems are a class of information systems whose objective is to support the creation, transfer and application of knowledge in organisations (Alavi and Leidner, 2001). Indeed, many KM systems have been developed and implemented in various organisations to handle this knowledge base. More importantly, these solutions aim to capture that tacit knowledge existing in the individuals that matches the particular domains the company specialises in. Capturing the knowledge of their employees has now been viewed as a business imperative – to codify the technical knowledge or the 'best practices' learnt by the employees that would otherwise be lost when the employee leaves the company.

2.3 Tacit knowledge versus explicit knowledge – the continuum

All knowledge can be classified on a continuum from tacit to explicit. Polanyi (1966) was noteworthy for identifying the distinction between these two types of knowledge.

To put it simply, explicit knowledge is knowledge that can be articulated in formal language and easily transmitted amongst individuals. On the other hand, tacit knowledge is described as personal knowledge embedded in individual experience and involving such intangible factors as personal belief, perspective, instinct and values. Generally, explicit knowledge is knowledge that can be represented in a written form and is capable of being widely distributed or diffused. On the other hand, tacit knowledge is not easily encoded and is usually diffused in face-to-face, synchronous communication models.

It is often said that tacit knowledge is best shared face to face, through apprenticeships, mentoring and communities of practice. In our implementation, we have introduced an alternative way to share this tacit knowledge minus the hassle of a face-to-face synchronous communication, through the concept of first recognising the knowledge areas possessed by an individual.

2.4 Challenges in designing systems that allow cooperation among users and genuinely enhance organisational performance

Managers have encountered problems when attempting to transform their firms through KM programmes (Gold *et al*., 2001). Laudon and Laudon (2004) describe some of the challenges faced. Information Systems that truly enhance the productivity of knowledge workers may be difficult to build because the manner in which information technology can enhance higher-level tasks, such as those performed by managers and professionals, is not always clearly understood. Some aspects of organisational knowledge cannot be captured easily or codified, or the information that organisations finally manage to capture may become outdated as environments change. Processes and interactions between IT and social elements in organisations must be carefully managed (Davenport *et al*., 2002; Grover and Davenport, 2001).

The most important challenge is, perhaps, making the tacit explicit. Several factors may affect the sharing of knowledge.

2.4.1 Structural elements and organisational culture

"Structural properties of organisations encompass the reward systems, policies, work practices and norms that shape and are shaped by the everyday action of organisational members" (Orlikowski, 1992, p.7). Whether such properties are conducive to sharing knowledge plays an important role in the success or failure of KM initiatives. Reward policies and incentives can encourage employees to participate in knowledge contribution. Lack of incentives can have the adverse effect. Company policies and norms that encourage sharing also play a vital role. A highly competitive environment where an employee's importance depends on how much resides in his head will prevent him or her from sharing knowledge.

2.4.2 Ties between sharing units

Weak or strong ties among teams and the presence/absence of trust play an important role in the sharing of knowledge. For instance, Hansen (1999), in his network study of 120 new-product development projects undertaken by 41 divisions in a large electronics company, found that weak interunit ties help a project team search for useful knowledge in other subunits but impede the transfer of complex knowledge, which tends to require a strong tie between the two parties to a transfer. Having weak interunit ties speeds up projects when knowledge is not complex but slows them down when the knowledge to be transferred is highly complex.

2.4.3 Cognitive elements/Politics and hidden agenda

Cognitive elements are the mental models or frames of references that individuals have about the world, their organisation, work, technology, and so on. While these frames are held by individuals, many assumptions and values constituting the frames tend to be shared by others. Such sharing of cognitions is facilitated by common educational and professional backgrounds, work experiences, and regular interaction (Orlikowski, 1992, p.4).

2.4.4 Ineffective knowledge management systems

Ineffective Knowledge Management Systems (KMS) that fail to capture and codify knowledge effectively: Many KM systems fail to effectively capture the knowledge residing in individuals. Lack of structure also contributes to information getting unmanageable.

The challenge of managing explicit knowledge is information overload – information being accumulated faster than it can be appropriately filtered and applied. For tacit knowledge, the challenge lies in formulating the knowledge into a communicable form. Hence, it is prudent to rethink the workings of traditional KM systems to codify tacit knowledge. Furthermore, knowledge is sometimes labelled tacit by individuals simply because of the reluctance to share. To accurately codify one's experiences requires a certain amount of effort and commitment from that individual. In addition, hoarding knowledge also makes one seem more valuable and indispensable, further increasing the level of reluctance. An effective system must be able to cultivate a healthy knowledge environment that encourages voluntary knowledge sharing.

A meeting of these challenges will lead to effective utilisation of the KMS, with users actively sharing and utilising the knowledge resources residing in each one.

2.5 Codification and personalisation

Hansen *et al.* (1999) studied KM practices at management consulting firms, healthcare providers, and computer manufacturers and found two very different KM strategies in place – the codification strategy and the personalisation strategy. In the *codification strategy*, knowledge is carefully codified and stored in databases, where it has common access to everyone in the organisation. In the *personalisation strategy*, knowledge is shared mainly through person-to-person contacts, with KM systems helping people communicate. Hansen and his colleagues recommend carefully selecting one of the two strategies.

In this paper, we propose the use of the personalisation strategy, where individual queries are answered by those who have knowledge of the domain in question. However, each query is codified in a structured manner in a database for future access and helps in building up a knowledge base. Also, KM is seen in the context of a knowledge community, where a common motivation is sharing and learning.

2.6 Knowledge-provider versus knowledge-seeker

A KM system needs to be useful. Within a knowledge-sharing setting (especially where a codification strategy is used), there are usually two main parties involved – the *knowledge-provider* and the *knowledge-seeker*.

The knowledge-provider has the clearer understanding of the knowledge at hand. However, the knowledge-provider usually does not understand the precise knowledge needs of the knowledge-seeker, as well as the context in which the knowledge will be applied. Moreover, the knowledge-provider does not have to know the identity of the knowledge-seeker.

Conversely, the knowledge-seeker understands the context in which the knowledge will be applied. However, he/she may not know that the required piece of knowledge exists, or how to go about seeking the knowledge.

In short, the knowledge-provider knows the answer but not the question, and the answer is not necessarily structured to cater to the question of the knowledge-seeker. The knowledge-seeker may know the question,[2] but does not know whether an answer exists. Eventually, there is a situation of 'information overload but knowledge underload', when the information is abundant but no one is able to harness it. Therefore, it is imperative to ensure that a well-constructed system is able to map the knowledge-seeker to the knowledge-provider.

Papadopoullos (2004) describes four basic categories of users (knowledge-seekers) that need to be satisfied:

1 users who need information about a topic they are not familiar with in preparation for starting a new project
2 users who need information about a topic they are knowledgeable about and are therefore in data-gathering mode
3 users who have a good idea of what they are looking for, know that a given document or piece of data exists, and simply need to locate it
4 users who need a very specific answer to a specific question.

Based on the above roles, Agarwal and Poo (2006) further came up with four terms to describe each role played by the knowledge-seekers:

1 learner[3]

2 data-gatherer

3 location-seeker[4]

4 focused searcher.

Essentially, depending on the context of data one is searching for and the domain knowledge the person has in the field pertaining to the search, the same person may assume one of the four aforementioned roles (Agarwal and Poo, 2006).

Agarwal and Poo (2006) and Agarwal *et al*. (2005) also researched on the mechanisms to improve the quality of information retrieval in a KM system. While they do not specifically touch on KM based on a community perspective, they provided useful ideas on the techniques to link the individuals seeking knowledge with the individual who can provide that knowledge.

As can be seen, certain mechanisms need to be in place to cater to each type of knowledge-seeker to ensure that he/she will be able to access either the right set of knowledge-providers (the experts) or the right set of existing knowledge bases (the repository).

2.7 Knowledge capture: organisations versus communities

Within the context of an organisation, skills-registers or experience-registers are usually maintained to capture the available skills and the knowledge base of the organisation. One such system available for knowledge capture in organisations is the Enterprise System (or the Enterprise Resource Planning (ERP) system). The Enterprise System aids in identifying the links between information and information-based processes, within and across functions in the organisation.

Within the context of a community, the system is not restricted to a definite set of skills or knowledge bases. In fact, the potential knowledge base of a community depends solely on the potential knowledge repository of its community members. Each individual has a knowledge base that may or may not necessarily overlap with the knowledge base of another individual. The system has to be flexible enough to capture new areas as new members join the community or when existing members rediscover a new area of interest that they would like to share.

We will now share with you an analogy:

> In a community setting where users gather to cooperate and collaborate, the first individual will plant the first seed of the system – the first knowledge area. With the contributions of the individual, this seed will propagate and extend into sub-topics akin to branching out into more specific areas. As more individuals participate, new seeds will be planted. A sprawling forest of knowledge will be established as the community matures.

It is this idea of contributing and sharing among individuals in a collaborative setting that is the main motivation of our research.

3 Collaborative mechanisms among users – internet communities

Before the world of internet came into the picture, there were already implementations of KM systems that resided in a closed-door environment. In fact, most were implemented as intranets that existed within the boundaries of the organisation. As most intranets began as departmental efforts to improve the sharing of information, the users of these intranets were largely restricted to the employees of the organisation.

When the internet became a reality, some of the intranets evolved into extranets, bringing their clients or suppliers into the picture. Information now flowed not only internally but also externally to their business counterparts.

As can be seen, the global reach of the internet has played a part in how KM initiatives have evolved. The value of the internet lies in its ubiquity. Users can connect to the company intranet anytime and anywhere as long as they have access to the internet. For instance, the physical location of the intranet may be in London but the employee can log on from Dubai. Geographical locations are no longer a big obstacle to global communications.

The platform-independent nature of the internet makes integrating different computing systems possible, allowing data and documents to be shared and making cooperation among information systems a viable option. This is largely attributable to the use of the Hypertext Markup Language (HTML) and the complementary Hypertext Transfer Protocol (HTTP).

Similarly, distributed resources and databases can be deployed cost-effectively using virtual tunnels within the internet. The common web browsers can be easily customisable to support multilingualism, regional preferences and other features that are a boon to users who span multiple national boundaries.

Yet another paradigm has also evolved along with the internet – virtual communities. A virtual community is a group of people communicating and interacting with each other using information technologies, for instance, the internet. Virtual communities that are not associated with organisations are commonplace. It is now much easier to build up such virtual communities without much technological know-how. Some of the systems catering to these virtual communities are online groups, discussion forums and the newly coined weblogs, affectionately called blogs by bloggers. These are not pure KM systems but they do aid in the sharing of knowledge through asynchronous communications.

Online groups and discussion forums usually evolve from a need to share knowledge on a common platform. Blogs, on the other hand, usually cater to a group of readers, with the bloggers usually deciding on the subjects of interest and contributing most of the content.

3.1 Online groups

Online groups have grown in popularity in recent years. The idea behind the existence of online groups is to make it easy for these groups of people to communicate on the internet. They are a communication mechanism to enable friends, family and colleagues to stay in touch without the need for direct face-to-face contact. They facilitate social interaction and may not necessarily be dedicated to the discussion of specific topics.

There are specialty groups that cater to topics ranging from sports, to health, to news, *etc*. People can join these groups to connect to other people they might not know in real life but who share the same interests.

Some popular sites for creating online groups are Yahoo! Groups (groups.yahoo.com), MSN Groups (groups.msn.com) and Google Groups (groups.google.com). Yahoo! Groups, for instance, boast of features such as message archives, photos sharing and polls.

3.2 Discussion forums

Discussion forums are effective mechanisms on the internet for people to engage in the discussion of specific topics, through the posting of messages and/or commenting on other messages. Such forums are also commonly referred to as internet forums, web forums, message boards, discussion boards, discussion groups, or bulletin boards. Essentially, the main feature of a forum is allowing people to start threads and to reply to other people's threads. The messages in a forum are usually not allowed to be edited by other users, although some forums may have designated moderators who will edit or delete posts that are deemed offensive to their forum community.

The posts in a forum are usually archived in a repository. Users can search the repository for information that had previously been discussed instead of creating a new thread. A healthy forum with an active group of participants means that it will have a rich knowledge repository that can be tapped into when the need arises. However, it also means that whatever is being posted by the forum users will be public knowledge during the lifetime of the forum. This may or may not dissuade a user from posting. A user may feel proud to have a particular thread of his well-accepted by the forum community. Another user may feel uneasy or sceptical about having his threads stored in the repository.

Early discussion forums could be described as web versions of electronic mailing lists. While mailing lists automatically deliver new messages to the subscriber, forums require the user to visit the website to read the new posts, although some forums offer extra features such as e-mail notifications of new replies to their subscribed threads.

3.3 Weblogs (blogs)

A weblog or blog is a personal journal on the web. A typical blog brings together text, images and web links that are related to its subject. It usually deals with either a set of topics or a particular topic, depending on the author of the blog. In some cases, the author might just write whatever he likes, without any apparent topic attached to the blog entry.

Blogs play a unique role in the knowledge arena. Blogging is about voluntary self-expression. It allows individuals to easily share their ideas. To put it simply, bloggers can be classified as knowledge-providers, their readers being the knowledge-seekers. The knowledge domains of a blog can be very extensive. They express as many different opinions as there are individuals writing them. In fact, it is only limited by how much the blogger is willing to share.

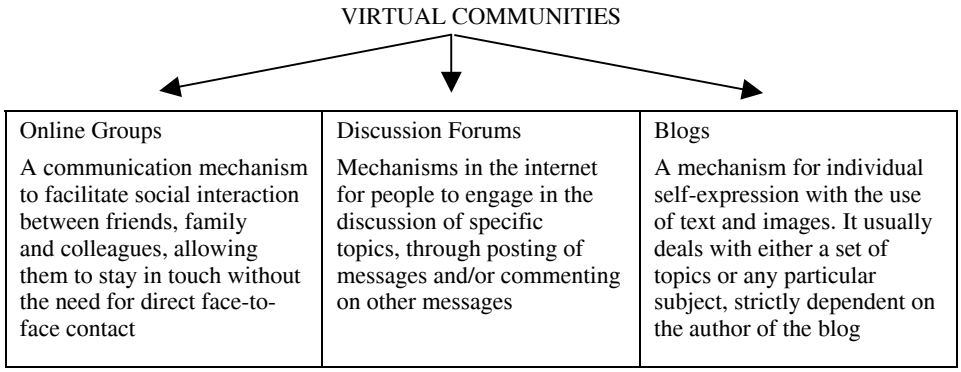
Blogs are different from forums as only the author has the power to dictate what can be discussed in the blog. Other readers are simply allowed to comment on the content being discussed. It is, possible however, to build a network of blogs that can function like a forum in that every individual in this blog network can create subjects of their choice, much akin to different topical threads in a forum.

Sites such as Technorati[5] allow bloggers to tag their entries using keywords. Technorati users can make use of the real-time search engine to easily track blog entries that correspond to keywords of their interest. In this way, bloggers make it easier for knowledge-seekers to seek them out. This interesting feature is also introduced in K-Comm, the KM system we have developed.

3.4 The philosophy behind collaboration – spirit of sharing

Figure 1 gives an overview of the examples of the virtual communities.

Figure 1 Examples of virtual communities



The above-mentioned systems do not establish themselves overnight but slowly develop based on the spirit of community sharing. The success of such systems depends on the essence of their initial existence – a group of individuals coming together to share what they know, to ask and to answer. Much of the success depends on the initiatives of the individuals rather than the workings of the system to map the knowledge-seeker to the knowledge-provider. As most groups and forums are formed based on a certain theme or domain decided by the founders, individuals who join them are generally those who have an initial interest in that domain. Compared to organisations where employees, who are usually the users of the systems by default, are 'encouraged' to share, in a community setting, individuals see themselves as stakeholders, and are more inclined to voluntarily take the initiative to share what they know.

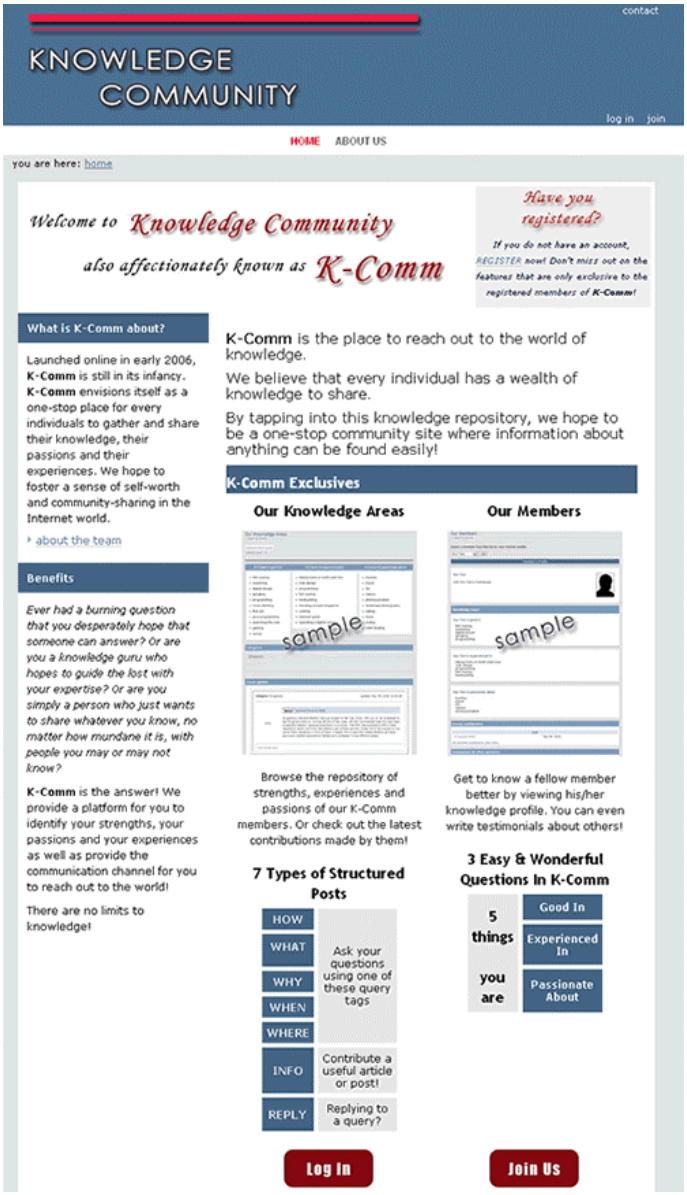
Indeed, the community spirit inherent in the online groups, discussion forums and blogs makes them an ideal platform for KM. However, the spontaneity of these systems poses another fundamental flaw – they are haphazardly organised. These systems are not concerned with managing knowledge, and are more of a form of communication mechanism. Information in these systems is accumulated at a much faster pace than it can be properly structured and applied. Information that cannot be applied is useless and can only sit idle. At most times, such information needs to be weeded out by seekers of information.

An information system, allowing collaboration among users for sharing of knowledge in a community setting, will be able to harness the advantages of organisation-oriented KM systems and community-centric communication tools present in the internet. Such a system can utilise the KM techniques employed by organisations to cultivate a community spirit of knowledge sharing and self-worth.

4 Knowledge Community (K-Comm)

We have developed an online KM system called 'Knowledge Community (K-Comm)', accessible at http://kcomm.redirectme.net (see Figure 2), to demonstrate the effectiveness of the features discussed above in recognising the knowledge areas residing in an individual. K-Comm envisions itself as a one-stop place for every individual to gather and share his/her knowledge, passions and experiences.

Figure 2 A snapshot of K-Comm (see online version for colours)



Source: http://kcomm.redirectme.net

Most KM systems today cater to specific domains. Groups, discussion forums and blogs in the internet are spread all over and haphazardly organised, and do not exactly capture knowledge. A KM system in a community setting is the right answer to fill this chasm, while at the same time promoting a culture of knowledge sharing and feeling of self-worth among people of all ages and across all fields.

4.1 Approach

K-Comm is a KM system that aims to transcend the constraints of knowledge sharing within a specific domain, by maximising the knowledge potential of every single individual for better codification and facilitation of the process of knowledge sharing and collaboration.

The system consists of a registration and profiling process; a Knowledge Area where contributions are made similar to a discussion forum, but in a structured manner for easy codification; and a Knowledge Profile page designed to illustrate the strengths, experiences and passions of the users, as well as to highlight the contributions made by a particular user.

4.2 Registration and profiling

Besides the usual registration form, we profile our users using three main questions as a tool to identify their knowledge areas. The three proposed questions are as follows:

1 What are the five things that you are *good at*?

2 What are the five things that you are *experienced in*?

3 What are the five things that you are *passionate about*?

These three questions are chosen mainly to cover three forms of knowledge areas that we wish to identify in an individual, namely, their strengths, their experiences and their passions. The questions are also structured to be open-ended to allow the individuals to give careful thought to what they think their strengths, experiences and passions are. This will be an opportunity for individuals to recognise their innate knowledge areas. Some of the areas may overlap. This is purposely encouraged to give users greater opportunity to arrive at their core knowledge areas.

The answers to these three questions are collected accordingly and an aggregation is done. Future users registering to the system are given the lists of answers that were previously entered by users. The lists act as trigger points or references.

A taxonomy is formed based on the answers gathered to represent the entire knowledge repository in K-Comm. The taxonomy acts as a structured representation of the knowledge that is residing in the users of K-Comm. An illustration of the profiling process is described in Table 1.

4.3 Structured posts in a knowledge area

One of the main problems faced by current discussion forums is the lack of structure of their discussion posts. We proposed the use of seven notations to properly categorise the type of post (see Table 2).

Table 1 Illustration of the profiling process

	Strengths	*Experiences*	*Passions*
Person A	□ Fish rearing	□ Taking local trains	□ Fish
	□ Swimming	□ Web design	□ Travel
	□ Digital design	□ Programming	□ DIY
	□ Programming	□ Fish rearing	□ Nature
	□ Surfing the internet	□ Backpacking	□ Photojournalism
Person B	□ Cross-stitch	□ Travel	□ Nature
	□ First aid	□ Cooking	□ DIY
	□ Bowling	□ Backpacking	□ Eating
	□ Badminton	□ Volunteering	□ Cycling
	□ Typing	□ Hiking	□ Painting
Person C	□ Java programming	□ Cooking	□ Landscape photography
	□ Online search	□ Classical guitar	□ Eating
	□ Gaming	□ Operating digital cameras	□ Music
	□ Soccer	□ Programming	□ Cycling
	□ Photography	□ Web design	□ Inline skating

Table 2 Structuring posts

How	*What*	*Why*	*When*	*Where*	*Info*	*Reply*
Users can ask their questions using one of these query tags.					Users can contribute a useful article/post.	A reply to a query

Other than the use of the seven notations introduced, we also propose to allow the poster to append a category to the post.

The category can either be a new category deemed appropriate by the poster or be chosen from a list of existing categories that have previously been proposed by earlier posters. The use of categories will allow the posts to be effectively structured and conveniently searchable. For instance, a particular user can search for posts that are related to a particular category, taken from the list of available categories.

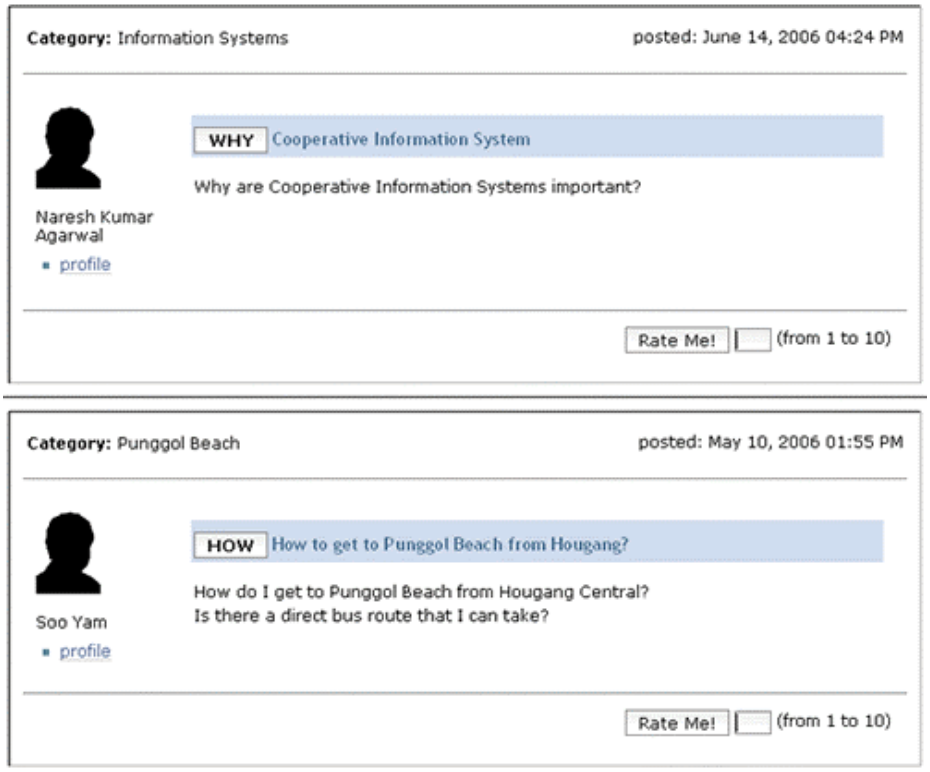
Figure 3 shows a snapshot of sample questions. The first question on Cooperative Information Systems is a 'Why' question type, belonging to the category 'Information Systems'. The second question on travel in Singapore is a 'How' question type, placed under the category, 'Punggol Beach'.

4.4 Community ratings

Another feature in K-Comm is the use of community ratings. This is a rating that is awarded to the user, based on the quality of the contributions made by the user (see 'Rate Me!' in Figure 3). This rating can only be contributed by other users. It seeks to provide an unbiased judgement on the level of expertise based on the contributions of the user.

Community ratings will play an important role in validating the knowledge shared by the user. It ranges from a default of 1 (Novice Contributor) to 10 (Expert Contributor), as seen in Figure 3.

Figure 3 Sample questions (see online version for colours)



5 Application of K-Comm within an organisation

K-Comm has been designed such that it can be an online community where any user can share and contribute his/her knowledge across different domains with other users. However, its application to an organisational setting could bring about a number of benefits.

When it comes to sharing technical or work-related knowledge, most employees are either reluctant (to make themselves appear indispensable) or uncertain about sharing (for fear of being embarrassed in case the information is incorrect). However, every employee will have knowledge that extends beyond his work – knowledge relating to his/her hobbies and interests, upbringing, hometown, experiences, *etc*.

Sharing of all types of knowledge in a common platform will help bring a 'community culture' within the organisation where everybody has something or the other to contribute and share. Instead of just a few experts, now everybody becomes an expert.

Ultimately, we believe that this inclusive approach will lead to the shedding of inhibitions and greater information sharing in all areas, including the core area(s) of interest to the organisation. We foresee a scenario where different organisation-specific knowledge communities collaborate actively using K-Comm to form a greater whole.

6 Conclusions and future work

We believe that the knowledge of individuals goes beyond what is being captured by existing KM tools that tend to concentrate on specific domains, thereby limiting the knowledge areas that are tapped.

Furthermore, the community aspect of most KM systems is often overlooked as the value of knowledge workers are viewed according to how much they can contribute to the well-being of the organisation economically – in the business sense, rather than emphasising the true value of the potential knowledge that each individual possesses and can deliver. By capturing the complete range of knowledge areas that an employee possesses, the employee will feel a greater sense of self-worth and should also contribute actively to areas that are of greatest need to the company.

In K-Comm, we have developed a system for capturing the tacit knowledge of individuals by codifying them into entities named Knowledge Areas through our profiling process. By representing the knowledge residing in an individual in terms of the Knowledge Areas that the individual possesses, we are able to obtain an overview of the knowledge base of the individual. Each individual will have a personalised knowledge profile. In this KM system, we are able to let users seek other users who have similar Knowledge Areas to engage in discussions. They can also search for 'experts' to answer their queries.

As the success of K-Comm depends on the community that it is built upon, we believe that K-Comm can potentially become an ideal place where all individuals will go to seek answers to their queries, as well as enhance their individual knowledge base by answering queries posed by other individuals. Such a system, we believe, has the potential to increase the efficacy of KM systems.

Future work will include deploying K-Comm in companies to capture not only the technical expertise of employees but also to identify their potential knowledge profiles. There is also the possibility of commercial exploitation whereby qualified experts in certain areas can be engaged to answer specific questions relevant to their domains of expertise. The option of multilingual support will also be explored to cater to non-English-speaking communities. This will necessarily make K-Comm a more well-rounded community and extend its knowledge base.

Acknowledgement

The authors wish to thank Tan Soo Yam for his help in developing the K-Comm portal and for contributing towards this paper.

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Notes

1 Contrary to the dominant understanding in KM of knowledge codification from tacit to explicit (espoused by Nonaka and Takeuchi, 1995), a stream of KM scholars base their work on Polanyi's research in the 1960s ("we can know more than we can tell" – Polanyi, 1966, p.4) to argue that tacit knowledge cannot always be captured and codified (Snowden, 2002; Tsoukas, 2003). "We cannot operationalise tacit knowledge but we can find new ways of talking, fresh forms of interacting and novel ways of distinguishing and connecting" (Tsoukas, 2003). However, our stand on the codification of tacit knowledge is in line with the dominant KM research based on Nonaka's SECI model.

2 There are times, however, when the knowledge-seeker may not know the question. Here, instead of the answer, he is looking for the right question to ask, *e.g.*, refining keywords during an internet search.

3 Agarwal and Poo prefer the term 'novice' to learner now, based on feedback received.

4 Location-seeker has been changed to 'location-searcher' to imply searching from a computer-based information system.

5 http://www.technorati.com/