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Managing Knowledge

Abstract

This paper provides a perspective on what knowledge is, why knowledge is important, and how we might encourage good knowledge behaviours. A knowledge management framework is described, and although the framework is project management-centric the basic principles are transferrable to other contexts.

From a strategic perspective, knowledge can be considered an asset that has the potential to provide a competitive advantage provided that it has intrinsic value, it is not easily accessible by others and the value it realises is sustainable. These traits of knowledge are context-dependent, although it is fair to say that any ongoing enterprise has at the core of its competencies a knowledge base, even if the potential afforded by knowledge is not always immediately obvious.

KEYWORDS: knowledge, knowledge management framework, implicit knowledge, tacit knowledge, explicit knowledge, knowledge management system, knowledge creation system, intrinsic motivation, measurement, management by objectives

1. Knowledge Definition and Knowledge Creation

In defining knowledge three situations can be compared; planning to catch a bus, plastering and parenthood. The difference between these three situations is that the knowledge needed to act requires different levels of experience or practice. To catch a bus requires little experience; just the ability to read a timetable and have access to a bus-stop. In contrast the thirteen steps to plastering are simple to read and are easy to understand but require experience to act upon. The third situation, parenthood, is considerably more complex. Parental behaviours involve instinct, intuition and increasing levels of experience. Even attempting to describe how to be a good parent is difficult, often requiring metaphors and analogies, and it's probable that any description will only be fully understood by other parents – those who have had similar experiences.

Therefore, we can infer that knowledge is inherently complex and there is a relationship between knowing and being able to act. Knowledge is context-dependent and it sits on a continuum between implicit and tacit. *Implicit knowledge* is that which can be easily articulated and used, while *tacit knowledge* is that which involves greater insight and is very difficult to describe. We shall see a little later

that it is possible to describe tacit knowledge. While all knowledge is important it can be seen from these examples that as knowledge becomes more tacit it has greater depth and has a greater potential to make a more profound impact. Tacit knowledge is certainly less accessible and less imitable. Tacit knowledge, by definition, is based on deep-rooted understanding and is very difficult (but not impossible) to transfer in an explicit manner whereby it can be placed in libraries and databases.

It is an over simplification, but a good general rule that while it is desirable to encode and store all knowledge so that it may be easily reused, the more tacit the knowledge the harder it is to encode and the more we need to converse and socialize to make sense of, understand and share such knowledge.

In the mid-1990s, Ikujiro Nonaka and Hirotaka Takeuchi described the knowledge creation cycle within enterprises that has been the premise of all knowledge systems since. Importantly, they claim that knowledge is a social construct; that is, we collectively make sense of the world and agree on the meaning of knowledge. It is through our social interactions that we share knowledge and through experimentation that we grow knowledge.

For simplicity, Nonaka and Takeuchi describe knowledge as either explicit or tacit, not on a continuum between the two as described above. A starting point on their knowledge creation cycle is the transfer of tacit knowledge. Tacit knowledge is shared in an organizational setting through socializing activities such as on-the-job training, mentoring and collective problem solving. Like storytelling within Hewlett Packard, such interactions aid in surfacing deep-rooted understanding. As we take in and make sense of tacit knowledge our understanding is still difficult to describe. In order to externalize and make explicit our understanding, we continue to discuss and make use of metaphor and stories until we are comfortable with our articulation. It is at this point that we can make explicit our previously tacit understanding and that we can combine this explicit understanding with other explicit knowledge. Combination of ideas is pure knowledge creation where new applications of the knowledge are conceived. The knowledge creation cycle is complete when we apply this new knowledge; furthermore, through activities such as learning by doing and experimentation we develop greater, deep-rooted understanding. The cycle then repeats itself where we begin to make sense and share through further socializing.

2. Knowledge Management

At an enterprise level, we strive to understand and encourage the knowledge sharing and knowledge creation process. We do this by applying strategies, technologies, techniques and controls; and we generally refer to this as our knowledge management system. While many definitions exist for knowledge management, a common and useful definition is the explicit and systematic management of vital knowledge – and its associated processes of creation, organization, diffusion, use and exploitation.

While knowledge is a valuable perspective from which to view an organization, knowledge activities require an objective. Dell's aim of reducing response time, IBM's goal of revenue growth and Chevron's desire to reduce operating cost all provide a focus and a measure for their knowledge activities.

3. Storytelling in HP

In planning to transfer inkjet technology from the USA to Europe, HP reaped the benefit of the experiences and tacit knowledge of those who were involved in previous technology transfers by listening to the stories of those involved.

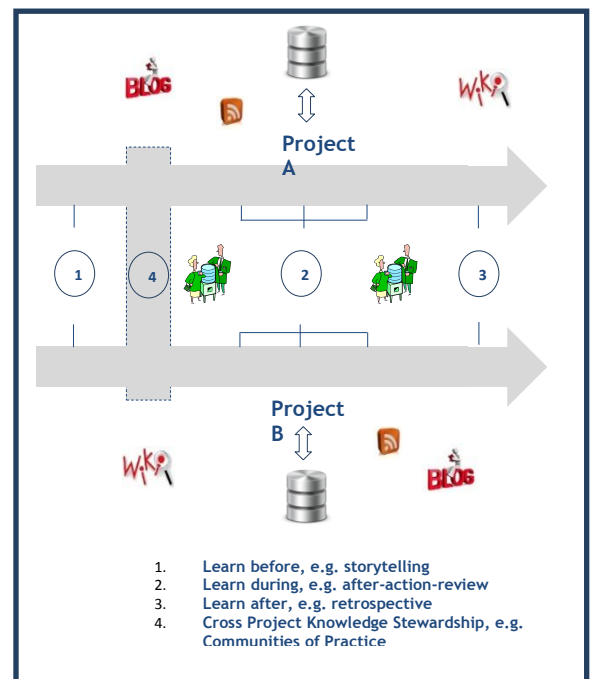
Applying a group storytelling technique, a facilitator gathered the following personnel for a 45-minute session:

- engineers, technicians and operatives who had been involved in previous technology transfers;

- engineers, technicians and operatives involved in this technology transfer; and
- engineers, technicians and operatives who learnt from peers who were involved in previous transfers.

The storytelling technique involved recording the group relaying their individual stories in a group setting, prompted by a series of open-ended questions. As individuals told their stories interruptions and questioning were encouraged, with others offering stories of similar experiences and how it may have frustrated them but also how they overcame issues. This exchange of stories is natural and leads individuals to forget the official story, resulting in a highly-charged and emotional session in which deep-rooted and hidden understanding surfaces.

Figure 1: Typical knowledge management framework



The session was recorded and the the facilitator subsequently listened to the recording and identified knowledge disclosure points (KDP), such as:

- **Decisions:** the logic for given decisions and their impact. What went right and what went wrong.
- **Mistakes:** how they happened, what was their impact and how they may be avoided.
- **Problem Solving:** how issues were resolved and what can be reused.
- **Artefacts:** any plans or documents that were necessary or useful.
- **Skills:** skills missing or necessary, and on what skills was success based.
- **Rules of Thumb:** hidden heuristics that were employed.
- **Experience:** what type of experience was necessary or useful.

This session took 45 minutes, which minimized the time commitment from such a large group. A KDP was identified approximately every 20 seconds, leading to a vast amount of useful information on which to build a technology transfer plan. The information included a deep understanding of issues such as role clarity; accountability; relationships and communication; self-help; and management support. The facilitator then drafted a new knowledge transfer plan where each identified KDP was explicitly included; successful KDPs were emphasized and controls were put in place for problematic KDPs.

The facilitator then reassembled the groups for a second 45-minute session and presented his or her understanding with the proposed plan. This served as both validation of the original knowledge gathering and a means of getting buy-in to the new plan. Changes were suggested, agreed and implemented within the meeting, and were ready to be presented for inclusion in the overall project plan.

A typical knowledge management framework suitable for project work is illustrated in Figure 1. Many techniques and technologies exist that support such a model (Chris Collision and Geoff Parcell's *Learning to Fly* and Nancy Dixon's *Common Knowledge* describe a number of these). To exemplify, a few of the common techniques are employed in this model.

The model figuratively describes two parallel projects, typical of the many ongoing projects within enterprises. It incorporates the elements emphasized within our definition of creation, organization, diffusion, use and exploitation. It also follows the BP framework, described by Collision and Parcell, of *learning before*, *learning during* and *learning after*.

Learning before involves accessing knowledge and understanding of previous relevant projects. Explicit knowledge will be accessible within files and databases. In this case deep-rooted knowledge is elicited through a storytelling (1) technique (see storytelling in HP), completed prior to project planning. *Learning during* is exemplified with the use of the US army's after-action-review (2), which is carried out throughout the life of the project. This is a simple technique whereby the participants gather and ask themselves: since the last review:

- What was the objective?
- What was the result?
- What were the gaps?
- What did we learn?

While often recorded and archived, the impact of the technique is the discussion and subsequent knowledge creation of the session.

Learning after is exemplified using a normal retrospective approach (3) in which as much understanding is elicited and archived for future use. Knowledge creation occurs in much of the ongoing project work, particularly in any group work such as group problem solving. A common technique to maximize knowledge creation is a community-of-practice (4). This typically is a cross project group made up of those interested in advancing a particular knowledge domain.

While databases are ideal places to archive knowledge, the emergence of web 2.0 has enhanced the contribution of technology to traditional archiving and, more importantly, to online discussion and therefore to online knowledge creation (see section 5, Social Computing in Intel).

4. Engagement

The design of the organizational climate has a single objective; to encourage the correct behaviours to support organizational objectives. From a knowledge perspective, behaviours reflect the knowledge system and its objectives. An experiment to capture the essence of a good, encouraging, knowledge climate found that knowledge workers had the best learning experiences when they: worked together; had relationships beyond work; had the opportunity to observe; were allowed to experiment; had access to information; and when they were challenged. This led to characterizing the elements of an encouraging climate to foster good knowledge practices. These include:

- **Diversity:** all differences enhance problem solving, providing different perspectives and it is at the intersection of these perspectives that new and novel ideas germinate. Research shows that functional and cognitive diversity make the greatest impact. Intuitively this makes sense; it is obvious when we have large problems and break down functional barriers to set up cross-functional teams.
- **Use of Information:** from a knowledge perspective, it is obvious that knowledge workers need the wherewithal to access information and knowledge. This includes an understanding of the technologies available but more importantly a mechanism whereby expertise can be located.
- **Outward Looking:** for economic reasons organizations are often too inward looking. However, idea generation, particularly novel ideas, is greatly enhanced with new perspectives and access to new information. Knowledge workers should be encouraged to be involved and network beyond their immediate surroundings.

- **Collaboration:** collaboration is diversity in action; however, diversity requires management. The most robust sociological phenomenon is that we are attracted to those we perceive as similar and we tend to not interact with those we perceive as different. This is most problematic when the difference results in us seeing a different problem or wanting to solve the problem in a different way. The answer to this conundrum is managed diversity through self-awareness and appreciation of others (difference).
- **Experimentation:** Risk tends to be an emotive term but there is much support for the link between risk and novelty. Experimentation, a more palatable term, is controlled risk or risk taken outside of the process. Experimentation is the classic case of creating deep-rooted understanding – moving from explicit to tacit in the knowledge creation cycle.
- **Intrinsic Motivation:** Therese Amiable found a strong link between idea generation and intrinsic motivation, a concept organizations are acknowledging only recently. Intrinsic motivation includes the elements of learning, challenge, choice and importance. Of course the most simple and most profound intrinsic motivation is the use of the term “thank you.”

5. Social Computing in Intel

With a goal to transform the way Intel employees collaborate in early 2009, Intel IT began enabling blogging and forum capabilities which, over time, expanded to include RSS feeds, wikis and video. Today, in addition to forums and groups, 55,000 employees are collaborating on over 1,000 wiki spaces. Organically evolved – the participants themselves began to share their success stories for others to use as models. Successful, active users guided new users on how to use the platform for their business needs.

Tools applied include:

- **Blogs:** Provide status updates for management or the team. The content is always readily available in clear, chronological order; which is a benefit if team membership changes.
- **Forums:** Solve project issues or problems asynchronously. They are especially useful for virtual teams that are distributed across different time zones.
- **Micro Blogs:** Where employees share status updates quickly, which is particularly useful for items that are on a critical path.
- **RSS Feeds:** Helping teams stay abreast of content changes. Instead of sending an email after each change, the team members subscribe to the RSS feeds for automatic, instant updates.

- **Videos:** Webcasts and meetings can be captured in video formats and shared with the team. Videos can be used for end user training on the products the team delivers.
- **Wikis:** Help teams manage projects by providing a group setting to: collaborate on requirements, store meeting minutes, store weekly status reports, conduct post-implementation reviews, solve problems, and answer questions.

These tools support group problem solving. Community members contribute to issue resolution, and by harnessing the knowledge of experts and encouraging self-help, the amount of time spent on resolving issues is greatly reduced. Teams are quickly able to pinpoint the problem by having access in real time to a large community of specific technology users. Use relies on moderators who seed new discussions, keep conversations moving, and, in general, nurture the community through regular interactions. Open communication is fostered, thereby allowing teams to focus on the core work instead of on coordinating communications and teams.

6. Measurement

It is an organizational obligation to provide an encouraging environment. Expectation setting and feedback, as part of management-by-objectives (MBO), are important elements of an engagement process and directly influence behaviour. Within the MBO framework it is very common to include a frequent manager-report conversation where performance is discussed and objectives are set.

From a knowledge perspective, this conversation should include objectives that focus on the encouraging environmental elements of expectation setting and feedback. Project work is enhanced the more we work with and seek input from others of different perspectives. In a work environment, a cross-functional team is the most obvious way to create this diversity of perspectives. It is recognized that it is easier for managers to seek resources and participation from outside the group and that such resources and participants often need facilitation to avoid task conflict. The process can be further enhanced when managers identify situations where they can set and measure team objectives as this drives collaborative behaviours.

Outward looking can be aided by setting expectations around involvement in professional bodies and conference attendance. Economics may restrict this, so allowing the use of your facilities may partly overcome this restriction. Importantly, an “outward looking” conversation should include potential and encouragement of personal networking opportunities.

Appropriate use of information is based on providing training on available technologies and techniques, and setting an obligation that available technologies and techniques will be used to write up and archive relevant work. Conversely, available technologies and techniques influence peers views of an individual's accessibility and managements ability to gauge an individual's willingness to share information. Experimentation is context dependent. The discussion should explore the potential and set guidelines.

Concluding Remarks

An individual's engagement is greatly enhanced the more they are intrinsically motivated; that is, when they seek enjoyment, interest, satisfaction of curiosity, self-expression, or personal challenge in their work. To this end the conversation should include potential and obligations regarding the individual being able to choose the activities that make sense; the degree to which the work purpose is important or worthy; the degree to which the work purpose is being accomplished; and performing the activities well.

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