

Knowledge Transfer: Managerial Practices Underlying One Piece of the Learning Organization

"Knowledge management" is something of a fad in today's business press. At the same time, it addresses key issues that can lead to success within organizations. Knowledge management addressed how organizations can manage the knowledge embedded in its systems, and contained in the heads of its employees. It also systematically considers how advanced information technology can be used to leverage existing knowledge and create new knowledge. This essay discusses one aspect of knowledge management, knowledge transfer: how to move good ideas from one part of an organization to others that can use the information.

The Growing Importance of Knowledge Transfer

Knowledge transfer has always been a challenge for organizations. Its importance has grown in recent decades for three related reasons. First, knowledge appears to be an increasing proportion of many organizations' total assets.¹ Second, organizations have moved away from hierarchical methods of control toward more decentralized organizational structures and increased employee involvement (Levine, 1995.). This has resulted in more creativity by frontline employees and subunits, but fewer obvious organizational paths through which the transfer can occur. Finally, advances in information technology have created new means of knowledge transfer. Innovations such as Lotus Notes, the Internet, and intranets all hold the potential for increased diffusion of innovations. However, technology alone cannot solve the problem of knowledge transfer; organizational structures and practices must facilitate and motivate transfers.

Knowledge transfer is only valuable when it is integrated into a set of policies for knowledge generation and capture. In what follows, we analyze the process of knowledge transfer and outline steps that managers can take to increase information flow within their organizations.

The Components of Knowledge Transfer

In principle, knowledge transfer can be broken down into distinct stages. We've chosen five steps to describe the process: idea creation, sharing, evaluation, dissemination, and adoption. These stages often overlap, are combined, or are skipped; they also have important feedbacks.

¹Thomas A. Stewart reviews the evidence for this claim (1997).

1) Idea **creation**:

A massive literature exists on how to promote creativity.² Robert Sutton has studied creativity in groups and offers the following list of questions to ask when assessing a group's potential for creativity.

- * *Is the knowledge in the group varied enough?*
- * *Is the group's attitude about its knowledge include respect for what it knows and searching for what it does not know?*
- * *Does the group know how to fight so that new ideas are encouraged?*
- * *Does the group engage in constant experimentation?*
- * *Does the group's status order support innovation, or do a few bosses control ideas?*

2) Idea **sharing**:

In practice, sharing (step 2) is often combined with validation and dissemination (steps 3 & 4). For example, a work group might share its ideas in a meeting, where their merits are discussed and relevant potential adopters hear the new methods. Here, *sharing* refers to the need to expose others to the idea in order for it to be *evaluated*.

Dissemination takes place once the idea has passed some minimum level of evaluation.

For information sharing to occur, two conditions must be satisfied. First, ideas must be in a form that others in the organization can interpret. Dissemination is easier when the knowledge can be made explicit or formal. For many skills and ideas, this involves transforming the idea into a codified, often written, format. Tacit, or informal, knowledge can be shared as well but the means of sharing are different, requiring face-to-face contact and opportunities for experiential learning. Apprenticeships often follow this time-intensive and sensory-rich means of transmitting knowledge. Nonaka has emphasized the rich interactions between tacit and explicit knowledge (1994). While conventional wisdom on why knowledge is difficult to transfer within firms has focused on motivational barriers, Szulanski (1996) found that features of the knowledge itself and the receiver's inability to interpret it were two of the most important factors in inhibiting knowledge transfer.

The second condition required for sharing to occur is that employees with ideas must be willing to share them. Sharing takes place at multiple levels, with overlapping but distinct concerns: from a worker to a workgroup, between workgroups, between departments, between business units, and between organizations. Unsurprisingly, Szulanski (1996) found that when the relationship between the source and recipient was distant or problematic, knowledge transfer was more difficult.

3) Idea **evaluation**:

Far more ideas exist than good ideas. Thus, organizations must *evaluate* their new ideas -- see whether they have worked in the past, are likely to work at new places, and actually work at new places. Employees must have the capability, incentives, and

² David I. Levine (1995) reviews the literature on management policies to promote the creation of new ideas by all employees. For more on creativity in organizations, see the articles in Staw (1997).

structures to perform the validation studies. At Xerox, for example, skilled technicians evaluate new ideas; the best are added into a best practices database for others to learn from.

4) Idea **dissemination**:

In principles, more information is better than less. At the same time, too much information creates overload. The Internet is a classic example, where nobody can read even a fraction of what is there. The key to disseminating *knowledge* is that people receive it who can use it. Several solutions exist to targeting information, ranging from the primarily technological to the purely organizational.

5) Idea **adoption**:

In the best of all worlds, if people knew the right thing to do, they would do it. However, we are not in such a world. Scholars of organizational inertia have developed complex theories of why, even after knowledge has been *transmitted* to the right people, it may not have been *transferred* to the organization. These theories fall into the categories of inadequate capability (known as "absorptive capacity" in the literature), poor incentives (the famous "not invented here" syndrome), and inadequate structures (for example, rigid operating procedures that are difficult to update).

How Management Can Promote Knowledge Transfer

This section outlines how managers can encourage knowledge transfer within an organization through the use of training, incentives, organizational structures, and technology. Under each section, we outline steps that will promote each of the stages of knowledge transfer outlined above.

TRAINING:

To effectively **generate** new ideas, employees need to be trained in problem solving, including an ability to think "outside the box." A typical program includes how to identify problems, prioritize, analyze root causes, identify possible counter-measures, implement the solution, and check whether the solution actually works. Companies must also provide people information on the business and its environment so their ideas are appropriate. In addition, employees need modern organizational skills such as how to work effectively as a team.

To **share** articulated or explicit knowledge, workers need to be literate in the languages in which ideas are expressed in their work. In addition to spoken and written language such as English, this may involve high-order "literacy" in more technical languages such as blue prints or statistics.

Managers and workers must be trained to **evaluate** new ideas. Just as importantly, they must be trained in systematically understanding what evidence should be convincing -- for example, the difference between correlation and causality, and the problems of small samples. As everyone who has ever studied statistics knows (and especially everyone who has ever taught it), these basic concepts are often difficult to apply in practice. Once these basics have been mastered, formal procedures such as statistical process control and the design of experiments can be useful in creating new

knowledge. Importantly, for most employees and managers, statistical and problem-solving training will usually be more effective if it is coupled with resolving an actual problem, instead of classroom training in statistics.

Training workers to both **disseminate** and **adopt** new ideas may revolve around making them aware of where else in the organization their ideas may be useful and where else ideas may arrive from. Workers must also know how to use technology to post and search for new ideas. A receiver's ability to understand an idea, "absorptive capacity", can be a barrier. This can only be resolved through increasing the worker's own knowledge base, requiring an increased emphasis on substantive ongoing education and training.

One difficulty with existing training efforts is their lack of integration. To be most effective, training on creativity should include designing solutions that include opportunities for validation and dissemination of ideas.

INCENTIVES:

To create an environment that encourages the **generation** of new ideas, managers should consider the following policies: incentive pay for ideas generated by groups or individuals; no layoffs for productivity improvements that follow from new ideas; job duties that include tinkering; permitting or encouraging experiments that are well-conceived but fail; and giving credit to employees who generate new ideas.

Employees are most likely to spend energy **sharing** what they know if they are in a single workplace with group incentives. Thus, extra incentives can be helpful when employees are in different units without common objectives. Both monetary rewards and recognition can prompt people to be more open with information and can create corporate cultures in which sharing of information is valued.

For example, at Buckman Laboratories (See www.buckman.com), everyone sees who answers problems on the open bulletin boards. Those who contribute to solving company problems in public are praised, those who do not become conspicuous. Bob Buckman emphasizes the benefits of there being "no place to hide". Similarly, when Jack Welch, CEO of General Electric, sees a new idea, he always asks: "Who else knows about this?" People know that their reward for cleverness depends on being able to explain how their idea has been shared.

Managers can also be rewarded for subordinates' participation. For example, at NUMMI first-level supervisors' job evaluation depends in part on their subordinates' participation in the suggestion program.

In order to encourage not only sharing but also **evaluation** and **dissemination** of ideas, knowledge-creating divisions must be rewarded for creating knowledge that other divisions use. Corporate headquarters cannot monitor the value of the knowledge transfer between units, or even whether any knowledge is shared. Knowledge-creating divisions face costs of creating an idea, posting it to the corporate computer network, posting it carefully (for example, avoiding division-specific jargon, being complete, creating helpful keywords, providing appropriate pointers to people who can supplement the report), and helping the knowledge-using unit implement the idea.

One idea is to pay for each posted idea. This promotes quantity but not quality of ideas and provides no incentive for idea creators to help adopters in implementation. A more complex alternative is to pay for the measured quality of each idea. This provides

better incentives for quality ideas but is expensive due to the costs of evaluation. In addition, there is still no incentive for idea generators to help adopters. A third alternative is to pay bonuses based on knowledge-using units' claimed results. Variants on this process include having knowledge-using units nominate knowledge-creating units for internal awards, or giving each knowledge-using unit a fixed number of prizes it can award to knowledge-creating units that help it out.

Adoption depends in part on validation because ideas that are clearly effective are more likely to be adopted. But even effective ideas are sometimes not adopted and there are several psychological reasons for this. Potential adopters may find it hard to believe that one's own ideas are not better than those from elsewhere. In addition, many people find it difficult to see the applicability of ideas from elsewhere because understanding how ideas can work in new contexts can be difficult to perceive. Finally, it can be embarrassing to say others did it better since rewards typically go to "can do" people. These tendencies may be reduced if people are exposed to lots of stories of stolen, adopted, and adapted ideas, and of those using these techniques are acknowledged and rewarded.

STRUCTURES

The most important structural component that encourages creativity or idea **generation** is often providing time to experiment and tinker. This may run counter to other productivity measures that emphasize efficiency. Also, formal employee involvement structures such as brainstorming, suggestion programs, quality circles, and self-directing teams support both creating and **sharing** knowledge. People need the power and the responsibility to make improvements.

Another key element is to make the knowledge explicit. Many Japanese firms stress the importance of formalizing knowledge, turning it from tacit to explicit. At the same time, these same firms often stress the importance of being "on site" so one can use most of the five senses to understand a problem (MacDuffie, 1997).

To promote **evaluation**, companies must institutionalize means of learning from past experience: "Companies must review their successes and failures, assess them systematically, and record the lessons in a form that employees find open and accessible. One expert has called this process the "Santayana Review", citing the famous philosopher George Santayana, who coined the phrase "Those who cannot remember the past are condemned to repeat it." (Garvin, 1993)

A variety of organizational structures can promote the **dissemination** and **adoption** of ideas. Despite the current emphasis on technology and new methods of idea transmission, much knowledge remains tacit and is most efficiently transmitted in person, renewing the importance of decidedly low-tech practices including job rotation across units, cross-functional meetings, cross-unit or cross-group meetings (e.g., sales convention), mentoring, training, and free time during coffee breaks.

TECHNOLOGY

What technologies support knowledge transfer? How can we integrate new technologies such as Intranets, groupware, the Internet, with other managerial practices?

One way in which technology may promote idea **generation** is through its ability to provide information, including real-time tracking of results, and communication with customers.

Groupware promotes **sharing** by tracking the status of ideas and communicating them across a group, or further with wide-area networks. Technology helps the quick **evaluation** of new ideas by capturing actions and transactions and computing their effectiveness. Personal computers can assist through the use of statistics.

Technology can help with the **dissemination** of ideas by making it easier to target appropriate recipients such as 1) a group defined formally by a common product, job title, or project, 2) a group formed by management, or 3) an ad hoc group formed by workers such as a mailing list, with either public or private membership. As the technology develops, the groupware itself should help determine who is likely to need a piece of information. Some examples are bulletin boards, Web pages, and newsgroups where people self-select to read. Complementing newsgroups and email, Internet "push" technology (currently implemented by Pointcast, for example, on the World Wide Web) deliver news of the sorts requested by users.

Those **adopting** new ideas can use email to communicate with the disseminators of new ideas and ask for help in implementation.

Conclusion: The Importance of Integration

Organizations worry a lot about promoting creativity and innovation but, in many cases, useful ideas already exist in some form. The key is to capture the existing knowledge from within, and outside, the organization and adopt those ideas that are relevant. This essay steps through five stages of knowledge transfer: creation, sharing, evaluation, dissemination, and adoption. For each stage, we examine the how training, incentives, structures and technology can be used to enhance the process. In order for an organization to be a true "learning organization", it must acknowledge the importance of all phases of knowledge creation and transfer and endeavor to create a culture of sharing and continuous improvement.

Focusing on some stages but not others is less effective than moving along with all stages in an integrated fashion. Creating knowledge but not sharing it, or finding that other groups cannot learn it, makes knowledge creation less relevant. If knowledge is transferred successfully, but not first validated, then lots of costly fads will sweep companies. Finally, true integration involves self-reflection -- doing cost-benefit and cost-effectiveness analysis, and continuous improvement of the learning and knowledge processes.

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