

Concept Mapping: A Tool for Representing and Sharing Expert Knowledge

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William Green, CEO of global consulting firm Accenture, claims that “more than 25 percent of today’s working-age population will leave the American workplace by 2010.”¹ “And that giant sucking sound you will hear is all the knowledge being drained out of organizations by retirements and other forms of turnover.”²

When they walk out the door of their organizations for the last time, these retirees will take with them approximately 400 million years of on-the-job experience. This retirement deluge is creating a crisis because organizations have not yet fully adapted to what it takes to succeed – and sustain success – in the knowledge economy.

In his 1966 book, *The Effective Executive*, Peter Drucker described what it means for an organization to function in a knowledge economy. “Every knowledge worker in the modern organization is an ‘executive’ if, by virtue of his position or knowledge, he is responsible for a contribution that materially affects the capacity of the organization to perform and to obtain results.”³

Over 40 years later, we’re still in transition to organizations that have embedded processes, tools and rewards to enable people to create and continuously improve knowledge as part of their daily work.

THE MYTH OF KNOWLEDGE TRANSFER

Organizations need to find effective ways to retain the capacity that the expertise of retiring employees represents. They also need to develop ways to rapidly bring new employees up to speed.

This process is typically referred to

as “knowledge transfer” and organizations are using an array of tools and methods to accomplish it, including: story-telling, knowledge management systems such as information databases for customer support, interviews of subject matter experts that are translated into a knowledge representation, video-taped interviews and mentoring.

But there’s a fly in the ointment. Learning research of the past 40 years has revealed that knowledge cannot be transferred. In order to be meaningful, the learner must construct knowledge. Learners must make the effort to meaningfully integrate new information into their existing mental models or cognitive structures. If this doesn’t happen, the learning is rote. New information is stored as a “cognitive island” and is easily forgotten or distorted.

Of the above mentioned methods, mentoring is the most likely to lead to meaningful learning. But it is time-intensive, costly, and not highly leveraged by organizations.

THE CONCEPT MAPPING ADVANTAGE

Concept mapping, originally developed at Cornell University, is an effective tool to elicit and visually represent the expert knowledge of individuals and teams. Concept mapping is effective because its development is guided by cognitive theory and produces a knowledge representation that supports the user/learner to develop expert knowledge. The effectiveness of concept mapping to support meaningful learning, collaboration and training has been validated by over 30 years of research.

In knowledge retention initiatives, expert knowledge is typically captured through interviews, and then

the interviews must be translated into a knowledge representation.

Knowledge elicitation with electronic concept mapping tools reduces time and cost because it produces a concept map as the interview documentation. This eliminates the need for a translation phase, saves time and money, and results in a more accurate knowledge representation because the expert participates in the refinement of the concept map as part of the interview process.

CONCEPT MAPPING AT WORK

For example, a concept map representing the “tacit knowledge” of a cardiologist with expertise in “first pass functional imaging” for diagnosing coronary problems was used to design an artificial intelligence program for training. Using this program, lab technicians were able to identify individuals at risk with an accuracy rate of 93 percent.⁴

In a business setting, a leading consumer products company used team concept mapping to reduce time to market for a product. They asked this guiding question: “What do we need to know in order to create a new paper towel that is 20 percent more absorbent than product X?” The resulting concept map not only served the team in its product development efforts, but also became a valuable organizational knowledge asset that could be improved and reused. The context, one of the most important and most difficult things to convey, remains permanently visible.

Using expert knowledge elicitation and concept mapping, we helped a small business owner reduce the time and cost of getting temporary customer service representatives up to speed. One question I asked the

owner was: “What do you know about your customers that a new customer service person doesn’t understand and needs to know?” The result was a suite of six nested concept maps, with key documents and a Web site attached, that lives on the desktop, easily accessible by new hires. The business owner reported: “The reduced ramp-up time was a huge success for us.”⁵

Another client is using concept maps to support collaboration and capacity building among partners in the Center for Strengthening the Teaching Profession’s New Teacher Alliance. Partners attach documents representing their work to an electronic conceptual framework of goals and objectives created by the leaders. Partners also extend that framework by clarifying the meaning of key elements.

Trainers at nuclear power plants have used concept mapping to capture the expert knowledge of nuclear engineers and equipment operators. In one case, an engineer who had been promoted was unable to settle into his new job because of frequent interruptions and questions from the person who replaced him about how to operate the equipment.

A trainer spent half a day with the engineer eliciting and mapping his expertise about how to run the equipment and the special issues it presented. This was given to the new operator and it did the trick. The promoted employee was freed to immerse themselves into his/her new position.

Electronic concept maps can be continuously improved through the addition of digital documents and media – podcasts, video clips. New links that explain the relationship between concepts reflect insights and creative associations. New sub-concepts represent deeper, more fine-grained understanding. The contributions result in a concept map rich in context and content. It’s “learning ready,” interesting to explore, and easy to contribute to and improve.

For instance, concept maps of strategic goals and core knowledge can become part of a company’s intranet. Concept maps stored on a server can be accessed from anywhere on the globe, making global knowledge building relatively easy.

The task organizations face as baby boomers retire is not to transfer

knowledge; it is how to create an organization-wide culture of learning and knowledge-sharing – what Nonaka and Takeuchi call, “the knowledge-creating company.”⁶

WHAT HR PROFESSIONALS CAN DO TO HELP

- Promote the use of knowledge representations that facilitate meaningful learning. This will make knowledge sharing more effective and will provide new hires with the rich context they need to gain expertise and get up to speed.
- Help upper management and line managers understand the nature of expert knowledge and what it takes to support every employee in developing expert-like mental models and in becoming an expert learner.
- Represent and share knowledge in a form that is easy to integrate into the daily work of the organization: just-in-time knowledge that is readily accessible for use in team meetings, report preparation, business plan preparation and forecasts.
- Promote a culture of learning and continuous improvement of knowledge. Completing tasks – making sure product roll-outs happen on time and within budget, developing and executing strategic plans – tends to dominate the mindshare in most organizations. The shortening of product cycles and the rapid pace of change are challenges for reflecting not just on “what we did,” but also on “what we learned.” What new knowledge, insights or perspectives can we share that would make the whole company smarter?

BOTTOM LINE IMPACT

Organizations will continue to grapple with organizational learning and knowledge-based capacity issues triggered by the retirement crisis for the foreseeable future. By offering effective tools and methods, HR’s leadership can:

- Reduce the cost of on-boarding new employees. Contextually rich knowledge representations can convey the big picture, while also showing how the individual employee fits into it.

- Reduce the cost of eliciting and representing the expert knowledge of individuals and teams.
- Increase trust, morale, and engagement by increasing management transparency and making employee contributions visible.

Concept maps are flexible and powerful tools for accomplishing these goals. Few tools are so widely applicable, valuable, and accessible for addressing essential workplace issues.

ENDNOTES

1 Holstein, William J. “A Gold Watch and a Vacuum,” *Office Space: Armchair M.B.A.*, *New York Times*, August 28, 2005, Section 3, p. 9. See article excerpt by Accenture in “Addressing the Issue of the Aging Workforce,” at www.accenture.com/Global/Services/By_Subject/Workforce_Performance/R_and_I/AddressingWorkforce.htm

2 DeLong, David W. *Lost Knowledge: Confronting the Threat of an Aging Workforce*. New York: Oxford University Press, 2004, p. 13.

3 Drucker, Peter F. *The Effective Executive*. New York: Harper Business, 1966.

4 Novak, Joseph D. *Learning, Creating, and Using Knowledge: Concept Maps™ as Facilitative Tools in Schools and Corporations*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 1998, p. 100.

5 Jaffe, Marcy. Personal letter to author, April 21, 2005.

6 Nonaka, Ikujiro, and Takeuchi, Hirotaka. *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford, England: Oxford University Press, 1995.

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