

Patterns as Facilitators for Knowledge Building in Learning Organizations

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Abstract: Learning organizations encourage individual learning and knowledge building. According to Cress & Kimmerle (2008), individual and organizational knowledge co-evolve by externalization and internalization processes. However, these processes are more difficult for knowledge-in-use. We propose that patterns facilitate the exchange of knowledge-in-use by relating specific problems to solutions, and thus support the co-evolution of knowledge-in-use. The implementation of a pattern-based knowledge exchange tool in an organization is introduced and first experiences described.

Individual Learning and Organizational Knowledge Building

Learning organizations support both individual learning and organizational knowledge building, which is learning at the organizational level (Pedler, Boydell & Burgoyne, 1989). The Co-evolution model by Cress and Kimmerle (2008) points out that individual learning and knowledge building are intertwined. By the process of externalization, individuals contribute their knowledge into a shared digital artifact. The externalized knowledge then exists independently from the individual. Another person is now able to gather the information contained in the artefact and transfer it into that person's individual knowledge (internalization). The group collaborates through communication that occurs within the digital artefact, for example by modifying the artefact, reflecting it or commenting on it, thus leading to a co-evolution of both individual and organizational knowledge.

The co-evolution model has not specified the type of knowledge that evolves. It may, however, not be equally easy to exchange different types of knowledge. Little is known about the exchange of complex *knowledge-in-use*. Knowledge-in-use (De Jong & Ferguson-Hessler, 1996) is a combination of different types of knowledge that are necessary to perform a given task, solve a problem or handle a complex situation. Knowledge-in-use is embedded in daily challenges and in most cases implicit (Smith, 2001). Knowledge-in-use is highly *situated* (Greeno, 1998), and individuals build *situational knowledge*, that is, a relation between a situation that requires certain knowledge and the knowledge itself, about situations as they typically appear in a particular domain (De Jong & Ferguson-Hessler, 1996). This relation helps to identify relevant features of a current problem, to build an adequate representation of the problem and to retrieve additional (declarative, conceptual or procedural) knowledge to solve a problem.

Knowledge-in-use is often the most precious treasure of learning organizations. In contrast to declarative or conceptual knowledge, it is obviously not easy to externalize, internalize and collaboratively develop knowledge-in-use. The externalization of partly tacit knowledge-in-use is laborious, because individuals have to be aware of their individual work routines and experiences. They have to draw general conclusions from situated knowledge-in-use and present their knowledge in an abstract way, so it can be transferred to other situations and contexts. Internalization processes are also not trivial. Individuals will have to transfer abstract information to a concrete situation. If successful, externalized knowledge will help others to detect features of a current problem, retrieve and adapt relevant knowledge-in-use to a specific situation.

We propose that patterns support the co-evolution of individual and organizational learning by facilitating externalization, internalization and evolution of knowledge-in-use.

Patterns and Knowledge Building

Patterns are structured input formats that connect a problem to a solution, indicate the context where the solution is successful and stimulate reflection by asking on different forces and (wanted and unwanted) consequences. *Externalization* is supported by patterns, because they help experts to focus on invariant components of recurring problems and their successful solution, so that different individual experiences are integrated into an abstract pattern that explicates the key components (figure 1a). By the explicit description of problem and solution, experts are reminded of tacit parts of their knowledge-in-use and completeness of descriptions is improved. Patterns support the *internalization* of organizational knowledge-in-use by explicitly stating the situations where that knowledge is needed. Thus, knowledge-in-use is more easily activated in situations where the knowledge can be adapted. The *evolution* is supported by patterns, because they facilitate a common language and structure in knowledge descriptions. Experiences of different experts may be integrated

into one shared pattern, so knowledge will be reflected and revised in a collaborative process. If successful, this will lead to new, emergent organizational knowledge (figure 1b).

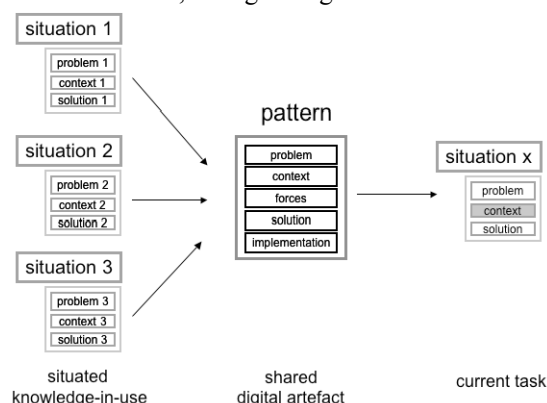


Figure 1a. Externalization of Knowledge-in-use.

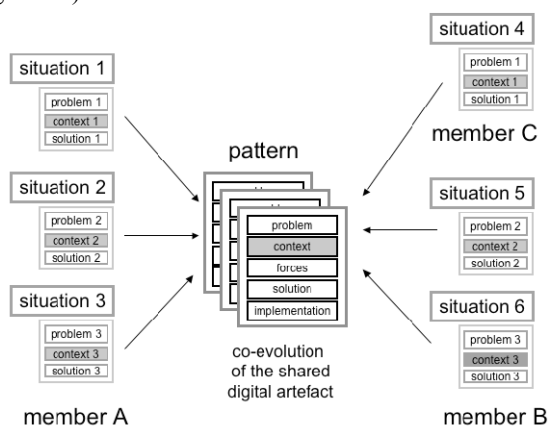


Figure 1b. Co-evolution of a Pattern.

Implementation of Pattern-based Knowledge Building

The project “Patterns and Tools for Non-Governmental Organizations” has implemented a pattern-based knowledge exchange platform in one of the biggest churches in Germany, the *Evangelische Kirche in Deutschland*, where 250,000 full-time staff members and about one million volunteers work together. A preliminary study indicated that there is a great amount of unshared individual knowledge-in-use, a strong organizational need for exchanging and developing this knowledge, and a readiness to use the internet.

The knowledge exchange platform consists of three main areas that are named “idea space” (a discussion board), “experience space” (a pattern-based collection of good practices) and “knowledge space” (a pattern-based wiki that is a collaborative written collection of reflected lessons learned). While contributions in the idea space are short and concrete, articles in the experience space describe single projects or situations. The patterns in the knowledge space are abstractions of individual experiences to an organizational collection of knowledge-in-use. The three spaces of the platform are strongly linked together in order to facilitate development from concrete ideas to more abstract, collaboratively written articles in the knowledge space. Mechanisms to support transformations between spaces are threaded and summarized discussions, links between spaces, networks that visualize articles related to similar topics and direct advertisements to contribute to the collaborative knowledge space. Moreover, professional profiles and the possibility to create groups support networking and collaboration.

In the 10 months after the launch of the platform, more than 2000 registered users could be won, not to name numerous anonymous readers of those pages that are accessible without registration (about 240 000 retrievals per month). In focus groups and online surveys, the platform is evaluated positively by the users, but psychological (e.g., reluctance to change someone else’s product, fear of losing face or getting personal feedback) and organizational barriers (e.g., lack of support by superiors, missing positive feedback for one’s contributions) make the ratio of active users compared to the passive readers seem small. 10% of the registered users have produced more than 300 articles in the experience space, 4% have written around 230 articles in the knowledge space, 3% have create more than 100 discussions. Collaborative actions take place in the form of modifying and commenting articles in the knowledge space (around 2% of the users) or participating in discussions in the idea space (4% of the users). 12 % of the users fill in their professional profile and 4% make use of the possibility to create contact to other users. These numbers of active contributors are comparable to other knowledge-sharing platforms, or to social software tools related to knowledge (e.g., Wikipedia). Future challenges will be to overcome the barriers that hinder active contribution and stimulate collaboration, so that other learning organizations may profit from a tool that fosters individual knowledge and knowledge building co-evolution.

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