

Learning by Experience Networks in Learning Organizations

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Abstract: *As part of the Virtual University of Finland, the Connet framework offers undergraduate courses in Cognitive Science. The studies are mainly organized as web-based courses or collaborative student projects. In the basic studies component, a student completes four one credit methodology courses and chooses a related assignment worth three credits for one of them. One of the methodology courses is entitled Networks in Learning Organization. It will be delivered entirely on the web, and it also will serve as a pilot course to help design other methodology courses.*

This paper will first briefly discuss the theoretical foundations of learning organizations and organizational learning. Then, we will review the role of networks as the technological foundation of a learning organization and continue by discussing the use of educational technology to support organizational learning and learn about it. Finally, we will describe the structure and the methods of the course and present topics that form the starting point for the discourse within the course.

Introduction

As part of the Virtual University of Finland, the Connet framework offers undergraduate courses in Cognitive Science. The studies are mainly organized as web-based courses or collaborative student projects. For example, in the basic studies component, a student completes four one credit methodology courses and chooses a related

assignment worth three credits for one of them. One of the methodology courses is entitled Networks in Learning Organization. It will be delivered entirely on the web, and it also will serve as a pilot course to help design other methodology courses.

For the students, the goal of the Networks in Learning Organization course is to learn to utilize network-based collaborative software tools for communication within a given organization in ways that contribute towards development of that organization. For example, the course introduces various CSCW (computer-supported collaborative work) and problem solving tools, which the students are asked to use to work on topics related to learning organizations.

The fact that network-based learning is learned via network-based learning tools is of particular interest. The learning by experience principle obviously fits the given context well. The students taking the course are required to establish small heterogeneous groups. These groups will form their fictitious organizations, specify their goals, communicate with organizations of their peer students, and develop their own organizations further on. Students may also use any available open problem solving tools to intensify their learning process. To add real life flavor, the students can also belong to several organizations at the same time.

This paper will first briefly discuss the theoretical foundations of learning organizations and organizational learning. Then, we will review the role of networks as the technological foundation of a learning organization and continue by discussing the use of educational technology to support organizational learning and learn about it. Finally, we will describe the structure and the methods of the course

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Learning organizations and organizational learning

The topic of learning organizations (and the related topic of organizational learning) has been widely discussed in management literature for more than twenty years, at least since Argyris & Schön (1978) published their seminal book *Organizational Learning*. The topic has been extensively covered in books (Argyris & Schön, 1978 and 1996; Garvin, 2000; Garrat, 2000; Senge, 1990) and in comprehensive review articles (for example, Dodgson, 1993; Fiol & Lyles, 1985; Huber, 1991; Levitt & March, 1988; Robey, Boudreau & Rose, 2000). The purpose of this section is not to provide a comprehensive integrative review of the area but to highlight the most important findings that are important in forming the foundation for the course described in this paper.

As several authors (including Garvin, 1993 and Crossan, Lane, & White, 1999) point out, the active academic discussion on organizational learning and a learning organization has not been able to produce one consensus definition for this widely used term. Following Garvin (1993) and other influential authors in the field as cited below, we believe that at least the following elements of organizational learning are important in understanding the nature of genuine learning organizations (i.e., organizations that consistently exhibit effective and efficient learning behaviors):

1. In organizational learning, organizations *observe their own behaviors and actions and modify them based on the feedback they receive from the environment* with the natural goal of improving their performance. (Argyris, 1977; Fiol & Lyles, 1995).
2. Organizational learning is a process of *sharing of "insights, knowledge, and mental models"* (Stata, 1989), and it requires efficient and effective *communication* within the organization.
3. Organizational learning increases "the *range of its potential behaviors*" (Huber, 1991), i.e., it improves the organization's ability to choose a proper behavior for a particular situation.
4. Organizational learning is a *continuous and never-ending process* (Garratt, 2000; Garvin, 1993).
5. Organizational learning requires *creativity and innovation*. (Garvin, 1993).
6. Organizational learning requires that the organization is capable of encoding the results of its learning in both *behaviors* (Fiol & Lyles, 1985) and *repositories for conceptual understanding and factual knowledge* (Walsh & Ungson, 1991; Robey, Boudreau, & Rose, 2000). The latter perspective links this issue immediately to the very popular topic of knowledge management (Davenport & Prusak, 1997), and it seems obvious that any genuinely good learning organization is also competent in its knowledge management activities.

Crossan et al. (1999) provide interesting and important insights about organizational learning for our purposes because they discuss extensively the linkage between learning at the individual, group, and organizational levels. They specifically emphasize that organizational learning is a multi-level process and it takes place at all of these three levels simultaneously. According to them, the links between these levels are based on four social and psychological processes, which they call *intuiting, interpreting, integrating, and institutionalizing* (Crossan et al 1999, p. 525). *Intuiting* is an individual level process, *interpreting* forms a bridge between the individual and group levels, *integrating* links the group and organizational levels, and finally, *institutionalizing* takes place at the organizational level. *Institutionalizing*

is the true organizational learning process in a sense that it is the only stage where learning will be embedded in the organizational systems, processes, and practices, but *institutionalizing* cannot take place without the previous stages, i.e., the processes that take place at the individual and group levels. Thus, all levels have to be taken into account also in pedagogical approaches utilizing organizational learning ideas.

Communication Networks as a Foundation for Learning Organizations

In their comprehensive review of the literature on the relationship between organizational learning and information technology, Robey et al. (2000) identify two main streams of research: a) use of organizational learning methods and tools to learn about information technology and b) the use of information technology to support organizational learning. From the perspective of creating a learning environment for learning about learning organizations, the latter stream is clearly more interesting. In their discussion, Robey et al identify two major (and intuitively obvious) ways information technology can be used to support organizational learning (and thus learning organizations):

1. Information technology can be used for maintaining organizational knowledge repositories and thus, supporting organizational memory. Again, the practitioner literature on knowledge management (e.g., Davenport & Prusak, 1997) is very closely linked to this topic.
2. Information and communication technology can be used both for communication and discourse between individuals and groups within the organization and for access to the knowledge repositories. In addition, communication networks support individual learning across organizational boundaries.

Organizational knowledge repositories can, naturally, be maintained with a rich variety of technologies varying from relational database management systems for structured databases used for administrative information systems to highly unstructured repositories of multimedia data maintained on a corporate intranet, which can be based either on open WWW technologies or on Lotus Notes or other similar proprietary technology. The types of technologies that are appropriate for a specific organization depend on a variety of factors (size, industry, technical expertise, knowledge intensity, etc.), but it is essential that every organization explicitly recognizes the need to formally organize and maintain their knowledge repositories so that they support the organization's learning goals. Experience from a variety of organizations suggests that particularly the efficient utilization of unstructured textual and multimedia data is very difficult, both because it is difficult to find strong enough incentives for organizational members to consistently contribute to the common repositories and because the interpretative processing of the repository contents is often difficult and insufficient.

It is important to note that the communication support that the networks provide takes place at two different levels: on one hand, they provide efficient access to factual knowledge both through individual (e.g., e-mail) and group (electronic conferencing) communication and through access to various knowledge repositories. On the other hand, they support the group level interpretative processes (Crossan et al 1999) by supporting one-to-one and group level discussion and debate. The structure information systems provide for communication can be a vitally important part of efficient support for the organization's learning processes, although it is clear that individuals and groups do not always follow the structures systems create for them - instead, they appropriate the technology in ways that best

supports their personal goals (DeSanctis & Poole 1994). Therefore, evaluating the fit between the use of communication technologies and organizational learning goals is important.

Learning about Organizational Learning using Educational Technology

A successful implementation of virtual courses and curricula requires an explicit need and a well-defined objective. Educational technology is too complicated to be wasted for building applications or information repositories with an unspecified educational goal. Compared to many other subject areas, the motivation for building a virtual course on Networks for Learning Organization is strongly related to the skills it builds. Summing up the elements of organizational learning, it is easy to draw the goals of the course. A student should

1. experience herself as a member of a learning student organization, which is linked together by a communication network;
2. be able to evaluate the tools applied in the network; and
3. analyze the learning process of the group.

These goals are clearly hard to achieve by a regular material-based course, whether implemented in a traditional classroom setting or as a web-based information package. Hence, rather than starting from a teacher's point of view, by providing a learner with extensive material on organizational learning, we should give him an experience of participating in a organizational learning process and absorbing the course's goals from inside.

In educational technology literature, behaviorist methods have long been juxtaposed with constructivist learning environments (Boyle 1997; Jonassen et al. 2000). However, even the latter often emphasize "objective" learning: a student might learn a topic by seeking for information in the World Wide Web or taking a role in a virtual world, be it a simulation or a MUD. Even learning environments which involve a group of real learners exploring a real case, like distributed cognition (Bell & Winn, 2000), are based on the objective approach stressing the distance between a cognitive learner and the object to be studied, individually or as a collaborative group. In experience-based learning, or participatory learning, the approach is highly "subjective": one is learning the system he is in. The learning environment is not just a - potentially alienating - cognitive tool but a world to be explored and learned; like a profession in the traditional system of apprenticeship.

To learn, an apprentice needs a concrete assignment to work on. In the case of learning to use networks for organizational learning, the concrete assignment consists of the following elements:

- A learning organization. This could obviously be a group of students learning the same course at about the same time.
- A learning goal. The idea of a learning organization is to improve its performance; thus, the student group selects a topic from a given list or develops a problem of its own.
- A communication network. The natural choice is to provide the student group with CSCW software tools running over the Web.

The similarity of organizational learning to problem-based collaborative learning is evident. However, the problems of a learning organization are rarely explicitly specified, or closed, but rather blurred or fuzzy. This means that the group should not only improve the performance of an identified process or practice, but even recognize the problems by themselves. This means that they need to make use of a creative problem solving tool. It is important that the students do not only communicate with each other, sticking to their starting points, but are open to novel and innovative approaches. To intensify this process, tools like idea generators are needed; for example, the

IDEGEN software. These tools should be applied to the problem solving phase as well as its specification.

However experience-oriented the organizational learning process might be, the group involved has to be able to reflect the process afterwards. Hence, the students need tools to keep track of their learning process. The purpose of the organizational learning process should not be limited to just an improved performance but even a better capability to improve performance; a more efficient way of organizational learning. Various tools for creating a collaborative learning diary could be applied; for example, Woven Stories (Harviainen et al. 1999).

Structure and Methods

In this section, we will discuss at a more detailed level the issues related to the implementation of the course and provide a description of the structure that the course will follow.

The course will be structured as an organizational development project in which students will be assigned into small teams that work together to solve problems closely related to the primary topic areas of the course. The problems will be presented in the forms of small open-ended case descriptions that have been designed to illustrate issues learning organizations are facing. For each instance of the course, the process will be synchronous and it will have a clear starting point and a well-defined end.

The course will be structured as follows:

1. At the time of the course registration, students provide demographic and academic background information. In addition, their pre-course attitudes towards and their initial ideas regarding solutions to organizational learning problems will be captured.
2. The background information and the data regarding the students' initial attitudes and solution models will be used to form heterogeneous teams of four or five students. The intention is to find heterogeneity not only in terms of gender, technical skills, professional experience, and academic background but also ensure that each team members' basic initial approach to solving organizational problems is not the same. We believe that some level of initial disagreement is beneficial because it provides a fruitful starting point for a fuller exploration of the solution space. The extent to which the group formation will succeed depends, of course, on the initial heterogeneity of the student population, but the interdisciplinary nature of the program should ensure sufficient diversity.
3. The students will attend 2-3 initial background modules ("lectures") that will be implemented in the virtual environment but delivered synchronously. The purpose of these modules is to ensure that the participants have a sufficient understanding of the basic concepts, fundamental goals, and the most important existing work in the area. The intention is not to provide model solutions or teach approaches to problem solving, but to provide an initial understanding of the work that the students can use as a resource while working on their own problems. To the extent it is possible, links to the most important resources will be provided in the virtual environment (see the references of this paper for examples of seminal work in the area).
4. Each team will be assigned a topic that has been identified in the organizational learning literature to be a potential problem area. The next section will briefly discuss these topics. In addition to a brief textual description, the teams will get a short case that illustrates the nature of the problem in an organizational context. For each instance of the course, the problems will be categorized into problem families that provide natural linkages between the teams.

5. The teams will work on the problems using two different types of tools: a) a distributed learning environment such as Lotus Notes, TopClass, or WebCT, and b) a problem-solving support and idea generation tool such as IDEGEN described above. The directions given to the teams will focus mostly on outcomes and not on the process because the active discovery of the process is one of the most important learning objectives of the entire course. An electronic log of the communication events will be maintained on both of the tools. In addition, the students will be asked to maintain a personal journal that includes their experiences regarding the learning process.
6. The outcomes of the problem-solving process will include the following elements: a) a definition and detailed identification of the aspects of the problem; b) a conceptual analysis of the factors relevant for the problem based on existing literature; c) raw results of the idea generation process; d) a description of solution alternatives; and e) a detailed description of the selected solution with a carefully developed justification for the selection. The final reports will be made available for all students in the course.
7. The analysis of the learning process is also a vitally important part of the learning process. After the teams have gone through the idea generation - solution selection process described above, they will be asked to review the electronic logs and their own personal journals in order to analyze the strengths and the weaknesses of their team as a learning organization with a strong focus on the reasons that affected the quality of the team's performance. Specifically, the teams are asked to make suggestions regarding the ways they could have improved their performance and avoided the problems they were facing during their work.
8. In addition to the two team reports (solution report and analysis of the learning organization), the course will require an individual final examination that will be administered as a mini-paper that requires the students to master not only the results of their own work but also the fundamental concepts introduced in the introductory lectures, a subset of the materials included in the course repository and, most importantly, in the work by the other teams.

Potential Topic Areas for the Teams

During the course, the topic areas that the project teams will be working on will be expressed as problem descriptions focusing on issues such as these:

- Only few members of the organization actively contribute to the organizational knowledge repositories.
- Large amount of data is available in knowledge repositories but it is poorly organized and not interpreted in the organizational context.
- Large amount of information is available, but the users ignore in their daily work the repositories in which the information is stored.
- The organization suffers from a very strong 'Not Invented Here' - syndrome.
- Best practices discovered within the organization are never shared with other members of the organization. In general, there is very little communication between organizations' members.
- The organization is very inflexible, reluctant to change, and demonstrates very little creativity.
- The organization performs well in familiar situations but it has a very limited ability to adapt to new circumstances.

- Emphasis on organizational learning has become a theme that surfaces occasionally as a special project, but the organization is not able to maintain a consistent focus on learning.

All these topic areas are very close to the core identity of organizational learning and learning organization (please see the discussion related to the nature of learning organizations above in Section 2).

Please note that these comprise just a small subset of possible issues, and that the limited amount of space allows only brief, cursory descriptions of each of the topics. Actual problem descriptions will be significantly longer and they will, as discussed above, be accompanied with a brief case that links the problem to the organizational context. Cases will come with instructions stating that the case illustration is not intended to provide an exhaustive description of the problem space.

Future Research and Conclusions

This course provides plenty of opportunities for future empirical research in this area. Although constructivist and experiential learning approaches are well-known and widely researched topics, in this case the dynamic interaction between the topic area and the pedagogical approach form a unique combination that generates a lot of questions for future investigation.

One of the interesting questions that can be explored with this course is the role of repositories and various types of repository components in this environment. How much will the materials available in the repositories be used in the formulation of the solutions to the problems and which types of materials will be used most? What is the value of materials from one course instance to the participants of later instances and are the courses able to build on the top of material developed by previous participants? With the future course instances, it will be possible to manipulate the availability of the various types of repository materials and evaluate the effect this has on the nature of the learning process.

Another interesting area for further exploration is the interteam communication: In this paper, we have only briefly referred to the interaction between the teams, but we believe that building incentive mechanisms to encourage this may have an important impact on the learning process through which we might also be able to model some of the knowledge transfer processes. What are the mechanisms that truly encourage cooperation between the teams and how will this cooperation affect the learning results? Finally, the course will provide an interesting opportunity to evaluate the relationship and the linkage between the uses of the various tools, in this case a traditional collaboration support tool and a tool for idea generation support.

The core idea of the course Networks in Learning Organizations will be the use of a learning organization to learn about organizational learning and learning organizations. In this topic area, it is vitally important and beneficial to apply the principles of constructivist and experiential learning approaches because they (particularly experiential learning) are very close to the fundamental issues of the field. In the same way passive repositories of knowledge do little good to any organization if they are not actively linked to the life of the organization, traditional repository based approaches to learning are not effective in teaching students the core concepts of learning organizations. We believe that the planned course that places the integration of intellectual activity and practical experience of the students to the center of the process will provide them with a deep and long-lasting understanding of the use of networks for building learning organizations.

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