ORGANIZATIONAL LEARNING IN A FOREST COMPANY
(Track 1)

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ABSTRACT

This paper offers an organizational viewpoint of learning. The focus is to examine how does a forest company's maintenance organization learn and develop. The main models for organizational learning in the focus organization are basic education, updating training, work-based learning and new recruitments.

Bandura's (1977, 1986) *social learning theory* sees learning as a continuous, dynamic and reciprocal interaction between individuals affecting, in particular, their attributes, values and behaviours. There is considerable evidence that a great deal of learning takes place at work but there is no single theory of learning in the workplace. The term *work-based learning* can relate to the placement elements, provided as part of a higher education course, it can refer to the semi-formal on-the-job training provided within organisations, and it can include the myriad of informal learning experiences to which people are exposed throughout their working lives (Cheetham and Chivers 2001, 265-266).

Organizational learning occurs when an organization achieves what is intended; that is, there is a match between its design for action and the actuality of outcome. Second, learning occurs when a mismatch between intentions and outcomes is identified and it is corrected; that is, a mismatch is turned into a match. Whenever an error is detected or corrected without questioning or altering the underlying values of the system (be it individual, group, intergroup, organizational or interorganizational), the learning is single-loop. Double-loop learning occurs when mismatches are corrected by first examining and altering the governing variables and then the actions. Governing variables are the preferred states that individuals strive to "satisfice" when they are acting. Double-loop learning questions the status quo and encourages rare events. Single- and double-loop learning is required by all organizations. Single-loop learning is appropriate for the routine, repetitive issues – double-loop learning is more relevant for the complex, non-programmable issues (Argyris 2004, 10, Argyris 1999, 67-69). According to Pedler et al. (1997) learning company is an organization that facilitates the learning of all its members and consciously transforms itself and its context.

Paper Business Sector

In Finland the forest cluster includes: forest economy, pulp, paper and paperboard industry, timber industry, the producers of machinery, the automation and chemicals needed in this industry, packaging industry, graphics industry, energy industry, logistical and consulting companies as well as research institutions and universities (Metsäteollisuus ry. 2000, 21–23). The most important areas are pulp, paper and timber (Lammi 2000, 1, Lammi 2000b, 13). There are 27 paper mills, 14 paperboard

mills, 18 pulp mills and 23 mills producing mechanical and semi-chemical pulp in Finland. (Forest.fi, 2008). The forest cluster employs 200 000 people. In addition to the importance as employers, forest sector companies have also played a significant role in building Finnish society, in shaping institutional infrastructures, state policies, and the life of local communities early in Finnish history (Tainio and Lilja 2003, 70, 80).

Finnish forest companies have experienced a radical transformation during the last two decades. Companies have been purchased, mergers have occurred, operations have become more international and companies have renounced some business areas (Alajoutsijärvi and Lilja 1998, 18-19). During the last decade the forest industries have undergone considerable centralisation and internationalisation, and both trends are likely to continue. Companies which are Finnish or have their head office in Finland have expanded their operations to Europe and other continents, though they may not be regarded as global companies so far. At the same time, their ownership has spread to become global. (Forest.fi, 2008). Because of this development the number of personnel has decreased and personnel reorganizing have occurred. Concurrently, due to the aging workforce, the need for recruitment is rapidly increasing. But there exists a lack of sufficient educated workers available for the forest sector (Metsäteollisuus ry. 2000, 57; Lammi 2000, 31). Also technological development has caused growing demands for updating training.

Maintenance

The European Federation of National Maintenance Societies (EFNMS) defines *maintenance* as: All actions which have the objective of retaining or restoring an item in or to a state in which it can perform its required function. The actions include the combination of all technical and corresponding administrative, managerial, and supervision actions. The forest company of this study defines it's maintenance as a combination of all technical, administrative and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function.

Research Design

The focus group of this study operates in maintenance function in a Finnish paper mill. The research was qualitative by nature. 29 managers and supervisors were interviewed with focused interview. 22 interviewees worked in maintenance and 7 in production.

INTRODUCTION

Change forces organization to learn. Argyris and Schön (1978) defined *organizational learning* as: "the detection and correction of error". Dodgson (1993) described organizational learning as: the way organizations build, supplement and organize knowledge and routines around their activities and within their cultures and adapt and develop organizational efficiency by improving the use of the broad skills of their workforces. Learning occurs when understanding, insight and explanations are connected with action (Argyris 2003). The focus of this paper is to examine how does a forest company's maintenance organization learn and develop. Important questions are: how the concept of organizational learning is perceived and appreciated in organization and what methods and tools are used in the development process of company's personnel.

BACKGROUND

Workplace Learning

Bandura's (1977, 1986) *social learning theory* sees learning as a continuous, dynamic and reciprocal interaction between individuals affecting, in particular, their attributes, values and behaviours. There is considerable evidence that a great deal of learning takes place at work but there is no single theory of learning in the workplace. The term *work-based learning* can relate to the placement elements, provided as part of a higher education course, it can refer to the semi-formal on-the-job training provided within organisations, and it can include the myriad of informal learning experiences to which people are exposed throughout their working lives (Cheetham and Chivers 2001, 265-266). The research made by Cheetham and Chivers show a wide variety of ways in which professionals acquire their competence. In addition to formal education, learning can happen in practice and in repetitive situations but also in reflection. Observation, copying and feedback are also ways of learning. According to Cheetham and Chivers extra-occupational transfer, stretching activities and perspective switching are learning methods as well as mentor/coach interaction, unconscious absorption or ismosis. According to their findings the use of psychological/neurological devices improve learning. Articulation, collaboration and liaison are also important methods of learning (Cheetham and Chivers 2001b, 282-285).

Single- and Double-loop Learning in Organization

According to Argyris (1999) learning occur under two conditions. First, learning occurs when an organization achieves what it intended; that is, there is a match between its design for action and the actuality or outcome. Second, learning occurs when a mismatch between intentions and outcomes is identified and it is corrected; that is, a mismatch is turned into a match. Essential actors in these learning processes are individuals but organizations can improve learning by ensuring suitable conditions.

Whenever an error is detected and corrected without questioning or altering the underlying values of the system (be it individual, group, intergroup, organizational or interorganizational), the learning is single-loop. For example, a thermostat is defined as single-loop learner. The thermostat corrects the situation by turning the heat on or off when it is "too cold" or "too hot". If the thermostat asked itself such questions as why it was set at 68 degrees, or why it was programmed as it was, then it would be a double-loop learner.

Single-loop learning occurs when matches are created, or when mismatches are corrected by changing actions but without presenting "why"-questions. Double-loop learning occurs when mismatches are corrected by first examining and altering the governing variables and then the actions. Governing variables are the preferred states that individuals strive to "satisfice" when they are acting. These governing variables are not the underlying beliefs or values people espouse. They are the

variables that can be inferred, by observing the actions of individuals acting as agents for the organization, to drive and guide their actions. The original single- and double-loop learning model (Argyris 1999) concentrates on the match of mismatch situation as a requirement for learning. But learning can occur when the invented and discovered solution is actually produced.

Single- and double-loop learning are required by all organizations. Single-loop learning is appropriate for the routine, repetitive issue – it helps get the everyday job done. Double-loop learning is more relevant for the complex, non-programmable issues – it assures that there will be another day in the future of the organization. Double-loop actions control the long-range effectiveness, and hence, the ultimate destiny of the system (Argyris 1999, 69). Sometimes double-loop learning is equated with Batesons's 'deutero-learning'. From an organizational learning perspective, most results-based reforms target narrow process improvement (single-loop learning) rather than a broad understanding of policy choices and effectiveness (double-loop learning), even though the latter is more critical for long-term organizational success (Moynihan 2005).

METHODS

Qualitative Data

Research was qualitative by nature. The word qualitative implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity, or frequency (Denzin and Lincoln 2003, 13). Strauss and Corbin (1990) have delineated qualitative research as any type of research that produces findings not arrived at by statistical procedures or other means of quantification. The way in which people being studied understand and interpret their social reality is one of the central motifs of qualitative research (Bryman 1988, 8). In scientific research empirical observations are never "results". The observations are *clues* that are interpreted in order to get "behind" the observations through a theoretical framework (Alasuutari 2001, 79). The understanding process begins with a certain preunderstanding about the project. Hermeneutics has been defined as 'the science of correct understanding or interpretation' with specific reference to the understanding of the meaning of texts (Polkinghorne 1983, 218). In this research the texts are the interview transcripts.

Narration is a typical way to clarify reality. The human world is based on story-telling and listening. The characters of stories and tales have become a target of research (Eskola and Suoranta 2000, 22–23). Interview is a method for collecting stories. The interview is a conversation, the art of asking questions and listening (Denzin and Lincoln 2003, 48). Individual interview is probably the most widely used method for gathering information in qualitative research. The key feature of interview is the ability to provide an undiluted focus on the individual. Interview provides an opportunity for detailed investigation of people's personal perspectives, for in-depth understanding of the personal context within which the research phenomena are located, and for very detailed subject coverage. Interview provides a tool for clarification and understanding (Ritchie 2003, 36). The interview style used in this research is *the focused interview* (Merton et. al., 1956). Silverman (2003) has used the term *open-ended interview*. It represents a more discussing method of interview where the interview is wrapped around particular topics (Eskola and Suoranta 1998, 79). A focused interview is one modification of the half-structured interview method. The topics are known beforehand but the strict design and order of questions that is typical to structured interview is missing (Hirsjärvi and Hurme 1991, 36, Eskola and Suoranta 2000, 86). Patton (1990) has called this kind of interview *the general interview guide approach*.

In the qualitative analysis the researcher classifies and categorizes the data. In the synthesis the aim is to form a general view and depict the phenomenon in a new perspective (Hirsjärvi and Hurme 2001, 143). In qualitative research the data is analysed entirely and holistically. All aspects considered reliable should be explained so that they do not conflict with the interpretation. According to Alasuutari

(2001), in qualitative research the data is examined through particular theoretical and methodological viewpoints. During the analysis the attention is drawn only to what is essential on the basis of the theoretical framework and the research questions. In qualitative analysis there is often the intention to interpret the implications. The researcher aims at finding something that is "behind" the text, aspects that are not said straight. The interpretation is more or less speculative. The researcher has a particular viewpoint concerning the data and he/she interprets the interview through that viewpoint. In the current study the data was transcribed to a computer. After the interviews the data were first read through completely in order to gain a general overview. The data was broken and bunched up, coded with the help of excel tables, and then analyzed. Then inductive deductions were made leaning on the data. The analyzing started during the interviews when the researcher made observations about the phenomena.

Sample

A sample is a small-scale representation of the population from which it is selected. Because it includes merely a part, not all, of the parent population, it can never be an exact replica of that population (Hedges 1978, 57). In a qualitative study questions always exist concerning what constitutes a theoretical or appropriate sampling or a considered sample. This study is based on a sufficient number of cases, 29 interviews, to be appropriate (Eskola and Suoranta 1998, 61) and the sample is based on consideration (Pirttilä 1979, 36–37). Qualitative samples are usually small in size. Three main reasons for that are: first, if the data are properly analysed, there will come a point where very little new evidence is obtained from each additional fieldwork unit. Second, statements about incidence or prevalence are not the concern of qualitative research. Third, the type of information that qualitative studies yield is rich in detail (Ritchie et al. 2003, 83).

RESULTS

Organizational Learning in Maintenance Organization

Workplace learning
New recruits bring new competence with when entering an organization. Their competence is based on achieved education and work experience. Apprenticeship contracts are used in current organization as a tool for learning. Apprenticeship learning improves both individual and organizational learning. Apprenticeship contract as a work-based learning process (see Cheetham and Chivers 2001) include theoretical lessons as well as learning by doing. Organizational learning occurs also in mentoring process when a retiring master worker works as a mentor with an apprentice for a period before leaving the company. This partly guarantees his/her knowledge transference to the younger professional. Teamwork and co-operation also promotes organizational learning. There exists pressure in organization for better control of the organizational competences. Therefore, for example an electronic competence management system (SAP data base) has been developed but it is still under further construction.

Single-loop, double-loop learning
Both single-loop and double loop learning can be distinguished in a forest company's maintenance organization (see Argyris 1999). Single-loop learning appears in regular maintenance work when broken equipments or parts are continually changed or repaired. Double-loop learning is based on single-loop learning when a maintenance worker raises up a question and asks *why this equipment has been broken*. The core reason of the breakdown is analyzed and repaired by changing the right-sized motor. If problem is in process you might need to collaborate with operators and use their knowledge to solve the problem. Maintenance personnel should not only be skilled in maintenance of device but also be aware of the process they are acting with. So, when you do double-loop learning you easily step outside your competence area and need to collaborate to widen your competence and solve the basic problem. Questioning promotes learning and produces improvements. Double-loop

learning happens when a worker actively searches for the reasons of the breakdowns. There still seems to be difficulties in diffusing the results of learning in the organization. The worker him/herself learns and knows how to handle in a similar situation in the future but the new knowledge is not necessarily spread out and utilized in the whole organization. On the basis of your experience you can advise other person how some action is better done. Of course, this knowledge helps to avoid biggest mistakes and waste of time but in more demanding cases person have to get experience and proceed to same competence level as you are. However, the importance of double-loop learning has been understood. You can not talk about a learning organization if this is not understood and implemented. The organization searches for new employees with double-loop learning skills and recruits only employees who are capable of thinking and questioning. The current personnel should be activated and motivated in sharing their know-how with colleagues.

DISCUSSION

The focus in this paper was to examine how does a forest company's maintenance organization learn and develop.

The organizational learning in the forest company's maintenance organization happens through different actions. New employees develop the organization during their training periods. Interaction between trainee, educational institute and maintenance organization is then active and produces organizational learning. New employees bring along new knowledge and experience when they enter the organization. Mentoring improve the knowledge transference between senior and junior workers as well as overall co-operation of maintenance and production personnel. Well-planned further training should be available to workers and they must be encouraged to advantage training possibilities. Different electronic resource systems help in managing competence of the organization. Supervisors are in the key role of competence management because they should know the competence of their own as well as subordinates. Another question is, what the supervisors are willing to do for the sake of improving learning in the organization and what the subordinates are willing to do for their learning? According to the interviews, *right attitude* is important.

The technical and functional core competences, relating to mechanical, electric and automation maintenance, have been analyzed in the focus organization. But defending the whole competence process in the mill is still in progress, an more has to be done with it. For example, the training and development actions should be based on the defined core competences. Also, there does not exist any defined process for the construction, development, exploitation and defending of core competences. Electronic competence management system (SAP data base) has been developed but it is still under further construction.

Single-loop and double-loop learning can be discovered in the focus organization. Single-loop learning occurs in basic maintenance tasks but in double-loop learning the question "why?" is underlined. Double-loop learning demands active problem evaluation and questioning working environment.

CONCLUSIONS

Organizational learning is not carefully managed and controlled in the focus organization. The importance of organizational learning has been widely recognized but any persistent actions have not been used for improving learning in organizational level. There exist several occasional efforts for improving collective learning in workplace but learning still seems to be mainly individual based and lean on individual's own activity. The top management should define the direction of learning in organization generally and the middle managers should be encouraged to promote learning: they have to empower and support learning of their subordinates to the direction the top management has first stated.

As well, there occur difficulties in diffusing the results of learning in the focus organization. The benefits of individual learning should be spread more efficiently to colleagues, teams and to different levels of the organization.

The direction of learning process in a maintenance organization is from single-loop learning to double-loop learning. Nowadays, the organization searches for new employees with double-loop learning skills and recruits only employees who are capable of thinking and questioning. Also the current personnel should be activated and motivated in sharing their know-how with colleagues.

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