

LEARNING AS AN ASPECT OF CHANGING PRACTICE

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Abstract

In this paper it is argued that learning in practice is situated in processes of conflictual cooperation. The paper gives a short outline of human rationality as a matter of following plans and it is argued how this perspective is mirrored in some of the dominant conventional learning theories. Inspired by Lave and Wenger's (1991) approach to situated learning the heterogeneous aspect of practice is highlighted and it is argued that we analytically need to distinguish between learning to master specific elements in various communities of practice and to orient oneself in a multiple-contextual practice. Finally, by using an example from our preliminary study of building a house it is argued that learning most be seeing a part of processes of conflict and cooperation.

Introduction

This paper is based on an ongoing empirical research project about how participants from different professions (engineers, architects and craftsmen) learn to corporate while building a house¹. The aim of the project and this paper is to research our conceptualising of learning and knowledge. In conventional learning theories the receptive nature of learning is closely related to an understanding of the world as static and prestructured. As will be outlined below, in this perspective, the world is presented as a collection of objects or facts, all material and all give and the subject is perceived as only intellectually active but incapable in practice of transforming this world in any respect other than tinkering with its objective contiguities. Action is viewed merely as instrumental technique. This understanding of learning is closely related to learning often being researched in preregulated institutions where it is the pupils' abilities to work with symbolic material, which is in focus. In research projects taking this perspective to learning the enigma is often how change (in the students' abilities to work with symbolic material) is happening.

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By focusing on how persons learn in a process where change is rule rather the exception, as in the process of building a house, we hope to turn things upside down making stability the big enigma. To us stability and continuity is something only achieved through human cooperation and shared activities. As will be argued, stability and continuity is not something given in external plans or cognitive schemataes but a result of cooperation. The building process² represents a fine example of a changing and shared practice where both issues of cooperation and conflict are two sides of practice.

To illustrate the changing nature of the building process, the rising of new problems and the corporative, creative work of solving these problems in the building process I take a quote from one of the craftspersons that frames some of these themes nicely. The craftsperson Jørgensen describes one of the many unforeseen problems arising in building process. The shafts from the cellars to the rooms upstairs are too narrow:

It is the engineer or the architect who have taken to much space, because he has not been aware that 5 pipes, no more than that 5 pipes, yes 6 pipes and 2 cabletrays, they take up more space (than expected/kn). We have to admit that we have too little space down there. But it is an advantage, that the two professional groups (electricians and plumbers) have worked together without getting into a fight, and they have been saying: "If I do it this way, then you can do it that way". In this respect it has been rather painless (Jørgensen, p. 12).

In the quote Jørgensen describes nicely an unforeseen problem arising in the building process due to the engineers or the architect not having sufficient insights into what the electricians and plumbers work with. Furthermore, as will be elaborated below, in the building process there are constantly being made economic reductions. In this case, the involved professionals negotiate the potential conflictual situation and solve it in a pragmatic fashion.

Outline of the Paper

This paper will outline some of preliminary results from our study (described further below) focusing mainly on issues of learning. The aim of the paper is discuss learning in a heterogeneous changing practice like the building process and this practice is in the paper termed a multi-

² The research project is a corporative project conducted by Erik Axel and Klaus Nielsen. This paper should be read in connection with Erik Axel's paper (2007 – in press).

contextual practice trying to designate the complexity of the corporative and conflictual nature of practice.

Firstly, the paper will give a short outline of human rationality as a matter of following plans and how this perspective is mirrored in some conventional learning theories. Secondly, the concept of community of practice is introduced and it is argued that we need to highlight heterogeneous aspect of practice and inspired by our research project the notion of a multiple-contextual practice is suggested. Thirdly, following this understanding it is argued that we need analytically to distinguish between learning to master specific elements in various communities of practice and to orient oneself in a multiple-contextual practice. Finally, the latter analytical perspective to learning is illustrated with examples from Jørgensen's description of a significant learning experience.

Learning, Plans and Western Rationality

The reason for choosing a construting site for our research project is to discuss a central notion in our understanding of rationality. To build a house is apparently a matter for the craftspersons following the plans made by architects and engineers. In our thinking, rationality is closely linked to making and following plans. This idea is deeply rooted in Western sciences where the plan is the model for purposeful action and epistemology (Suchman, 1987, p. xi). Moving even further back, this line of thinking has its roots in Descartes' understanding of rationality and epistemology. According to Descartes our knowledge of the world becomes more certain (safe) if we follow a systematic method where we first analyze/divide the problem we are facing into its smallest recognizable parts. Secondly, we synthesize/reconstruct the parts by following strict logical rules to a more complex recognition of the subject matter at hand (Descartes, 1996). The dialectic of the process of analyzing and synthesizing is what Descartes prescribes as the method, which provides us with a certain (safe) knowledge of the world. This systematic way of knowing the world has a great impact on what we consider to be science and rationality (Nielsen, 2006). To develop a plan and follow it is like developing a method. In traditional philosophy to follow plans is central for rational actors. The significance for human actions is derived from our ability to follow plans, and plans are the background knowledge that makes human communication possible (Suchman, 1987, p. 28). By taking a construction site as our empirical focus point we want to challenge the notion of plans being the central causal component for our activities. Instead we want to suggest that plans are one central resource for situated activities at the construction site regulating the activities, it is merely one way of regulating the practice of building a house.

Conventional learning theories

Theoretically it will be argued in line with Axel's paper (Axel, 2007 – in press) that what we consider to be knowledge is dependent on the stability of various contextual settings (Axel, 2006a, 2006b). In conventional learning theory notions of contexts are hardly ever addressed and learning is often outlined as a receptive process (i.e. as a process of internalization) of an already prestructured and static social world³. Two different schools of thought are central in conventional learning theories: an *empiristic* and a *rationalistic* (Packer, 1985)⁴. Neither of these schools conceptualizes social practice nor issues of activities (creative/imaginative/organizational contributing actions). The empiristic position is the principal epistemological school of thought that claims that all knowledge of reality is based on sensory experiences. Rationalism takes the epistemological approach arguing that individuals obtain knowledge of reality merely through the use of reason (Lübcke, 1991; see also Packer, 1985 and Merleau Ponty, 1981 further critique). The empiristic position in psychology discloses itself in a behavioral psychology while in the rationalistic position is primarily formulated as an information processing theory of human cognition⁵. The information processing theory can be said to be a frame concept covering many different research programmes but not a comprehensive theory. Characteristically, these theories focus on describing how the individual gathers, processes and produces information about the surrounding world (Miller, 1983). Most mainstream definitions of learning have their roots in these two positions. Omrod (1999) argues that learning is defined commonly in relation to these two positions in psychology. Learning from a empiristic point of view is defined as “a relative permanent change in behavior due to experience”, while learning from a cognitive point of view is defined as “a relatively permanent change in mental associations” (p. 3). The first definition focuses on people’s change in observable behavior while the other on changes in mental associations.

In this paper it is especially the information proces psychology perspective on learning which is interesting due it's conceptualizing of learning as a process of developing and strengthning mental structures (plans) making information processing running smoother. According to Lave and Packer

³ This outline of conventional learning theory is rather undifferentiated. One could argue that Skinner is not receptive and that Bandura, to some degree, includes aspects of the social world in his understanding of learning.

⁴ Both these perspectives have roots in functionalistic thinking.

⁵ It must be underlined that my presentation of behavioural psychology and information processing theory is a brief summary and does not claim to be theoretically adequate due to my aim of only discussing central conceptions of learning.

(2007, in press) information process psychology describes learning as a matter of internalising human competence in terms of a formal system of rules that operate on tokens. The subject is taken to be computational in character, logically equivalent to an automated formal system. The rules of such a system are syntactical, that is to say, they require no interpretation or judgement for their application (Lave and Packer, 2007, in press, p. 6). Learning in information process psychology is a movement towards a self-contained computational rationality intensifying man's ability to follow mental plans (developing schematas).

If we return to the construction process building a house in our empirical material, learning would be a matter of internalising the rules for building a house already formulated in the plans for the house. It would be a matter of learning to follow the different kinds of rules there are for using tools, placing the different components in the right places, etc. A lot of these rules would be described in the plans (drawings and sketches) made for constructing the building. Learning would be a matter of internalising the plans already made, transferring this knowledge to the practical construction site and applying it to the concrete workprocess (inspired by Dreier, 2003).

Rather than seeing the learning process as a matter of following plans, it is in this paper seen as a part of a changing practice. The situated nature of the learning process is closely connected to the negotiation between different professions. This very practical process of negotiation have we termed conflictual cooperation. It is a concept denoting the construction process as a matter of being a process of taking different concerns into account, of using various resources to regulate the process and to understand the different perspectives involved in the process. The notion of conflictual cooperation will be discussed further below.

Learning in a Changing Practice

Thus, the empirical project opens for the opportunity to study how people learn being part of a changing practice including both cooperation and conflicts. To comprehend this complex process of conflictual cooperation and learning the paper is analytically based on Lave and Wenger's (1991) understanding of learning as situated in social practice. In their work Lave and Wenger conceptualized learning as a dialectic process where participants are actively changing and are being changed being participants in social practice. In the following this statement will be discussed further.

The concept of community of practice

Being part of the practice our empirical research project about building a house illuminates in an illustrative way from our perspective what the ambition of Lave and Wenger's concept of community of practice is namely to denote that we as persons are always situated in various shared practices. Being situated in a shared practice can't be reduced to being member in an institution, being a member of a homogeneous group etc: As we see it a shared practice (a community of practice) most likely must be understood as a practice where the participants are situated differently sharing the same project. In this sense community of practice is also a heterogeneous practice (the participants have different interests, working with different assignments etc.) and at the same time a homogeneous practice (the participants have a shared understanding of what they are doing and why).

Learning in a homogeneous/heterogeneous perspective

In Lave and Wenger's work, however, they tend to focus on the homogeneous aspect of the process and consequently describing the learning process as a process of becoming a member of a community of practice. This understanding of learning seems to presuppose that a community of practice is basically a homogenous practice while the heterogeneous perspective is not fully analyzed when it comes to issues of learning. One of the reasons for this tendency to focus on the homogenous aspect of social practice could be that Lave and Wenger (1991) theoretical work drew on five studies of apprenticeship. Most of the settings characterized stand out as relatively small communities with a rather low division of labor⁶. One gets the impression we are dealing with a relatively tight-knit group that shares a specific practice. Furthermore, when it comes to learning Lave and Wenger (1991) focuses on the difference or the tension between newcomers and old-timers. The newcomers follow certain trajectories towards gaining membership in a particular community. In this process they develop dependencies between themselves and the old-timers by gradually being indispensable to the production and reproduction of the community (Østerlund & Carlile, 2005). In emphasizing the newcomers' inbound trajectories in communities of practice Lave and Wenger (1991) stress the reproductive and historical dimension of practice and leave matters of conflicts and difference (except for the relationship between newcomers and old-timers) out of sight.

⁶ Except from Marshall's survey of meat cutters in a supermarket (Lave and Wenger, 1991, p. 76).

Being part of a multi-contextual/heterogeneous practice

When focusing on the building process, the research project comes to focus on a heterogeneous practice with a high degree of division of labor and different learning experiences but the participants are still being part of a shared practice. In order to conceptualize learning in a heterogeneous practice we will use the notion a *multi-contextual practice* to captivate central features of the building process. By using the term multi-contextual practice we would like emphasize that the building process must be seen as a process, where people from different professions participate in various contextual settings in practices (like when electricians, plumbers, architects and engineers are working together on the kitchen part of the building), but still the contexts are part of a common practice. As mentioned above Lave and Wenger focused on learning as a process closely related to how a community of practice was historically constituted (learning as closely related to production/reproduction of structures in a community of practice) we will focus on learning related to being part of heterogeneous practice and related to the development of an emerging structures. In this perspective learning is seen as processes where participants in various contextual settings in practice tie their activities together in the process of building a house (like in quote in the beginning of the paper where the electricians and plumbers worked together solving a shared problem). This aspect will be elaborated in the empirical example further below.

Learning in heterogeneous practice

More specifically it will be argued that learning in the process of building a house is an active, constructive and conflictual process and it includes the concern for the problem at hand and for how other professions involved working with the problem. So basically, it is argued that when we address issues of learning we need to be aware of the multi-contextual nature of social practice and the degree of regularity involved in social practice.

When taking the notion of social practice (as multi-contextual) seriously we can analytically differentiate between various ways of thematizing learning. One way of approaching learning is to see learning as process of mastering specific techniques like welding, combining and connecting pipes or electrical cables etc. This approach to learning is somehow close the one found in conventional learning theories (mentioned above). Another (analytical) approach to learning will focus on learning to orient oneself as part of a multiple contextual practice (or across practices). In the latter case learning is a matter of understanding how one's work is part of a heterogeneous multi-contextual practice, to understand the difference between what I am doing and what different

participants do in various contexts and how one's work can complement others work and vice versa (inspired by Bateson (1972/2000), see also Nielsen, 2007 in press). As rightly suggested by Lave and Wenger (1991) belonging (to identify oneself) to a community of practice is a crucial part of the learning process, however, the notion of learning to orient oneself is closely related to understanding what one is doing in relation to how this is *different* from what other participants are doing in other parts of social practice.

As will be outlined in the concrete example below to have learned something is also a matter of tying together what is done in other contextual settings and thereby changing practice.

In the following a short description will be given of the concepts mentioned above.

Method and background

We have followed the building process of an international dormitory at Roskilde University Centre campus for a proximal 100 primarily foreign students during our research process. The research process is exploratory in nature. The building process has taken approximately 24 months and we have followed it for about 18 months. We entered the building process in the middle of the process. Different persons central to building process have been interviewed. The head engineer, the head architect, several leading crafts persons and residents have been interviewed. During the research process we have conducted participant observation and followed a number of the meetings at the construction site between central participants (for an elaboration of the methodological details see Axel, 2007 – in press).

Empirical Example

In the following an example will be given of how notions of learning to orient oneself display itself at the workplace. A short account of the building process leading up to the example will make it more understandable. Due to economic shortage several changes in the building process happen in the construction process and the original idea of how the building should look like outlined in the preliminary drawings is changed. One of the significant changes happening to building is that the cellar is minimized, so it actually only consists of two small pathways (gange) under half of the building. Originally in the drawings made by the architects there should have been one large cellar under the whole building. Due to economic problems the cellar has been significantly reduced. The heating facilities are placed in one end of the minimized cellar, the water pipes enter the building through the cellar and all the electrical devices are also located in the minimized cellar. These

changes poses new and unexpected problems for the craftspersons since they have to find new ways to make shafts for all the wires and pipes that need go into the various rooms above the cellar. Furthermore, the plumbers who work with pipes and wires need to consider how their work can be synchronized with the other craftspersons working with the floors upstairs. An important part of being able orient oneself in the building process is to know about the complex and contextual nature of social practice. The problems that arise in the process is closely related to the multi-contextual practice and must be solved in relation to this practice.

The craftperson Jørgensen describes a significant learning experience related to how he handled the problem with shafts:

So we figured out that if one could get hold of a plastic grate ("rist") one could get secured (sætte fast). A plastic "grate" (rist) here with holes in about 30 times 30 somehow being secured by the iron there. When we came up with our pipes, then one could with a "stick saw" move a part of the square (feltet) and then you have two pipes there (Jørgensen, p. 17).

As one can see from the example Jørgensen depicts a situation where learning is seen as a process where he is not only solving a problem but he is also developing or modifying a new piece of artifact in order to solve his problem (the grate). The reason for Jørgensen to solve this problem is not merely a matter of "knowing more", it is also rooted in economic thinking, making work easier and matters of safety. If he can develop a grate he might be able to save money and a large hole in the floor poses a safety problem for the other workers at the construction site. The learning process is not merely a matter of solving a discrete problem but it adds a new dimension to the work of other participants in the building practice (development) tying together aspects of what these other participants are doing. It influences what the other participants need to do. Actually, Jørgensen considers it as a part of reflecting on his learning experience how this change will effect the others participants' work. As indicated in Jørgensen's description he has considered how the grate (rist) will influence the other craftspersons' work. So in order to be able to solve the problem at hand he has to orient himself to what other participants are doing in other contexts in the practice of building the house. He describes it like this:

Then the ventilation man arrived, he should have a bigger hole, then the electrician came with his cables, and then you had the grate (rist). It was also an advantage because when Jørgen (head of working with concrete) should pour concrete in, then I could see the advantage. We had the shaft and a lot of pipes there and it was perforated more or less, the plate there, but when Jørgen should cut it out, then it was "just" to take some cardboard or plastic in this size as the size of the corridor, and then he could cut out the holes there, so he actually places some plastic or cardboard and then he could pour concrete down there (Jørgensen, p. 18).

As described by Jørgensen here, the grate (rist) will not only provide a flexible tool for the other craftspersons' work synchronizing their work, but it will also function as a kind of template (skabelon) for when the concrete is going to pour down the shafts, and, furthermore, it could be used in other future building processes as well.

The kind of artifact that Jørgensen develops in relation to the situation affects the other participants differently. For some of his colleagues it is a piece of tool that facilitates their work and again for other participants it is a template (skabelon) regulating their work. In other words in order for Jørgensen's grate (rist) to be considered a learning experience he reflects on the grate (rist) in relation to other contexts in social practice and, furthermore, by developing the grate he is tying the work of various contextual practices together. In this sense Jørgensen's learning experience illustrate that learning can't be seen as merely an individual experience, but it must also be seen as a process where a new aspect of practice is developed changing practice. Not only does it help changing the organization it does also reflect how different participants can work differently with the grate (rist).

Conflictual cooperation revisited

If we take a closer look at the example above we can see that both conflict and cooperation play a significant and intertwined role in Jørgensen's learning experience. Basically the problem of the cellar is founded in decisions of reducing the economic resources invested in the house taken primarily by the owner of building. This economic reduction leads to a decision where the drawing of the cellar is revised, however, developing new problems of how to integrate the installations in the cellar with the technology in the rest of the building. This potential conflict is, at first, solved by Jørgensen developing a grate making it possible for the different professions synchronizing their work and at the same time follow the security rules at the construction site. The reduction of the

cellar could have developed into a serious conflict between the different professional groups involved in the building process because the changes made a significant influence on their workschedule. Taking a broader perspective on Jørgensen's learning experience, one could argue, that it is closely related to notions of conflictual cooperation. It is an attempt to solve a potential conflict between economy and quality. As the house was originally formulated in the plans it was a house of a higher quality compared to the final version of the house with a minimized cellar.

The process of reducing the cellar sent a wave, metaphorically speaking, of unforeseen changes through the building process. It restricted the possibilities for the craftpersons to plan and place a lot of the installations on the floors above the cellar. It slowed the building process down and the final version of the house was finished later than expected. It became later evident to us when we interviewed residents who were living in the building experienced that the build had the quality they had expected. The grate that Jørgensen developed was a result of a conflict and it became a significant learning experience as an example of cooperation, however, the conflict was not solved by Jørgensen's grate, it was merely displaced to a conflict between the owner and the future residents.

In the beginning of the paper it was emphasized that our rationality is closely related to plans in the sense that plans prescribe ways we systematically accumulate and synthesize knowledge. In dominating conventional learning theories processes of learning followed the same pattern. In this preliminary empirical study we have emphasized that learning and development is closely related to conflict and cooperation constantly changing and transforming practice. This primary study invites to new ways of thinking about learning and development in practice.

Discussion and Conclusion

In the beginning of this paper it was argued that learning in conventional learning theories was related to "a relative permanent change in behavior due to experience" or "a relatively permanent change in mental associations. Both these descriptions of the learning process were not adequate since they did not take the contextual nature of learning into account. Lave and Wenger's notion of learning in a community of practice was introduced but the heterogeneous nature of learning at the building process was not fully disclosed. The notion of a multi-contextual practice was introduced as way of understanding the building process as a conflictual cooperation containing both the

homogenous and heterogeneous aspects of practice. As a consequence the notion of learning to orient oneself was introduced emphasizing the comprehension of what other participants in other contexts of practices are doing in relation to one's own work. As indicated in the illustration with Jørgensen one learns being part of practice working with unforeseen problems. In this perspective learning is an active process closely related to developing an emerging structure by tying the work of different contexts of practice together changing the organization.

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