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Ambiguity as Work: Teachers' Knowledge Creation in Classrooms

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INTRODUCTION

The purpose of this article is to explore the learning environment for teachers' work in classrooms, trying to understand processes of knowledge creation in-situ.

Schools and teachers are not alone in educating pupils. A role is also played by what may be called 'contextual loyalties and dependencies', where teachers are dependent on a trusting relationship with parents, for example. It is interesting to note here the importance of the relationship between actors outside the 'organisation' (parents - children) and teachers, a network of triads (teacher – pupil – subject), and the complex system in classrooms and schools. One example of this in terms of learning is that pupils may have good knowledge in English because of teaching, but also because of their exposure to movies, PC-games, music and so on. In such a network of triads, sometimes classmates have access to relevant knowledge, and sometimes parents have the access. When parents are the only learning source for pupils (i.e., science and language) the teacher – pupil relation is disconnected.

Munby, Russell and Martin (2001) claim that our understanding of teachers' knowledge has turned from prescriptive to practical. They also point to the fact that we lack empirical studies concerning teachers' knowledge creation. This has also been noted by Beijaard, Korthagen & Verloop (2007).

> [T]he issue of teacher learning has until recently drawn relatively little attention from researchers…. The process they [teachers] go through is more one of survival than of learning from experiences, thereby producing a situation with little potential for further professional development…. more research is needed into the basics of teacher learning. (pp. 105-108)

Cochran-Smith and Lytle (1999) report research which reveals that teachers' knowledge is generated from in-service training, literature, reflection and so forth. But only exceptionally is there a focus on everyday knowledge creation. These studies focus on teachers' deliberative reflection and action, but according to Cochran-Smith & Lytle such research creates a teacher who is not fully competent, despite acquired experience.

KNOWLEDGE CREATION

This study elaborates on the question of knowledge creation in a social context, that is, in the structure of the classroom, informally on the personal level where the teacher carries out his or her work. But there is also the pressure of the situation, where matters other than learning may be predominant for the professional teacher. Even then learning takes place. The real process of knowledge creation may be taking place informally and locally.

Changes take place on several levels, for example through many newly started projects, better pupils, cost savings, more administration and so on (Alexandersson, 1999). Activities can go in different directions, they may be perceived as positive or negative and these can occur in parallel with each other. As such it is problematic to use a one-sided view of the processes of learning. It may be more productive to think in terms of change and stability, simultaneously. Research (Seashore Louis, Tool & Hargreaves, 1999; Alexandersson, 1999) has laid the foundations for understanding that schools often have to deal with horrendous problems. Teachers wrestle with conditions that cannot be solved, and it is not always certain that solutions will be permanent.

Seashore Louis (1998) has summarised part of the latest discussion on school improvement in three different tendencies and perspectives. I would like to emphasise one of them:

> The notion that thinking is "irreducibly a social practice" implies that dissemination and utilization [of research] are best thought of as a process of reflection, in which people with different, but overlapping, knowledge and culture meet to consider their common concerns. (Huberman & Broderick, 1995, p. 21)

Also, new directions in research, postmodernism, new-institutionalism (Powell & DiMaggio, 1991) and sociocultural perspectives have begun to influence this area and provide opportunities for new approaches. In fact, today it is more a question of learning in interaction and in a contextual setting than the traditional view.

Rather, knowledge construction occurs locally and is unrelated to government's goal-orientated work for change. Knowledge construction is generated in the context and is controlled by it, and the 'goal' is something determined by the situation, by existing frames and by notions of what makes a good teacher and a good school. These notions are constructed by tradition and in interplay with the surrounding environment.

I want to continue in the direction described above in order to further the notion of 'the creation of knowledge' in complex environments.

TEACHERS' WORK AND THE PEDAGOGICAL ENVIRONMENT

My aim is to show how teachers create knowledge, act, and how they understand the work situation. I will touch on learning processes and give an account of the research, which has dealt with this work, and the learning process of teachers. Huberman (1983) pointed out that we, surprisingly, have little knowledge of how the teacher copes with everyday problems from a learning perspective.

> … we know a great deal more about the delivery and implementation
> of new or intensive inputs - new educational programs and products,
> or injections of person-mediated expertise in the form of change
> agents and educational extension agents - than we do about
> everyday problem-solving through the acquisition of practice-relevant
> knowledge. (p. 478)

He points out that we have possibly been paying attention to the wrong dimensions. The fundamental processes in our everyday lives have receded into the background while we have instead put our energies into grandiose changes and similar things we feel we have to do. We cannot understand changes without gaining insights into how people in fact work and solve problems. We know too little about how adults in school learn and create meaning in their local culture.

He, along with other researchers (Hultman, 2001; Eraut, 2002), states that teaching is carried out differently to the ways in which we normally choose to describe this process.

> Teaching is heavily interactive, but instruction is not only carried out
> chiefly through a series of interpersonal communications, it is literally
> made possible by the presence of a complex web of implicit contracts
> and interdependencies between adults and children – contracts
> based on mutual affiliation and attachments. (Huberman, 1983, p.
> 495)

He and others describe how teaching can be perceived as something that is interactive. But the implications of this are that teaching cannot simply be seen as a number of communications. Teaching is literally a network of informal contracts and reciprocal relations between the inhabitants of the classroom–reciprocal arrangements which develop through a lengthy interaction in which the participants 'find each other', appreciate each other and have trust in each other. For many teachers, this network building can take many years if we look at, for example, a teacher at the primary level. We could even state that proper teaching cannot be carried out (Hultman, 2001) until these relations are established.

TEACHERS' LEARNING IN CLASSROOM SETTINGS

There is little research into learning processes in schools and similar organisations, in particular that with a special focus on adults in schools. Lortie's (1975) sociological study of the work of teachers can now be regarded as a classic as is the case with Jackson's (1990) anthropological study of life in the classroom. The latter has often been cited because it brought focus to 'the hidden curriculum'. Above all, Jackson's study deserves to be mentioned as one of the few that shows what a teacher's work is really like. These interpretations and attempts at understanding are refreshingly free of any normative viewpoints.

Huberman (1983) gave an early analysis of the complexity of the work of teachers (which can also be seen from Jackson's study) and the title of his article illustrates this: *Recipes for Busy Kitchens*. Eraut (2002) has more recently spotlighted Huberman's ideas and placed them in a contemporary research situation. As a reply to Huberman he chose to title his article: *Menus for Choosy Diners*. Erault points out here that we lack adequate analyses of the complexity of teachers' work. Elbaz (1983) and Clandinin (1986) also show in their case studies of teachers' work how teachers create everyday knowledge and how they reflect on their own work.

Hargreaves (1998) and Hultman (1998) examine the work of teachers and principals and present an alternative picture of what goes on in schools. It is possible to see schools as balkanised (as having many different subcultures) or as a set of delicate webs. This way of looking at the environment of schools contributes to both an understanding of complex processes and of how teachers manage their roles in the teaching process. Day, Fernandez, Hauge and Möller (1999) have also conducted analyses of the life and work of teachers in a wider international perspective.

Johansson and Kroksmark (2000) examined teachers' strategies and paid special attention to various types of intuition. On the other hand, Hultman (2001) describes teachers' improvisations and how learning processes are constructed in everyday work. Despite what has been said above about research into learning and the theories of learning, we still know surprisingly little about how teachers learn 'at work'.

When Eraut (2002) discusses the complexity of teachers' work, he points out that knowledge formation differs from other professional groups since teachers build up their expertise via a number of episodes.

> The transformation of case experience into usable form is attributed to the mainly unconscious aggregation of knowledge from a large number of episodes…. For teachers, episodic knowledge of a child is less easily obtained; it has to be snatched from the busy classroom environment by spending time with individual children or by giving the child sufficient focused attention to notice her behaviour in small or large groups. (p. 375)

He notes here that the knowledge, which is created, is difficult to achieve since it, metaphorically speaking has to be snatched from a hectic environment (see also Jackson's [1990] concept of the overcrowded classroom).

EVERYDAY LEARNING IN COMPLEX SETTINGS

It is genuinely difficult to learn in complex settings. Early impressions and expectations tend to be confirmed (Eraut, 2002). We tend to remember unusual events more than frequent ones. Episodes are remarked on only if the pupil catches the eye of the teacher. The knowledge of the teacher tends to build on unusual events (non-typical), which can hardly be seen as valid and reliable knowledge (Eraut, 2002).

In this context it is pointed out that teachers need calm and insightful conversations with the pupil but that they are more likely forced to react swiftly (Eraut, 2002). The setting does not facilitate the use of holistic pictures of the pupil in a complex environment. Early research in the field even stated that it was possible to talk of 'superstitious learning'. This happens easily in complex settings since there is a weak link between action and knowledge (Hedberg, 1981; Weick, 1985).

But the interesting issue remains - how do teachers actually learn and act despite the fact that they are in such a situation (Weick, 1985)? This phenomenon has not been studied in depth even though the problem was discovered early on within organisational research and still occupies our minds (Spender & Scherer, 2007). The knowledge creation of teachers shows a completely different dynamic if we focus on teachers in classroom interaction (Eraut, 2002), the facilitation of learning, and the process of learning.

DATA COLLECTION IN SCHOOLS

In this section, interviews and observations from the field are used to focus on some of the characteristics of classroom interaction that are important for the understanding of teaching and knowledge creation. Quotations and vignettes were collected in a study in two schools in southern Sweden, one in a large town (years 1 to 9), and the other in a small town (years 1 to 6). In the first school, teachers from years 4 to 6 were interviewed, and in the second, almost all of the teachers were interviewed, a total of 21 teachers.

A conversational/ethnographic type of interview was used that I call a 'contextual interview' (Hultman, 1998, 2001, 2006), which produces data similar to observations (Figure 1, below).
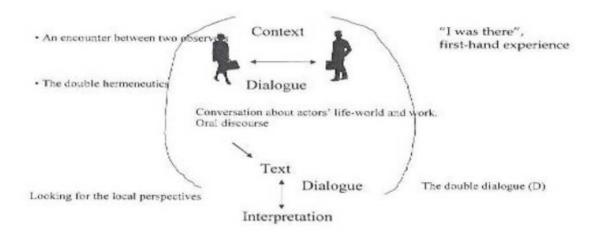
Context — Dialogue — Text — Dialogue — Interpretation

- An encounter between two observers
- The double hermeneutics

"I was there", first-hand experience

Conversation about actors' life-world and work. Oral discourse

Looking for the local perspectives

The double dialogue (D)

Figure 1. The Contextual Interview (Hultman, 2001)

In these interviews, we have an interaction between two participants, and the teacher is one of them. In such a setting, one can get descriptions, interpretations and intentions that help in one's understanding of events and actions. It is not only the words and sentences that are important in the interpretation, but also what happened between the parties in the interview. This is an interview that follows a content structure for the dialogue, but one created between two people who are interested in the same thing and have both similar and different experiences of that phenomenon, for example classroom interaction or the principal's leadership. The transcribed interviews depict a conversation, they do not follow a question and answer pattern.

The contextual interview gives continual feedback on the dialogue, giving possibilities for validation and control by means of the interviewee's response (Hultman, 1998, 2001). The method or approach gives opportunities for mutual discoveries, 'making things visible' and 'making processes conscious' and also hints at theoretical findings. The risk of giving leading questions and so on is similar, or even more severe, when compared to the traditional interview.

AMBIGUITY IN TEACHERS' WORK

To some extent teaching can be described as floating and full of surprises.

> T   I can see it now, but not when it happens, in the middle of my work with the kids. And every day is different – things happens all the time […] and sometimes things can turn out to be different, more interesting and more fun. Everything can happen … changes almost daily, something that you never expect.
>
> [a living organism]. … Yes, in some way, it feels like that.

It is not static all the time, many things happen during the workday. The teacher quoted above experiences that as a living organism. It lives its own life, so to speak. And in such a situation, it may be hard to understand why things happen.

T	… actually, I think I learn all the time.
I	In what way?
T	I change pupils' ways of working. I think the best way is to … figure it out as I go along and understand gradually what I'm doing and the way they do things …
I	Can you give me an example, that …
T	No.
	[…]
T	It is very hard to give examples.
	[…]
T	But often it's like, "No! Let's do it that way", instead.
I	So it's just?
T	Yes, it just … [Clicks]. And then you realise that what you did wasn't that good, let's do it like this instead, often it's like that. It need not be any big mistakes.

According to this teacher, it is hard even to give examples of what happens during the process (Reed, 1994). The reason for that may be explained by complexity – examples are neat but the teacher is in the middle of a process and that is not easy to describe in a neat way. Sometimes thick description (including context) may be needed. Sometimes the process is difficult to understand and you have to use process variables when you are unable to detect the cause-effect chain, as below. That 'living organism' takes over even when you planned to do math.

I	… it says math, but it's another content underneath all that [social work] …
T	Yes, that's the major influence … if it says math, I have to know what mood they are in, what frequencies they are tuned in to? Are they at the same frequencies? … well, if that's the case, it will be a smooth journey. They will be busy doing math …
I	But math is not dominating, as you see it?
T	No, it's both …
	[…]
T	There's a lot going on in between the lines in the schedule
I	But it's there all the time.
T	Yes, It sort of takes over all of this …

The schedule may only exist on the surface. "If the system is ok, we will be doing math", so to speak. Sometimes it seems so complex that you can't figure out why it happened.

T   … the feeling you have when you walk out of the classroom … Hey, that was a hit! And then when I try to find out why – I do not know why it was a hit. I haven't a clue; I have no answer, to why it went good or wrong.

T   Sometimes it seems like it just happens, sometimes I feel like I'm standing … like I'm standing on the outside.
[…]

T   I don't have so much influence, I can influence to some degree, solve conflicts, but on other occasions I can feel powerless in understanding why it works so damned nice. I do not know – was I the cause of that or … well, like, do I have a part in this?

This teacher feels like a person standing on the outside, while at the same time being inside. And one can understand later, after the fact, but maybe not even then. Teaching is understood as managed by a teacher but as we see, it could also be interpreted as a living system that is hard to steer. The teacher is very important of course, but I like to raise the metaphor of the teacher as a spider in the web (Hultman, 1998), not the teacher as manager or conductor. And in that role it seems like you have to look for hidden clues within that web.

T   … you notice progress, not from one week to the other, but when you meet parents [mandated talks about pupil progress] and report, and compare that with what you had in spring, you see that a lot has changed, but you need …
I almost need to sit down and reflect for a while, on my own. I may not notice it when I'm in the middle of it …

And I meet with these pupils, I meet parents and then I "see" that many things have happened.

And I also get help from my colleagues [teaching that class], because they also notice positive changes. And that's feedback, you realise that you, are doing a good job after all.
[…]

T   I read parents when I'm sitting in that meeting with them. I can feel gratitude coming from them, somehow. And they say it in words … and I can also see it, that they are satisfied with their child.

You look back, listen to others and you meet people. And that is a crucial behaviour, to meet and have talks with people face-to-face. And when you do, you see, feel and hear. That is feedback, but a kind you have to look for and get close to and you also need help, from others (parents, colleagues), in interpreting what is going on. Teachers become *interpreters of signs* (Barley, 1996, p. 425), similar to the model Seashore Louise discusses:

> Thus, cognitive shifts are not activated "within the person" or "within the setting" but rather within the mediating activity itself, dynamically and dialectically – a bit like Leontiev's concept of a continuously shifting "construction zone" or Schön's notion of "reflecting in practice" and Dewey's idea of "knowing in action". (Seashore Louis, 1998, p. 1088)

In this case, the teacher discussed change. My impression is that this is the case all the time, but it is restricted by the lack of time. And it is also restricted by space and the fact that the teacher-pupil relationship can be understood as 'separate but together' (Paradise, 1996). Teachers are very sensitive when it comes to borders and others' turf.

T1   Sure, you talk to other colleagues too, exchange some words in passing, but I wouldn't call it collaboration, not in any way …

I   That sounds like a totally different dimension. [Yes, totally different] In spite of the fact that they work in a building 3-5 metres away [the physical distance between primary and secondary teachers].

T1   Yes, they work next door to us!
      […]

I   Do you argue for these matters in front of your colleagues and push for it, or …?
      […]

T2   No, no … My colleague and I work like that and I like it and it works for us, but it is nothing that I would like to push for. Because if I do, I cross over and move into their turf and tell them … do like this.

They do things together with a colleague because they are friends and have found a way to do it. But if they try to influence others they enter others' turf and cross over and they know others' opinions. So it seems to be a lot of webs, which are at the same time connected and loosely coupled.

One teacher illustrates how she manages learning in a complex situation:

T   I can never sit down and explain something to a child who has something that prevents her from listening.

I   How do you learn that?
      […]

T   … well, you try it a little bit … and then you feel that you earned some points and … maybe you have it in you, I can not always plan in detail what to do - so I have a trythought*. And I usually say that, it's like playing an instrument, and then I know the terrain a little bit. It sounds like I'm airy but …
      [* the author's translation of an idiosyncratic word from Swedish, "grotanke"]

This teacher uses the same metaphor as Jackson (1990) – "it's like playing an instrument". I think it means that you enter the situation not fully prepared and use your experience (which also gives confidence) in situ, allowing novel events to invite you to new ways to act. It seems to be exciting for the teacher and also something that one can do after many years of teaching. It is very difficult to 'see' these processes and even to talk about them, but in some forms of dialogue one can discover them in retrospect.

CONCLUSIONS

Teachers' creation of knowledge occurs in a special environment that few of us are acquainted with. It's silent and to some extent hidden. It is not sufficient only to observe, we need to invent new methods and combine old ones. Teachers describe the knowledge creation process in special words that can be understood as metaphors for the process that they are participating in.

Apprentices-in-context is my preliminary concept that contains much of collected data. The teacher can be understood as an actor who creates meaning in context, using 'invitations' and signs, gradually understanding more and more of the process. But, as discussed below, some parts will still be out of reach. In order to learn, teachers feel, 'see', reflect, notice, compare, meet and so on. Teachers focus on mood and frequencies. Often the situation contains surprises and has a floating character that one discovers after the fact. This can make it difficult to grasp cause and effect in the teaching process. The environment is not composed of single events, it is characterised by complexity and a flow of action chains. That situation also creates a feeling of being a part of and apart from the process at the same time. I think that one possible interpretation of this can be that teachers learn how to live in such complex environments, accepting partial understanding. Teachers are intertwined with other actors and the context and need to adapt to that gestalt. Actors are each others' contexts (Siskin, 1994; Hicks, 1995; Hultman, 1998).

Lave (1993) and others have discussed the meaning of situated learning and research on apprenticeship and extended the notion of learning in the following way:

> … there is no such thing as "learning" sui generis, but only changing participation in the culturally designed settings of everyday life. Or, to put it the other way around, participation in everyday life may be thought of as a process of changing understanding in practice, that is, as learning. (p. 6)

> But his [the blacksmith's] understanding of the skimmer also emerges in the forging process. He does not know what it will be until it is finished. (p. 13)

This is similar to the situation for teachers. But teachers do not have mentors in the conventional sense and the word 'apprentice' has to be understood in another way in classrooms. Teachers spend most of their time with pupils. My

impression is that one can understand teachers' situation as an interaction between persons and different contexts. Some of these interactions are tight and others are loose. Teachers' work includes learning or as Lave (1993, p. 8) puts it, "learning is an integral aspect of activity … all the time."

In everyday work teachers experience difficult learning situations and one extreme was found in a recent study in science classrooms (Reimstad & Stärner, 2005). 'Small talk' was discovered among pupils as a way towards solving difficulties in their work (an informal form of conversation and problem solving). This may develop into a situation when 'everyone misunderstands' because they all see things the same way. That is significant because the study revealed that this small talk is difficult for teachers to see, hear and follow. This kind of small talk is full of subtle expressions such as giving signals to each other, for example glances, lowering the corners of the mouth or raising their eyebrows. This adds another dimension to the concept of apprentice-in-context, in the sense that you do not get in touch with certain processes of utmost importance for teaching and learning.

Complexity and ambiguity as work. Ellström (1999) indicates some difficulties in learning in the workplace in his discussion about the integration of teaching and work, for example the lack of time, not always having full information about the dynamics of work and not always being able to analyse the relations between cause and effect. This is precisely the type of situation that exists in schools and which I have accounted for in my analyses of teachers' knowledge creation in this article.

Schools are characterised by what has been described by March and Olsen (1976) as 'anarchy' with vague and conflicting targets, lack of feedback and a complex and contradictory working process, among other things (see also Ellström, 1983). March and Olsen considered such a situation, at the time, as ineffective learning or as blockages in the learning process. But how does learning take place in a situation where we do not have ideal conditions?

In my analyses, I see that the situation can be considered in a different way and that teachers deal with it by means of other strategies. I like to use metaphors and concepts such as 'contextual invitations', 'improvisations' and 'mini events and initiatives'. Contextual invitations mean that the immediate situation creates opportunities and 'invites' learning. At the same time, however, it is not certain that this will happen. Often, the opportunity passes and teachers are not able to use it as an opportunity for learning. On other occasions, we do things which unconsciously lead to learning. This is also mentioned by Weick and Westly (1996) when they describe the learning process in terms of improvisations, micro events and humour, or Barley (1996) who speaks of contextual knowledge. Ellström (1983) maintains that such an environment might even be a good thing, because it allows a higher degree of creativity since pedagogical goals can be interpreted and gradually developed.

Environments with different logic. A comparison can be made between different environments. I see two different logics or pedagogical environments where the second corresponds to the data I presented above. The first is often referred to when thinking about schools or when giving advice.

1. *Planned and technical*: clear targets, targets direct action, clear cause – effect, order and method, immediate feedback, formal knowledge important, analysis, 'think first, act later'.
2. *Interactive and situated*: vague and conflicting targets, context directs action, unclear cause – effect, hectic and varied, delayed feedback, informal knowledge important, intuition, 'act first, think later'.

This discussion has previously been accounted for by Ellström (1992) in terms of two different perspectives; one rationalistic and one non-rationalistic perspective on human actions. He introduces the idea that these can also be perceived as complementary, not only separate. Ellström argues for a synthesis between the perspectives but with non-rational overtones. The focus of my interest is the logic in the first logic. One example is the last quote above when one of my teachers used the word "try-thought" as a way of illustrating the process of learning. This may be understood as an intelligent improvisation because one is mixing intuition and rational planning. Knowledge, experience and an 'experimental' attitude are put into use. I consider that the relationship between these logics may be such that they fulfil different functions and are unrelated in practical working activities. This is an insight led by the new-institutional school (Powell & DiMaggio, 1991) and its observation that structures and rhetoric have a meaningful function in the life of organisations.

In this article, I have tried to explore the environment for teachers, attempting to create a deeper insight into knowledge construction in an interactive and situated environment. We need to know more about the logic of teaching and try to design studies over time in order to map teachers' learning processes in situ. We need more qualitative studies based on descriptions and participant observations in classrooms, 'seeing' it through the eyes of the teacher and the pupil. In interaction with actors in the classroom, using conversational interviews, we can get closer to the processes of knowledge creation.

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