Mia Karlsson

An ITiS Teacher Team as a Community of Practice

An ITiS Teacher Team as a Community of Practice

Mia Karlsson

An ITiS Teacher Team as a Community of Practice

ABSTRACT

Title: An ITiS Teacher Team as a Community of Practice

Language: English

Keywords: ICT, community of practice, teacher teamwork, in-service teacher training, school development

ISBN: 91-7346-504-6

In many countries around the world there have been initiatives to promote the use of information and communication technologies (ICT) in schools, both as a goal in its own right and as a means to enhance the pedagogies in the classroom. A core issue in these initiatives has been the development of teachers´ competencies in using ICT. In Sweden, there have been a number of initiatives that include in-service training of teachers. Most of these have been focusing the "theoretical and practical" training of teachers outside schools, typically organized as courses for individual teachers. One exception is the most recent Swedish National Action Program, ITiS (Information Technology in Schools), aimed at pedagogically-oriented in-service training for teachers in teams. Individual teachers in the teams receive a personal computer, they are to carry through a student project using ICT, and they meet with a facilitator (15 hours) and other teacher teams in seminars (20 hours), all in order to support pedagogical development.

The overall aim of this research is to enhance the understanding of how a teacher team functions as a vehicle for the development of competencies in pedagogical use of ICT. More specific research questions are asked about what characterizes the teacher team how do the team and the teachers in the team use the resources offered by the ITiS program as well as other resources in their environment; what issues and concerns about the pedagogical use of ICT, do the teachers raise; and what are significant dimensions and content in their learning? In addition, there is a perspective at drawing conclusions for design of teacher competency development and in-service training, in particular of learning how to use ICT and developing pedagogical awareness of such use.

Etienne Wenger´s theory of Communities of Practice (CoP) provides a framework. This theory takes as a basic premise that learning should be understood as changing participation in changing social practice. The theory argues that in a CoP, participants have a mutual engagement for a negotiated joint enterprise and over time, they develop a shared repertoire.

In the empirical study in this work, a case-study approach has been used. A teacher team consisting of eight teachers, one woman and seven men, teaching grades 6-9, have been followed during a period of ten months. The case is chosen from a number of teams studied. The methodology is mainly ethnographic and data has been collected through observations, informal conversations, documents, and focus group conversation.

An overall result is that the team is a community of practice on all accounts, where the teachers are accountable to each other and to their joint enterprise. Important resources in fulfilling this joint enterprise are the members of the team; the facilitators; other teams; and the technology in itself. As a resource, ICT becomes a catalyst for pedagogical discussions. It is noteworthy that ICT is secondary to the pedagogical agenda where teachers raise many different issues, for example infrastructure, instructional models and design, and students' learning and development. When it comes to the teacher's learning processes, they expressed different epistemologies with respect to learning how to use ICT, where they want someone to tell them exactly what to do, and learning about pedagogy. In the latter case they do not want someone else to set the agenda.

The conclusion from this study for in-service training is that, ITiS is a working model for school development concerning ICT. The organization in teacher teams as a basis for the work is highly functional and the inclusion of facilitators to scaffold the learning processes is important, besides offering the technological infrastructure with private access to computers.

CONTENTS

4

CONCLUSIONS AND DISCUSSION 213

Acknowledgements

Writing a dissertation is a journey, which includes a great portion of joy as well as agony, and lots of hard, lonely, work. But it is not something that can be done in isolation; this dissertation could not have been written without the support and assistance of many different people.

Being a doctoral student has given me the opportunity to engage in new communities of practice, meeting new people, as well as moving on, leaving some communities of practice behind. Whether I have been at the core of the practice, or in the margin, is not the important part; what is important is that interaction with other people has shaped my identity. Whatever my role has been, it has brought on changes in my life. I am glad for all the encounters that I have had the privilege to be engaged in, where some people have had a crucial role when it comes to forming my identity in a way that makes living and learning an exciting journey.

My supervisor, professor Berner Lindström, has been an invaluable companion on my intellectual journey, constantly questioning my writings, adding his analytical sharpness. Our journey together has been far longer than I anticipated to begin with, but Berner never gave up on me. Being at the point where I am today, I am glad that neither him, nor I, jumped off the train before arriving at the end station. Without your support, Berner, it would not have been possible. Thank you for believing in me and for providing thoughtful guidance and criticism, and for being a human being.

My other supervisor, senior lecturer Ph.D. Ulla Runesson, has also supported me with priceless advice, especially the advice I sought, and got in the twelfth hour, after my last seminar. Thank you, Ulla. I never thought I would be able to get the 150 pages of results and the discussion part back together again, but after I had followed your advice, my life changed from being a perpetual doctoral student to a possible Ph. D.

During the years I have spent as a doctoral student at Gothenburg University, I have not had a position at the university. I have come to the university to attend courses, tutoring sessions, and seminars, and in this respect I have been a peripheral participant. But I have never felt marginalized, since everyone at the university always make me feel welcome to be part of the research community. I especially would like to thank Ph.D. Hans Rystedt, who spent a lot of time preparing a

very interesting discussion for my final seminar. You supplied me with many new thoughts and ideas, and as you can see, I listened to most of them. I would also like to mention Jonas Linderoth, Lars-Erik Jonsson, Eva Hjörne, Marie Bliding, professor Roger Säljö and professor Mikael Alexandersson at Gothenburg University, who all have given me intellectual challenges during various stages of writing my dissertation. I would also like to express my warmest thanks to professor emeritus David Magnusson, Stockholm University, department of psychology, who during the years has showed interest in my work, read parts of my manuscript, and taken time to discuss my work with me. Your concern and commentaries have been mostly appreciated.

During 1999 – 2002, I had a position as a doctoral student at the School of Education and Communication, Jönköping University. I would like to thank all of you at the University, for giving me the opportunity to work in an academic environment, and for making it possible for me to have a salary during three years.

I would also like to thank the staff at Central School, especially John, Roger, Aron, Karen, Peter, Leonard, Mike, and Tom – not your real names, but I know that you will recognize who I am referring to. Thank you all for welcoming me to take part of your professional lives at Central School, allowing me to "hang around".

I do not believe writing a dissertation is possible without having dear friends around. My dearest friend since 25 years, Karin Alnervik, who is an expert on facilitation in school, always has a listening ear and never hesitates to criticize my writings when I am off the track. You often challenge me, and many times I have redirected my analysis after one of our cherished walk-and-talks. Thank you for being my friend, and one of my sharpest critics.

There are two other professional facilitators that have become close friends during the last five years; Åsa Bäckström and Karin Åberg. There have been many times when we have engaged in talking about facilitation and school development. Thank you for sharing your expertise, and for being such good friends.

When I changed from writing in Swedish to English a few years back, my dear cousin Bruce Junvik, who is an American teacher and writer, helped me to get started by revising my text. Thank you for helping me to add the touch needed to switch from Swenglish to English. This summer, another loved member of my family, my niece Andrea

Hjelmåker, read my dissertation, and handed it back to me with correction marks all over the pages. Many times, Andrea showed that I am a bit out of touch with the English language nowadays. Thank you, Andrea, for putting all those hours in.

My close relatives have also been invaluable companions on this journey. My mother and father in law, Ester and Lars Karlsson, are very dear to me. Among many other things, thank you for taking care of my dog Hugo when I've been in Gothenburg. My sister, Gunilla Hjelmåker, often gives me an encouraging telephone call. When you said that my dissertation seems to be about everything (meaning, lerning, identity, etc, etc), it became a reason to revise the text.

My father, Yngve Junvik, has always said that one should finish what one starts. A few years back, when you were at the hospital, it made me ponder on why I am writing a dissertation. Was I fulfilling your dream? I asked you how important it was to you that I completed my dissertation. Your answer was that it is not important to you, but if it is to me, then I should complete it. I came to the conclusion that it is not your dream I am fulfilling; it is mine. Thank you, Dad, for always standing by my side, whatever choices I make in life.

Someone has said that there are angels whose only job is to make sure you don't get too comfortable and fall asleep and miss your life. I have four such angels in my life; my three children and my husband. When God handed out kids to mothers, I was first in line; I definitely got the best ones! Thank you Stina, Gustav, and Maja, for constantly reminding me what is meaningful in life. Your teenage years were spent in the presence (or absence?) of a mom who was busy writing a dissertation, but you did such a good job all three on forming an identity, where all three of you turned into such wonderful young adults. I'm so proud of you. I am confident that having you around, you will make sure I don't get too comfortable and fall asleep and miss my life.

My fourth angel is my husband Sven. Not only have you supported me financially during these years; you have more than anyone else supported me morally. Living with you is the best experience life has to offer. I promise that I will soon begin to contribute (financially and mentally) to the one community of practice where I definitely am a core member: our family.

Habo, 19th of September, 2004
Mia Karlsson

BACKGROUND

This part of the dissertation serves as background to understand the empirical study and the analysis made. The first chapter is an introduction, where the aim of the study and the research questions are presented. The following chapters - two through four - is an account of what is stated in policies as well as earlier research regarding issues related to ICT in society in general, and ICT in pedagogical settings in particular.

Chapter two deals with ICT as a new cultural tool, which affects our society to a great extent. It is argued that what is new is that information and communication systems are brought together by electronics, which gives us an opportunity to act towards ICT, not just receiving information from it. As ICT has been integrated in society, it has become all the more important to integrate ICT in educational settings in order to prepare our youngsters to act in future society.

Chapter three is an account of school changes in the perspective of technology. Goals and objectives of schooling have changed. The view on how teachers are organized, and the view on teacher competence have changed as well, where facilitation is a new way of supporting school development.

Chapter four deals specifically with ICT in schools: who uses it and how it is being used and effects on teaching and learning. There is also an account of ICT initiatives, where the ITiS program is given special attention.

INTRODUCTION

Information and communication technology (ICT) is not a new phenomenon. If one considers humans making paint to draw pictures on stones as technological development, ICT can be viewed as been around for thousands of years. However, modern ICT, based on computers, is fairly new.

During the last decades, ICT tools seem inevitably have come to stay in society. School, one of the largest societal institutions, have adopted modern ICT, and the rapid expansion of computers during the 1990's, involves there not being many schools in Sweden today that lack computers (Hernwall et al., 1999).

State authorities (SÖ, 1984; SOU 1999:63; Prop. 1997/98:176; Delegatin for ICT in Schools) with a political agenda and political goals aimed at steering school practice, emphasize the importance of ICT in education. Aspects salient for state authorities in Sweden are not only about teachers learning how to use ICT tools. It is also about what teachers need to learn as to changing school practice in order to teach an up-growing generation who are going to be active in a society quite different from the society that teachers themselves grew up in; a society that involves ICT.

The state has initiated several ICT programs in Swedish schools during the last three decades where IT in School (ITiS) is the largest competency development program ever. More than 70 000 teachers (around 50%) have participated in the program during 1999-2002 and the initiative has cost around 2 billion Swedish kronor. The program is designed in a way that teachers cannot apply for participation on an individual level; they have to apply as a team. The program is aimed at "pedagogically-oriented in-service training for teachers in team" (Delegation for ICT in Schools, 1999). The ITiS model is to some degree interesting regarding individual teacher competence development, but the requirement of teachers having to apply as a team is particularly interesting, since it allows a study of teamwork as

a vehicle for teacher team development when a new tool, ICT, enters the arena.

ICT is a central feature in ITiS, where the program has a strong emphasis on ICT: I(C)T is included in the program title; teachers receive a computer to be used privately; teachers are to carry on a student oriented project, where ICT is to be used; there are three theoretical aspects referring to ICT that are to be covered during pedagogical discussions in facilitation meetings and seminars (ICT in the World, ICT and Learning, and ICT in Practice – Delegation for ICT in Schools, 1999, p. 3); the State provides Internet access for schools who do not have connection before entering the program; there is also an emphasis on all students and teachers having an e-mail address, since it is regarded as "an important prerequisite for being able to participate in the ICT society" (ibid, p. 7). All this points to ICT as a central feature of the ITiS program. However, there is no time allocated to learn how to use ICT in the program (except for those teachers that have no or little previous experience of using ICT).

The focus of the program is on "pedagogically-oriented in-service training for teachers in teams" (ibid, p.2) suggests that learning and development occurs as teachers participate in everyday practice, interacting with each other, and others, making use of objects that surround them, such as ICT tools. In this respect, ITiS can be viewed as a program where teacher teamwork is assumed to be means for nurturing a change of pedagogical practice using ICT. The Delegation for ICT in Schools (1999) state that:

> The national curricula adopted in 1994 prescribe a change of focus in schools from teaching to learning. This implies that the traditional organization of work in schools; one teacher, one classroom and 25 odd pupils, will be replaced by teams of teachers working together with a larger group of pupils. In this change ICT can be a powerful tool for learning and as such promote the transition. Evaluations of ICT projects in schools provide strong evidence that only when the organization of work has been changed can the introduction of ICT fully support the learning of children (p. 1).

Teacher teamwork presumes interaction and discussions between teachers around practice. As participants in ITiS, teachers are to participate as a team under certain conditions, which includes

attending meetings with a facilitator. Bringing in an outside person who moderates their discussions – a facilitator – is a new activity on the school scene. The time spent with a facilitator and in seminars with other teams are to focus pedagogical issues that emanate from teacher's questions around everyday practice. The Delegation for ICT in Schools (1999) gives some examples:

> Participants also study and discuss ICT and pedagogical/didactic issues such as e.g. how ICT influences education and how the multi-capabilities of modern information technology can be exploited. In addition, there is discussion on how working approaches and methods, teaching and pupil roles may be affected by the use of ICT in learning situations (p. 4).

Individual learning is implicated in the program as well, where participants receive a computer to be used in their home. This can be viewed as a way for authorities to guarantee the availability of a computer to each participating individual teacher. But it is also implicated that they are to use it for learning purposes at home, detached from their peers, learning by themselves. It can therefore be concluded that the program is aimed at individual learning, as well as learning in collaboration with other people. However, the focus is on teachers learning as a team participating in a competency development program where ICT is a central feature.

The idea around teacher teams is not new. The Swedish curriculum of 1969 (Lgr 69), recommended that teacher and other personnel should work in teams who plan and carry out their work together. The following national curriculum (Lgr 80), further stressed the issue by recommending teacher teams. However, there are no legal writings formally regulating that teachers are commanded to work in teams, although the present curriculum (Lpo 94) include writings on the importance of active discussions among teachers and emphasize cooperation with other teachers in practice.

Teachers learning how to integrate ICT in educational settings, is not an issue for just Sweden, where there are initiatives around the world in order to implement ICT in schools. However, the National Action Program ITiS initiated by the Swedish government appears to be unique in a sense that it emphasizes pedagogical development, and not ICT courses, even though ICT is a central feature of the program.

15

Aim

The issues dealt with in this dissertation concerns teachers learning in a teamwork frame, where the studied teachers participate in a competency development program where ICT is a central feature, and where teachers have to apply as a team. The strong recommendation of teachers working in teams, is a way to contextualize, and formalize, social learning. Social learning is here referred to in relation to a social theory of learning (Wenger, 1998), and not to theories of social learning in general.

> It is important here to distinguish a social theory of learning from a theory of social learning. A social theory of learning claims that human learning is fundamentally social in the sense defined here, whether it takes place in social interactions, in a group, or by oneself. This theory therefore does not suggest that we learn better in groups or in other interactional contexts or that individual learning is somehow inferior or to be avoided (Wenger, 2004, footnote p. 4)

The above suggests that learning occurs in practice. Practice in school is usually referred to as practice carried out in the classroom in general, or as it unfolds on a particular school, teachers working with students. In this study, there is a delimitation concerning what part of practice is studied: the studied practice refers to the ongoing practice on a particular teacher team, engaged in interaction with each other in informal, as well as formal, settings. Therefore, it is the teacher team practice, with its ongoing activities on the team that constitutes the unit of analysis. The general school practice on a particular school (which includes students and other people on the school and on other schools, who teachers are related to, and artifacts such as ICT tools) and the larger system that teachers belong to (which includes steering documents) are a backdrop to studying the ongoing practice on a particular team.

The aim of the study is to understand how a teacher team functions as a vehicle for the development of competencies in pedagogical use of ICT.

In addition to the above stated aim, there is a perspective at drawing conclusions for design of teacher competency development and in-service training, in particular of learning how to use ICT and developing pedagogical awareness of such use.

To understand how the team functions, there is a need for a theory that allows an analysis of the team as individuals who are expected to enhance their learning in everyday practice in interaction with each other. In addition, there is a need for a theory that allows a view of the team as individuals who are mutually engaged in a certain practice around a particular task: to integrate ICT in pedagogical practice. A model that allows viewing the team this way is the theory Community of Practice (Lave & Wenger, 1991; Wenger, 1991; 1998; 2004; Wenger et al, 2002). The theoretical perspective applied is not chosen in advance, but emerged as a suitable framework for enhancing understanding of the studied team. In addition, the theoretical perspective offered specific tools for elaborating certain aspects how this team functions.

The theory Community of Practice is a theory that views learning as situated in practice (Wenger, 1991; Lave & Wenger, 1991; Lave, 1997; Wenger, 1991; 1998; Wenger et al, 2002). There is an assumption in this perspective that persons acting cannot be separated from their social world of activity (Lave, 1996). The individual and the community of practice that she/he belongs to are interrelated and socially intertwined (Wenger,1998).

Learning develops in negotiations of meaning, which changes participants' identities. As teachers learn and transform identities, their community of practice changes. This applies as well the other way around; when a community of practice changes, it changes and transforms participants' identities. Negotiations related to expected learning as to development of practice, emanates from the question of "what-we-are-here-to-do", or as formulated by Wenger (1998): the joint enterprise.

Community of Practice is a dialectic theoretical perspective. I do not believe that the theory is difficult to understand, but there is a complexity in the theory, which lies in many aspects being interrelated and intertwined. In this respect, the theory can serve to give voice to something we already knew, but did not quite have the language to act upon (Wenger, 2004). In a complex society, that initiates a complex competency development program for teachers, with a complex objective - learning - a complex dialectical theory seems in place to apply, in order to understand the research questions.

17

Research questions

When teachers apply for participation in the ITiS program, they have to apply as a team; individual participation is not possible. They are to carry through a student project where as many subjects as possible are integrated, using ICT. They are also to write a joint final report. Their attendance at seminars and facilitation meetings are mandatory, where teachers stands a risk to have to give up the computer they receive through the program, if they do not comply with this demand. Hence, it can be stated that the program strongly emphasizes interaction between teachers as a team, as means for competency development in everyday practice, in a program where ICT is a central feature. When using the concept pedagogical use, the concept does not just refer to pedagogical means in instructional design, but means for administration as well, and support for learning – for teachers as well as for students (Lindström, 2003).

An overall question is how the team functions:

1. What characterizes a teacher team when they participate in a competency development program, which requires pedagogical use of ICT?

The other research questions aim to enter deeper into the issue and highlight certain aspects of teachers learning as participants in the program.

2. How do teachers use the resources offered by the ITiS program as well as other resources in their environment?

3. What issues and concerns about the pedagogical use of ICT, do teachers raise while they participate in the program?

4. What are significant dimensions and content in teachers' learning in practice?

ICT AND CHANGES IN SOCIETY

A new cultural tool

ICT is not a new phenomenon in society. Pencil and paper, written text, telephone, railways, and moving pictures, are some examples of information and communication technology. However, this is not usually what we refer to as modern ICT. Modern ICT includes computers, which distinguishes it from the possibilities that were at hand with earlier innovations. This makes it feasible to talk about a new cultural tool. When we try to understand society, it is difficult not to think about technical artifacts, or tools, surrounding us; tools that form our lives, and at the same time tools that are constantly reformed and further developed. ICT is definitely a tool, but it is more than a tool, since ICT offers a content of information to deal with and critically examine, and ways to communicate that offer possibilities for interaction with other people throughout the world. Turkle (1995) says:

> At one level, the computer is a tool. It helps us write, keep track of our accounts, and communicate with others. Beyond this, the computer offers us both new models of mind and, a new medium on which to project our ideas and fantasies. Most recently, the computer has become even more than tool and mirror. We are able to step through the looking glass. We are learning to live in virtual worlds. We may find ourselves alone as we navigate virtual oceans, unravel virtual mysteries, and engineer virtual skyscrapers. But increasingly, when we step through the looking glass, other people are there as well (p. 9).

Modern ICT has developed quite rapidly One example is the Internet, which became broadly available for the public as late as 1994. In 1969, Margaret Mead (1970) pointed out that, when there is a rapid development in a society based on technology and cultural elements, there will be changes, especially for children; they are often far ahead of adults when it comes to using new technology. Tapscott (1998) points out that, those younger than 25 years of age are the first generation growing up surrounded by digital media. He argues that

children and youngsters of today learn, play, communicate, work, and create communities that are very different compared to that of their parent generation. He calls the generation born after the late 1970's for The Net Generation. Their parents grew up with TV as a central media, but for the Net Generation, there has been a displacement from passively receiving TV broadcast, to being actors in a digital world where the cornerstone is interactivity. He argues that children's knowledge around ICT is developed as they use these new media from early age. They receive powerful tools when it comes to expressing themselves, as well as possibilities to affect issues, but ICT also offers new powerful tools for play. To understand how this generation intends to use their digital competence is, according to Tapscott, the most essential questions for parents and teachers, since children are a powerful source for societal development. This puts great demands on those who educate and prepare children and youngsters to enter a society where ICT is an integral part of children's life world.

On a rhetorical level, Veen (2001)[1] uses the notion Homo Zappiens to describe the generation that has access to modern ICT. He argues that their ability to rapidly be able to read a text is a result of them having learnt to scan visual material by surfing the Internet, but also by zapping through the TV channels where it is completely natural for them to watch three programs at once. They learn the structure of the program, and they are able to swiftly shift between channels when they know that something boring is going to be on next. They develop a capacity to work in a non-linear way. There are no problems doing several different things at the same time; they listen to music, chat on the Internet, talk to a friend on the telephone, at the same time as they are doing their homework. Veen argies that Homo Zappiens are preparing themselves for a future that all the more is going to value creativity. Furthermore, he says that the educational system underestimates the capacity of this generation, and that education needs to introduce new teaching methods.

Many adults feel threatened by young people, especially when it comes to how they think and act, and by new ways of communicating

---

[1] See article written by Paula Isaksson in *ITiS sätter spar i skolan,*
p. 18-19, for a popularized summary of professor Veen's arguments.

where there is no way of controlling what goes in and what comes out (Tapscott, 2001). Those in teacher training in Sweden today, have 9 years of compulsory school and three years of high school[2] and at least three and a half years of university studies. Considering the lengthy education, there are few active teachers that belong to the Net Generation. Educated teachers, younger than 25, are not in majority of active teachers teaching in the year of 2004. This means that most teachers deal with a generation that have totally different conditions than the teachers themselves had; it is a generation brought up with computers.

Turkle (1995) argues that modern technology shapes youngsters' identities when they interact with others on the Internet. She points to a becoming culture, a culture built upon simulations, affecting our ideas on consciousness, our body, self, and what a machine is. Through empirical findings, she shows fundamental displacements as to how we create and experience human identity. In these games, people define who they are, which doesn't have to be anchored in reality since they choose their identity, where who they are, is negotiated through the game. This is a new way of playing games, which is made possible by information and communication systems brought together by electronics.

Information and communication

By asking for, borrowing, and sharing information with others society can be reproduced, but also change since human beings are creative, enabling them to add new elements and thereby create new knowledge. The integration of ICT in society involves a displacement concerning which knowledge that is valued as necessary in order to act in a future society. One example is that:

> All students have to be familiar with modern IT when they leave school (Utbildningsdept. 1998, p. 6, my translation).

To be familiar with modern ICT includes being familiar with how it can be used for gathering information as well as for communication.

---

[2] Swedish: gymnasium

But the computer was not a tool for information and communication from the start; it was first a tool mainly used for calculations.

The development in society apparent today, where ICT is an integral and important aspect, has its roots in a development that started in the 18th century, when the view on information and communication was changing (Chandler Jr., 2000). During the latter part of the 18th century, there were vast changes due to industrialization, which made building of an infra structure, meeting the demands of the market (i.e. a functional postal system) a focal commission in society (Brown, 2000). Information and communication became an important aspect of building a new society, not least in the United States, where the leaders appreciated the value of an informed critical mass that could help resist the former colonizers in building a political system of elections conducted by the majority system. Printed newspapers were published in the United States supported by the leaders in pursuing a development, which included newspapers being distributed by the postal system. Building roads and a railway system during the 19th century, revolutionized transportation and communication (Chandler Jr, 2000). The telegraph, the telephone, radio, and moving pictures, were inventions that gave people enhanced possibilities to communicate with each other and take part of information. In the 20th century, those possibilities were further enhanced with the invention of the computer.

The development of the computer can be divided into three different stages (Chandler Jr., 2000). From the early 1950's until the beginning of the 1980's, there was the era of computer processing. The computer was mainly used in the national defense and by researchers for calculations. This era was succeeded by the era of the microprocessor, which was predominant until the middle of the 1990's. The era was signified by the personal computer (PC), which in the middle of the 1980's was being mass-produced and marketed as a consumer product. In the middle of the 1990's, the general public had access to the Internet, which signified the beginning of the network era (ibid.). At this time communicative functions were made available to the public on a broad front. The forerunner to the Internet was the ARPANET[3]. In 1971, it was possible to link four university computers

---

[3] Advanced Research Project Agency Network

in order for researchers to share information. When World Wide Web was introduced in 1990, HTML in 1991, and NCSA Mosaic in 1993, the foundation was created for governments, organizations, and individuals, to start building Web sites (Nolan, 2000). Since then, the Internet use has exploded. Between 1996 and 1997 Internet use increased by 103% (Wallström, 1999).

Sweden is one of the most computer dense countries in the world. In a country with a population of merely nine million inhabitants, it has to be regarded as extraordinary that as many as 1.4 million computers were sold between 1997 and 1998. This figure is probably related to the advantageous benefit offered to employees to buy a computer through their employer (Vedin, 1999). This development has continued, and during the year of 2000, more than one million computers were sold in Sweden (Aftonbladet IT, 2001). In February 2001, the amount of Internet surfing Swedes were 4 229 000 (Aftonbladet IT, 2001).

The novelty of our culture is that we are able, for the first time in history, to connect human communication and information, in written, oral, and audiovisual forms to one system; a system which is believed to have the power to change society.

> The emergence of a new electronic communication system characterized by its global reach, its integration of all communication media, and its potential interactivity is changing and will change forever our culture (Castells, 1996, p. 329).

So, what is new is that information and communication systems are brought together by electronics, which gives us an opportunity to act towards it, not just receive information from it.

Societal interest in ICT in schools

Different actors on the political scene have, during the last decades, stressed the importance of ICT in educational settings. In 1984, the National Board of Education (SÖ, 1984) released a publication on the issue "Approaching Computer Society", where authors who have societal interest in computer development, such as: labor unions; technicians; teacher educators; universities; and national department of education, express their view. It is stated that computer use will be

23

enhanced in school since society is going in a direction towards enhanced computer use, and that this calls for competency development among teachers, as well as new educational material. It is also stated that enhancing computer literacy is of utter most importance since people need to be aware of possibilities and risks with the technology, in order to be able to participate in societal ICT development in a desirable way (Keisu-Lennerlöf, 1984).

In the European Union white book of education, the "IT revolution" is mentioned first of the three main revolutions that are referred to as prime movers for societal development (Euoropeiska kommissionen, 1996, p. 10). The Swedish national board of education, and Kommunförbundet[4] have jointly made up an ICT guide for schools, and the teacher trade union has policy documents concerning ICT in school (Lärarförbundet et al, 1995, p. 10). In addition, the governmental IT commission, which was appointed in 1994, speak of the need of ICT in school, and how new technology opens up for a new pedagogy and a changed teacher role.

There are two main aspects as to consequences of introducing ICT in schools. Firstly, ICT competence can be viewed as a goal, since it is stated that all students have to be familiar with modern IT when they leave school (Utbildningsdepartementet, 1998). This is an entirely new objective in the school system. The purpose of this goal is to enhance computer literacy among Swedish inhabitants. All children attend school from the age of seven, and if this goal is achieved, all children will be familiar with ICT by the year of 2010.

Secondly, ICT is a media that is a mean for developing pedagogical practice in school. Teaching with ICT is not the same as teaching without ICT. To teach with ICT requires not only an infrastructure that makes it possible, but also teachers that are competent ICT in knowing how ICT can be used in educational settings, and who know how to use the media themselves. It is as well a matter of teaching *with* the aid of ICT as it is a matter of teaching *about* ICT. Many teachers do not have this type of competence; ICT is a new tool that didn't exist when most teachers got their teaching credentials, and there were no examinations goals stating that they needed this type of

---

[4] Swedish Community Employer Organization

competence at that time. Therefore, there is an assumption of the need for competency development on a broad front among practicing teachers.

After a 1996 government proposition (Prop. 1995/96:125), the examination goals for obtaining teaching credentials in Sweden changed. The proposition states that:

> The design of the teacher education program is of great importance both for spreading knowledge around IT, and for development of pedagogical working methods based on new technology (p. 35, my translation).

Teacher students examined during the year of 2000 were the first teachers comprised by a new examination requirement.

> In order to receive a teacher diploma, the student has to have the ability to use computers and other information technology aids, for their own learning, as well as knowing how these tools can be used in teaching children and youngsters/students (UFB 3, 1997/98 SFS 1996:913, my translation).

In the final report written by the committee of the teacher education program (SOU 1999:63) it is proposed that the teacher education program should be designed in a way that enables teachers to...

> ...prepare children, youngsters, and adults, to be able to act in an all the more knowledge rich working life and societal life, where information and communication technology is inherent as a natural feature (p. 59, my translation).

In the following government proposition (Prop. 1999/2000:135) it is stated that ICT...

> ...should be an important element in teacher education, since ICT is a significant tool for teachers, and, a power for pedagogical change, as well as being an administrative aid to the teacher (p. 65, my translation).

The emphasis of ICT in teacher education is a strong indication that future teachers will have to be able to manage new technological tools; during the latter part of the 1990's, the Swedish government invested considerable amounts in order to support ICT competency development among teachers, further elaborated on in chapter four.

SCHOOL DEVELOPMENT IN THE PERSPECTIVE OF ICT DEVELOPMENT

Objectives and goals of schooling

According to the Swedish National Curriculum (Lpo 94), "the primary objective of schooling is, and always has been, to mediate knowledge" (p. 8, my translation). But mediation of knowledge is only remotely connected to school, since learning has been going on in practice long before schools were invented.

The knowledge human beings have developed and appropriated through history has during the years increased as to degree of abstraction (Säljö, 2000). To exemplify this, the example of human knowledge on fire is used. We do not know for sure how people learned to make a fire. But it is not probable that they knew that fire starts as the result of an oxidation process so rapid that more heat energy is released than what can be carried off by radiation or conduction. It is more probable that human beings, through practice, appropriated knowledge around fire from practice (e.g. from lightning), and that the abstraction above was added after long experience of fire in practice. Humans learned how to materialize fire, and combined with intellectual ability, the knowledge of fire became abstract. This is one type of theoretical abstraction that some teachers in school aim to mediate to students.

Which type of knowledge that is considered valuable to mediate in schools, is related to the era the student is living in, and which cultural context one is discussing. In ancient Greece, and when the Romans ruled, rhetoric's was considered an important subject. During the medieval times, religion was emphasized where the aim was to educate priests (Ozmon/Craver, 1995). In the middle of this time period, trade became an important source of income and Latin was the only current international language. Arithmetics, law and navigation were important as well. During the renaissance, the humanities grew strong and local, and in particular, dated and oral subjects had a strong position. Poetry, classical literature, architecture,

sculpting, and painting was emphasized, but soon these had to yield to book-learning (Dahl, unpublished manuscript, 1998). The rationalists conquered the renaissance humanists, and certainty became more important than philosophical skepticism (Toulmin, 1995). The rationalists' victory over the renaissance humanists dominated as late as in the 1950's.

There are basic and seemingly unchangeable presumptions in society why all children should be subjected to schooling: school is the place where we send our youth to take part of what is difficult to learn from just living and experiencing life. Before there were public schools in Sweden, there was another system. From 1632, the head of the household was responsible for teaching all members of the family how to read. This was not a common system for other countries at the time; literacy campaigns have mostly been a matter for the 20th Century (Liedman, 1997). Learning how to read and write was considered important to society since people then would be able to read the Bible and study Lutheran catechism, knowledge that was regarded as necessary and assessed by parish catechetical meetings. Many heads of families fulfilled their task well, but not all. Informal learning was many times sufficient for becoming a farmer, but as society became industrialized, new and different demands were imposed on citizens. There are many things one can learn from just living and experiencing everyday life. However, there is certain theoretical knowledge considered valuable for everyone to know that is difficult to attain from just living. One example is literacy.

Teaching youngsters at home was not a satisfactory solution to literacy, since many children were needed to help out on the farm. This was the reason for establishing compulsory schools. When the Swedish compulsory school was imposed in 1842, it was to guarantee all children their right of education. Compulsory schooling did not mean the same as compulsory school attendance. Some children were still educated in their homes. However, the fact that children should be subjected to education by the age of nine was determined and stated by law. School became a catalyst for societal development, since illiteracy was regarded as a societal problem which was to be dealt with by offering all children formal schooling. School became a driving force in societal change.

In today's society, what is it that school can create conditions for? What do children of today need knowledge of that cannot be learnt by just living? Why can't we just leave kids to learn from life, from everyday experiences outside of school? And, what type of knowledge is it that they appropriate; is it knowledge that is relevant for their future lives? Is the time spent in school proportionate to their knowledge appropriation? And do the teachers have necessary competencies to guide students in the learning process to appropriate knowledge suitable for the 21st Century?

Some say that, in our time and culture, it is the ability to appropriate and apply knowledge that is the new source of wealth (Handy, 1995; Hagström, 1995). Traditionally, schools were based on learning things such as table of rulers, dates, and values valid for the time when they were brought about (Liljequist, 1999). In the complex society we are living in today, other skills are needed, such as learning how to search the Internet to find information on different subjects taught in school. There is not the same need to know tables or rulers or dates. Learning how to push the right buttons on a computer can easily attain such information. Instead, the discourse of knowledge entails the importance of learning to become critical, to be able to solve problems, and to have good communication skills, knowledge which to a great extent is abstract, where we need to use our intellect.

Material artifacts, or tools, are extensions of our intellectual and physical ability, and play a great role in our appropriation of knowledge. By the help of ICT, many problems can be solved considerably easier than if we were to use our intellect only. We can do quick calculations, be aided in critical thinking around a phenomenon by taking part of different perspectives mediated through text, pictures, or sound, and we can communicate in a matter of seconds with each other, all over the world.

To learn things such as table of rulers should not be regarded as negative, but it may be means for the teacher to keep control over student knowledge appropriation where the result may be that the teacher simply reproduces the past. This could prevent the student from the possibility of developing the ability to see alternatives (Bernstein, 1996). Although school is...

> ...deeply a matter of transmitting a cultural heritage (Lpo 94, p. 7, my transl),

it is also

> ...necessary that students develop an ability to critically view facts and circumstances, and be able to realize consequences of different alternatives (ibid).

What is learnt in school is historical and social constructions, which go beyond content; learning table of rulers and learning how to search the Internet supports different kinds of knowledge appropriation. In the learning process, the student is raised to learn many different things, for example: a working method; finding the code to the knowledge valuable in the situation that he or she is part of; adapting to the culture; learning how to structure existence to fit into society; learning how to cooperate, or how to work on your own. Earlier, certain knowledge was useful for something valuable in that time and age. Today, certain knowledge is useful for something different, valuable in this time and age, emphasizing that youngsters are expected to have knowledge of computer use (Utbildningsdepartementet, 1998, p. 6).

Many children get acquainted with the possibilities of computers at a young age through computer games supplied by commercial producers, a mass industry. Learning how to use the computer through computer games, gives children opportunity to get acquainted with computers in everyday play. Many children have access to computers in their home. In 1998, more than half of the Swedes had access to a computer in their home (Vedin, 1999). Since then, the density of computers has continuously increased. However, there are still those that do not have a computer at home, which makes school the only place that can guarantee that all children are offered the possibility to get acquainted with computers. All children are enrolled in school; all do not have access to computers at home. Besides, it is not certain that they in their home learn how to use common software programs and Internet search engines, something that might be an asset when it comes to developing theoretical knowledge. Through school, all children can be offered the possibility to use ICT. Since all children are enrolled in compulsory school, ICT becomes a tool for social justice. As a group, teachers are the only societal institution that all children encounter on a daily basis.

29

Therefore, teachers are a potential force that could be prime movers for the ICT development that State authority has expressed as desirable in society on a broad front.

What schools can offer are pedagogical software programs, but also to let the students learn how to search the Internet and how to use regular software programs (such as the office package) in the learning process. One way to make students use computers for schoolwork is when

> ...teachers' principal objectives for student computer use include having students make presentations of their work before an audience (Becker, 2000b, p. 13).

The ability to value and critically examine information appears to be relevant knowledge for the future lives of students today. School is responsible for transmitting basic values, but also for supporting the student to develop a critical mind. In a report from the Knowledge Foundation (KK-stiftelsen, 2001a) it is shown that more than half of the students (59%) regard the Internet as a tool that has heightened their consciousness of source criticism. But the same survey also shows that teachers (32%) are not as prone to consider the Internet as a factor to source criticism as the students are. In addition, the survey shows that students consider their motivation to be enhanced when ICT is integrated, and that the learning process is facilitated. So, according to students, it is more meaningful to use ICT in the learning process than not using it, whereas the teachers are more hesitant as to the value, of ICT.

Moral values is another topic discussed regarding what schools are accountable for towards students, parents, and society. Colnerud (2001) asks whether…

> …all norms are worth reproducing? Many of today's socially acceptable norms are of dubious value for future generations! (Colnerud, 2001, p.61, my translation).

It is stated that the important issue of ethics and ICT, is that teachers must not underestimate…

> …the importance of a connection to, and a communally creative communication with, students (Colnerud, 2001, p. 63, my translation.)

To mediate societal values is one objective of schools. The objectives and goals of schools are described on many different levels. In the curriculum, some goals are described as goals to attain, others as goals to strive for. In addition, there are overarching normative goals such as schools being responsible of mediating societal values. There are also objectives stated in other documents such as government propositions. Many different interested parties scrutinize the different objectives and goals, and teachers having authoritative monopoly as to what is regarded as valuable knowledge, is changing. Objectives in school are not just a matter of authorities stating goals, and teachers making sure they are upheld. Society, which includes parents and students, express their opinions on the objectives of schooling, as well as the media, such as television and newspapers, which affect schools to a certain degree. Student and parent democracy is encouraged; hence, students and parents become a channel where the objectives of schooling are scrutinized and not as easily accepted as before when authorities were sovereign regarding the objectives of schooling. Society values that students are critical and well informed, and the authorities are no longer to be taken for granted to determine all objectives in school.

Teachers today are accountable to students, parents, and society, to teach an extended learning objective compared to earlier times, an objective including ICT. ICT has a potential to permeate most subjects in school, making ICT knowledge salient for teachers on a broad front. Since the state emphasizes that all students have to be familiar with ICT when they leave school (Utbildningsdepartementet, 1998), the issue as to who is a competent ICT user - the teacher or the student - is brought to the fore. Teachers have traditionally been the ones to know the content of what is taught, whereas a new problem has arisen concerning ICT in teachers not knowing how to integrate and use ICT professionally. Today, many teachers may know less than their students about how to use ICT, and they don't always have all the answers to their questions. When teachers know less than students it may sometimes cause teachers to seek help from students. This is a new kind of displacement in school; school becomes a place where students and teachers explore knowledge together.

Some recent changes in school

Some are of the opinion that school is not changing as fast as society demands, and there are several analyses accentuating school as difficult to change (i.e. Cuban, 2003; Postman, 1995; Englund, 1995; Sundgren, 1996; Madsén, 1994). There are even those claiming that the world our children live in changes four times as fast as our school (Dagget in Dryden/Vos, 1994, p. 98), which ought to be hard to prove empirically.

A 1993 evaluation (Svingby, 1993), made by The Swedish National Board of Education, sketches a gloomy picture of earlier school development initiatives in Sweden. As far back as 1948 (SOU 1948:27), the school commission talked about the importance of schoolwork having a connection to the outside world, and the importance of using new teaching methods. But as late as 1993, schools were dominated by traditional teaching methods consisting of students answering questions that the teacher poses, or, teachers giving lectures (Svingby, 1993).

According to Arfwedsson (1985), there are few stabilizing factors for teachers except the school code, a central notion by Arfwedsson, defined in 11 points. The school code can be summarized in the following: the school code is the result of the total span of contextual influences where the function for teachers is to create meaning, in order to organize the world around them. Arfwedsson found that there is a strong solidarity principle among teachers. One such principle is about resistance towards change, especially changes being introduced from the outside (ibid).

Fullan and Stiegelbauer (1991) argue that, in educational settings, it is important that teachers' view on change is shared among them, not just remaining on the individual level; there has to be a mutual engagement around the reasons for the change. As long as a teacher does not find the change meaningful, there is no reason to accept a change. It is a risky activity to leave old assumptions for something new, if the teacher cannot assess the change as for the better. A teacher cannot "afford" to invest personal energy into something that does not seem meaningful (ibid).

Swedish teachers have experienced changing conditions in their profession in many different ways. These changes are considered so vast that, Swedish Teachers' Employer Organization talk about an epic change (Svenska Kommunförbundet, 1995).

All changes are not dealt with in this background. I have chosen to account for four major changes, relevant to this study. Firstly, there is an account of ICT as a new media used in education. Secondly, there has been a change as to how teacher work is organized. It used to be a solitary profession, teachers being sovereign in their own classrooms. Today, teamwork is highly recommended. Thirdly, a changed view on teacher competency development is accounted for. The last major change dealt with in this chapter, is the possibility to reflect on practice in the presence of a facilitator as a form of competency development.

New media

Media such as radio, television, slides, and video, have been integrated and used in schools for several decades, and teachers have had to learn how to use such media as educational material. As early as 1920, Thomas Edison had a vision:

> I believe that the motion picture is destined to revolutionize our educational system and in a few years it will supplant largely, if not entirely, the use of textbooks (in Cuban, 1986, p. 9).

Looking back, we can conclude that moving pictures have not had the impact on schooling that Edison predicted. We do not yet know what will happen in the traces of implementation of ICT in schools, but I am arguing that ICT media are profoundly different. ICT has the potential to permeate almost all subjects as well as administration, in addition being the only form of media that allows for two-way communication. Hence, new educational material based on ICT has to a great extent changed possibilities for teaching and learning.

When teachers receive a computer to be used in their home, as many Swedish teachers did during the late 1990's through the ITiS program, it is strongly implicated that teachers are encouraged to use the computer on their own time at home, even if they are not given extensive education on how to do so. The implication is that even if teachers are not good at using the computer, having it around will

make them use it and eventually it will change their views on how it can be used in practice.

It is reasonable to assume that teachers with long teaching experience have certain difficulties in adopting such a vast change as the introduction of ICT media, developed in a different setting than school. If one views change as a learning process (Fullan/Stiegelbauer, 1991), change is not one dimensional, but moves at different levels which can entail teachers having to use new or revised material, such as a different curricula or new technology. In addition, they might need to adopt new methods, and they might have to change their basic view on teaching. There is a price to be paid for this. Not only in financial terms, but in human anguish and agony of having to leave old assumptions, to enter into something unknown, and to accept the unknown as something that might be for the better, despite there being no guarantee for it being so (ibid).

If a teacher maintains authority out of his/her own (in-)competence concerning new media, to decide what kind of knowledge students should have, and how to go about appropriating that knowledge, it could mean that students are being deprived of the right to constantly enhance their critical understanding and view new possibilities available by using new tools (Bernstein, 1996).

In addition, ICT is such a vast field that no teacher can no everything related to ICT which students may have questions about. Teachers contributing resources may be a way to cover the competencies needed on a school.

Teamwork

The recommended organizational form for teachers is to work in a teacher team. The traditional view of teachers' work as a solitary profession, is all the more being abandoned in favor of team work and cross curricular work related to themes, which in turn can be a reason to change traditional scheduling of hours (Liljequist, 1999). The tradition of the teacher profession as a system consisting of solitary teachers, where the teacher is relatively autonomous in carrying through his/her work, makes team teaching a radical change from the earlier view on how the teaching profession was to be practiced.

The idea of teacher teams is not new. In the Swedish curriculum of 1969 (Lgr 69), it is stated:

> Consequently, one or several teachers who together with other personnel constitute a teacher team lead the work. In conferences, they choose and plan the curriculum and assignments given to students, carry out the work and summarize and discuss the results. In daily preparation, the teacher or the teacher team must clarify to themselves what the aim of the current working period is, and which results to strive for, which curriculum that is to be treated, and how the work is to be managed and which educational material that is to be utilized (Lgr 69, p. 106, my transl).

A few years after teachers started to work through the curriculum Lgr 69, a national investigation was appointed, the so-called SIA-investigation (SOU 1974:53), focusing on schoolwork from the inside. A new concept was introduced: the work unit. The concept work unit had its roots in an organizational division of students, and a teacher team was:

> ...the personnel working with a work unit, or - in high school - with one subject or a group of subjects within the unit (ibid, p. 579, my translation).

Four possible strategies were put forth as to how a one-teacher-system could be changed, which had come to be a problematic structure of school organization, since it to a very limited degree favored individualized teaching. The main strategy recommended (Kallos, 1985) was expressed as:

> The one-teacher-system is to be modified gradually. School is mainly to be organized around teacher teams (as to personnel) and in work units (as to students). Mainly, special education is integrated as group teaching within the frame of the work unit (SOU 1974:53, p. 566, my translation).

In the proposed legislation that followed as a result of the investigation (prop. 1975/76:39) it was recommended that the most common type of teaching should be carried out in what is known as classes, or smaller groups. However, it was to be done in work units, where teachers through educational legislation would come together in a conference at least once per semester. Granström and Olsson made a study in 1987, where they found that:

> Most matters treated in the conference are either about student care or teacher's own work situation (p. 10, my transl).

The work unit conference is the only activity that teachers are ordered to attend concerning obligations as a participant in a work unit. In the commentary to the Lgr 80 curriculum (1980:6, p. 9), there are seven main tasks stated concerning the task of a work unit. These concern: pedagogical planning; student counseling; student responsibilities and investments in the environment; parental contacts; evaluation of the work and working conditions; cooperation between school and work life, and cooperation between schools and associations and organizations. Since the commentary material is a part of the National Curriculum, it is governing for teachers practicing their profession.

The teacher team can be viewed as the executive organ for the work unit.

> The concept work unit is often connected to the concept teacher team. However, teacher teams are not obligatory (Lgr 80. 1980:6, p. 23, my translation).

There is nothing formally stating that teachers have to work in teams. The concept teacher team[5] is not used in the current curriculum (Lpo 94). There are writings, however, on the importance of discussions among teachers, such as:

> ...the task schools have, to mediate knowledge, presumes an active discussion in the local school... (p. 8, my translation).

Also, about evaluation and trying out new methods:

> ...must be carried out actively between school personnel and students... (p. 9, my translation).

And that a teacher is to

> ...cooperate with other teachers in practice to reach the educational goals (p. 12, my translation).

Even if the concept teacher team is not used in the current curriculum Lpo 94, there are strong implications. Several practitioners have shed

---

[5] Swedish: arbetslag

light on the issue[6] and practice has contributed to teachers most often, at least formally, participating in a teacher team. In 1995, the teachers' trade union worked out an agreement where it was stated that teachers had the possibility of raising their salary, if the principal considers it called for (Svenska kommunförbundet, ÖLA 2000, 1995). It is not stated as a requirement that teachers have to be on a teacher team. However, in practice, teachers have to define in what way they are to work as a team. If not, they will not be considered for higher wages (personal communication with C. Holst at Lärarförbundet in Jönköping, February, 1999). So, there is a strong implication from authorities that teachers are to work in teams.

There is research on teacher cooperation (Ahlstrand, 1995) arguing that teacher cooperation is located to two different arenas: the formal (like conferences) and the informal (other types of cooperation among teachers). The teachers in Ahlstrand's study state that they to a very limited extent can affect their work in the formal arena. Questions put forth there are not much about content and methods in everyday practice.

> Everyday practice, like everyday lessons, is hardly ever discussed, not as to short term planning or the more long term policy on how teaching is to be designed (ibid, p. 129, my translation).

Matters around individual students are discussed, which teachers consider important, but more often it is the type of questions that need immediate attention that is brought forth (like an individual student's need of more special education time).

Formal collaboration between teachers such as the conferences they are obliged to participate in, does not seem to be the most favorable way to develop team work since that time is spent dealing with other questions than those seen by the team as being the most central to carry out their task (compare Kallos, 1985).

---

[6] Examples of literature written by practitioners around work units and teacher teams: Brettell, 1986; Assermark/Sörensson, 1999; Jönsson, 2000; Åberg, 1999; 2000; Lycken, 1999.

However, the informal arena has several advantages compared to the formal arena, since teachers themselves decide when, with whom, and what, is to be brought forth (Ahlstrand, 1995; compare Becker, 1999).

> This study shows that the informal arena is characterized by a content close to teacher interests, being; student care and teaching, teachers to a great extent being the ones taking the initiative shaping the informal arena, which is utilized as promoting collaboration (Ahlstrand, 1995, p. 153, my translation).

Often, teachers with the same basic view will seek each other.

> However, as long as it does not include colleagues working with the same students, besides, being that teachers' working hours are spread out, the informal arena has difficulties becoming an actual aid in the work (ibid p. 154, my transl.)

Being given the possibility to work on a teacher team, though, is not enough when it comes to changing practice (Wingård, 1995). Neither is it enough that the principal supports teacher teams or that the team has access to facilitation[7] (Lauvås/Handal, 1993, p. 27). A necessary condition to change practice includes active participants who communicate with each other (Wenger, 1998). However, teacher workload is a constraint to teachers putting their energy into reflection, and there is not much time for constructive discussions among teachers reflecting on practice (Fullan/Stiegelbauer, 1991).

Teacher competency development
The tasks that a teacher may spend time performing during working hours, has changed. Today, teacher work can include such different tasks as...

> ...participating in developmental and curricular work, competency development, planning, cooperation, evaluation, documentation, information, marketing, administration, leadership, facilitation of teacher students, other teachers, assistants, etc, coordination, cooperation with parents and so on (Svenska Kommunförbundet, 1995, p. 33, my translation).

All the above suggests that teachers may need different competencies than earlier, when teacher work was mostly about teaching subject matter content. When the Swedish school system was decentralized in

---

[7] Swedish: handledning

1991, municipalities assumed responsibility for deciding which development programs teachers would participate in. When it comes to teacher in-service training, it is stated that if competency development programs are to be successful, they have to emanate from teachers' and local education authorities' experienced needs (Lärarförbundet, et al., 1996, p. 12-13, my transl.). In discussions between principal and teachers, teachers are to clarify what kind of competency development is needed for the individual teacher, and the team, in order to further develop student learning.

Research on in-service training argues that learning is not primarily something that is being attained through formalized education consisting of courses and seminars, but rather part of everyday practice (Alexandersson, 1994, my transl; compare Ellström, 1992; Emsheimer, 1994; Madsén, 1994; Senge, 1993; Tiller, 1998; Rönnerman, 1998), which can be described as horizontal learning, teachers learning from each other in practice.

Traditional teacher in-service training has mostly been focused on courses of instruction, or lectures; specific selective investments in teacher training (Colnerud/Granström, 1996). This can be described as vertical learning, where an expert tells those with less knowledge something that can enhance their competence.

During the 1990's, it was stated that this type of in-service-training - vertical learning through formalized courses - would probably be more and more scarce (Mattsson/Nyman, 1994). However, bringing in an expert does not have to be equivalent to traditional vertical learning; meeting with an expert can be viewed as a particular kind of horizontal learning, where the expert and the learner in negotiations inform each other:

> Even when a transaction involves the meeting of an "expert" with a "client," the relationship is starting to be understood as a "horizontal" one. Progressive doctors are attempting to reconceptualize the medical consultation, not as an expert providing a service to a recipient, but as the meeting of two forms of knowledgeability that have to meet and negotiate how they inform each other. Doctors are still doctors, but the process of making their expertise effective requires this horizontal exchange… Peers negotiate with one another how their respective stories are relevant sources of knowledge for each

other's situation… Horizontalization is the key to ensuring the meaningfulness of the exchange (Wenger, 2004, p. 20).

Facilitating student learning in a setting including ICT implies that teachers have to learn how to use specific technology, including software. Teachers must also prepare to deal with numerous new questions that arise as a result of ICT, such as how ICT changes school activities. Who had heard of the Internet or chatting ten years ago, words that today are part of children's daily vocabulary? How are teachers to deal with students spending school time chatting on the Internet? How are teachers to deal with all the changes that follow from students having access to an abundance of computer games? How is language changing with the use of ICT, and to what degree does a teacher need to know this language? A list of related questions could be very long, new questions that have come up as a result of ICT being introduced in schools, questions which teachers are expected to prepare for.

One way to prepare for teaching children in the 21st Century is for teachers to enroll in competency development programs offered by the state, like ITiS. In this program, there is a new kind of aid added for teachers to reflect together: a facilitator that facilitates the process.

Facilitation

Traditionally, there has been little or no such thing as a facilitator brought into an existing teaching practice in order to facilitate teachers' learning processes. However, during the 1990's this changed, and literature on facilitation in schools point to facilitation as one way to develop schools (Bergström et al, 1993; Näslund/Granström, 1995; 1998; Persson, 1999; Brorman, 1999; Hammarström-Lewenhagen/Ekström, 1999; Åberg, 2000).

The aim with facilitation may differ, since its' form depends on the situation. There is a commencing study (Åberg, 2004) where the aim is to clarify facilitation by examining what unites, or differentiates, the phenomena labeled facilitation in Swedish schools. In this paper, the author argues that:

> Group facilitation as an activity for practicing teachers has lately appeared on the school scene as means for developing practice. However, the thought of what facilitation is, or can be, are vague and ambiguous, which in turn is reflected in practice.

> Facilitators, such as consultants, therapists and pedagogues with different educational background, crowd an arena lacking mutual and characteristic concepts, and this can therefore constitute a   broad field of different activities labeled "facilitation" (Åberg, 2004, p.1).

In research from 1998, it is argued argue that there are some uniting concepts: learning and development (Näslund/Granström, 1998). Persson (1999) argues, as to teacher and school development through facilitation that, teachers have to be given time to discuss all kinds of questions, not just those needing immediate attention, and those that have a direct bearing on practice. Teachers are not used to spend time having that type of discussions, he says. They mostly discuss concrete matters that have a direct bearing on practice (ibid).

There are several facilitation traditions where the origin can be derived from apprenticeship, but also, from the academic world (Näslund, 1995; 2004). The apprenticeship model has a long tradition, not least through the handicraft trades, but academic facilitation has a long tradition as well. Trade facilitation has often been an expert telling someone that is a novice how to do something "the right way". It is often assumed that it is possible to handle similar situations in a similar way; a view that has its roots in behaviorist theory (Thiel, et al, 1997). Instead, apprenticeship in theories of situated everyday practice tradition places emphasis on learning as being situated, where focus is on…

> …participation in continuous and various sociocultural activities. Other people, institutions, the physical environment, the learning individual - all contribute (Lauvås/Handal, 2001, p. 66, my translation).

Another model that Lauvås and Handal describe (1993; 2001; Handal/Lauvås, 2000), and which they mean have topical value today, is called The Action and Reflection model. This model alternately stresses action and reflection on the act (Schön, 1983). The ideas that are pursued from this perspective are to show the foundation of the trade, instead of showing a "correct" way to go about the activity. This type of facilitation offers a possibility to reflect not only on the action, but on grounds for the action.

The models above are formulated as dichotomies. But Lauvås and Handal (2000) say, that:

41

> From that which lately has grown out of theory, experience, and reflection, we are more inclined to combine the reflective model with the apprenticeship model (which goes for tacit knowledge as well) by the apprentices participation in a community of competent professionals (p. 87, my translation).

This combination is about participating in practice, but also about reflecting on practice by distancing oneself from it. It also includes someone scaffolding the process if needed (the concept scaffolding will be further elaborated in the theory chapter).

Facilitation is not necessarily something positive per se.

> Practice is dependent on the quality of the work being performed by the facilitator (Lauvås/Handal, 1993, p. 27, my translation).

Nordström (1999) describes a model which she has developed with her colleagues Alnervik and Åsen; a model that...

> ...positions itself against the therapy tradition (consultation and problem solving) and the rights-and-wrongs in the apprenticeship model" (ibid p. 10, my translation).

The main focus of this model is on Learning through Conversation. The team being given time to reflect on everyday practice together with each other, is a key concept. The following characterizes Learning through Conversation:

> A dialogue where everyone contributes

> The conversation is to shift between experience, theoretical knowledge, and own values

> The interaction between everybody's thoughts on one and the same issue

> Learning through Conversation emanates from how we communicate and what we communicate about in order for the individual to examine his/her own learning, as well as others'

> Respecting others, meaning, everybody's thoughts have equal value

> It brings everyday practice to the fore

> A reflective conversation together with someone that offers resistance[8]

> Theories behind the assumptions are made visible: knowledge and competencies inherent on the team. The goal is to ascend to a mutual understanding built upon differences

Furthermore, the value of expressing written reflections is stressed. Writing is an aid in distancing oneself from direct experiences and moving towards the general (ibid, p. 11).

In another document included on the web page of the Swedish National Board of Education, Englund (2000) writes about a similar concept - deliberating conversation - and what characterizes this concept (p. 6, my translation).

> a conversation where different views are brought forth, giving space to different types of arguments

> deliberative conversations always include tolerance and respect for the other's arguments

> the element of collective effort of will, meaning, a strive to arrive to consensus or, at the least, arrive to contingent agreements

There are several common factors between Nordström's and Englund's view on the importance of conversation, where Nordström emanates from the concept Learning through Conversation, and Englund emanates from the democratic values in school. Englund argues that deliberation ("mutually multiple nuances of different alternatives", p. 5, my transl.) is a key concept for how a democracy can, and should, function where the educational system is a potential force for developing deliberative rules of conduct. The importance of conversation for school development, the permissive atmosphere where all arguments have a right to be expressed, and respect for the other participants, unite the two perspectives. People engaged in conversation do not necessarily have to be embraced by the same basic pedagogic view. However, Englund says:

---

[8] The Swedish word used is "motstånd", which may also be translated as different view/opinion, or, feedback.

> One has to agree on what aspects you do not agree on, what decisions there are to be made, and which procedures that are needed in order to reach a decision (Englund, 2000, p.5, my translation)…

…even if that decision is temporary, and the solution will be subjected to change in the future.

The aim with facilitation in school context is to enhance student learning, an aim resting on a normative foundation. But Englund also stresses that when teachers, in a classroom situation, meet a large number of students, there are great problems making exact criteria for a deliberative conversation hard to uphold, since that kind of conversation hardly exists in practice. The point of departure, though, is the teachers' rule of conduct towards deliberative conversations with a possibilitiy to change the educational system.

Nordströms facilitation model can be understood as a dialectic process where action and reflection on action (and where the conversation in its own right is an action) must go hand in hand, where action is focused to have something to reflect upon. Nordström is quoting Marie Cardinal, who says:

> When I talk to you, I don't think it through first, and then talk. I think in and through our conversation! What you say, and I say, is raw material in a thought process that happens between us (Cardinal in Nordström, 1999, p. 3, my translation).

Hence, what is interesting is what happens in the group when the individuals have a conversation with each other.

ICT IN SCHOOLS

ICT use

ICT affects how commercial companies, and our personal lives, are organized. It also affects teaching and learning (Castells, 1996). In an IEA survey done by Pelgrum & Plomp (1993) it is shown that in 1992 there were still only 3% of teachers that used computers as an integral part of their teaching. This survey was carried out in 21 countries[9]. Another research project in the United States, carried out at about the same time (Mancinkiewisz, 1993/94), shows how approximately half of the teachers used computers in their teaching where teacher competence and creativity was closely related to computer use. Innovativeness and self-competence were the most prominent qualities held by the to teachers that used computers in school. The results of the above mentioned studies are strikingly different, which might be explained by the United States being in the lead as to ICT investments, while the study made by Pelgrum and Plomp included 21 countries where 17 were not even among the top countries as to ICT investments even as late as 1999. Besides, the IEA study was a very comprehensive study in comparison to Mancinkiewizc's four schools.

The introduction of ICT in school has brought about new possibilities for teachers and students to change pedagogical activity. In a general sense, Pedersen (1998; 2000) states that one can assume that a changed use of ICT in schools is a complicated interaction between developing hardware and software, enhanced experience of computer use and thereby changed attitudes towards technology as well as towards pedagogy and pedagogical trends. ICT has changed the possibilities for designing instruction in school, and it has changed how knowledge is appropriated and how it is being used.

> These technologies are dramatically transforming the basic patterns of communication and knowledge interchange in

---

[9] Sweden was not included

societies, and automating the component processes of thinking and problem solving. In changing situations of knowledge acquisition and use, the new interactive technologies redefine - in ways yet to be determined - what it means to know and understand, and what it means to become literate or an "educated citizen" (Pea & Seely Brown, 1993, vii-viii).

Although ICT in school has existed for more than three decades, the discussion around ICT in education is volatile and difficult to describe in exact terms. As an example, it is shown how research reports contradictory results regarding which effects ICT will have on pedagogical practice, where some hope that the teacher role will be changed (Tweddle, 1993, in Pedersen, 1998). Others mean that ICT will be an educational material among others, used in a traditional way (Tengström, 1997). There is research done during the 1990's where the authors argue that computers do not make student learn more (Höglund/Karlsson, 1998; Vedin, 1999; Pedersen, 1998). Other research shows that computer use does not lead to any extensive changes with respect to working methods in school (Cuban, 1993; Skolverket, 1997; Unenge/Unenge, 1997). Pedersen (1998) who has made an overview of research on ICT in schools, states that whether the question of teaching and student learning with the aid of ICT is something for the better, or not, is an equivocal question and therefore difficult to answer. He concludes by saying that research on the issue is contradictory, and that it does not give any distinct results as to the assumed positive effects of ICT and student learning.

However, there are certain shifts in research done after 1998, and Becker (2000a) has shown through a survey study that Larry Cuban's results about ICT's limited possibilities to change school, only applies to a certain degree. New applications have been introduced such as e-mail, the World Wide Web, and digital video editing, which, if the proper conditions are at hand, will change teacher practice. These conditions are; teachers feeling comfortable using the media fairly well; the time schedule allowing students to use computers in their everyday assignments in the classroom; equipment being available permitting ICT to be used as a supplement to other educational material. Furthermore, Becker shows how teacher philosophy on design and good teaching, is important as to how much ICT will be used. Something that makes ICT valuable and useful is when a teacher emanates from a pedagogical standpoint built on

constructivistic theories on learning, including student projects where collaboration is encouraged, and where students can participate in the decisions about the content out of their own interests (ibid). There is also research done in the United States that show other effects of integrating ICT in school, where drop outs have found a way back to school (Europeiska kommissionen, 1996, p. 66).

ICT initiatives

The computer was first introduced in Swedish schools in the beginning of 1970. However, computer use in schools was almost non-existent during this decade, except in those schools where experimental projects were initiated (Riis, 1991). In the 1960's, there had been research done on computers in educational settings in the USA, where Seymor Papert at MIT studied how computers could be used to enhance children's learning (Papert, 1980; 1993). In this respect, Papert can be viewed as a forerunner in research on computers in educational settings. Papert and his colleagues invented the LOGO-programming language. Papert's main findings are that if children are exposed to using a computer in such a way that the computer does not program the child, but the reverse - the child learns how to program the computer - learning is enhanced. He argues that, when children learn how to use the computer to figure out different ways to reach a solution to a problem, the knowledge is obtained differently than with other types of teaching methods. To Papert, these findings are central to future education, not only on an individual level, but also on a political level, the level that steers education.

In the middle of the 1980s, there was quite extensive research being done on LOGO in the United States, but in Sweden, LOGO has not been widely spread (Pedersen, 1998). The effects of LOGO is disputed:

> Despite the evident enthusiasm of many practitioners and investigators in this area, a series of studies about the effects of LOGO programming on children's problem-solving skills conducted in the early 1980s did not report any positive results supporting the cognitive effects hypothesis (De Corte, Verschaffel and Lowyck, 1996, p. 698, in Pedersen, 1998, p. 42).

47

Even if Papert's work was not widely spread in Sweden, his research was pioneer work on computers in schools.

In Sweden, the government gave the Swedish National Board of Education an assignment to do experimental work with computers in school in 1971. This was an outcome of bills put forth in the Swedish parliament during the late 1960's and early 1970's suggesting that, the state should examine possibilities to use computers in education (Riis, 1991). An early initiative, which started in 1970, was the Project for Research on Interactive Computer based Education SystemS; PRINCESS (Lindh, 1993; Riis, 1991), led by a research team called CLEA[10] at Stockholm University. The aim was to find methods for using computers in school. Emphasis was placed on the student as an active participant. The project led to some fundamental principles for future computer education in Sweden: student oriented methods, individualization, and student influence over their work. Software programs were to be student orientated in accordance with that emphasis, meaning, students asking questions to the computer, rather than the other way around (Lindh, 1993). These principles were profoundly different from the behavioristic view implicated in educational technology during the 1960's. Computer support was, after PRINCESS, considered especially appropriate to use for students having motivational problems in learning. Another favorable outcome from using computers were the enhanced possibilities to give content a concrete form, and to adapt content to reality, (Lindh, 1993).

Between 1973-1980 there was a state financed project in Swedish schools called DIS[11] (SÖ, 1980). The aim was to study

> ...pedagogical consequences of computerization in school, meaning, effects of the content taught, organinzation and methods, and in-service training and educational material (Skolöverstyrelen, 1980, p.1, my translation).

Youngsters' knowledge about, with, and by computers was stressed (Lindh, 1993). *About* computers refers to computer science, which was not a subject at this time, but integrated in other school subjects such as social sciences and mathematics. *With* computers refers to using the computer as a tool in subjects where it was appropriate to use the

---

[10] Computer based LEArning environments
[11] Datorn i skolan. English: Computers In School

advantages of the inherent possibilities in computers, i.e., calculation. *By* computers refers to using the computer as an aid for learning a specific content related to a school subject.

In the final report (SÖ, 1980) it was stated that it is possible to use computers in school, adding that computers are needed in senior high school[12], but not in compulsory school.

In 1984, the Swedish parliament decided to introduce computer technology in compulsory school as well. It was decided by the Ministry of Education that students in grade 7-9 should have 80 lessons of computer science (Riis, 2000).

A special computer developed for school called COMPIS (Computer in School - Lindh, 1993; Jedeskog, 1998), was a result of a technical project, TUDIS, which started in the beginning of the 1980's, where the aim was to create a prototype for a computer to be used in schools. The investments at this time were focused mainly on obtaining hardware, and teacher competency development as to ICT use hardly existed at all (Riis, 2000).

The Swedish national board of education has a government assignment to promote ICT development in school. More than a quarter of a billion Swedish kronor were allocated by the state during the 1980's to develop computerization in Swedish schools (Riis, 1991). One major initiative was the DOS project[13], where the Swedish National Board of Education was responsible for carrying out the initiative.

The DOS project started in 1988, and was mainly aimed at developing software products. Around 160 local school development projects were granted funds to enroll in local projects. In the evaluation of the initiative (Riis, 1991), the researchers noted how teachers not to any great extent had changed their working methods, but used the computer as a tool added to other tools. Twelve recommendations were given as to how to continue the work with computerization in school. One recommendation concerns in-service training for teachers, where it is suggested that teachers who have been engaged in

---

[12] Swedish: gymnasium
[13] Datorn och Skolan. English: Computers and School. See also Skolverket, 1996.

different computer projects during the years ought to be able to educate each other. There is also a recommendation that universities and schools have to cooperate as to in-service training where focus is to be placed on pedagogical dimensions of computer use.

After 1991, a lot happened with computerization in Swedish schools. Since 1993 the National Board of Education has accounted for statistics on computer access in schools. From 1995 and onwards, there has been a considerable enhancement in Sweden concerning computer installations in compulsory school (Skolverket, 1998). This is valid for computers being used by teachers for administrative purposes as well as computer use in instruction. The rapid expansion of computers during the 1990's, involves there not being many schools in Sweden today that lack computers (Hernwall et al., 1999). A similar development is to be found in the USA, where more than 90% of schools were connected to the Internet in 1998, 39% of the teachers having access to the Internet in their own classroom (Becker, 2000a).

However, in 1994, the Swedish national board of Education stated that the type of software programs that ask students questions, instead of the other way around, were still being used the most, apart from word processing and calculating programs.

In 1994, the Swedish government commissioned the National Board of Education to develop a Swedish Internet-based school network. Sweden was, via the Swedish University Network (SUNET) connected to the Internet as early as 1988, but it was not until the middle of the 1990's, when the Internet was made public, that computers really started to be integrated in Swedish schools. The Knowledge Foundation, was established by the Swedish Parliament in 1994. In 1996 -1999, there were 27 "light house" projects in progress, funded by The Knowledge Foundation, where some municipalities were granted a considerable amount of money in order to develop ICT in school (Riis, 2000; Riis et al, 2000).

The Knowledge Foundation also invested in the development of educational material as well as a web site, KNUT. The total amount invested was around SEK 1,5 billion. An additional SEK 1,7 billion has been invested by the state since 1999 in the largest national development program ever for Swedish teachers - IT in School (ITiS).

A study by the Knowledge Foundation (KK-stiftelsen, 2001) shows that 99% of the examined students had access to computers in school. It is also stated that:

> Computer knowledge, which was an important question in the 1980's to investigate as to integrating computers in general education, is today almost to be taken for granted (SOU 2001:13, p. 114, my translation).

ICT use among teachers

During the years, there has been a change concerning which teachers choose to use the computer professionally (Pedersen, 1998). During the latter part of the 1980's, it was mainly math teachers who used the computer. There are similarities as to how teachers in the United States, and Sweden, have been shown to use ICT. Becker (2000a) argues that math teachers in the United States, as in Sweden, were among the first to adopt the tool, but today, math teachers use the computer in instruction only to a limited degree. Becker suggests this might be due to the fact that teachers teaching math and science have a strong belief in transmission of a great amount of information, or skills, during a limited time. There is a wide range of content that must be covered. Using computers is often viewed as a constraint of how many areas the teacher will be able to cover during that time. Also, math teachers use the Internet to a lesser extent than other teachers, since they do not seem to see the benefits of how it can be used in their particular subject (Becker, 1999). Another problem is the time schedule being designed in 40-minute units. Teachers using the computer the most are those that teach middle school, since they are not restricted to 40 minute units.

In Sweden, in the beginning of the 1990's, it was mostly teachers teaching the Swedish language and special education that found ICT useful. Word processing especially was found to be a useful tool in those subjects (Pedersen, 1998). Jedeskog wrote in 1997 that, there would probably be a development towards social science teachers being the ones to use ICT to a greater extent, since the Internet offers such rich possibilities to search for information and to communicate around the world. Becker (1999) states that the World Wide Web has come to be the most used ICT tool in school. He has shown that the three most important predictors for teacher use of the Internet is: the

possibility of being connected; teacher competencies in computer use; and teachers pursuing a constructivistic pedagogy. Other conditions are: staff participating in competency development programs; a high degree of informal contact between the teachers; principals being involved in professional leadership activities. In addition, other conditions contributing to teacher use of the Internet is if the teacher is young. However, this does not apply it the teacher is a math teacher.

The report from the Knowledge Foundation (KK-stiftelsen, 2001) shows that, the greatest obstacle for instruction integrating ICT is teachers' knowledge of ICT, where 67% of the teachers asked, say they lack sufficient ICT competencies. This is also confirmed when examining how students perceive teacher competencies. Jedeskog (1998) has shown which obstacles teachers experience as to ICT in instruction. One of the obstacles concerns computer use being time consuming in instruction, as well as in planning instruction. Besides, teacher workload is too high. Another obstacle may be the physical location of the computer. Furthermore, teachers are lilmited by not finding relevant software programs in addition to computer support being expensive. Teachers also say that it is difficult when they loose control over what the students are doing when they use ICT. Lindh (1993) describes teacher resistance to ICT by three main categories: humanistic reasons, which includes a fear of, or resistance to, computers or a computerized society. Technological reasons refer to the fear of not being able to handle the computer, meaning, a teacher may feel insecure about not being the one with the most knowledge in the classroom. This is supported by Richard's (2001) findings, who has empirically shown that:

> ...there was a strong overall sense that teacher resistance to the use of computers in the classroom derived from a perception that computers represented a threat to the role of the teacher (p. 63).

Lindh's third category is about pedagogical reasons where the teacher is unable to see any benefit of using ICT in instruction (Lindh, 1993).

More recently, a study made by Dawes (2001) identified barriers to ICT use in education. The following factors were indicated as of critical importance to teachers: ownership of up-to-date technology, a

sense of purpose for ICT use, adequate training, realistic time management, inclusion in a supportive community of practice.

Collis and Moonen (2001) state that future education is going to be comprised of ICT. They argue that ICT in school is an inevitable development and refer to the integration and use of ICT, saying: "You can't not do it!" (p. 43). They suggest a model, grounded upon empirical data, where they emphasize the concept "flexible learning", stressing students learning on their own. They have tried out the model within one university, where they started offering it to students enrolled in a particular course. Later, the model developed to embrace all courses at the university. In order to carry through such a model, they give concrete suggestions as to what to consider. Their suggestions include, for example, that: these type of changes take time, key persons are important as well as available support, you should not strive for too much at once, and, it is not going to be cost effective to start with.

Collis' and Moonen's "You can't not do it!" may be questioned. Postman puts up a warning as to hyperactive fantasies among 'cheerleaders of technology' (1995, p. 42). He draws attention to the need of discussing the potential dangers with ICT as to what type of society that evolves. He is not against computer use, but argues that ICT may steer attentiveness from more important matters such as human judgment, appropriation of deeper knowledge, and how virtual reality might be a new form of therapy. The Swedish ITiS program does not seem to belong to the category described by Postman, since the emphasis on the program is on pedagogical intentions in order to change school by integrating computers, instead of pushing technological advancement. The aim is stated as "pedagogically-oriented in-service training for teachers in teams" (Delegation for ICT in Schools, 1999). In other words, it is not the technology per se that is of importance in the ITiS program; it is to focus school development.

The ITiS program

Local municipalities have, since 1991, assumed responsibility for teachers' in-service-training (Prop. 1990/1991:18, but...

> ...the state has a special responsibility for providing programs that are conditioned by centrally decided reforms(p. 95, my translation).

This means that, the state can promote changes in school with strategic development investments, such as the ITiS program. The minister of education[14] writes:

> It is only when teachers feel they have a firm grasp of the new technology as a pedagogical tool that it can become a tool for change. (Delegation for ICT in schools, 1999).

Further, she writes that:

> The national programme for in-service training in ITiS is based on teachers taking responsibility for their own learning at work, where they should feel they receive powerful support from school management and facilitators (ibid).

Most schools had, in 1999, acquired hardware and software programs to be used in school settings, but since teachers do not have adequate knowledge of how to use ICT in pedagogical settings, a new approach was tried within the ITiS program, which involves more than 50% of all teachers in Sweden (around 70 000 teachers).

The program was preceded by a government bill, (Prop. 1997/98:176) emphasizing ICT as a tool for learning. In 1999, the Swedish government initiated the ITiS program, investing more than 1.7 billion Swedish kronor. The program aimed at developing ICT competence among 70 000 Swedish teachers who participated during 1999 - 2002. The project is by far the greatest national competency development program ever for teachers in Sweden.

> ITiS is an information- and communication (ICT) project as well as a school development project. It is the most extensive

---

[14] Ingegerd Wernersson was Minister for Schools and Adult education when the delegation published the brochure referred to

investment in school development and in-service training in Sweden ever (Delegation for ICT in schools, 1999, foreword).

ITiS a program aimed at competency development on a broad front, compared to some earlier programs, like the Knowledge Foundation program in 1996-1999 as to 27 so called "Lighthouse projects" (Riis et al, 2000).

The Action Programme covers pre-school class, compulsory school, municipal adult education and, during 2002, folk high schools (Delegation for ICT in Schools, 2002-02-21).

ITiS can be viewed as a pedagogical intervention that legitimizes and promotes a changed teaching practice, a changed teacher role, and changed conditions by using educationally valid material (such as ICT) and methods.

For teachers who apply for participation in ITiS, one requirement is that they apply as a team. There are some additional requirements for participation, such as: the team is to integrate school subjects; use a student oriented method, problem based learning[15] (PBL) and carry through a student project. These requirements could be viewed as an attempt to approach the question of how collaboration in teams is to be pursued. However, there is little written within the program as to teachers' complicated planning situation and how they are to pursue collaboration organizationally. Sharing experiences in compulsory seminars (20 hours) with other teacher teams and a facilitator, is one way of designating hours to facilitate that these types of questions may be brought forth on the agenda, as well as when meeting in the team with a facilitator present (15 hours).

Facilitation of teacher teams is a central feature of the ITiS program where more than 1100 facilitators have been educated within the program (Chaib & Tebelius, 2004). As facilitation has entered school, researchers as well as practitioners[16] have shed light on the subject. Empirical data from the first report in the national evaluation of the program (Chaib et al, 2001) show that facilitation courses differ across the country as to content and structure. This may not be remarkable,

---

[15] See Dahlgren, 1998, for description of the PBL method
[16] Examples of literature written by practitioners around work units and teacher teams: Brettell, 1986; Assermark/Sörensson, 1999; Jönsson, 2000; Åberg, 1999; 2000; Lycken, 1999

since the concept "facilitation" is being used in many different ways, lacking a distinct definition (Åberg, 2004).

The written material referred to on the ITiS webpage, can be viewed as a guideline for teacher work out of the intentions of State authorities. The National Board of Education, as well as the ITiS delegation are politically decided institutions. Political writings have a political, ideological, and, normative character. This means that, even if there are only a few documents formally governing teacher work - like the National Curriculum and the school law - there are guiding documents aiming to indicate an expected government intended direction as to the development of Swedish schools. It is not stated that facilitation has to be carried out a certain way. However, there are guidelines. A teacher can, by participating in facilitation emanating from the suggested perspective, become aware of his/her own situation and appropriate a rule of conduct that can be passed on to the students, in accordance with the new advocated role showing the teacher as a facilitator for students learning on their own, rather than being an authoritative teacher transmitting knowledge decided by a sovereign teacher.

Changes are expected to happen out of a so called bottom-up-perspective, by teachers learning more about ICT and how it can be used as a pedagogical tool. The implementation of ICT in school is not regarded as something to be forced on to teachers in accordance with a top-down-perspective, even if it is the State allocating resources and making change possible.

In the program, the state provides certain material and personal resources to promote change, such as a computer to be used by the teacher in his/her home, and facilitation during 35 hours. The question is: Which change is to be promoted? It has been answered by using the word should when it comes to the way participating teachers are to carry through an ITiS project.

> The theoretical elements, as well as the more practically oriented work in the project, should be carried out by integrating different subjects, using problem based learning (PBL) where the project is student-oriented (Delegation for ICT in Schools, my translation).

The ITiS delegation does not only recommend the teaching method, PBL[17], but demands it. Such a method is in line with research on computers in education where Koschmann (2000) formulates a strategy including activity (the role of the student), collegiality (changes in traditional teacher role), and authenticity (the need for curriculum changes and material needed to support such a change). Koschmann (et al, 1996) suggest computer supported problem based learning (CSCL) as a means of developing theory based, rather than technology driven, instruction[18].

If ITiS truly is a bottom-up-perspective can be questioned, since there are governing factors inherent in the program design. Teachers have to apply for participation as a team; individual participation is not possible. To accept only existing teachers teams as participants implicates the need for developing teacher teams. In addition, teachers have to adjust to the design of the program, which means that they have to attend meetings with a facilitator, and attend seminars with other teacher teams, regardless if they find the meetings meaningful as to their own view of competency development. To be examined as an ITiS teacher, the teacher has to be present at meetings for 35 hours, in addition to reading recommended literature. All this is to be fitted into regular working hours. In addition, teachers are to carry through a student project across subject borders, proceeding from a theme, using a problem based learning method. The above criteria for participation calls for close collaboration among teachers, where they also have to write a joint final report, following an academic model for writing a thesis.

It is reasonable to assume that teachers find it interesting to take part of different methods such as Storyline, Portfolio, or PBL; in other words, to develop their competencies of instructional design. Demanding a certain method can, from the viewpoint of the ITiS delegation, become a way to meet teachers' interest for new methods, in order for a change to come about as to new working methods in

---

[17] For information on the Problem Based Learning method (PBL), see Dahlgren, 1998
[18] According to Koschmann et al (1996), there are six principles for learning: multiplicity, activeness, accommodation and adaptation, authenticity, articulation termlessness.

school. However, it may also rule out other possible teaching methods that teachers may want to use.

The way in which ITiS is organized with respect to possibilities for learning and development, can be viewed as an attempt to combine aspects from a formal arena as argued by Ahlstrand (1995) (commanded collaboration, compulsory attendance at facilitation meetings and seminars) with aspects from an informal arena (which questions that are to be brought forth). The problem with teachers teaching the same students is solved as well, since participating teacher teams are to be an already existing teacher team, teaching the same students. Besides, participation in the program is mainly to take place within regular working hours, where time is set off for reflection together with a facilitator. The program is designed in a way that is both loose and rigid at the same time, which rather can be viewed as a "matter of finding the triggers to catalyze evolution than creating a full design" (Wenger et al, 2002).

As shown above, ITiS is an attempt to implement ICT in school on a broad front. Fullan and Stiegelbauer (1991) emphasize that implementation is not a happening, but a process, a journey. Implementation is a change of an existing practice towards a new practice where the process may involve using new material, a new practice in instructional design, and, new norms and values in order for students to attain expected learning. Implementation is a bottom-up-process as well as a top-down-process. According to Fullan and Stigelbauer there are nine critical factors affecting implementation: need, clarity as to goals and resources, complexity, quality and practicality, experience from other developmental projects on the local school, support by local politicians, principal role, teacher role, and concordance between governmental reforms and local needs.

ITiS has come about from a societal need to implement ICT in school where information technology is viewed as an important propelling force behind societal change that is signified by a rapid change of work and everyday practice (Prop. 1997/98:176). When it comes to the critical factors above, argued by Fullan and Stiegelbauer (1991), I have chosen to relate these to what is known concerning the ITiS program on the one hand writings by the Delegation for ICT in Schools, on the other hand empirical data included in the first evaluation report of

ITiS on a national level, which I have had the opportunity to follow closely, and be involved in (Chaib, et al, 2001). Finally, there will be a short summary concerning the final report on the National Evaluation of the program (Chaib/Tebelius, 2004; Chaib et al, 2004).

When it comes to need, empirical data from the first evaluation report shows that teachers express a need to learn more about ICT, this quite often being the motive of applying for participation. When teachers participate in ITiS, they discover what their needs are in a more specific sense. They discover what is possible to do, and how they would like to go about their own competency development. They highly appreciate the possibility to reflect on everyday practice with their colleagues in the presence of a facilitator, and several of them express a wish to continue with facilitation after having completed the program. As they participate in ITiS, many realize that learning ICT was not the sole aim of the program, but rather a means for something else. In other words, they often do not apprehend the intentions of the program to begin with. The goals have not been clear, which initially causes a lot of disappointment among the teachers. The "something else" is a strong focus on development of their working methods and ways to go about instruction, by working across subject borders in a student project, in addition to creating a forum for reflection among colleagues in the presence of a facilitator rather than learning how to use the computer. As time passes, the intentions behind the program are clarified to the teachers, and they come to appreciate how their competencies develop as they participate in the program. However, many teachers express a wish to learn more about practical handling of ICT and applications available.

The clarity of the program can be questioned since writings from the delegation have changed during the three years of the program. But this can be regarded as part of an ongoing process where the delegation has allowed the intentions to change, in accordance with a process model. Non-clarity could also be an outcome of the complexity that is inherent in implementation of ICT in school. Complex changes are more difficult to carry through than simple ones, but in return, they accomplish more (Fullan/Stiegelabauer, 1991). The greater the intention, the more happens. At the same, it demands a lot from participants to be part of a complex change, and wanting too much all at once can easily result in failure (ibid). Is ITiS a

program with great intentions, where great changes are brought forth, or, is it going to end up a failure since too much is aimed for? The overarching goals in ITiS are: an equal school, a developed teacher role, to support ongoing developmental projects, to improve the conditions for ICT use as a tool for learning, to try out new methods and models suited for computer supported learning, to study ICT related societal changes which might have consequences for school, to shed light on ethical and democratic aspects of ICT, to support spontaneous and informal sharing of knowledge between teachers (Delegatin for ICT in Schools). These are vast goals, where it is impossible today to state whether the goals are going to be achieved or not. This is a question that the national evaluation (Chaib/Tebelius, 2004) has given some answers to.

A crucial factor for a change being successful is, if participants are offered continuous support (Fullan/Stiegelbauer, 1991). This is not offered through the program after teachers have received 35 hours of facilitation. It will be a matter for each municipal local authority to decide upon. There are more than 1100 educated facilitators within ITiS. We do not know if they are going to be utilized in the future. It might be difficult, since local authorities most often have a restricted budget for those kind of activities.

Quality and practical possibilities are factors that can overturn a program (Fullan/Stiegelbauer, 1991). In a complex program like ITiS, quality is about many different types of quality: qualitative facilitation; quality hardware and software programs; qualitatively good computer support. Practical possibilities concern to what degree teachers find it feasible to use ICT in instruction. The empirical data from the national evaluation indicate that teachers are content with facilitation, but the quality of computer support, being able to get help from someone on technical matters, is not adequate. Practical possibilities in realizing what they want to do, though, are considered good, since teachers see new possibilities of using ICT in the future, where many of them have begun to reason around ICT for instruction in a new way.

The ITiS delegation stresses that ITiS is not a project, it is not supposed to end at a certain time. The ITiS delegation ceased to exist at the end of 2002, but this was only a date set for formal government

support. ITiS is something that is meant to continue and be part of everyday practice in the future in local schools. It is reasonable to assume that it has to be given some time in order to succeed, since teacher thinking and acting around ICT in school is not something that will change in a sustainable way in only a few weeks.

> People do not learn or accomplish complex changes by being told or shown what to do. Deeper meaning and social change must be born over time (Fullan/Stiegelbauer, 1991, p. 73).

Communal municipalities have been offered by the state to let a certain amount of teachers participate in the program, but some schools have offered all of their teachers to participate, allocating municipal funds. Local municipalities supporting ITiS participation is considered important in order to make a change. The same goes for principal support. Principals, whose teachers enter the program, undertake to participate in ITiS principal training. That way, they get involved in ITiS, even if they do not work directly with teachers and students on the project.

Another critical factor mentioned by Fullan/Stiegelbauer (1991), is the role of the teacher. The social interaction between teachers is emphasized. They argue that: change involves learning, where interaction is the key word to accomplish something new.

> New meanings, new behaviors, new skills, and new beliefs depend significantly on whether teachers are working as isolated individuals[19] or are exchanging ideas, support, and positive feelings about their work[20]. The quality of working relationships among teachers is strongly related to implementation. Collegiality, open communication, trust, support, and help, learning on the job, getting results, and job satisfaction and morale are closely interrelated (ibid, p. 77).

Within the ITiS program, teachers are more or less forced to work closely with each other since the student project is carried out across subject borders where all teachers on the team participate, in one way or another. Then, it becomes natural that teachers to a greater extent have informal contact. Becker (1999) shows what he says is one of the

---

[19] Fullan/Stiegelbauer refer to Goodland, 1984; Lortie, 1975; Sarason, 1982

[20] Reference made to Little, 1982; Mortimore et al., 1988; Rosenholtz, 1989

more interesting results in his study on Internet use. One of the conditions he has examined, is teachers informal contact with each other:

> ...frequent informal interactions among teachers may help teachers to learn enough about the Internet to apply it in their teaching in a variety of ways. The Internet thus becomes a potentially important tool in the creation of a collaborative professional culture among the teachers of a school (Becker, 1999, p. 33).

The ITiS delegation demands that a teacher must be on a team in order to participate; compulsory attendance in meeting other teams in seminars and in reflecting together with their colleagues by the aid of a facilitator; a constructivistic teaching method such as PBL; a jointly written report by a scientific method, including teachers having to reflect on theoretical aspects of their actions; that teachers after participating in the program have a certain amount of knowledge of ICT use. The demands for participating in ITiS can therefore be viewed as in concordance with research on how teacher teamwork can support school development.

The final report of the National Evaluation of the ITiS program (Chaib & Tebelius, 2004), shows that cooperation between teacher has enhanced. Having a facilitator present who moderates pedagogical discussions is viewed as positive, and teachers have gotten many new thoughts for future work. But it is also shown that there is a disappointment among teachers not being able to sufficiently enhance ICT competencies during participation in the program, since the program is too focused on issues other than using ICT as a tool. The conclusion is that the program would have benefited from also offering teachers training in ICT use. It is also pointed out in the discussion part that, the question must be raised on how teachers' and facilitators' knowledge is going to be used in the school development that has begun with ITiS.

Summary

Modern ICT, based on computers, are new cultural tools that have come to affect our society to a great extent. ICT is definitely a tool, but it is more than a tool, since ICT offers a content of information to deal with and critically examine, where ways to communicate offer possibilities for interaction with other people throughout the world. Information and communication systems are brought together by electronics, which gives us an opportunity to act towards it, not just receive information from it.

The availability to the public, and the mass production of hardware and software, has brought about that children and youngsters born after the late 1970's grow up under very different conditions than the generation before them (Tapscott, 1998), living in a world permeated by computers, many of them using computers from an early age. They learn, play, communicate, work, and create communities that are very different compared to their parent generation, or the generations that most active teachers belong to. To understand how the young generation intends to use their digital competencies is, according to Tapscott (1998), the most essential question for parents and teachers, since children are a powerful source for societal development. This puts great demands on those who are educating children and youngsters for a society where ICT is an integral part of children's everyday life.

The integration and use of ICT in educational settings is of great importance from a societal point of view, and has brought about a changed teacher role. Teachers need to develop competencies in many areas, not only concerning learning how to use ICT, but also when it comes to teachers preparing to deal with numerous new questions that arise as a result of integrating ICT in instruction in school.

Teacher competency development used to be a matter of in-service training based on courses. Today, in-service training might as well be about reflecting together with colleagues, often in the context of a teacher team; a highly recommended form to organize teachers in the 21st Century. Law does not regulate teacher participation on a teacher team. However, practice has, in different ways, contributed to teachers most often, at least formally, participating on a teacher team. A new kind of aid for making teachers reflect together is to introduce

a facilitator that facilitates their learning process. Literature on facilitation in school point to facilitation as being successful concerning teachers learning how to develop school (Berström et al, 1993; Näslund/Granström, 1995; 1998; Persson, 1999; Brorman, 1999; Hammarström-Lewenhagen/Ekström, 1999; Åberg, 2000).

Another aspect of a new teacher role is the possibilities for teachers to use new educational material, based on ICT, in instruction. For many teachers, who have long experience of teaching, it is reasonable to assume a certain difficulty in adopting such a vast change as using tools developed in a different setting than school, bringing forth many new questions related to knowledge and knowledge appropriation.

The type of knowledge that is considered valuable to mediate by schools changes over time; valuable knowledge is always related to the era the student is living in. Earlier, certain knowledge was useful for something highly valued in that time and age. Today, certain knowledge is useful for something different, valuable in this time and age, authorities emphasizing that youngsters are expected to have knowledge of computer use when they leave school (Prop. 1997/98:176).

So, teachers today are accountable towards students, parents, and society, to teach an extended learning objective compared to earlier times, an objective including ICT, which has a potential to permeate most subjects in school, making ICT knowledge salient for teachers on a broad front.

The integration and use of ICT in educational settings can be concluded as being of great importance from a societal point of view. As conditions in society change, school needs to change to meet the demands of society (Lpo 94; Hagström, 1995).

The computer was first introduced in Swedish school in the beginning of 1970, although almost non-existent during this decade. The state initiated several projects during the years that followed to introduce ICT in educational settings, and after 1991, a lot happened as to computerization in Swedish schools. The rapid expansion of computers during the 1990's, involves there not being many schools in Sweden today that lack computers (Hernwall et al, 1999). However,

there are contradictory research results as to the effects of ICT on teaching and learning (Pedersen, 1998).

During the years, there has been a shift as to which teachers choose to use the computer in their profession (Pedersen, 1998). During the 1980's, it was mostly math teachers. During the 1990's, teachers teaching the Swedish language and special education teachers found ICT useful in instruction. Since the World Wide Web was introduced in the middle of the 1990's, the Internet has become the most used ICT tool in school, especially when it comes to the rich possibilities of searching for information and communicating around the world (Becker, 1999). ICT has changed the possibilities for designing instruction in school, and some mean that it changes "what it means to know and understand, and what it means to become 'literate' or an 'educated citizen' (Pea & Seely Brown, 1993, vii-viii).

The latest state ICT initiative in Sweden, ITiS, involves almost 50% of all teachers (70 000 teachers) who represent pre-school class, compulsory school, municipal adult education and, during 2002, folk high schools. ITiS is a program aimed at competency development on a broader front in comparison to some earlier ICT initiatives in Swedish schools. Teachers are to apply as a team (individual participation is not an alternative), and are obligated to integrate all subjects represented on the team in a student-oriented project using a problem based learning method. They meet with a facilitator for 20 hours, and attend seminars with other teacher teams during an additional 15 hours. These meetings are compulsory. Each teacher receives a computer to be used in their home, and at the end of their participation in ITiS, they are to present a jointly written report to be examined by a meta facilitator in a final seminar. The demands for participation in ITiS, is in accordance with research on how teacher teamwork can support school development.

THEORY

T he following chapter accounts for the theoretical perspective, or theoretical "family", that the main theory used in this study, Community of Practice (Wenger, 1991; 1998; 2004; Lave & Wenger, 1991; Wenger et al, 2000) can be placed within; the sociocultural perspective. There is an account of the theory Community of Practice in particular, a theory where the author endeavors to propose a synthetic perspective, influenced by several theories, where Wenger places learning as caught in the middle.

The point of departure is that the social world of activity cannot be separated from the persons acting. The central concepts accounted for are: learning, meaning, identity, and the concepts community and practice, viewed as one entity: community of practice. On an analytical level, there are three dimensions of the relationship between practice and community: mutual engagement, the joint enterprise, and a shared repertoire Significant learning happens along these three dimensions, the dimensions being intertwined and interrelated in practice (Wenger, 1998).

THEORETICAL PERSPECTIVE

Introduction

The main theory used in analyzing the empirical data in this dissertation is the theory Community of Practice (Lave & Wenger, 1991; Wenger, 1991; 1998; 2004; Wenger et al, 2000). The theory Community of Practice is a social theory of learning. Lave and Wenger first used the concept Community of Practice in 1991, as they wrote on situated learning and legitimate peripheral participation. The point of departure was apprenticeship, which is founded in communities of practice (Lave & Wenger, 1991). It is a perspective that places learning within a context constituted by our lived experience as participants in a community around a certain practice.

The concepts community, and practice, constitute each other and are to be viewed as one entity (Wenger, 1991; Wenger, 1998). Wenger (1998) argues that practice is a more useful analytical concept than, for example, culture, activity, or structure, since it enables a different kind of analysis. Practice consists of activities, cultural aspects, certain structures, and historical and institutional aspects. An analysis originating in practice therefore better covers the complexity in learning. The interrelated and intertwined perspective on culture, activity, structure, history, and institutions, is supported by other theoretical traditions, such as activity theory[21]:

> There is no such thing as a purely cultural setting (one that has no historical or institutional dimensions) or a purely historical or purely institutional setting (Wertsch, 1993a, p. 121)

The source of learning is constituted by social interaction between members of certain sociocultural communities:

---

[21] Wenger (1998, p. 286) argues that "theories based on practice have a different ontological foundation than Activity Theory" the way Activity Theory has been formulated by Leontev, 1981, and Wertsch, 1985.

> Participation in social practice - subjective as well as objective - suggest a very explicit focus on the person, but as person-in-the-world, as a member of a sociocultural community. This focus in turn promotes a view on knowing as activity by specific people in specific circumstances (Lave & Wenger, 1991, p. 52).

The theory Community of Practice is formulated as an endeavor to propose a synthetic perspective,[22] influenced by several different intellectual traditions (Wenger, 1998). Learning is caught in the middle of two axes. The vertical axis "reflects a tension between theories that give primacy to social structure and those that give primacy to action", whereas the horizontal axis "provides a set of midlevel categories that mediate between the poles of the vertical axis". Four additional intermediary diagonal axes are added, but these are not as extreme as the tension between the poles on the vertical axis.
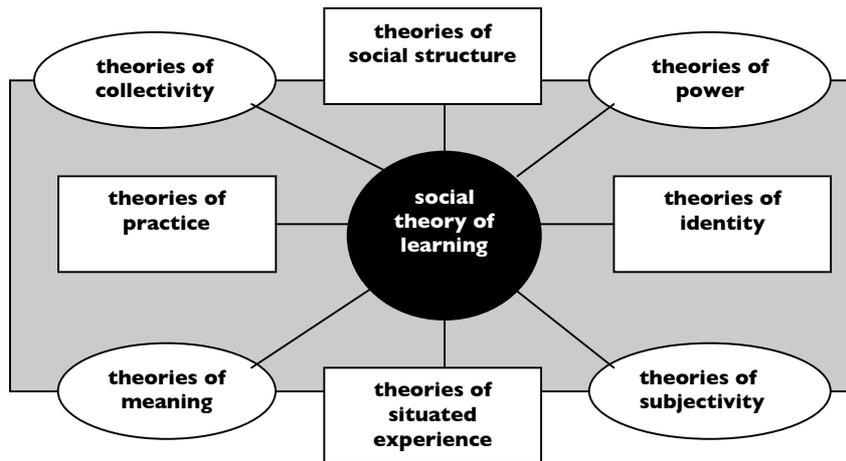
Fig.1. Refined intersection of intellectual traditions (Wenger, 1998, p.14).

---

[22] For an extensive account of which theoretical traditions that Wenger make reference to, and which has influenced his thinking in forming a synthetic perspective on learning, see Wenger 1998, p. 279-285

A social theory of learning must "integrate the components necessary to characterize social participation as a process of learning and of knowing". These components are:

Meaning: a way of talking about our (changing) ability - individually and collectively – to experience our life and the world as meaningful

Practice: a way of talking about the shared historical and social resources, frameworks, and perspectives that can sustain mutual engagement in action

Community: a way of talking about the social configurations in which our enterprises are defined as worth pursuing and our participation is recognizable as competence.

Identity: a way of talking about how learning changes who we are and creates personal histories of becoming in the context of our communities (Wenger, 1998, p. 5).
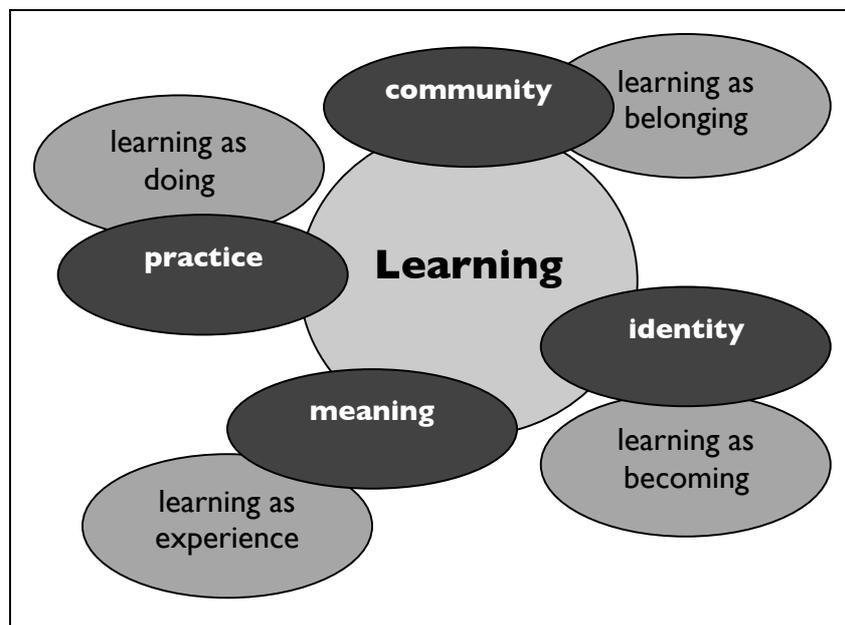
Fig. 2. Components of a social theory of learning (Wenger, 1998, p. 5).

This chapter will account for some central concepts in the theoretical perspective used, where other theoretical traditions that show commonalities with the theory Community of Practice, as well as differences in theoretical assumptions, will be addressed. Firstly, I will address the central concept *learning.* Secondly, I will turn to the concepts *community* and *practice*, and give an account of the concepts as one entity; community of practice. Thirdly, the concept *meaning* will be dealt with, and last, the concept *identity.*

Learning

Interaction with the world

Learning has been studied from many different angles, using many different methods analyzed within different theoretical traditions. It may seem apparent that learning cannot be detached from the situation the learner is in, and that learning cannot be detached from action and the activities that people are involved in, which includes the use of intellectual and physical tools. However, these aspects have to a very limited extent been problematized within traditional research on learning (Pea & Seely Brown, 1993; Rogoff & Lave, 1999).

From the 1950's and onward, much research on learning has been cognitive research (Bruner, 1990), where cognitive psychology was predominant in the 1960's and 1970's. In traditional cognitive research the importance of context, social, cultural, and historical factors, are secondary (Lave, 1996; Wertsch, 1993b); learning is focused as a mental process (Pea & Seely Brown, 1993; Rogoff & Lave, 1999).

> Learning traditionally gets measured on the assumption that it is a possession of individuals that can be found inside their heads. By the degradation approach, learning is not in heads, but in the relations between people (McDermott, 1996, p. 292, compare Lave, 1996, p.7).

Researchers within sociocultural theories argue against the traditional cognitive view on learning. It is not problematic that learning occurs, but there is a complex problem in learning, which cannot be reduced to a mental process within the individual; context and action are parts that cannot be separated from the learning process.

Even though many theories take context into consideration as a factor that affects learning, it may still be that focus is not placed on the

72

individual's interaction with his/her surroundings, but rather the intra-psychological development of the individual.

The theoretical standpoint sketched ahead, emphasizes human learning as fundamentally social, a statement that includes learning by oneself as well as learning in social interactions with others (Wenger, 2004), since all learning has a social origin.

> This theory therefore does not suggest that we learn better in groups or in other interactional contexts or that individual learning is somehow inferior or to be avoided. I want to offer this clarification because such superficial interpretations have turned out to be quite common. Nor does a social theory of learning deny our genetic heritage; it simply claims that our experience of our genetic given is under culturally based interpretation (Wenger, 2004, p. 4).

Learning is an inter-psychological process, before it becomes an intra psychological process (Vygotsky, 1978; compare Wertsch et al, 1993; Chang-Wells & Wells, 1993; Säljö, 1992; 1996). When studying learning, focus is placed on what happens between people when they interact with each other, and with the world around them, using intellectual as well as physical tools. Interaction entails action. Human actions involve using tools (Wertsch, 1998). Humans act in practice. "Practice is about meaning as an experience of life" (Wenger, 1998, p. 52). In other words: learning happens as people are engaged in creating meaning in their life by engaging in activities in practice. But people do not always think of their job as learning, since "what they learn *is* their practice" (ibid. p 95).

All human activity, such as learning, involves using tools. In the theory community of practice all actions are viewed as being mediated by tools. This means that there is no such thing as un-mediated action (Wenger, taped interview 2004-04-15). What people learn from interacting with the world is conceptualized as knowledge.

Knowledge
Knowing is not about recognizing and knowing something as an isolated entity, but rather knowing how to use knowledge in different practical situations (Lave, 1988). People appropriate knowledge that is important to them, out of what the situation in practice demands from

them (Lave, 1988; 1996; Lave & Wenger, 1991); they learn what needs to be learnt in order to fit into a certain social group.

> In learning to be a responsible member of certain social groups, one must learn how to do certain things in the right kind of way: how to perceive, think, talk, act, and to experience one's surroundings in ways that make sense to the others around one. Thus, on this view, what one has in common with other members of one's social group is not so much a set of shared beliefs or values as such, but a set of shared semiotic procedures or ethnomethods [Garfinkel], ways of making sense – and a certain set of *ordered* forms of communication, or speech genres [Bakhtin, 1986]. Thus internalization is not a special geographical movement inwards, from a real of bodily activity into a nonmaterial realm of 'the mind', but a socio-practical-ethical movement, in which 'children grow into the intellectual life of those around them' [Vygotsky, 1978; 88]. (Shotter, 2000, p. 46).

A small child appropriates knowledge that in some cases has taken humanity thousands of years to arrive to; knowledge, which would be impossible for an individual to discover on his own during a lifetime. Hence, we appropriate knowledge, which is not a result of our own thoughts or us examining a phenomenon on our own, but rather; we appropriate existing knowledge in interaction with others (Säljö, 2000).

The notion appropriation will be used in this dissertation; "acquisition of knowledge", often used in a cognitivistic perspective, will not be used ahead. Appropriation of knowledge (Wertsch, 1998) refers to having incorporated knowledge "as your own". One could say that it is about having incorporated a different view, being permeated by the knowledge. As to the notion acquisition, Rogoff (1995) argues that participatory appropriation is not about acquisition, but rather a process of becoming[23].

From an identity standpoint, Wenger (2004) argues that knowledge is partial:

---

[23] Compare Shotter, who talks about how people influence each other in their being, not just in their intellects, and claims that they actually 'move' each other rather than just 'give each other ideas' (Shotter, 2000).

> One's own knowledge is always partial, and appreciating this partiality is essential to being able to contribute. "Engaged partiality" becomes the main challenge and the way knowing manifests. From an identity standpoint, partiality is a different relation to a domain than simply knowing or not knowing. You know your part, but because your partiality is engaged, in practice you know more than you know (p. 21).

Every practice has a knowledge domain (Wenger et al. 2002) which is the knowledge needed in order to do what needs to be done in a particular practice. Participants are accountable for having certain knowledge in that domain (i.e., a teacher is accountable for having certain knowledge around the subject taught, but not accountable for knowing how to do brain surgery). Valuable knowledge depends on how the practice is oriented towards the broader discourse. Knowledge can easily become something specific for a particular practice, where there is a danger of ignoring the broader discourse which practice is part of. Knowledge in practice involves the interaction between the local and the global (Wenger, 1998); local, meaning, knowledge in a particular practice participants belong to; global, meaning, knowledge valued as important in other practices that a particular practice is connected to.

Individuals participate in many different practices, where they to a certain degree carry knowledge and competencies from one practice to another. This can be how a computer is being used in a certain setting, which can be carried over to another setting. That way, new meaning can be created in the community, out of the situation that is prevalent. This is not the same thing as saying that knowledge is "transferred", since…

> Learning is never simply a process of transfer or assimilation (Lave & Wenger, 1991, p. 57).

Two situations are never identically the same. Therefore, it will always be a matter of using mediating tools and experiences from one situation in a new manner, when used in another situation.

Mediating tools
Mediation, mediating tools, and mediated action, are theoretical notions not dealt with to any greater extent in the theory Community of Practice, as stated earlier. This is not due to Wenger not acknowledging the importance of mediating tools in human actions.

Quite the contrary; actions being mediated is a fundamental assumption within the theory Community of Practice. The view on mediation is that there is no un-mediated action (Wenger, taped interview 2004-04-15). However, since mediation, mediating tools, and mediated action, are not emphasized in mainstream research on learning, it may be in place to account for the concepts, drawing at large on a different theoretical tradition than Community of Practice; cultural historical activity theory, which has developed in the footsteps of Vygotsky, Luria and Leontiev. Activity theory is a theoretical tradition that shares many assumptions with the theory Community of Practice.

Human action always includes mediating tools. Mediation originates from the word media. Media is a link between the individual and the world. An example of mediation would be when an individual is going to travel from one place to another, and considers going by bus. The bus mediates the action, and can then be described as a material, mediating tool. If the individual wants to find out if the best way to travel is taking the bus or maybe taking the train, s/he might call someone to ask. The language then, used in their conversation, becomes an intellectual mediating tool, and the telephone a physical mediating tool. If the individual has access to a timetable, the written text will be what mediates the action.

Learning is to a great extent a matter of learning how to use tools, which inherit earlier generations' conceptual constructions. Material tools are earlier generations' discursive practice which have been materialized. Knowledge appropriated in practice by our forefathers (including ways of talking about practice) has taken a material form, like the calculator, the compass, the watch, etc (Säljö, 2001).

> Cultural development, i.e., learning at the level of collectives, is largely a matter of transforming ideas and concepts into material artifacts (Säljö, 1997, p. 6).

We are born into a world shaped by earlier generations use of mediating tools in activity.

> …the species-specific characteristic of human beings is their need and ability to inhabit an environment transformed by the activity of prior members of their species. Such transformations and the mechanism of the transfer of these transformations

from one generation to the next are the result of the ability/problivity of human beings to create and use artifacts…(Cole, 1995, p. 190)

Vygotsky (1978) brought forth the idea of mediation around 75 years ago. He expressed mediated action as a triad consisting of subject, object and mediating artifact. Vygotsky's insertion of cultural artifacts as the unit of analysis to understand human cognition, was revolutionary.

…objects ceased to be just raw material for the formation of the subject as they were for Piaget. Objects became cultural entities and the object-orientedness of action became the key to understanding the human psyche (Engeström, 1996b).

Mediating tools do not refer to just physical artifacts, and cannot be reduced to material objects:

The thinker in this world is a very special medium that can provide coordination among many structured media, some internal, some external, some embodied in artifacts, some in ideas, and some in social relationships (Hutchins, 1997, p. 352)

Psychological tools is a key concept and a cornerstone in Vygotsky's theory of cognitive development (Kozulin, 1998; 2003). Examples of psychological tools are signs, symbols, texts, and most fundamentally - language. So, using language, i.e., speech and writing, is viewed as mediated action. Individual cognitive development cannot be separated from mediating tools.

So when asking about someone's ability level we are usually asking about someone's skill in functioning with a particular cultural tool (Wertsch, 1998, p. 45, compare Wertsch, 1993).

Language is our most fundamental mediating tool (Kozulin, 1998; 2003). Words, concepts, and other communicative expressions, constitute discourse frames, formed in interaction between people using certain words and concepts within the frame of a situated practice (Rogoff/Lave, 1999; Säljö, 2001). People act, e.g., speak from what they know about what is demanded of them in the situation and the activity system they are presently active in (Keller & Keller, 1993).

Language activity in a specific situation is not to be understood as reference to thoughts or ideas being mental representations within the individual, as grounds for the speech act. Language is used in

different ways depending on the situation. Using language will have consequences as to an individual's choice of the most appropriate way to express something within a particular practice. To exemplify, one could refer to someone asking questions about the ethnographic method. The method can be described in different ways; the answer may depend on who is asking the question. If it were a researcher posing the question, words like context, holistic view, and multiple interpretations are maybe used. If a student in Swedish grade school was posing the question, using a different word than context may emphasize the importance of context[24]. In addition, the response may include that reality is not easily described in one particular way. The question is the same, but which language and which words, the individual chooses to use, is dependent of the situation and the person posing the question.

Wertsch (et al., 1995) make four points with respect to mediation where the first one concerns mediation as an active process. The second point is that when a new cultural tool is introduced into the active process, the tool transforms it. The third point concerns how mediation "always involves constraint as well as empowerment" (p. 24). And the fourth point is that "cultural tools usually emerge for reasons other than to facilitate many of the kinds of action they in fact end up shaping" (p. 25). This means that there may be accidental or unanticipated benefits – so called 'spin-offs.' Sometimes, we may reflect on, as well as model language and thought, using a tool that was not designed for that purpose (Olson, 1995). Cultural tools can be selected or dictated by sociocultural forces beyond individual choices, and still benefit in an unanticipated and accidental way (Wertsch et al. 1995, p. 26).

Mediation is connected to time and space, "as such linked with historical, social, cultural and institutional contexts" (Junefelt, 2001, p.98), contexts crucial for how mediating tools develop, and for the actions the individual executes, and the meaning created therein (Wertsch, 1993a).

Wertsch uses the term individual(s)-acting-with-mediational-means to express the mutual relation between individual(s), action, and

---

[24] There is a common word in Swedish for context, used in every-day-speech: sammanhang

mediating tools. By using tools, humans can solve problems in activities. The interesting part is not how the tool functions in its own right, or how the individual functions, but how the individual and the tool function as a unit (Wertsch et al., 1993; compare Säljö, 1992).

> Thus, the answer to the question of who is carrying out the action will invariably identify the individual(s) in the concrete situation *and* the mediational means employed (Wertsch, 1993a, p. 12).

It is argued above that, human action is mediated by tools, which is a fundamental premise for the theoretical perspective, and since there is no such thing as un-mediated action, the concept mediation is not used to any great extent in the theory Community of Practice. Another fundamental premise is that learning is situated.

Learning as situated in practice

All learning is situated in practice. In Wenger's earlier work with Lave (1991), the notion situated learning put emphasis on a different view on learning than that which was mainstream at the time; a traditional cognitivistic view. Situated learning was a transitory concept to view learning from a different perspective.

> The notion of situated learning now appears to be a transitory concept, a bridge, between a view according to which cognitive processes (and thus learning) are primary and a view according to which social practice is the primary, generative phenomenon, and learning is one of its characteristics. There is a significant contrast between a theory of learning in which practice (in a narrow, replicative sense) is subsumed within processes of learning and one in which learning is taken to be an integral aspect of practice (in a historical, generative sense). In our view, learning is not merely situated in practice - as if it were some independently reifiable process that just happened to be located somewhere; learning is an integral part of generative social practice in the lived-in world (Lave & Wenger, 1991, p. 34-35).

There is an abundance of research that view learning as situated and contextual (Engeström,1999, compare Lave & Wenger, 1991). Engeström (1999) divides this type of research into a weak and a strong version. The weak version can be very well grounded, and is the one that is most often described. This view is advocated in research arguing that learning is situated in physical and social

contexts, therefore, context has to be taken into consideration when studying learning.

> The strong version argues that learning literally is a by-product of participation in social practice. To understand learning, one must start by analyzing the particular social practice one is interested in (Engeström, 1999, p. 250).

So, the weaker version talks about the need to take context into consideration, the stronger version talks about participation in communities of practice, where the point of departure for the analysis is the particular social practice.

The concept situated learning is not used to any great extent in Wenger's later writings (1998; 2004), but as stated earlier a fundamental premise for the perspective. Situated learning suggests that, different conditions support different learning experiences.

Arrangements for conditions of learning

One condition for learning is whether the learner has access to someone around that is more competent, as often is the case for a child interacting with a teacher. Vygotsky uses the concept Zone of Proximal Development (ZPD, Vygotsky, 1978), described as a potential zone between development and learning where the child, with the help of an adult or a more competent peer, can learn what it shouldn't be able to learn, according to the maturity and mental age of the particular child. Vygotsky's definiton of ZPD is:

> ...the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through independent problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86).

Research on ZPD is not only carried out studying children; ZPD applies to adults as well, as Engeström (1986) shows in his study of cleaners.

Chaiklin (1997) points to three main aspects as often highlighted or emphasized in research on ZPD, referred to as the common interpretation of the zone of proximal development:

> ...generality assumption (i.e., applicable to learning all kinds of subject matter), assistance assumption (learning is dependent

on interventions by a more competent other), and potential assumption (property of the learner that permits the best and easiest learning – Chaiklin, 1997, p. 41)

A concept connected to ZPD, used in educational settings, is that of scaffolding (Greenfield, 1999; Rogoff & Gardner, 1999; Litowitz, 1993; Chang-Wells & Wells, 1993; Stone, 1993). An example of scaffolding can be found in a situation where there is interaction between an infant and the mother. Even if the mother does not view herself as a teacher of the child, she adjusts her interaction with the small child in such a way that it supports the child's learning (Rogoff & Gardner, 1999).

Linn (et al., 1996) describe scaffolding referring to studies within the Computer as Learning Partner Project (CLP). They say that, when a teacher gives the student too much support, student responsibility in the learning process is taken away, while too little support, leaves the student floating around in an endless search for an answer. Scaffolding is about making judgements as to what kind of, and how much help the student needs. They identify four central aspects concerning how scaffolding can be integrated in the learning process out of their experiences from CLP.

The first is about choosing a repertoire, or list, of available goals relevant for everyday experience where the goals should be close to what students find in educational material, as in books. If the goals are too abstract, it favors those who find it easy to learn by heart.

The second aspect of integrated scaffolding is about how thoughts can be made visible, by helping the student create effective models making her re-present her understanding in a conceivable way to others.

The third aspect on scaffolding is about how teachers can support students in linking different ideas. Students need help engaging in a process where they can identify similarities and see close relations between ideas. Giving students the possibility to solve problems that result in complicated solutions that demand persistence as well as control of the results can do this.

The fourth aspect is about how students are given the opportunity to reflect on their learning process and take responsibility for their own

learning. In doing so, they are given an examining role as well as a critical role in the process. By comparing results with others, and remaining critical, they gain experience as to controlling their understanding in order to develop the same.

Linn's (et al., 1996) description would then imply that the teacher, through scaffolding, could help students by facilitating many different ways to re-present their understanding. When the student has access to several models, he or she can choose one of these ways to re-present their thoughts out of what is suitable in a particular situation.

A teacher of today is talked of in terms of being an enabler, mentor, facilitator, advisor, or coach to students. State authorities describe a new teacher role as follows:

> The teacher will still be a bearer of knowledge, but will all the more be a facilitator, who aids the student in finding knowledge on his/her own (SOU 1995:68, p.20, my transl.).

Selinger (2001) argues that teacher control of knowledge is weakened when new media, such as ICT, is implemented in schools, and how teacher role is affected, where she argues that their role does not diminish, but changes to one of supporting and scaffolding (Selinger, 2001, p. 91).

Community of practice

Dimensions of the relationship between practice and community

To participate in practice is viewed as a process that includes a change in the understanding of one's practice, or in other words, learning (Lave, 1997).

> The problem of learning could be conceived in social and historical terms as changing participation in changing social practice (Lave, 1997, p. 141, compare Wenger, 1991; 1998; 2004)

Knowledge is not necessarily appropriated in formal education, but in practical life, such as at work (Engeström, 1986; 1994; 1996), where learning is always situated and contextual (Lave, 1988). Learning occurs in practice where knowledge undergoes construction and transformation in use (Lave, 1996). Different contexts offer different meanings, which are connected to the situation human beings are

involved in (Lave, 1988; Bruner, 1990; Rogoff & Lave, 1999). Different cultural expressions vary, thereby creating different kind of practices (Bruner, 1990). There is a distribution between language, interaction and physical artifacts, or tools, which shape practices differently (Vygotsky, 1999).

On an analytical level, there are three dimensions of the relationship between practice and community:

Evolving forms of mutual engagement: discovering how to engage, what helps and what hinders; developing mutual relationships; defining identities, establishing who is who, who is good at what, who knows what, who is easy or hard to get along with

Understanding and tuning their enterprise: aligning their engagement with it, and learning to become and hold each other accountable to it; struggling to define the enterprise and reconciling conflicting interpretations of what the enterprise is about

Developing their repertoire, styles, and discourses: renegotiating the meaning of various elements; producing or adopting tools, artifacts, representations; recording and recalling events; inventing new terms and redefining or abandoning old ones; telling and retelling stories; creating and breaking routines (Wenger, 1998, p. 95).
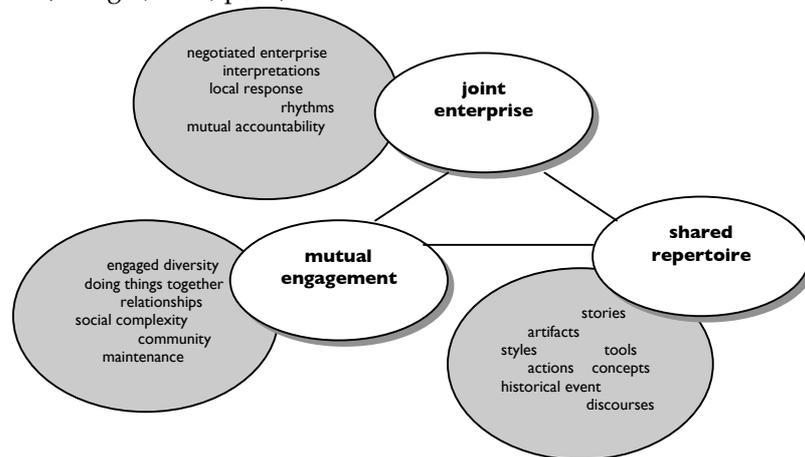
Fig. 3. Dimensions of practice as the property of a community (Wenger, 1998, p. 73).

Formal constellations, like a written document stating who belongs, are not what constitute the community (although, this can be a community of practice). At a work place, there might be several different communities of practice, where those included do not have to belong to the same work team. Communities of practice can develop on the side of formal constellations, so this is not an indicator of a community of practice. But there are certain indicators that a community of practice is being formed (Wenger, 1998, p. 125):

> sustained mutual relationships - harmonious or conflictual
>
> shared ways of engaging in doing things together
>
> the rapid flow of information and propagation of innovation
>
> absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process
>
> a very quick setup of a problem to be discussed
>
> substantial overlap in participants' description of who belongs
>
> knowing what others know, what they can do, and how they can contribute to an enterprise
>
> mutually defining identities
>
> the ability to assess the appropriateness of actions and products
>
> specific tools, representations, and artifacts
>
> local lore, shared stories, inside jokes, knowing laughter
>
> jargon and shortcuts to communication as well as the ease of producing new ones
>
> certain styles recognized as displaying membership
>
> a shared discourse reflecting a certain perspective on the world

A community of practice develops borders, which can lead to difficulties for those outside of the community to become participants (ibid). However, borders are not there just to exclude people, they also keep the participants that are included united. There can be a risk, though, in the community forming borders; they might be cut off from

other communities of practice that they are connected to in different ways (e.g., a teacher team not being connected to other teams in their school). A teacher who isolates himself in the classroom, develops a community of practice with his students, but not with his colleagues. If so, there is a risk that he will not represent anything but himself and his community. Artifacts produced in such a community would only be valid and meaningful in a local context.

A community of practice is not an isolated entity; engagement entails external relations (Wenger, 1998). In such relations, reification and participation[25] are both needed to bridge practices by negotiation of meaning. Visiting another practice is a way of enriching boundary encounters, where participants can negotiate meaning with outsiders and insiders at the same time.

Boundary relations are about how one practice can be connected to another. A community of practice is never totally isolated from the rest of the world. There are boundary objects that organize interconnections, such as forms, documents, artifacts, terms, concepts, and other reifications. There are also people acting as brokers, connecting practices by bringing in different perspectives from the outside (ibid).

If brokers are good, they can open new possibilities for meaning by making new connections enabling coordination. A broker's task is to facilitate learning by introducing elements of one practice to another, made possible by the broker's experience of multi membership. It is a delicate task, which requires legitimacy from the participants. The contribution of a broker lies in being neither in the community, nor outside of it (ibid). It is about distance, and closeness, and about participation as well as reification.

> The problem of communication is then one of both participation and reification, to be dealt with in terms of opportunities for the negotiation of meaning within and among communities of practice (Wenger, 1998, p. 108).

Sometimes, it is difficult for participants to recognize the value of brokering, being focused on their own enterprise (ibid). Their

---

[25] See page 100-105 for elaboration on the concepts reification and participation

disappointment towards the broker might be expressed as boundaries lacking the kind of understanding found at the core of their own practice. A broker being subjected to disappointment and lament might call for brokers being engaged in relations with each other, recognizing one another, seeking companionship "and perhaps develop shared practices around the enterprise of brokering" (ibid. p. 110).

Boundary practice cannot work if it gets self-involved. An example would be a training class. If the training just goes on in class, and ceases to be a boundary practice, then it becomes self-involved.

Below, the dimensions of practice as the property of the community will be further elaborated, starting with mutual engagement.

Mutual engagement

Practice exists because people are engaged in actions (Wenger, 1998). People maintain a close relationship with a mutual engagement organized around what they are there to do. They negotiate meaning with each other as to their actions; it is a matter of mutual engagement.

Members interact with each other during work, they talk to each other during conferences, or on the phone, they e-mail each other, someone takes responsibility for fixing coffee, etc. To be a member, it might be just as important to know the latest gossip, as knowing what the principal wrote in his latest memo. It is about maintaining the community by everyone engaging in what happens around them (ibid).

Engagement defines who belongs to the community of practice. Engagement in practice does not have to entail homogeneity; it is as much a matter of heterogeneity and diversity. Disagreements and competition can both be forms of participation. Working together creates differences as well as conformity. Rebellion is often a greater sign of engagement than passive adjustment. Relations mirror the full complexity of engaging in a community of practice. Power and dependence, expertise and helplessness, success and failure, alliances and competition, anger and tenderness, friendship and hatred - communities of practice have it all (ibid, p. 77).

Each participant finds a unique place and identity within the community. In being mutually engaged, their competency contributions compliment each other, as well as overlap. In a community of practice with a mutual engagement, people help each other. It is not as important to know everything yourself, as to know how to give and receive help (ibid). In a community of practice, there are constant negotiations about what is considered the mutual task to be completed; by Wenger referred to as the joint enterprise[26].

Joint enterprise

A joint enterprise can never be fully determined by an individual participant, nor is it fully determined by an outside mandate; it is communally negotiated. The enterprise does not become joint by everyone agreeing on everything, but rather by participants jointly negotiating the enterprise. Wenger (1998) points out three aspects of the enterprise that "keeps a community of practice together":

> It is the result of a collective process of negotiation that reflects the full complexity of mutual engagement

> It is defined by the participants in the very process of pursuing it. It is their negotiated response to their situation and thus belongs to them in a profound sense, in spite of all the forces and influences that are beyond their control.

> It is not just a stated goal, but creates among participants relations of mutual accountability that become an integral part of the practice (pp. 77-78).

The enterprise of a community of practice resides in a greater system, which is a result of a long historical development. Teachers have not invented the school system, and they cannot to any greater extent affect how school, as an institution, is constituted. Others' efforts to maintain a certain amount of control over the practice (like principals

---

[26] In Swedish, I have chosen to translate joint enterprise as 'den gemensamma uppgiften', since 'företag', which is a direct translation of enterprise, has a different connotation in Swedish, not as applicable as translation in a school context. 'Uppgift', though, is a commonly used notion in Swedish schools, alongside 'uppdrag', which is the institutionalized form of 'uppgift'. This translation serves well, taking the theoretical implications described by Wenger (1998; et al 2002) into account.

or politicians) are often successful, and curriculum and the school law play a crucial role as to what teacher teams consider possible to do, or not to do.

In spite of constraints in the system, teachers can create a practice that enables them to do what they consider need to be done in order to fulfill their joint enterprise. It is the teachers themselves that through a mutual engagement in practice negotiate the enterprise and how it is to be carried through. They are mutually accountable to the enterprise (Wenger, 1998).

Accountability
The concept of accountability has been studied in many different disciplines, not least in economics. It is a broad research field in its own right, but will here be accounted for the way the concept is treated within the theory Community of Practice. Hence, this is not an overview of research on accountability in general, but as specifically treated in this dissertation, reference made to Wenger (1998).

Teachers are accountable for many different things to many different interested parties, where the main aspects concerns covering the range of knowledge that is needed in order to teach students that which is stated in the national curriculum as the objectives and goals of schooling. On an individual level, Grossman (1990) argues that teachers are accountable for subject matter knowledge, general pedagogical knowledge, pedagogical content knowledge, and knowledge of context. This statement by Grossman is a broad statement, which could include almost anything. However, nobody expects a teacher to know what medicine to prescribe to a student suffering from pneumonia; they are not accountable for that kind of knowledge. So on a general level it can be stated that what teachers are accountable for depends on what kind of pedagogical activity they are engaged in, and in which context they are teaching; they are accountable for their joint enterprise as it unfolds in negotiations among them.

Accountability is always discussed in relation to something or to somebody. This can be viewed on different levels: societal, group, or individual level, or, the way Wenger views it: "accountability to an enterprise" (Wenger, 1998, p. 152).

One of the requirements added regarding what type of knowledge an individual teacher is accountable for, is shown in the document stating what a student examined as a teacher, from the year 2000, is to have obtained. A teacher student

> ...has to have the ability to use computers and other information technology aids, for their own learning, as well as knowing how these tools can be used in teaching children and youngsters/students (UFB 3, 1997/98 SFS 1996:913).

Teachers need to prepare students to act in a society where ICT is inherent as a natural feature (SOU 1999:63). Learning how to use ICT becomes a new competence development area for teachers, since it is implied that in the future, they will be accountable to society for knowing how to use ICT in instruction.

Even if institutional systems of accountability exist, it is not equivalent to what emerges as a response to those institutional systems, since "each community of practice also defines its own regime of accountability" (Wenger, 1998, p. 245). It is in negotiations around the joint enterprise that a regime of accountability develops in a community of practice, which give rise to relations of mutual accountability about …

> ...what matters and what does not, what is important and why it is important, what to do and not to do, what to pay attention to and what to ignore, what to talk about and what to leave unsaid, what to justify and what to take for granted, what to display and what to withhold, when actions and artifacts are good enough and when they need improvement or refinement (Wenger, 1998, p. 81).

An individual teacher contributes to the whole and invests him/herself in an enterprise, which makes the individual look at the world a certain way:

> As we invest ourselves in an enterprise, the forms of accountability through which we are able to contribute to that enterprise make us look at the world in certain ways. It moves us to understand certain conditions and to consider certain possibilities. As an identity, this translates into a perspective. It does not mean that all members of a community look at the world in the same way. Nonetheless, an identity in this sense manifests as a tendency to come up with certain interpretations, to engage in certain actions, to make certain choices, to value

89

certain experiences - all by virtue of participating in certain enterprises (Wenger, 1998, p. 152).

Teachers make judgments as to what is appropriate concerning actions and products, which becomes the regime of accountability and an integral part of the practice when shared among them (ibid).

Teachers are accountable to many different interested parties (society, parents, students, etc.) to execute a practice that offers affordances for students to learn what needs to be learnt in order to be educated citizens with all that it entails. However, there always is a response to institutional systems of accountability. Accountability to the joint enterprise includes an ability to understand what the enterprise is about and how to contribute to fulfilling it, which is an ongoing process of negotiations among the teachers.

Over time, a community of practice develops a shared repertoire, which helps them fulfill the joint enterprise.

Shared repertoire

A shared repertoire can include many different things, such as:

> ...routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions, and concepts (Wenger, 1998, p. 83).

Discourse and style are also part of the repertoire. The repertoire joins reificative aspects[27] (objectified or concrete aspects), and participative aspects[28], both resources in negotiations of meaning, which will be addressed, and further elaborated, later in this chapter.

Elements included in the repertoire reflect a history, and often, well-established interpretations. But the repertoire remains inherently ambiguous. The inherent ambiguity makes processes that include coordination, communication, or designing an activity, difficult and unpredictable. This does not have to be a constraint. Different interpretations or misunderstandings are not only problems that have to be solved, but also an opportunity to produce a new content of meaning (ibid).

> When combined with history, ambiguity is not an absence or a lack of meaning. Rather, it is a condition of negotiability and

---

[27] See p. 100, this chapter
[28] See p. 100 –103, this chapter

thus a condition for the very possibility of meaning. It is how history remains both relevant and meaningful (ibid, p. 83).

In this respect, ambiguity is an inherent condition that can be put to work in order to create new meaning with regard to the shared repertoire.

The shared repertoire has a rehearsed character (Wenger, 1998, p. 83), but also involves props. A rehearsed character put emphasis on performance. The shared repertoire includes shared representations, but as I will argue below, representations as a way to re-present knowledge in a way that is most appropriate according to the situation. This means that shared representations are not stable, but negotiable among those who share a way to re-present what they know.

Representation and re-presentation
There is a fundamental assumption beneath the theoretical perspective sketched that knowledge is a construction by people engaging in social practice. Kozulin (1998) contrasts Piaget's constructivism with Vygotsky's historical cultural approach by stating:

> Probably the most essential difference lies in their understanding of the subject of psychological activity. For Piaget, this subject is an individual child whose mind, through interaction with the physical and social world, arrives at the mature forms of reasoning associated with formal operations. For Vygotsky, psychological activity has sociocultural characteristics from the very beginning of development; children, therefore, are not lone discoverers of logical rules, but individuals who master their own psychological processes through tools offered by a given culture (Kozulin, 1998, p. 39).

The constructivistic view of Piaget examines social activity from an individualistic perspective. A constructivistic view, drawing on Piaget's findings, has a different theoretical base than theories developed in the footsteps of Vygotsky. In the sociocultural perspective, the idea of trying to solve the problem around cognition by studying what is inside the head is abandoned, in favor of focusing language in interaction within social practices. It is a micro social process, where language ability arises through an individual being subjected to language in the culture where he/she is. By emphasizing

language and concepts as fundamental phenomena in the formation of social practices, there is a distinction made between the constructionist perspective on cognition (Burr, 1995; Gergen & Gergen, 1992) and the traditional constructivist perspective, where mental constructions are viewed as an abstract representation of reality. How a notion is being used, is not dependent of "how it really is" (i.e., there is no inherent meaning in the concept "being a teacher"). The notion is used in different contexts where individuals have agreed upon a shared meaning of the concept. Constructionism formulated this way includes a subjective cognitive level as well as a general discursive level, which means that a duality between the two is rejected (Gergen & Gergen, 1992).

When phenomena are viewed as constructed differently in different practices, there is not one conceptual construction superior to all other possible constructions. Therefore, there is no use studying the cognitive structure of a conceptual construction, which means that the problem with transfer (meaning, an individual using cognitive resources appropriated in one context transferring to another) becomes uninteresting (Lave, 1988; Lave & Wenger, 1991). What is interesting is that, discourses are tied to actions within a certain practice, and when we move between different practices, we can bring out alternative discourse that fit the practice we presently are engaged in. Using a different terminology, one can speak of re-presenting knowledge in different ways, using the most appropriate way for re-presenting knowledge in a situation in a certain practice. This view contrasts from the traditional view on representations as mental entities.

For a long time, psychologists as well as philosophers and linguists have been puzzled by how people learn, and how we represent the world (Solso, 1991). During the 18th century, with representatives such as Berkely, Hume and Mill, the idea about three different kind of representations was brought forward: direct sensations, pale copies of perception (or that which is stored in memory), and transformation of these pale copies (as in associated thought). Towards the end of the 19th century, the view on mental representations was divided into two schools: the structure of the representation (static) and the process (active). Since then, modern psychologists have either emphasized the structure, or the process (ibid.). Many researchers of today choose to

view a connection between the two, where it is assumed that both have to be integrated in a cognitive system, since they co-operate (ibid.). This view can be found for instance in the theory of Social Representations (Jodelet, 1995).

By the time of the so-called cognitive revolution in the middle of the 1950's, the cognitivists maintained a position that mental processes and representation of knowledge were necessary components in order to understand human psychology. This made mental representations an object to study on a large scale. Jerome Bruner was one who in his earlier writings (1974) wrote about mental representations, where he divided them into three different types of representations: 1) to know something and be able to do it (action – e.g., to tie a knot); 2) to have a picture in the mind of how to do it; 3) a symbolic representation that can be exemplified by somebody telling how to do it. In Bruner's later writings (1990), he has shifted focus from the concept of representation to the concept of meaning.

One theory dealing with representations from a social perspective, sometimes claimed as a theory within the sociocultural perspective (Davidsson, 2002) is the theory of social representations[29]. The theory has its roots in Durkheim's theory on social facts.

> This theory has probably generated such enthusiasm among social psychologists partly because of its promise to throw light on to the constructive {Berger and Luckman, 1966} aspects of social life, partly too because of the claim to provide an integrated frame for understanding attitudes, attributions and beliefs, and partly because it provides a rationale for a specifically social psychological level of analysis (Potter and Wetherell, 1996, p. 142).

A key idea in the theory Social Representations is that subjects have a representation of an object. When a certain group shares common sense knowledge on an object, or idea (e.g. a particular theoretical view on learning), it becomes a social representation that is incorporated as common sense knowledge in the group. The social representation is stable, and difficult to change. It circulates in

---

[29] French: Les Représentation Social; Swedish: Sociala Representationer. See Moscovici, 1984; 1988; 1995a; 1995b; 1997; 1998; Jodelet, 1995; Farr/Moscovici, 1984; Chaib/Orfali, 1995 for further elaboration on the theory Social Representations

conversations, and has a "life" of its own, independently of one particular individual. The social representation steers how people in a certain group act.

Israel (1995) considers the Swedish translation of the word "representation" unfortunate, since the French concept has somewhat a different connotation by implying performance, presentation, or account. These ways of translating the concept emphasizes the communicative dimension of representation, something that Serge Moscovici (the founding father of the theory Social Representations) is content with. He argues that "we think with our mouths" (1997), implying that thinking and speech are in a dialectic relationship where one cannot be said to have precedence over the other, in concordance with Vygotsky´s ideas (1978).

Moscovici considers himself to the ideas of John Dewey. Dewey emphasizes the importance of communication for human and societal development and change. Dewey (1916) argues that all communication is educative.

> Not only is social life identical with communication, but all communication (and hence all genuine social life) is educative.

In a sociocultural perspective, a phenomenon can be re-presented in a way so that it becomes understandable to those that are being subjected to the re-presentation as people communicate with each other. This is not suggesting that it is a reflection of reality which exists as a mental scheme inside the individual, and which can be examined as such. Re-presentation rather refers to the individual choosing an appropriate way to re-present something from the situation that prevails.

> Some form of mediation - re-presentation - has to occur, in order for the inner, or the private, to be accessible to others (but it doesn't necessarily have to be a linguistic description; gestures, mimicry, pictures, can also fulfill those functions in certain situations (Säljö, 2000, p. 87, my translation).

From this perspective, it is not our mental representations that steer our actions. Instead, it is the action that we are involved in (e. g., making something understandable to someone else) that is fundamental to the way we choose to re-present something.

Texts emphasizing social representations as mental structures, which can be studied by focusing mental schemes, are problematic if one chooses a sociocultural perspective, and would not be in concordance with the theoretical perspective outlined in this thesis.

The theory Social Representations is under development, and does not stand without critique. Potter and Wetherell (1996) are critical towards the theory of Social Representations when it comes to…

> …the relation between groups and representations, the nature of consensus assumed by the theory, and the roles of language and cognition (p. 142).

Markova (1996) discusses similarities and differences between a sociocultural theoretical perspective and the theory on social representations, and states that there are great similarities in the use of the same concepts and fundamental ideas as to human knowledge. However, when it comes to the role of representations, Markova (1996) describes the difference in perspective in the following way: Sociocultural theories of learning examine how individuals learn to control their surroundings; they learn to maintain a goal oriented activity and learn how to adjust to others perspectives. At the same time, individuals become conscious of the social surroundings as cognitively penetrable where there is a possibility for change (s 184-185). The theory of social representations examine how socially shared knowledge snares the individual in existing ways of thought, which constrains the free thought and enforce a special way of perceiving the world, occurrences, and objects. Since a social representation is stable, it is difficult to change, unless something dramatic happens (Jodelet, 1995). The power in social representations lies in them being implicit: the less conscious individuals are about their social representations, the more powerful they are (Moscovici, 1984). By making them visible, they become available for critique and analysis (Markova, 1996).

The way I understand Wengers (1998) way of dealing with representations, is to reject the idea of dichotomies, adopting a dialectical perspective towards the issue, meaning that there are mental representations, but how we choose to re-present what is in our mind, depends on the situation; what practice we are presently participating in, and what part of our identity we choose to reveal.

Identity is not stable, it is transformed all through life, and so are re-presentations where we choose what way is best to re-present something in relation to the situation, which renounces representations as stable over time. In the theory of Social Representations, representations are viewed as stable, although not static.

There are writings within the framework of the theory of social representations that are in concordance with a sociocultural perspective, but the theory as a whole appear difficult to add as a theory belonging to the sociocultural "family". In the sociocultural perspective it is not interesting to study representations as cognitive units, as stated earlier. Another difference in theoretical assumptions is whether our social representations steer our actions, or, whether shared re-presentations are expressed in our actions under certain conditions, where emphasis is on conditions prevalent in the situation, not on the representation per se. I am hereby arguing that the concept re-presentation is a more appropriate concept when taking a sociocultural perspective as point of departure.

In addition to the above, I have not found meaning a concept accounted for to any great extent in the Theory Social Representations, whereas it is a central concept in the Theory Community of Practice.

Before addressing the concept of meaning as viewed in the Theory Community of Practice, there will be a historical account of some other theoretical traditions regarding the concept of meaning.

Meaning

John Dewey and George Herbert Mead[30] did early analysis on the importance of meaning to knowledge appropriation (Englund, 2000). In the year of 1934, Mead (1995) stated that meaning is found in the interaction between people, given and formulated in terms of response. Separate words do not contain meaning, but when people interact with each other, meaning can be created.

---

[30] John Dewey and George Herbert Mead were close theoretically, as well as personally (Morris, 1995).

Dewey argues that meaning is inherent in interpretation and understanding. Understanding occurs when meaning links what is apprehended (something known) to what is to be comprehended (something unknown - Stensmo, 1994). Instruction is a means for the teacher to create conditions for learning, taking student interest into consideration. But students do not always know what interests them. It is a challenge to teaching to ensure that students have the opportunity to comprehend the unknown by building upon the already known by offering as many different ways as possible for the student to create meaning. In doing so, communication between student and teacher plays a central role. There is an implication that this does not only apply in formal education as Dewey (1916) argues that all communication is educative.

According to Dewey, who was a pragmatic theoretician, there is a connection between the creation of meaning and the pragmatics of knowledge; in what way is particular knowledge useful to the individual? Usefulness is the basis for choosing which new knowledge to appropriate (Hartman/Lundgren, 1980). To know what the consequences will be, where something will be used in a certain context, is to comprehend meaning.

News signifies something which has just happened, and which is new just because it deviates form the old and regular. But its' meaning depends upon the relation to what it imports, to what its social consequences are (Dewey, 1926).

John Dewey did not live long enough[31] to experience the cognitive revolution. In the middle of the 1950's, many researchers, among them Jerome Bruner, advocated that the cognitive revolution was about establishing meaning as the basic concept of psychology; to discover and describe the meaning people are creating in their experienced encounters as a basis for learning (Bruner, 1990). However, the cognitive revolution did not quite take that turn. Instead, it was largely assumed that how information is processed inside the individual, is a central key aspect of learning. Information processing and meaning, have very little to do with each other, according to

---

[31] John Dewey died in New York City in 1952 (dewey.pragmatism.org)

Bruner. If information does not create meaning for the individual, he or she will not learn (compare Jarvis, 1992).

The assumptions that were made within cognitive research, being that learning is about internal psychological processes (as information processing), have been loosened. Bruner (1990) calls what happened during the 1990's the contextual revolution, since when meaning is created, it is not mainly an intra individual process; meaning is situated and thereby dependent on the context wherein it is created. Meaning is to be found in ongoing discourses where people in interaction with each other create meaning (Cherryholmes, 1988). In order to feel comfortable with the discourse and to be able to understand what is going on, some kind of meaning has to be created. Meaning is negotiated in everyday discourse, where both speakers and hearers are responsible for constructing understanding (Mehan, 1996).

The creation of meaning is a dynamic, as well as a historical process. History, culture, politics, and economy, has to be considered since it determines how the discourse creates what is valid (Englund, 2000). Viewing meaning this way implies that meaning is not stable.

Englund (1996) talks about offering meaning, and argues that this is what education is about. In my opinion, offering meaning is problematic, since it is doubtful whether someone can offer somebody else meaning. The way I view the issue, the teacher can offer conditions for students that can be experienced as meaningful (or meaningless). However, I share Englund's view on instruction in teaching as meaning creating discursive communication processes with embedded conflicts of value (p. 44). Within a discourse certain things are discussed, some are not. There are explicit or implicit rules determining what is going to be included and what is not, proceeding the speaker and the listener. If a conversation is characterized by allowing different perspectives to be brought forth, the reflexive ability of the participants can develop (Englund, 2000). My addition to that statement is that such conversations can be meaningful, or meaningless to the participant, which shapes learning differently.

If offering meaning is a difficult concept, so is sharing meaning, since "what can be shared is practice and ownership of meaning, that is, the

ability to negotiate meaning in given circumstances" (Wenger, 1998, p. 296).

Meaning is a concept that includes meaningfulness as well as meaninglessness. Focusing on the notion of meaningfulness is key to understanding individual learning.

> …I will argue that focusing on meaningfulness is also critical because it is the level at which learning becomes part of the experience of being human. Without a focus on meaningfulness, we are likely to miss what is most important about human learning – whether we are building theories or trying to foster learning in practice (Wenger, 2004, p. 4).

But meaning is also inherent in meaninglessness (Wenger, 1998). Participants in a community of practice may find certain actions meaningless when there are few possibilities to negotiate meaning, and therefore they minimize their effort and maintain a distance towards, for example, in-service training. Meaninglessness can then become a way of life. It can also be a way to disconnect people in a local culture:

> Meaninglessness - as freedom, resistance, or disconnectedness - has become part of the local culture (Wenger, 1991, p. 70).

Meaning is neither located inside us, nor out there somewhere, but exists in the dynamic relation in being a human being, living in this world (Wenger, 1998). There is reciprocity between affecting and being affected. The process links many factors and perspectives and produces new solutions. The process inherits resistance, but is at the same time moldable. Negotiated solutions can be incomplete, accidental, short-lived, or specific for a certain situation; contingent. Whichever the situation, meaning is located in negotiations of meaning, which involves the interaction of two constituent processes; participation and reification (Wenger, 1998, pp. 51-71; 2004).

Negotiations of meaning
Negotiations can be described as give-and-take between participants, where achievement is accomplished gradually, and where the production of what is negotiated gives rise to an experience of meaning (Wenger, 1998). Negotiations of meaning, involve the interplay of participation and reification and where the two converge

(ibid). These processes are fundamental for human experience of meaning, thus, also for practice (ibid.).

Wenger describes where meaning is located, and how it is constituted, by arguing that:

> meaning is located in a process I will call negotiation of meaning
>
> the negotiation of meaning involves the interaction of two constituent processes, which I will call, participation and reification
>
> participation and reification form a duality that is fundamental to the human experience of meaning and thus to the nature of practice (Wenger, 1998, p. 52).

Negotiation of meaning mirrors a history of mutual engagement. When negotiating meaning, the individual has to be able to communicate with other participants in an adequate way. This includes being able to use the language as well as being able to recognize the repertoire of the community of practice. The possibility to negotiate meaning increases the closer the individual is to the core of the community (Wenger, 1998).

In negotiations of meaning there is an inherent ambiguity, which provides a space, or a gap, by not being bound to an absolute interpretation. The space allows for dynamics, as to creating new meaning (ibid). The history becomes relevant and meaningful when what one knows from before, can be used as a point of departure in a new situation in order to create something completely new.

There are things being formed routinely in a practice, but that does not mean that it is not subjected to negotiation. We constantly renegotiate our routines, according to demands of the situation (ibid).

The processes involved in negotiations of meaning - reification and participation – imply each other. However, below they will first be treated on an analytical level as separate concepts. Then, there will be an account of how participation and reification imply each other.

Reification

A community of practice produces things from abstractions. It can be written text, symbols, stories, terms, concepts, artifacts, language,

representations, discourses, etc.; reifications. According to the Merriam Webster dictionary (2003), reification is "the process or result of reifying" where reify is "to regard (something abstract) as a material or concrete thing". Etymologically, the word is founded in 'making something into a thing'.

Another similar word is objectification, but reification is a wider concept. Reification is not limited to objectification. The product is intimately connected with the process. Since reification is an aspect of the creation of meaning, the process and the product are two sides of the same coin. Products of reification are not merely material objects; they reflect a practice that shows traces of human meaning creation over time (ibid). In this perspecticve, reification is …

> …the process of giving form to our experience by producing objects that congeal this experience into "thingness" (Wenger, 1998, p. 58).

Participants in a community of practice spend a considerable amount of time being involved in producing reifications. Designing instruction, evaluating, making lists of presence and absence, keeping track of student achievements in order to grade them - all are examples of reifications needed in order to maintain a teaching practice. Many of the reifications in a practice are submitted from the outside (like the national curriculum). If so, the participants have to appropriate what is reified by putting it into a local context, in order for reifications to be meaningful to them (ibid). To give form to our experiences through reifications can be a way to stabilize practice, but it can also be a way to give form to something that is found quite meaningless by the participants, perceived by them as de-stabilizing practice. Reifications are not just something positive that facilitates maintenance of the practice. To a teacher team, the abstraction "we have to find time to talk to each other" might lead to a reification stating "conference on Thursday", where the form might be more important than the content. When time is not used to do what teachers find meaningful, the conference becomes a substitute for what it was aimed to supply, which creates a de-stabilization of practice.

Participation
Participation is not just about being associated to a community. It is about being active (Wenger, 1998). It is a complex, active process,

which combines doing, speaking, thinking, and feeling. Participation is both personal and social. To participate forms our personal experience, but it also forms the communities we participate in. It includes all kinds of relationships, conflictual as well as harmonious. To participate goes beyond the physical work place. A teacher does not stop being a teacher at the end of the day. It is a feature of who that person is. Therefore, participation reaches beyond certain particular activities in interaction with certain particular people (ibid).

There are different types of participation. Complete participation includes participants that are to be found at the core of the community where they participate fully. The peripheral participant is not yet there, but on his/her way. The dominating aspect would in that case be participation defined as non-participation, with the possibility of becoming a core member. The third kind of participation is the marginalized participant. Members, who always find themselves not being listened to, develop as non-participants, and will over time be marginalized from the community. A marginalized member turns away from the community and the dominating aspect is non-participation defined as a limited form of participation (ibid). Non-participation is not always the same as marginalization; non-participation can be a way of defining ourselves in stating what we do not wish to engage in.

> Our identities are constituted not only by what we are but also by what we are not (ibid. p. 164).

Peripheral and marginalized participation produces qualitatively different experiences and identities.

> The difference between peripherality and marginality must be understood in the context of trajectories that determine the significance of forms of participation (ibid p. 166).

For a newcomer, non-participation can be an opportunity for learning, since full participation cannot be a goal to start with.

> ...some degree of non-participation is necessary to enable a kind of participation that is less than full. Here, it is the participation aspect that dominates and defines non-participation as an enabling factor of participation (p. 165).

Conversely, a long-standing member can be in such a position that his non-participation has been ingrained in practice, which inhibits full participation.

> ...a form of non-participation prevents full participation. Here, it is the non-participation aspect that dominates and comes to define a restricted form of participation (p. 166).

Wenger (1998) focuses on how participation will have certain consequences concerning what it takes to support and understand learning. For individuals, participation means that learning is a consequence of being engaged in, and contributing to practice where the individual acts in a community with others. For the community, it means that learning is about improving practice, and to secure that it lives on through new generations of members. For the organization, learning is about upholding the communities of practice that are tied to each other, and through which the knowledge of the organization becomes visible and thereby, effective and valuable as an organization (ibid).

Learning is not a separate activity easily identified as something we do on specific occasions; learning is something we can take for granted is happening more or less all the time (Wenger, 1998). Learning can occur when people are by themselves (Wenger, 2004), without interaction with another person (i.e., reading a book). But, learning on your own is in some way an activity that involves other people, like: someone has written what you are reading. What is central about learning is the meaning of doing what one does and how it changes the ability to participate in practice. Reading a book on your own on educational issues, may change your ability to participate in the world of teachers, to get access to it, and to be a part of the negotiation of meaning that takes place there. In this sense, learning on your own is fundamentally a social act since its' meaning is social (Wenger, 2004).

Participation and reification imply each other
Participation and reification cannot be viewed as separated from each other. They do not define a spectrum; they require and enable each other. Where one of the processes is to be found, one can always ask where the other one is. To understand one, you have to understand the other. By combining the processes in many different ways, they

give rise to many different ways of experiencing meaning (Wenger, 1998).

If there is too much participation, and too little is reified, the lack of concrete material can make it difficult to coordinate activities. It may also lead to different opinions not being brought to the surface, being implicit assumptions (that is why lawyers always want everything in writing). On the other hand, if too much is left to reification – leaving too few possibilities to share experiences or to actively negotiate with each other – there is not enough overlapping to participation in order to create meaning. This explains why it is not enough to put it in writing (ibid).

The ideal state is when participation and reification are balanced (ibid). Participation and reification cannot replace each other, but shortages in one can be compensated in the other. If participation, for some reason, is not practically feasible, participants may instead engage in making reifications within the community of practice, which to a certain extent can compensate for lacking participation. The same goes for lacking reifications, since extended participation can compensate for the shortage. That way, there will be continuity in the creation of meaning among the participants (ibid).

Participation and reification are inherent in language. Through words, negotiations of meaning affect what might look as pure participation. But language is always a form of reification as well. What it means to be a teacher might seem obvious, and few would contest that a teacher is there to facilitate others' learning processes. But, "to be a teacher", is defined out of specific forms of participation where meaning is contextualized (ibid.).

Since participation and reification come as a pair, there is reason to ask how the production of meaning is distributed, that is, what is to be considered participation, and, what is to be considered reification.

> A computer program, for instance, could be described as an extreme kind of reification, which can be interpreted by a machine incapable of any participation in its meaning.

> A poem, by contrast, is designed to rely on participation, that is, to maximize the work that the ambiguity inherent in its form can do in the negotiation of meaning (Wenger, 1998, p. 64).

Different mixes of participation and reification become "differentially productive of meaning" (ibid.) Wenger argues that this perspective has pedagogical implications as to instruction on complex matters.

> An excessive emphasis on formalism without corresponding levels of participation, or conversely a neglect of explanations and formal structure, can easily result in an experience of meaninglessness (ibid, p. 67).

Educational design is:

> …fundamentally about pondering when to reify and when to rely on participation. It is about balancing the production of reificative material with the design of forms of participation that provide entry into a practice and let the practice itself be its own curriculum (ibid, p. 265).

In addition, Wenger argues that:

> Learning cannot be designed; it can only be designed *for* – that is, facilitated or frustrated. (Wenger, 1998, p 229).

Identity

A learned experience of agency

Wenger (1998; 2004) defines identity as a learned experience of agency. Identity is transformed in negotiations of meaning as individuals participate in social communities, where learning produces experiences of agency. It is not a new direction Wenger speaks of (i.e., to abandon the social in favor of the individual), it is a focus on identity formation as individuals participate in communities of practice.

> Once we move from a focus on cognition to a focus on identity, we have to include within the theory the full range of resources available to learners for negotiating meaning and producing an experience of agency (Wenger, 2004, p. 13).

An analysis emanating from this perspective should not be directed to focus either the individual or the social. Instead, focus should be maintained as to how these constitute each other:

> The concept of identity serves as a pivot between the social and the individual, so that each can be talked about in terms of the other (Wenger, 1998, p. 145).

Identity formation is a lifelong process, where learning goes beyond mere socialization.

> It is an investment of a community in its own future, not as a reproduction of the past through cultural transmission, but as the formation of new identities that can take its history of learning forward (Wenger, 1998, p. 263-4).

Identity is not a personal trait, a role, or a label, but an experience including both participation and reification. Identity is not an object, but a becoming, constantly subjected to renegotiations. We define ourselves, and who we are by the ways we experience ourselves by participation, as well as by the way we, and others, reify us. In this respect, identity is formed both from the inside and the outside (ibid). Out of such a perspective, identity is characterized by something one identifies oneself *as* (reification), at the same time being a participative process where one identifies *with* something or someone. The identifying process is about meaning being identified in the identification process.

People often think of identity as discursive, since we talk about ourselves and others talk about us. But, the words we use do not mirror the full experience of living, being engaged in practices. Identity is a layer of events including both participation and reification. Our identity is construed by joining the two through negotiations of meaning (ibid).

Negotiability

There are two central aspects of identity: identification and negotiability. Being able to negotiate meaning is ground for being able to participate in changing practice. Transformed identities become constitutive of the self and the community (Wenger, 1998). So, learning is a process that changes people, as they are involved in social practices where learning transforms us as individuals, which also brings about changed actions where our practices are being transformed as well.

When a participant in a community reforms his/her identity, it is something that can be experienced as a gain, but also a loss. Participation has a price; it costs, since learning includes changing as a person (compare Fullan/Stiegelbauer, 1991).

106

In the community, our identity is defined as who we are by the known and the unknown (Wenger, 1998); we recognize the familiar, we express ourselves in a certain way, and engage in activities in a certain way. Through these ways, our identity becomes manifest. For non-participants, these ways can be experienced as un-familiar if the person does not know how s/he should behave according to the ways used by the members of the community. Non-participation shapes identity by confrontation with the unknown. The unknown, as well as the already known, form identity.

Identity can also be viewed as a direction for learning. Who we are is defined by talking about where we have been and where we are going. In constantly learning new things, our identity is transformed. Our past and our future melt together when we are in the midst of negotiating the present. A sense of direction gives us the possibility to sort out what is important, and what is not, what contributes to our identity, and what is in the margin (ibid).

Identity is a nexus of membership. We define who we are through the ways in which we combine our memberships in different communities of practice, which becomes our identity. Life is about finding paths so that our different memberships can exist side by side. Working with this conciliation, is an integral part of the concept identity (ibid).

Identity can also be viewed as a relationship between the local and the global. The defining of who we are is done through negotiations around how the local belonging is part of a wider constellation, like discourses (ibid).

Learning in practice is about negotiating an identity. Newcomers must find a place related to their own past, at the same time incorporating it into the history of the community (Lave & Wenger, 1991, Wenger, 1998). It is a way to become part of the community. Therefore, it is not certain that newcomers are more progressive in their appearance than those who have worked there for a long time, since newcomers often have a greater interest in being part of the community, than pursuing changes within the practice. This can make them seek continuity rather than change. When it comes to those that have been working there for a long time, they have invested a lot in practice, but that does not mean that they would not want to change

their practice. They can be very benevolent to 'new blood' being injected in their community of practice by members not being charged by the past. This makes a fruitful encounter between newcomers and old-timers possible. (Wenger, 1998).

Being a participant in a community of practice, shapes identities by negotiability and identification, as stated above. Identification holds people together, but it is a dual process, which also involves negotiability "because it determines the degree to which we have control over the meanings in which we are invested" (Wenger, 1998, p. 188). It involves an ability to negotiate these meanings. In this respect, negotiability "is defined with respect to social configurations and our positions in them (ibid p. 197), by Wenger called economies of meaning.

An economy of meaning implies that different actors have different ownership of meaning, where meaning is created in particular practices (Wenger, 1998). How meaning is created in a technical setting, by technicians, is different from meaning created in a pedagogical setting, by teachers, an example being a software program. The technician designing the program creates meaning within the prevailing situation of his/her practice, e.g., a technical setting. The teacher creates meaning by using it in a pedagogical setting.

The notion of economy emphasizes:

> a social system of relative values
>
> the negotiated character of these relative values
>
> the possibility of accumulating "ownership of meaning"
>
> the constant possibility of such positions being contested
>
> systems of legitimation that to some extent regulate processes of negotiation (Wenger, 1998, p. 199).

The notion economy of meaning suggests that, "some meanings do achieve special status" (ibid). Meanings have different value, where some meanings are more valuable than others in the community of practice. This does not mean that understanding how to do something, like using a software program, is defined on a linear scale. A person's understanding of a matter cannot simply be said to be less

than somebody else's; it depends on the economy of meaning and who owns the meaning. Understanding is a tacit endorsement of the status of one's own meaning within the economy of meaning. It might not be necessary for a person to understand how to use a particular software program in order to create meaning in practice; it might be quite enough to understand that the software program exists, and who to turn to, if help is needed to make the activity meaningful. So, understanding is not defined on a linear scale, but some meanings can achieve special status as being more valued in the community of practice. The link to different ownership of meaning is the broader economy of meaning (ibid).

Ownership of meaning is local. It depends on what meanings matter to us when it comes to being able to negotiate meaning with others. For example; a teacher can have a special interest in ICT, which probably makes her learn things that might not be necessary to learn as a teacher, which some other teacher, with different ownership of meaning, does not learn. The link between their different ownership of meaning is them being part of a broader economy of meaning.

> Ownership of meaning can be shared and it can have degrees. In fact, it does not diminish from being shared. On the contrary, because meanings are socially negotiated, shared ownership can widen participation in their production and thus increase ownership for all participants (Wenger, 1998, p. 200).

Influencing design requires negotiability, where those participating must be given a possibility to be able to negotiate meaning.

> Design creates fields of identification and negotiability that orient the practices and identities of those involved to various forms of participation and non-participation (p. 235).

One consequence of design can be that negotiability is restricted; the individual can be refused to share ownership of meaning. Then again, it can be a possibility to share ownership of meaning with others in a broader economy of meaning.

> For instance, the economy of meaning of a community of practice is primarily based on engagement, the economy of meaning of a cultural heritage involves imagination, and the economy of meaning of an institutional discourse is primarily a matter of alignment (Wenger, 1998, p. 202).

Modes of belonging

To clarify the process of identity formation, Wenger (1998) describes engagement, imagination, and alignment as three modes of belonging. The described modes of belonging can be apparent to a different extent within a community. When one aspect becomes dominating, the character of the community may change in an undesirable way. By combining them in an effective way, and by letting them be impressed by participation as well as reification, the community of practice can be a learning community (Wenger, 1998, p. 187).

One problem with the statement above is if "a learning community" is interpreted as implicating that learning always is for the better for the community. The statement may then be questioned, when viewed in relation to another statement by Wenger (1998):

> Learning is something we can assume – whether we see it or not, whether we like the way it goes or not, whether what we are learning is to repeat the past or to shake it off. Even failing to learn what is expected in a given situation usually involves learning something else instead (p. 8).

In this respect, I am arguing that a community of practice is always a learning community. Change does not have to mean that the community develops in a desirably way according to the participants. Whether the learning that is going on brings on a change in a desirably way or not, can be viewed as a question of combining the modes of belonging in an effective way.

Wenger (ibid.) argues that by combining nearness and distance to the practice, a reflective practice can be created. Nearness is about engagement, to be close to the existing practice. Distance concerns being able to view something from the side. The point of departure is our imagination. When we combine the ability to imagine, with alignment, it enables us to act out of a wide view on the world. We align our activities and understand why; often it is called having a vision. In a learning community, the rhythm of the group has to be found as to optimal combination possibilities of learning concerning engagement, imagination, and alignment (ibid.).

Engagement
Engaging in practice includes the power to negotiate the enterprise, thereby forming a context for creating and experiencing an identity

where we look upon ourselves as competent in doing what it takes in order to do our part to fulfill the joint enterprise of the community of practice. In a community of practice, the ideal stage is that all participants have the same right to participate in negotiating the enterprise. It alternatively shifts between negotiability and identity formation, where aspects of power become visible. (ibid).

Engagement can make competence so local that no other views are allowed to disturb the picture; nothing disturbs the existing order to drive the history of practice forward. In that case, the community of practice will be a constraint for learning, since it will powerfully snare the participants by upholding existing identities (Wenger, 1998; compare Markova, 1996). My addition to the above is that there will be a constraint for *significant* learning. Learning is always ongoing, but non-significant learning may not drive the history of practice forward.

Alignment
The second mode of belong is alignment. Through alignment we become part of something big, where we do what is expected of us to act in a broader context (ibid). One example is when we align ourselves towards the expectations that the employer has, which is an expression of us belonging to a wider social system. Alignment is a condition for the possibility of a socially organized activity. However, there is another side of alignment. It can be a prescriptive process where the possibility to act and negotiate one's own position in the wider context out of the own community, is taken away. Then, it becomes a violation of the individual and might crush identity.

Alignment is about directing and controlling energy. It is also about power; power over ones own energy so that it might be used for an alignment of what needs to be done. It is also about power to inspire others to form, or even demand from others that they form, alignment.

Imagination
The third mode of belonging is imagination. Wenger's use of the concept of imagination emphasizes the creative process in the production of new representations. To work with ones re-presentations is a process where we expand ourselves by exceeding time and space and are able to create new re-presentations about the world and ourselves. It is not an individual process. It is rather a

111

process anchored in social interaction and mutual experiences. Imagination always involves the social world where borders for reality and identity is expanded (Wenger, 1998. The below is a summary of pages 175-178, partly cited).

It is through our imagination that we are able to view our own practice as a continuing history that reaches far back, thereby being able to conceive new possible futures. By inviting the exotic to our vicinity and letting it bring us to foreign countries, imagination can make us view our position with new eyes. By extrapolating ones own experiences, or in other words, stepping outside the well known frames, the individual is able to imagine how work life appears to colleagues within the same work area.

The way we imagine things, has a direct bearing on how we perceive the world. Two stone cutters that are being asked what they are doing, give different answers. One says, "I'm cutting this stone so it gets a perfect form". The other one says, "I'm building a cathedral". Both answers can be said to be correct, but they reflect different ways to relate to the activity. They are doing the same thing, cutting stone, but they learn different things during the activity since their ability to imagine what they are doing differs. Imagination refers to a process where the individual has an ability to go beyond time and space and create new images of the world, and of themselves.

It takes will, freedom, energy, and time, to expose oneself to the exotic, move around, try new identities, and examine new relations. It takes the ability to proceed without being too fast as to that which constrains a special form of account. It is about accepting non-participation as an adventure, and to withdraw from all judgment.

To work with ones imagination requires material to work with. There might be a need for a new terminology. Reifications offer participants to step aside and view the situation in a different way. Reifications are nourishment to our imagination by its form.

The process of working with imagination entails:

recognizing our experience in others, knowing what others are doing, being in someone else's shoes

defining a trajectory that connects what we are doing to an extended identity, seeing ourselves in new ways

locating our engagement in broader systems in time and space, conceiving of the multiple constellations that are contexts for our practices

sharing stories, explanations, descriptions

opening access to distant practices through excursions and fleeting contacts - visiting, talking, observing, meeting

assuming the meaningfulness of foreign artifacts and actions

creating models, reifying patterns, producing representational artifacts

documenting historical developments, events, and transitions; reinterpreting histories and trajectories in new terms; using history to see the present as only one of many possibilities and the future as a number of possibilities

generating scenarios, exploring other ways of doing what we are doing, other possible worlds, and other identities (Wenger, 1998, p. 185)

Lack of imagination can make us detach ourselves and thereby make us ineffective. Imagination can be based on stereotypes, projecting, in a simple way, assumptions about specific practices. The specific character of the community might then be overlooked. The ability to invent something new in our imaginary world, is therefore a delicate act in identity creation since it deals with participation and non-participation, to belong and to stand beside, the factual and the possible, what is possible to achieve and what is unattainable, the meaningful and the meaningless.

Imagination requires that we are able to emancipate ourselves, to step aside and view our engagement through someone else's glasses. It calls for having the ability to examine, take risks, and create improbable connections (ibid).

113

Power

Being engaged in a practice, includes the power to participate in negotiating the enterprise, thereby contributing to the shape of a context in which we can create and experience an identity where we view ourselves as competent, doing our part to fulfill the joint enterprise (ibid).

> A social concept of identity entails a social concept of power and, conversely, a discussion of power must include considerations of community, negotiation of meaning, and identity (Wenger, 1998, p. 190).

Wenger (1998) does not deal with the concept of power in terms of political institutions, or economic systems, but rather as a quality within social communities; it is not primarily about conflict, domination, or competing interests, but about the possibility to act in the world; agency.

> Learning always takes place in the context of *economies of meaning,* where power is defined as the legitimacy of the meanings we arrive at. Note that power in this context is not defined as evil or dominating; it is an intrinsic dimension of a social learning system in which learning creates an experience that may or may not gain legitimacy (Wenger, 2004, p. 10).

For a 15-year old who has learned how to recognize text on the Internet, it is easier to appropriate a message provided by the media, than for a teacher who is not familiar with the context. If a teacher knows what the Internet has to offer, but does not know how to use it, it implies the possibility of loosing power and control over the situation. For those teachers, it might be a situation where teacher power is limited compared to student power, since the teacher has not learned how to produce legitimate text (compare Bernstein, 1996) in the Internet context, therefore does not have agency in that context.

> Defined as a learned experience of agency, the concept of identity requires a theory of power to talk about the ability to act as an agent. Learning changes our ability to be an agent in the world and therefore involves relations of power – including competence and incompetence, participation and non-participation, centrality and marginalization. These struggles for legitimacy depend on relationships of identification, which make us accountable to the competence of certain communities. In other words, being recognized as competent only matters to

114

the extent that one identifies with the communities that can confer legitimacy to learning. If you think that academics are full of it, who cares if they don't find you competent (Wenger, 2004, p. 12-13).

A teacher may not identify herself as a competent ICT user, and is therefore not accountable to the competence needed in the community the student belongs to. This type of situation may give rise to new power constellations between teachers and students. Teachers' traditional obvious power is dislodged when not knowing what the students are doing in the classroom when they are using the Internet. The students might also question given rules, like why they cannot chat on the Internet, or use their media knowledge to produce text not written by themselves, submitting it as a paper of their own, where the teacher has no or little experience of power over the situation, lacking agency in that context.

Power can also be a subtle unification of participation and non-participation. A student attending school may not do it voluntarily (there is compulsory school attendance). It might result in aligning his/her energy towards that, or those, executing power in the classroom. Such a feeling of powerlessness might cause a student to rebel, when the situation is meaningless to the student. If so, there will be a tension between identification and the possibility to negotiate meaning (ibid).

> On the one hand, it is the power to belong, to be a certain person, to claim a place with the legitimacy of membership. On the other hand, it is the vulnerability of belonging to, identifying with, and being part of some communities that contribute to defining who we are and thus have a hold on us (Wenger, 1998, p. 207).

Cultivating communities of practice

Knowledge is not the same as information; it is an integral part of activities and interactions in a community of practice (Wenger et al. 2002). It is social as well as individual, and has a dynamic character. When individuals learn new things, it changes them, thus their community of practice. To cultivate communities of practice is a way to give nourish to that which is significant learning to the development of a community of practice.

115

There are seven principles defined by Wenger et al (2002) to cultivate communities of practice. These are:

1. *Design for evolution.* Rather than designing communities of practice from scratch, design is a matter of shepherding their evolution (ibid). "The primary role of design is to catalyze that evolution" (Wenger et al. 2002, p. 54).

2. *Open a dialogue between inside and outside perspectives.* It often takes an outside perspective to help members see the possibilities (ibid p 54). If those brought into the community from the outside understand the issues of the community, they gain legitimacy and can act effectively as agents of change.

3. *Invite different levels of participation.* "The key to good community participation and a healthy degree of movement between levels is to design community activities that allow participants at all levels to feel like full members" (Wenger et al. 2002, p. 57). People participate in a community for different reasons, and all having the same degree of participation is an unrealistic expectation. There are degrees of community participation where some members constitute the core group. "They often take on community projects, identify topics for the community to address, and move the community along its learning agenda" (ibid. p 56). Another level of participation is to be an active member, which means attending meetings, but they do not have the intensity of the core group. To be on the sideline, watching the interaction of the core group is to be a peripheral member. Good community participation is built upon participants at all levels feeling like full members. "To draw members into more active participation, successful communities build a fire in the center of the community that will draw people to its heat" (ibid. p. 58).

4. *Develop both public and private community spaces.* A public event is open to all community members. The events are richer if individual relationships among members are strong. But such events are not to be primarily focused on. Primary is the one-on-one networking of community members, which is the private space. It creates a conduit for sharing information

116

with a more limited number of people. "Every phone call, e-mail exchange, or problem-solving conversation strengthens the relationships within a community" (ibid. p 59). But there is also a common mistake, relying on a community designed to focus too much on public events (ibid, p58).

5. *Focus on value.* In the beginning, value is often placed in focusing on current problems and needs. Initially, the purpose of a discussion can be to raise awareness. The potential value can emerge over time. "When someone shares an insight, they often do not know how useful it was until the recipient reports how the idea was applied. The impact of applying an idea can take months to be realized. Thus, tracing the impact of a shared idea takes time and attention" (ibid. p 60). People sometimes complain about assessing community value as being difficult, but "…such early discussions greatly help community members as well as potential members and other stakeholders understand the real impact of the community" (ibid pp 60-61).

6. *Combine familiarity and excitement.* Familiarity creates an environment where people feel free to be candid and try out half-baked ideas, and they can suggest ideas that the others listen to, without obligation to take it (ibid, p 61). In addition, "Lively communities combine both familiar and exciting events so community members can develop the relationships they need to be well connected as well as generate the excitement they need to be fully engaged. Routine activities provide the stability for relationship-building connections; exciting events provide a sense of common adventure" (ibid. p 62).

7. *Create a rhythm for the community.* A rhythm in life creates a sense of familiarity. "When the beat is strong and rhythmic, the community has a sense of movement and liveliness". But a too fast rhythm can make people stop participating since it makes them feel overwhelmed. And too slow of a rhythm can make the community feel sluggish. "Finding the rhythm at each stage is key to a community's development" (ibid. p. 63)

It is a challenge to design structures, and letting that which emerges become a catalyst for evolution of communities of practice. Structure of practice is emergent, but design is only one structuring element (Wenger, 1998, p. 233). There is an indirect relation of design to practice, where practice constitutes a response to design. Wenger argues, that:

> There is an inherent uncertainty between design and its realization in practice, since practice is not the result of design but rather a response to it (ibid. p. 233).

METHOD

This part of the dissertation describes methods used in data collection and how the dissertation is composed methodologically. Methodological considerations are dealt with respect to case study, ethnography, and the particular method focus group conversation.

There is also an account of methodological consequences of the theoretical perspective, alongside a description of the attempt to assure quality in the study.

Chapter eight deals particularly with the stages in the analytical process, which is carried out in an abductive way.

THE EMPIRICAL STUDY

Design

This is a case study where the empirical material consists of data from one teacher team working at a school situated in a larger city in Sweden. Data has been collected through observation, focus group conversations, interviews, informal conversations, and documents, mainly during two and a half months in the year of 2000, from March through May, and one day in September. In 2001, the team was visited twice, once each semester.

Description of the teacher team

In order to find a suitable team for the study, regional coordinators for ITiS were contacted. The following criteria was presented:

Six to ten teachers. This is a suitable size in order to attain data needed in a focus group (Morgan, 1997), one of the methods used to collect data. The size of the group should not be too small, in order for different perspectives to be brought forth. Neither should it be too large, since it might inhibit some members to talk.

Teachers that already worked on a team, and who were expected to continue to be on the team after their ITiS participation. There is a stipulation within ITiS stating that teachers that apply for participation should be an existing team. A team put together just for the sole purpose of participating in ITiS, would be difficult to follow after their ITiS participation was completed.

A team having applied for participation but not yet entered the program as to meeting with their facilitator. Learning is always ongoing (Wenger, 1998), but it was assumed that a learning situation involving a facilitator would add extra dimensions to teacher's learning during these meetings, which became a reason for participating at their facilitation meetings from the beginning.

Due to the possibility of being overwhelmed with data, and not being able to analyze data in depth, a decision was made that the study would consist of one team only. From visiting a team in March 2000, a

decision was made that this team was to constitute the case to study since they fulfilled all three criteria. Their school is situated centrally in a larger town. The team consists of ten teachers, but one of them did not participate in ITiS, since she was going to resign shortly after the team had entered the ITiS program. One of the other teachers was on a leave of absence during the spring, when their participation in ITiS mainly was to be completed. Therefore, she did not participate in the program. This left eight teachers on the team who were going to carry through the ITiS program. Seven are men, and one is a woman. Four of the men are younger than 30 years old. The teachers included on the team described above, which came to make up the case studied in this thesis, represent a number of subjects:

Male	English/French
Female	English/ Spanish
Male	Mathematics/Physical education
Male	Mathematics/Physical education
Male	Mathematics/Natural Science/Technology
Male	Swedish/Social Science
Male	Music
Male	Special Education

When teachers work with their student project within the frame of ITiS, they engage 29 students in grade nine. As far as data collected from students, these are the students referred to. Furthermore, teachers - as a team - work with two grade eight classes. All, except the language teachers, work with younger children on the school as well.

Collection of empirical data
Empirical data was mainly collected during the time when the teachers participated in the ITiS program, which stretched from March 14, 2000, until September 28, 2000. During the summer break, I did not visit them. In September, 2000, I participated in their examination seminar where their final ITiS report was discussed. A follow-up visit was made in February, 2001. An additional follow-up visit was made in October, 2001. There were a total of 13 visits. Ethnographic research, tend to swell with an abundance of data. I

122

have taken Kvale´s (1996) advice, trying to refrain from ending up with the 1,000-Page-Question. The transcribed data material consists of 182 A4 pages (font Palatino 12 pt), which amounts to 2679 entering, where one entering constitutes a consecutive statement of one person. Entering 2251 –2505 is their final ITiS report and entering 2506 –2537 is their student evaluation document. Other documents, such as the school vision, or their preliminary ITiS application, are not included in these 182 pages, but on the side.

The empirical data consists of the following:

Field notes from observations: at seminars and facilitation meetings, during breaks (i.e. the staff coffee room), in a regular classroom, the computer class room. Field notes have been adjusted, and transcribed in exact words to a great extent, when compared to the same situation tape recorded.

Transcripts of the exact wording of taped conversations with teachers (individually and as a team), ITiS facilitators, students, principal, substitute coordinator, other teachers at school.

Conversations between: teachers, teachers and ITiS facilitators, teachers and students, teachers on the team, and other colleagues at school. These conversations have been within the frame of:

- o   teacher team conferences (with or without facilitator)
- o   seminars (together with three other teacher teams and the seminar facilitator)
- o   informal conversations in the coffee room or in the hallways, and in the classrooms
- o   focus group conversation (the teachers)
- o   when students presented their project in the assembly hall
- o   interview (with the principal)
- o   group interview (with students)
- o   classroom

The data from observing when teachers are having formal discussions with each other at conferences were tape-recorded. At the same time, I was writing down on a portable computer what the teachers said as

they talked. This made transcriptions of the tapes easier, since most of what they said ws already written.

Other empirical data includes these documents:

The *application for ITiS participation*, where their project, and participating teachers, are described

The Barrel Team's *final report of their ITiS project*, which also includes a personally written reflection from each one of the teachers

An *evaluation form* answered by the students after the completion of the ITiS project

The *Barrel Team personal webpage* on the Internet (which includes a Webquest for the ITiS project, teacher personal pages, schedules, etc.)

The *School webpage*, 21 links on the main page, additional links on each linked page

The *Central School Vision* for the year of 2005 (written by the principal of the school)

In addition to the above, teachers answered a simple survey form on demographic data from teachers participating on the team, and a short personal description of their experience of earlier computer use (appendix 1).

The strategy used in observations may be labeled as limited interaction from my part (Schatzman/Strauss, 1973). In focus conversation with the team, I was more active, introducing three themes to discuss (appendix 2). The interviews with the principal (appendix 3) and the students (appendix 4) were semi structured, allowing a great deal of openness in their answers.

METHODOLOGICAL CONSIDERATIONS

Case study

Case study can mean different things to different people, and in some sense all research can be talked of as being the study of cases (Hammersley/Gomm, 2000). But "custom has it that not everything is a case" (Stake, 1994). To be considered a case, it has to be a bounded system. A teacher team can make up a case, but teacher competence development can not be considered a case, since it lacks boundedness, or specificity. Hence, case study may be described as a generic term for investigating a phenomenon or a particular group (Sturman, 1999; Bogdan/Knopp-Biklen, 1982). One way of describing a case study is to refer to it in terms of certain dimensions (Hammersley/Gomm, 2000). One dimension is the number of cases investigated; a few, or often, just one case. Another is the amount of detailed information collected.

> So, usually, 'case study' refers to research that investigates a few cases, often just one, in considerable depth (ibid, p. 3).

Cohen and Manion (1989) state that:

> Unlike the experimenter who manipulates variables to determine their causal significance or the surveyor who asks standardized questions of large, representative samples of individuals, the case study researcher typically observes the characteristics of an individual unit - a child, a clique, a class, a school or a community. The purpose of such observation is to probe deeply and to analyze intensively the multifarious phenomena that constitute the life cycle of the unit with a view to establishing generalizations about the wider population to which that unit belongs (p. 124-125).

Bassey (2002) gives a prescriptive definition of educational case study:

> (a) To explore significant features of the case,
>
> (b) To create plausible interpretations of what is found
>
> (c) To test for the trustworthiness of these interpretations,

(d) To construct a worthwhile argument or story,

(e) To relate the argument or story to any relevant research in the literature,

(f) To convey convincingly to an audience this argument or story, and

(g) To provide an audit trail by which other researchers may validate or challenge the findings, or construct alternative arguments.
(Bassey, 2002, p. 109).

To what extent context is accounted for, how detailed the study is, the number of cases dealt with, comparative aspects, whether the study is descriptive or explanatory, evaluative or prescribing, depends on the purpose of the study (Hammersley/Gomm, 2000).

A case may be described in terms of a particular theoretical framework. An important dimension of this particular study, where the theory of Community of Practice (Lave & Wenger, 1991; Wenger, 1991; 1998; et al 2002) is applied in the analysis, is that the presented case constitutes an instance of a certain type. This type of case can be described as a teacher team enrolled in ITiS, with certain local conditions as well as institutional, social and historical conditions.

Case study is sometimes considered a controversial approach, not least as to the generalizability aspect. This remains the weak spot of the approach, since the problem with generalizability is not satisfactorily solved.

> The knowledge contribution by a case study is that those taking part of the results can have the case in mind, while considering other cases (Larson, 1994, p. 180, my transl)

This is a rather broad statement, which can be elaborated on further. I have chosen to account for three ways of viewing generalizability in case studies (the two first ones are in turn subjected to scrutiny by Gomm, et al., 2000, pp. 98-112).

One way of viewing generalizability is that the case study can be useful in providing an account to serve as something for others to make use of where it may facilitate an understanding of their own situation. In this respect, it can be referred to as 'transfer' on the basis

of "fit" (Lincoln & Guba, 2000). As stated earlier, transferability is a delicate concept, since one situation is never identical with another. But, Lincoln and Guba are arguing that,

> ...if Context *A* and Context *B* are "sufficiently" congruent, then working hypotheses from the sending originating context *may* be applicable in the receiving context (2000, p. 40, italics in original).

The notion used by Lincoln and Guba is fittingness; it is up to the user, rather than the researcher, to generalize from the findings.

Donmoyer (2000) argues that language can impact our thinking weather the sending context is congruent with one's own context or not; differences can be as illuminating as similarities. Therefore, the Lincoln and Guba argument seems less than adequate to Donmoyer, who searches for more radical theoretical notions than 'transferability' and 'working hypotheses'. To Donmoyer, it is more a question of meaning-making than formulating hypotheses. Using language to tell a story, can become a vehicle for vicarious experiences, which may be used by the receiver to integrate (or differentiate) knowledge. Even if two situations never are identical, a story about a case can be a source for generalization by changing the way someone thinks and acts, and which questions to pose. Donmoyer states that:

> Case study research might be used to expand and enrich the repertoire of social constructions available to practitioners and others; it may help, in other words, in their forming of questions rather than in the finding of answers (p. 51-52).

Bassey (1999; 2002) has coined the concept fuzzy generalization, which he argues has a potential value in case study research. He draws attention from absolutely true statements, and uses terms like it is possible, or likely, or unlikely that. Fuzzy generalizations make no absolute claim to knowledge,

> ...but hedges its claim with uncertainties. It arises when the empirical finding of a piece of research, such as
>   In this case it has been found that...
> is turned into a qualified general statement like this:
>   In some cases it may be found that... (p. 12).

Fuzzy generalizations state "what may work" rather than "what works" (Bassey, 2002).

127

From the above reasoning, the study before us is a composition which methodologically may be labeled as: A case study, using an ethnographic methodological approach, employing fuzzy generalizability, where it is up to the reader to create meaning around the findings; through fittingness or dissimilarities.

Ethnography

Ethnography is "the art and science of describing a group or culture" (Fetterman, 1998, p.1). A researcher using ethnographic method makes a journey in a complex world. One standpoint in ethnographic studies is that the social world is not to be understood as a simple cause and effect connection, or, from some basic assumption about social action following universal laws (Hammersley & Atkinson, 1995). Ethnography has been used in several studies emanating from a sociocultural perspective (e.g. Wenger, 1991; Lundmark, 2000; Löfstedt, 2001; Bliding, 2004).

There are many different kinds of ethnography[32]. Usually, ethnography is associated with anthropology, but the method is also used in other research disciplines, such as educational research[33] (Qvarsell, 1996; Larsson, 1994; 1998). In accordance with Hammersley and Atkinson (1995), I interpret the ethnographic method in a liberal way. They "see the term as referring primarily to a particular method or set of methods" (p. 1). They do not dwell on defining a distinction between ethnography and other qualitative research methods, but state that the researcher participates in people's lives for an extended period of time, collecting whatever data available; observing, listening, asking questions. Formal interviews may be used, but even

---

[32] Academic, applied, action, and advocate ethnography (Fetterman, 1998); Integrative ethnography (Bassanger and Dodier, 1997); Structural, Symbolic/Interpretative, and Organizational ethnography (Jacobsson, 1991); Inductive ethnography (Alvesson/Sköldberg, 1994); Feminist ethnography (Skeggs, 2001; Bell, 2001; Stacy, 2001, who is critical to the concept but acknowledges a partially feminist ethnography
[33] Some references as to educational research using ethnographic method: Ball, S., 1981; Beach, 1995; Chaib, 1996; Kullberg, 1991; Lundmark, 2000

more important is everyday conversation. Collecting empirical data for an ethnographic study is often extended over more than a year. But, if the researcher is familiar with the context, this claim can often be reduced considerably (Alvesson & Sköldberg, 1994). Since there have been a limited amount of visits to the studied school (thirteen visits), I have chosen to label the research method used as an ethnographic approach, building upon methods used in ethnography.

The ethnographic method is interesting as to my research questions, since on one hand, the human being is viewed as a cultural being, formed in interaction with others. On the other hand, the view on human beings as individuals with resistance and special interests (Ehn, 1996) towards, for instance, changes in school.

Working with the ethnographic method resembles the work of a journalist. But a journalist seeks the exceptional, the extraordinary and that which differs from the ordinary, while an ethnographic researcher seeks to describe peoples' everyday life and routines (Fetterman, 1998).

The ethnographic research process may seem unmethodical, but is far from being so. No ethnographic study can be conducted without a basic theoretical perspective, which helps the researcher to define the problem and how to go about investigation (ibid). The researcher forms a conception of the area of interest, which creates curiosity as to extending knowledge on the subject, and finding out about relevant theories that can be applied to analyze the material. This becomes a guide in the research process.

A researcher's philosophical and theoretical perspective is a guide in the research process. Fetterman (1989) argues that theories that have an ideological base, may blind the researcher rather than guide him/her through the maze of data on the field.

The mutual dependence of theory and empirical data is acknowledged:

> Without assumptions, concepts, and theory, empirical data will not at all appear as meaningful (Alvesson/Sköldberg, 1994, p. 111, my transl.).

However, a word of caution is in place, since theory can infatuate the researcher, especially if theory is based on ideology (Fetterman, 1998). A theoretical perspective is to function as a guide.

Using the ethnographic method, there is no rule stating that only one theory may be used. Theories that may seem useful initially may also be abandoned, which was the case with the theory Social Representations, used in the initial stage as an analytical tool in this thesis.

> When theory is no longer a guide, it is no longer useful; when the data do not fit the theory, it is time to look for a new theory (Fetterman, 1998, p. 7).

But, if empirical data shows something contrary to theory, it may also be viewed as a result, giving an opportunity to develop theory (Eliasson, 1995).

The following is a summary of ethnography as a method:

> People's behaviour is studied in everyday contexts, rather than under conditions created by the researcher, such as in experiments.

> Data is gathered from a range of sources, but observation and/or relatively informal conversations are usually the main ones.

> The approach to data collection is 'unstructured', in the sense that it does not involve following through a detailed plan set up at the beginning, nor are the categories used for interpreting what people say and do entirely pre-given or fixed. This does not mean that the research is unsystematic. However, initially, data is collected in as raw a form, and on as wide a front, as is feasible.

> The focus is usually a small number of cases, perhaps a single setting or group of people, of relatively small scale.

> The analysis of the data involves interpretation of the meanings and functions of human actions and mainly takes the form of verbal description and explanations, with

quantification and statistical analysis playing a subordinate role at most (Hammersley, 1998, p. 2).

Fieldwork

Fieldwork is an essential characteristic of the ethnographic method, and a necessary part of the approach.[34] When the researcher is on the field, she tries not to interfere with everyday practice. However, it is important to participate to a certain degree in order to obtain data (Hammersley / Atkinson, 1995; Patton, 1990; Larsson, 1986). The researcher participates

> ...in peoples daily lives for an extended period of time, watching what happens, listening to what is said, asking questions; in fact collecting whatever data are available to throw light on the issues with which he or she is concerned (Hammersley / Atkinson, 1995, p. 2).

The researcher's ability to be personally engaged and involved, and at the same time keeping necessary distance, besides, being able to collect and handle a large amount of empirical data, is crucial for a successful ethnographic study (Alvesson / Sköldberg, 1994).

Access is about gaining entrance to the field, being able to collect necessary data to complete the research project. It is not just about having permission to physically participate. Even if a researcher has permission to spend time with a teacher team, she may not be permitted to collect necessary data. It may be that the teachers do not want the researcher to partake of sensitive information given at a meeting. One way of securing access is to use "gate-keepers" (Taylor / Bogdan, 1984; Punsch, 1994; Hammersley / Atkinson, 2000). Those are people who have the power to open up for access. Gate-keepers can also obstruct the data collection, by obstructing the researcher from gaining access.

In striving to gain access to schools for the present case, approached principals were never obstructive; I was always welcome to do research at their school. However, sometimes teachers have expressed that they are resistant to me doing research at their school. When I first was accepted as a doctoral student, and was looking for a suitable

---

[34] For an extensive argumentation around the relevance of fieldwork in educational settings, see Punsch, 1994. See also Delamont, 1992, as to method and pitfalls.

team to study, I had a more broad research focus; school development and teacher team development. During this time, I repeatedly experienced difficulties gaining access to the field, where the resistance came from teachers. When I narrowed my research field by concentrating my study around the ITiS program, there was no problem gaining access. I was even granted access to one of the schools that previously had decided that I was not welcome to collect data at their school as long as the research focus was teacher team development. When I approached them three years later, describing my research focus as being interested in ITiS, there was no problem gaining access (this is information from data not used in this dissertation).

Changing the description of my research focus (from teacher team development, to how a teacher team functions as a vehicle for development of competencies in using ICT in educational settings) was not a way of being deceitful to my informants. To "trick" the teachers into thinking that I was studying something different than what I was telling them, was not my intention. Some ethnographers do covert data collection. However, it is highly questionable (Hammersley & Atkinson, 2000). I have tried to be open with the people included in my study. By narrowing my research focus and presenting it as a study of ICT competency development when a teacher team participates in the ITiS program, it turned out to give me very useful data as to teacher team development as well.

Writing

To do research is to tell a story. In ethnography, great emphasize is placed on the researcher's ability to tell her story in a reliable, credible, and interesting way (Hammersly, 1998; Larsson, 1998). There is a heuristic validity criteria referring to the researcher's ability to communicate something to the reader, making the reader view an aspect of something in a new way (Larsson, 1994). But there is no standard format for presenting the story. The most used way is what is called ethnographic realism or naturalism.

> The researcher is often absent from these portrayals, as if he or she were merely a camera (Hammersley, 1998, p. 21).

This is similar to how a novelist, or someone writing a biography, presents their story. The author meticulously reproduces everyday details and includes quotations from the informants.

My ambition has been to write in a comprehensible way, telling a story, not including all the details I would have included in a novel, but enough details to supply a contextual frame for the reader. It has been important to strive for intelligibility. However, there is a certain discourse that mainly belongs to the academic world, where certain concepts may be difficult to appropriate for someone not familiar with the academic discourse. However, sometimes it may be necessary for a researcher to maintain a certain vocabulary and reasoning to secure scientific quality.

On other levels in society than the academy, there might be actors who find this research interesting to take part of. This aspect is important to me, as I view the possibility to carry on a dialogue not only with other academics, but with practitioners as well. Practitioners may judge my research project out of other criteria than those important in the academic world, which I welcome. I hope my story is intelligible for a broad audience, at the same time realizing that it probably is not. I may not have succeeded in my attempt to make it intelligible, but firstly and far most, an academic dissertation is to be judged in an academic setting.

Focus group conversation

A focus group conversation is a methodological procedure where people are brought together to discuss a specific subject, or theme, lead by a moderator (Krueger, 1994; Morgan, 1997; Hylander, 1998; Wibeck, 1998; 2000). It resembles a group interview. It is an "economic" way of collecting data, compared to participant observation, since the conversation is focused around one or several themes. Many views and opinions can be expressed in a short period of time.

The sample is strategic. The conversation is steered and focused, but participants are encouraged to talk freely around the subject. There are no multiple choice answers provided. When a focus group conversation is analyzed, it is done according to principles used in

qualitative methods. Focus group conversations should not be used in order to create conflict, or to try to reach a consensus. Nor should it be used to change attitudes, or to reach a decision (Krueger, 1994).

When a focus group is put together, the ideal number of participants is six to ten (Morgan, 1997). Often, the participants have something in common. In this case, they are all teachers on the same team. Participants who already know each other, can sometimes be a disadvantage since they might be talking about issues that they take for granted (like issues they may have talked about many times before). The researcher may not be aware of the presumptions of the group, which might lead to the researcher not understanding what they are talking about. The advantage, though, is that a conversation flows easier between people that know each other.

The moderator introduces the topic to be discussed. S/he makes sure that the conversation flows, and that it is maintained around the topic. An important aspect of being a moderator is that s/he has to be genuinely interested in what people say, even if s/he has heard it before (Krueger, 1998). At the same time, the participants should not be encouraged to turn to the moderator. The ambition is to make them talk to each other. If the moderator is too interested, a participant might turn to him/her giving an "answer", rather than talking to the others in the group. The moderator can prevent this from happening by writing down notes while they talk, which is one way of showing interest without seeking contact.

The moderator is focused on what is being said, but the absence of discussion can be considered useful data as well (Morgan, 1997). There could be different reasons why certain things are not expressed verbally. To choose not to talk about a certain issue, can reveal power constellations, since power often is expressed through that which is not talked about (Bernstein, 1996). Since people are very precise about what they reveal about themselves, it is of utmost importance to create a confiding atmosphere (Krueger, 1994).

The moderator can be involved to different kind of degrees. A low moderator engagement is especially interesting concerning studies in social science (Morgan, 1997), especially in explorative studies when the researcher is not quite clear as to which questions to pose. Krueger (1994) recommends that the questions are posed so that they follow a

134

pattern starting with opening questions, introductory questions, transition questions, key questions, and ending questions. However, a focus group conversation with a low moderator engagement can consist of as little as one question (Morgan, 1997). The focus group conversation in this study consisted of three themes to talk about (appendix 2).

Methodological consequences

The choice of my research problem is a consequence of the theoretical perspective I am embraced by; the sociocultural perspective. An ethnographic study often puts great emphasis on the surrounding culture. In this study, culture is a part of the studied practice, but above all, actions within the teacher community of practice are focused where cultural aspects are considered, but not the focus of the study. The concept culture is not treated in detail in this thesis, but viewed as "the synthesized totality of artifacts available to a group" (Cole, 1995). Conformity to ethnographic studies is rather in understanding human action through the social meanings that inform the account given.

> The centrality of meaning also has the consequence that people's behavior can only be understood in context (Hammersley and Atkinson, 1989, p. 9).

Hence, it follows that the individual must be studied in context, which is a perspective that views neither the individual nor the group as having primacy in the study, instead, both being constitutive of each other.

Conversations and interviews are methods used. However, the emphasis is not on language as a direct reproduction of thought, but rather, on the function of language in social practice, as stated in earlier chapters. This implies that; it is not interesting to pose the question how individuals appropriate conceptual understanding from the standpoint of concepts having an inherent specific meaning. What is interesting is how the individuals use certain concepts, in a specific situation.

In order to study the teacher team's participation in ITiS it is important to try to understand their situation. I gain insight by

135

observing situations where social interaction between the teachers and others in their surroundings, are found. In order to gain further insight, I have staged interaction among the teachers by subjecting them to a focus group conversation, where I intervene by asking them to talk about specific topics, or themes. I have also studied applicable documents related to the teacher profession and teacher participation in ITiS.

Emanating from the theoretical perspective sketched, there would be nothing preventing me from using quantitative data, or statistic analysis. This depends on the research questions. In this study, the research questions have a character suited for using qualitative methods such as observation and different types of conversational methods.

Quality in qualitative studies

To work with a qualitative study means to mould the character, or, the quality of something (Larsson, 1994, my transl.) Larsson describes what he proposes as qualitative criteria in qualitative studies. These have been an aid for me in order to remain critical to my own study. The criteria are not always to be applied in their entirety (ibid). There is a risk in stating criteria since they may be too steering. However, they might act as a frame to work within. The criteria stated by Larsson are:

Quality in the completeness of the presentation: perspective consciousness, internal logic, ethical value

Quality in the results: richness of significance, structure, theory contribution

Criteria of validity: the discourse criteria, heuristic value, empirical anchoring, consistency, and the pragmatic criteria

Quality in the completeness of the presentation
During my time as a doctoral student, I have come across many different theoretical perspectives, which have made me view things in a different way today, than I used to. We see what we have acquired tools to be able to see.

> Though the layman sees exactly what the physicist sees, he cannot interpret it in the same way because he has not learned so much (Hanson, 1958, p. 16, compare Eliasson, 1995).

From this standpoint, the empirical data is interpreted data long before I write down my final interpretation. When I arrive to the final writing in the interpretation process, my knowledge concerning the empirical data, as well as my knowledge of related theories, have been refined.

Giving an account of the theoretical perspective underlying this dissertation is one way of letting the reader take part of the decisions as to how data has been interpreted. By choice of theoretical perspective, it is shown how the interpretation is characterized by certain ontological en epistemological assumptions. It is part of a researcher's decency to try to act in accordance with a conception of the world and a conception of knowledge by declaring a theoretical standpoint (Eliasson, 1995).

Before I knew about the theory of communities of practice, I had a practical and theoretical knowledge of teacher teams in school. I myself am a teacher (middle school teacher, grades 4-6).[35] I also have education as, and have practiced as a media communicator with a special interest in ICT since the middle of the 1980's. In addition, I have participated in the national evaluation of ITiS, which made me interested in studying teacher teams in this particular setting. All together, I have a fairly extensive understanding of the field I am investigating.

Larsson (1994) says that research has internal logic when there is harmony between the research questions, assumptions around the research and the nature of the studied phenomenon, the collection of empirical data, and the analysis method. When examples are needed to illustrate a theoretical argument, I have tried to use examples from a school context, or, from a general ICT context. This is done in order to create harmony between background, theory and research questions. In the analysis, great importance is given to conversations between the teachers and observations made, based on me being present.

---

[35] Previously, this type of teacher was called mellanstadielärare in Swedish

In an ethnographic study, the researcher often becomes close to the people she has studied, which makes the ethical aspect especially distinct (Larsson, 1994). It is not clearly stated which ethical rules to apply.

> It is the responsibility of the ethnographer to try to act in ways that are ethically acceptable, taking due account of his or her goals, the situation in which the research is being carried out, and the values and interests of the people involved (Hammersly & Atkinson, 2000, p. 285).

One ethical consideration made is to let the informants, places, and the school they work at, be anonymous. At one occasion, I discussed this with the teachers, and they told me that it did not matter to them whether I did so or not. However, I found it more ethical correct to do so, one reason being that one of the teachers did not attend the meeting when we had the discussion.

The ambition has been not to affect the teachers when observing them, which means that I have tried not to interfere in discussions between them, or be a part of it, or be involved when they talk to their students. I have tried to keep a certain distance towards them and their work, but this type of data collection demands a certain degree of closeness to the informants, and it is important to be able to pendulate between closeness and distance (Ehn, 1996; Repstad, 1993). Me not being part of their community of practice is expressed by one of the teachers when we are having a discussion about ethical matters in research. One teacher says that, they are not involved in my work. To them, it is as if the university has sent me to find out about their work, so they say that it does not matter to them. My interpretation of this is that; this is my study, and I am the one who is responsible for the content.

Changes on the team, due to me being present when teachers talk to each other about questions that I bring up, is not my intention. However, this should not be neglected as a possible consequence. It is important to take on a reflexive attitude (Hammersley & Atkinson, 2000) towards the empirical data. Reflexivity is a concept emphasized in ethnography which means that the researcher herself is aware of her being part of, and contributes to, what happens in the group that is being studied. Therefore, one has to critically view the role one has

as a researcher in the research process (Ehn, 1996; Hammersley & Atkinson, 1989; 2000).

There are times when teachers have invited me to participate actively in their conversation and help them find answers to a problem, as if I was one of them. One example is when they asked me about something that they presumed I knew, being; how they should design a student survey. I tried to answer their questions, being part of the discussion, which would have been awkward not to do in that situation. Other examples are times when we have been sitting in the coffee room and my tape recorder has been switched on. They have talked to me freely even when they have been aware that the tape recorder is on. When they have asked me to turn the tape recorder off, I have done so, and I have not used the information then given.

Being included in informal conversations that are characterized by all of us being teachers, has often given me rich, empirical material. Being close to your informants is something natural if a researcher spends an extensive amount of time with the informants. The analysis shows that the teachers to some extent express that my presence has affected them, even though this has not been intentional on my part. One teacher writes about my presence, constantly asking questions, as one among other reasons for her becoming a "computer nerd".

Another ethical consideration is offering the teachers to read what I write. It could be hazardous doing so, since data may be tampered with (Hammersley & Atkinson, 2000). However, it can also be a way of offering the informants the right to have an opinion on issues that might hurt them in one way or another. The teachers have not once asked me to let them read my text. But, when I had written an initial result part called "The Barrel Story", I sent the material to them, asking them to make comments, asking if they were of the opinion that I had described them and their working conditions in a correct way. They commented on one sentence, something I responded to since they expressed that they thought I had misinterpreted the situation. The sentence they offered instead was, after discussions with them, considered a more adequate way of interpreting the situation and gave further support for the analysis that follows around peripheral and marginalized participation.

Quality in the results

In the result part, my aspiration has been to account for a richness of significance by using quotes from the empirical material including the surrounding conversational context. Geertz (1993) uses the notion thick description, illustrated by Geertz as someone blinking with the right eye and how this can mean different things in different situations: someone has got ticks; somebody else is flirting; another person is making a parody of someone flirting, etc. What a blink with the eye means, is dependent on the context and the situation, which has to be described if one is to understand why the person is blinking. Thick descriptions are common in ethnographic studies.

When it comes to structure, my ambition has been to reduce complexity where the norm "the greatest possible simplification" (Larsson, 1994, p. 173) has been a guideline. I have tried to do away with superfluous concepts. But, one has to be careful so the results do not become blurry, since there is a demand to keep the text together where "the details of arguments are clear, specific, and relevant" (Larsson, 1994, p. 174). Therefore, it is important to mark and separate what the main results are from those that are of secondary importance (Hammersley, 1998). In this study, the main results are those directly related to the research questions. The text included to make the main result understandable, is secondary.

The collective building of theory is valuable in all research (Larsson, 1994). Ultimately, research is about producing knowledge. In ethnographic studies it might be about showing how a certain group acts as to cultural rules or material circumstances. In order to develop theory, it is important to be aware of earlier research in the field. In the research process, I have read books within the theoretical perspective as well as studied research done in the field of ICT as a societal phenomenon, and teacher competence development. Mostly, I have concentrated on research done within an educational framework.

Criteria of validity

In an ethnographic study, intimate knowledge of everyday practice in the culture under investigation, forms a foundation for validity claims. I have appropriated such knowledge through my many visits at the studied school, but how do I know that my work meets the

demands of the research community? What is it that makes it valid as research?

Kvale (1996), as well as Hammersley (1998), say that the question of validity includes the philosophical question of what truth is. In accordance with Hammersley (1998, p. 66) I argue that, what I bring forth in the study can be judged in terms of plausibility or probable truth. This view is not totally relativistic. Berger and Luckman (1967) describe this view by arguing that there is a subjective reality in human constructions, but there is also an objective reality, which we cannot do away with.

Peirce (1990) points to what is problematic concerning claims of truth. He says that truth is contingent (compare Rorty, 1989), it is dependent on how we, in a particular time and age, view truth from research where it is the most frequently used hypotheses that define what is true (described by Bertilsson and Christiansen, 1990). Concerning the eternal question of truth, I argue: what is true in a societal community is dependent on more than one person considering it being true. An individual may have a definition of truth that he/she does not share with anyone in society. If it is not shared, it has very little value. Hammersly (1998) is arguing that someone has to judge the truth claim as plausible. When we judge, we use language. Using language has consequences, since language is constitutive. Language is action, and something happens when language is used. An individual can maintain a certain view on truth, but it cannot be viewed as truth if all others consider it untrue. However, for that particular individual it may be true, since it may have consequences for that person.

Validity and reliability are central concepts within all research (Pedhazur & Schmelkin, 1991), alongside the concept of generalization. Kvale (1996) calls this "a scientific holy trinity" (p. 229). Generalization has been dealt with earlier in this chapter. Validity concerns whether one has examined what was intended, and reliability concerns the accuracy of those examinations.

When it comes to qualitative studies, Hammersley (1998) says that the traditional view on the concepts validity and reliability cannot sufficiently provide us with a conceptual basis for judging ethnographic studies. In this study, I am the instrument. This means that, it is not possible for anybody else to do exactly the same study as

141

I have done; it is impossible to check if the instrument is reliable as to accuracy by carrying through several identical examinations. A teacher team only participates one time in ITiS, and even if a team for some reason should participate twice, it would not be the same thing studying them the second time, as the first. It would be a different situation.

However, it is possible to refer to how reliable I have been related to accuracy when transcribing my data, or, how meticulous I've been when reading it. Have I grown familiar with my empirical material, so that I sort out data used for further analysis out of a consciousness of why? Have I transcribed all the tapes? How meticulously have I transcribed them? In what way, have I triangulated my data?

The following is an example of how minute I have been. During the time when I was collecting data, and as my empirical material grew, I read it over and over again, transcribing large parts word for word, comparing field notes with tapes. Over time, I gained knowledge of what the data contained during the phase of collecting it. Those parts not transcribed were taped conversations where I, when I listened to the tape, decided that certain conversations were not relevant for the study. An example would be when a teacher talks to a student concerning football practice outside school, or the lesson when the students were presenting their ITiS project orally. I taped the lesson, but at the same time I made field notes on my laptop. Since I was not interested in the content of their presentations, my field notes were sufficient for my purpose, and I did not transcribe the tapes.

A study can be validated by triangulation, which means that there is more than one source to support the description made (Kvale, 1996; Hammersley, 1998). There are variants of triangulation where one is to let the informants judge how plausible the interpretation is, so called respondent validation. This was done as to the initial text in the result part, which was presented to the team. Larsson and Hammersley both point to this being problematic as there can be a number of reasons why a person being studied interprets something differently than the researcher. But, in my study, I reserve myself the right, as a researcher, to be the one who takes precedence over the final interpretation.

Another form of triangulation is to compare data from one context with data in another. I do not strive for triangulation, since one situation never is the same as another, maybe making the argument of comparing data through triangulation of questionable value. But I have a rich material, and have sometimes had the possibility to reflect on data from one situation with data from another. One example is the participants' familiarity with computer use. I have formed my opinion on their ability, observing them by being present when they use the computers, but I have also asked them to fill out a form where they are asked to write down their previous experience of using computers. Furthermore, they talk about their own competence, but they also talk about each other's competence. In this respect, data can be described as triangulated. However, this is not predominant in the analysis, and as stated earlier, of less value in this type of study, emanating from a perspective where experiences are situated.

Validity should not just be applied during a certain stage in the research process, such as when the result part is written. Validity claims should be paid attention to throughout the research process (Kvale, 1996). It is about being well acquainted with the validity of theoretical assumptions and how these can be applied to the research questions. In addition, it is about the fitness of the design, a consciousness about how reliable the informants are, and problems around transcription. It is also about whether the chosen analytical strategy allows the researcher to produce valid results, and to be able to judge relevant grounds for validation. Furthermore, it is about the report being a valid account of the main results of the study (p. 237).

Hammersley (1998) suggests two concepts as to validity claims: plausibility and credibility. Plausibility concerns how we arrive to what is plausible with respect to what is considered as earlier established knowledge. As to credibility, it concerns how credible, or trustworthy, the researcher is as to the phenomenon studied and the circumstances around the research process.

The difference between everyday knowledge and knowledge attained from research is that the researcher is a specialist when it comes to examining different phenomena.

> What is special is to be found in the discovery of something possible to systematize (Larsson, 1994 p. 179).

143

Besides, the researcher is part of a greater context, the academic context, pursuing certain norms. Hammersley (1998) mentions three of those norms:

> All findings are subjected to communal assessment of their validity in which there is an effort to resolve disagreements by seeking common ground and trying to work back to a resolution of the dispute by relying only on what is accepted as valid by all disputants. This rules out the dismissal for arguments on the basis of the personal and social characteristics of the person advancing them.

> Researchers are willing to change their views if such arguments from common ground suggest those views are false; and they assume (and behave as if) fellow researchers have the same attitude.

> The research community is open to participation by anyone able and willing to operate on the basis of the first two rules (Hammersley, 1998, p. 68).

One can never be definitely sure as to the validity in a knowledge claim, but we can make sensible judgments as to the probable validity of such a claim (ibid). The requirement is that, the research community is convinced of such a claim, which by Larsson (1994) is labeled the discourse criteria.

The criteria of consistency, implies that when the whole (the interpretation) and the parts (particular empirical data) are presented, there should be no contradictions. This is especially important within the hermeneutic tradition, but inherent in all types of qualitative analyses (Larsson, 1994). As to consistency, I argue that if inconsistency may be apparent on a semantic level, one has to consider the surrounding context and give context priority over semantic literal meanings, which, as argued earlier, do not exist, according to the outlined theoretical perspective.

The validity in a study may also be judged through its' empirical anchoring. In a quantitative study, this is often referred to as the correspondence criteria. Since this concept is intimately associated with quantitative studies, implying only one possible interpretation, Larsson (1994) chooses to use the concept empirical anchoring. The value lies in what consequences the results will have in practice; the

pragmatic criteria. In some ethnographic studies a view may be put forth including:

> ...the ability to translate results from the analysis of a culture to an ability to act in a competent way in the described culture (ibid. p. 186, my transl).

The ambition in this study is not that the results can be translated as to telling teachers how to act in a competent way. The results are not to be seen as directly translated to practice, or the school culture, since practices are contextually different settings.

> To be of value research findings must have public relevance, but that this must not be interpreted as implying that every research project, and even less every research report, must make direct contribution of knowledge required by some narrowly defined group of practitioners (Hammersley, 1998, p. 75).

ANALYSIS

Choice of analytical tools

The theory Community of Practice (Wenger, 1998) is the main theory used for analyzing and understanding the empirical data, described earlier as a social theory of learning. ITiS is a competency development program where teachers interact with each other on the team, and with others in facilitation meetings. The theory Community of Practice serves as a suitable analytical tool since emphasis in the theory is on learning. Ultimately, learning is about creating meaning as a response to engaging in practice (ibid).

Englund (1996) argues that one of the central objectives of research is to develop knowledge around socialization and communication processes as meaning creating (p. 41). The concept socialization and communication processes refer to pedagogical processes, influential processes, learning processes. Teacher learning processes in this study is viewed as a process inherent in socialization and communication processes. These processes have seldom been analyzed as meaning creating (ibid). Using Wenger's theory as an analytical tool, makes it possible to study teacher's learning processes as inherent in socialization and communication processes when it is studied what teachers say and do regarding what they express as meaningful as well as meaningless, and how it shapes the appropriation of knowledge.

The strategy for analysis has some aspects in common with a hermeneutic study, but the method used is more closely connected to empirical data than traditional hermeneutics, which is a more interpretative approach (Alvesson/Sköldberg, 1994). What is similar is the ambition to use a discernible advance, where certain data is selected in the analysis. This means that, there has not been an ambition to describe everything inherent in the quite extensive empirical material. Data is discerned to show light on what is of particular importance for the studied phenomenon. But this is done after having read the whole material many times. There is also an

ambition to understand the whole from the parts (Baszanger/Dodier, 1997), like in hermeneutics, (Gadamer, 1994, compare Alvesson/Sköldberg, 1994).

There is a switch between parts and the whole and between empirical data and theory, which is a point of departure to analyze data in accordance with an abductive approach (Peirce, 1990; Qvarsell, 1994; Starrin/Svensson, 1994; Alvesson/Sköldberg, 1994). However, hermeneutics often refer to the validity of one singular interpretation. In this study, no such claim is argued. My account is one interpretation where I am opposed to the thought that there could only be one rational and homogenous interpretation of the empirical data in this study. This does not mean, though, that there is no validity in the study. It merely suggests that if the account is plausible and credible as to the research community, and if there is a heuristic value, mission is accomplished.

Abduction

The pragmatist C.S. Peirce (1990), who was active about one hundred years ago, coined the concept abduction. Bertilsson and Christiansen (1990) have written a preface to some of Peirces articles (1990) where they state that the abductive logic is what crowns Peirce's pragmatism.

> The value of abduction lies in abduction making it possible to inform us as to what reality reasonably is about. Reality described in an abductive way is a context, a meaning complex, whose consequences can be cleared out deductively as well as inductively, but where its' genesis in no way can be reduced to one of the two operations (p. 33, my transl.).

Abduction entails pre-understanding and preconceptions. The point of departure is empirical facts, but theoretical understanding serves as a source of inspiration in order to discover patterns that enhance understanding. The procedure is close to the hermeneutic spiral. Qvarsell (1994) has described the abductive process out of Peirce's abductive logic as follows:

> In abduction, the researcher takes a point of departure in ideas of the studied object and uses theoretical concepts to 'zoom in' relevant aspects of the studied field. The researcher does not

test hypotheses, but rather finds data to build suggestive answers in form of hypotheses. But, there is always flexibility between theoretical concepts as an aid in the search, and empirical findings, which often are unexpected findings. It is the unexpected, maybe the deviant, that renders a substance quality (the 'something') that is apprehended in the first stage of experience (Qvarsell, 1994, p. 9, my transl.).

So, abduction suggests that:

...empirical data develops gradually and theory is refined as the research process advances, where both gradually are re-interpreted in the light of the other (Alvesson/Sköldberg, 1994, p. 42, my translation).

Stages in the analytical process

When this study was in its' initial stage, I was permeated and impregnated by two other theories than the theory of Community of Practice. These was the theory on Social Representations (Moscovici, 1984; 1988; 1995a; 1995b; 1997; Chaib/Orfali, 1995) and Basil Bernstein's Code Theory (1996; 1997; Bernstein & Lundgren, 1983). Bernstein's theory was mainly interesting from the theory development during the 1990's, where focus on the theory is somewhat changed from earlier writings. Bernstein here emphasizes discourse and communication, and makes social class a secondary issue, which was predominant in earlier stages of the development of the theory.

Both these theories were abandoned, since neither theory provided me with an analytical tool to understand why teachers appeared to have such a disparate view on learning, which appeared to be a prominent and powerful aspect in the empirical data. Furthermore, the concept of meaning is not treated to any great extent in either of the two above-mentioned theories, even though it is not neglected. It is considered an inherent important aspect in both theories, but not elaborated on to any greater extent.

When I read Wenger's theory, it became clear to me how I could use certain concepts prominent in this theory as sensitizing concepts (Qvarsell, 1994; Patton, 1990; Alvesson /Sköldberg, 1994). Qvarsell talks about "looking glass" or "feeler", to describe how sensitizing

148

concepts make it possible for the researcher to focus the phenomena under investigation. Sensitizing concepts are not definite concepts, but can be explained as something that makes the researcher sensible to new relations, perspectives, and conceptions of the world (p. 11). In that way, sensitizing concepts can open up the process by helping the researcher to focus on the research questions without them being predetermined categories which force themselves on the empirical material.

> Rather than being preordinate categories or operationalized variables, sensitizing concepts proved a basic framework highlighting the importance of certain kinds of events, activities and behaviours (Patton, 1980, p. 137).

Sensitizing concepts used in the analysis are *meaning, learning, identity* and *enterprise*.

In an earlier study on teacher student's ICT use, I had used meaning as a sensitizing concept (Karlsson, 2001; Chaib/Karlsson, 2001), which was used here as well since meaning is what learning is outermost about (Wenger, 1998). Learning became a sensitizing concept by the emphasis in the ITiS program. When I had established meaning and learning as suitable sensitizing concepts, I added identity, where the three constitute the subtitle of Wenger's book Communities of Practice (1998). To start with, this was not intentional - it was rather my interest in the connection between learning and identity after studying Basil Bernstein's theory on Pedagogy, symbolic control and identity, which made me choose identity as a sensitizing concept to begin with.

Another sensitizing concept used is enterprise. Enterprise is a concept that I adopted after having read Wenger's theory.

When the empirical material is analyzed, questions are constantly directed towards the data, emanating from the sensitizing concepts. What do teachers find meaningful/meaningless as to their own learning? How do they mutually define identities? How do teachers define their enterprise? Why is the enterprise considered meaningful to pursue? What are the inherent conditions that facilitate fulfilling the enterprise? These are examples of questions that guide the analysis. The analytical method of proceeding includes a constant fluctuation between parts and the whole.

When well acquainted with the content of the empirical data, having read it many times and transcribed large parts of it word by word, a narrative story was written on the dynamics of the teacher team and their contextual conditions. The data used, derived from answering the question: What needs to be included to write a story about The Barrel team, in order to describe the dynamics of the team as they are participating in a competence development program where learning can be assumed to happen? I posed questions to the data, emanating from the following criteria:

> description of the school (geographical location, premises, organization, economy, pedagogical climate
>
> teachers' account of how they describe ITiS, ICT, the teaching profession, students
>
> teacher's description of what they consider being a teacher means in practice
>
> individual degree of participation in the ITiS program
>
> description of their student ITiS project
>
> a general description of ITiS from written texts
>
> problems arisen and described as a consequence of teacher ITiS participation
>
> teachers' learning processes as to ICT and previous experience of ICT
>
> what is considered meaningful/meaningless for teachers and students in their learning process
>
> teachers' expressed epistemological view

The teachers were asked to comment on the story, and suggest changes if they were of the opinion that I had not described the team in a credible way. I responded by changing one sentence (which was all they asked me to change). Their suggestion "revealed something hidden" (Alvesson/Sköldberg, 1994, p. 131), which enabled me to proceed with the analysis in a new direction. The 'hidden', was about one teacher not giving primacy to the joint enterprise, which made me reflect on how a participant marginalizes himself from a community of practice, and how his own marginalization finally makes the others

of the team marginalize him as well, since he is hurting their community of practice by pursuing his own trajectories.

There is a constant reciprocal action between reading empirical data and reading theory. I constantly keep finding new angles of approach, where certain early findings diminish, as others appear salient over time. Finally, the result part is structured into three chapters. The Barrel Story is not included in the result part as it turned out in an initial stage. In the analytical process, this text was integrated in three different chapters. In chapter nine, there is first an account of the school context, followed by writings focused around the teachers' mutual engagement as a team. Chapter ten concentrates on their joint enterprise, and chapter eleven on their shared repertoire.

In chapter twelve through fifteen, the conclusions are presented and discussed. The discussion starts out describing the team taking a point of departure in indicators characterizing a team as a community of practice. In the following chapters, thirteen and fourteen, the analysis takes a point of departure in indigenous concepts; that is, concepts that are derived from data and which can be viewed as belonging to the team (Qvarsell, 1994; Patton, 1990), rather than predestinated theoretical concepts. Two such concepts have grown out of the analysis: horizontal learning and pedagogical discussions.

Horizontal learning is viewed as opposed to vertical learning, but not in any simple way; it is rather a different type of horizontal learning than "just" learning from each other that is discussed. The concept "pedagogical discussion" is used in a way that refers to discussions among teachers regarding issues that may have consequences for their pedagogical practice concerning instructional design as well as teachers' competency development, in addition to discussions around how to administrate pedagogical practice.

Summary

This is a case study where the empirical material consists of data from one teacher team. The critique towards case studies is the problem with generalizability. The study is a composition which methodo-logically may be labeled as: an educational ethnographic case study, employing fuzzy generalizability (Bassey, 1999; 2002) where it is up to

the reader to create meaning around the findings; through fittingness or dissimilarities (Donmoyer, 2000).

In collecting data, methods within the ethnographic tradition have been used alongside focus group conversation.

There were three criteria for choosing a suitable team. From visiting teams, a decision was made what team was to constitute the case to study. Their school is situated centrally in a larger town. The team consists of eight teachers who were going to carry through the ITiS program. Seven are men, and one is a woman. Data has been collected through observation, focus group conversations, interviews, informal conversations, and documents, during three months in the spring of 2000, from March through May, and once in September. In 2001, the team was visited twice, once each semester. The empirical data consists of 182 A4 pages, in addition to other documents.

Besides collecting data by observations and taking field notes, focus group conversation is a method used. A focus group conversation is a methodological procedure where people are brought together to talk about a specific subject, or theme, led by a moderator (Krueger, 1994; Morgan, 1997; Hylander, 1998; Wibeck, 1998; 2000). Even though a teacher facilitator is not a researcher but a colleague, a focus group conversation can be similar to the type of facilitation recommended in the ITiS program. The researcher makes sure the conversation flows, and is maintained around a topic. The difference between how one goes about having a focus group conversation and facilitation, is that the facilitator often starts out from the questions brought up by the group. A focus group conversation is maintained around a topic introduced by the researcher. Besides, the aim of a focus group is to collect empirical data, which differs from the aim with facilitation.

An ethnographer usually puts great emphasis on the surrounding culture. In this study, culture is not a central concept. The focus is rather on practice as being a cultural phenomena where actions - what teachers say and do - within the teacher team, is the main focus.

Larsson's (1994) criteria for quality in qualitative studies have been a guiding tool in viewing the study and its relevance. The criteria are qualities as to the completeness of the presentation; qualities as to the results; and criteria of validity. The ambition in the study is not that

the results can be translated into telling teachers how to act in a competent way, but the result may shed light on some aspects as fitting or dissimilar to another practice, thereby becoming a point of departure to continue a discussion around communities of practice of teachers, as a basis for further discussions among teachers in schools.

To understand data, the theory of Community of Practice (Wenger, 1991; 1999; Lave & Wenger, 1991) is used in the analysis. The theory emphasizes learning, meaning and identity where learning ultimately is about creating meaning by engaging in practice.

The analysis is abductive (Peirce, 1990; Qvarsell, 1994; Alvesson & Sköldberg, 1994). Abduction implies that theory and data inform each other where both gradually are re-interpreted. Sensitizing concepts such as meaning, learning, identity, and enterprise were used to bring the analysis forward. There was a constant reciprocal action between reading empirical data and reading theory, constantly finding new angles of approach, where certain early findings became less dominant, as others appeared salient over time. Finally, the result were structured and presented as three chapters.

RESULTS

The results are presented as three chapters. The first chapter starts out describing the school and continues showing the team and their mutual engagement as participants in ITiS. The following chapter is concentrated around their joint enterprise and how learning to integrate ICT becomes an added dimension to their enterprise while participating in the ITiS program. The third chapter deals with their shared repertoire, and in what way the integration of ICT is related to the content in their pedagogical discussions.

In the narrative descriptions, there will be no reference made to the source of data. Notations showing which source data is derived from, would, in my opinion, disturb reading the narrative account. Therefore, I have chosen to show the source of data only when there is an indentation in the text, which indicates that it is a direct quotation.

MUTUALLY ENGAGED AS A TEAM

Description of the school

Central School is situated in a fairly large city in Sweden. The school has a century long history. On campus, there are some older buildings from the early times, but newer buildings as well. The main building is almost eighty years old, recently renovated in light colors. Administrations have their offices there, but there are also classrooms in the building, for instance the computer classroom and some classrooms for the younger children.

There are more than 1000 students enrolled at Central School: in grades six to nine, there are twelve classes in spring 2000, consisting of about 350 students. To some extent, there has been a flight from the school concerning teachers. Some teachers at the school talk about it as a problem school, and one teacher says that many teachers at Central School have chosen to look for a job elsewhere.

The school has invested in about 40 modern computers, but there are quite a few older computers as well, without CD-drive. Not all of the old computers are connected to the Internet, but those can be used for certain things, like word processing. Some computers are connected to the Internet by a radio relay station, but some buildings do not have a modem and are not connected. Educational material amounts to around SEK 1200 per student, which includes copying, cultural events, themes, and textbooks.

In cooperation with the municipalities, the school has created a concept for the region offering computer education for all employees working for the community. Three of the teachers and one of the administrators offer courses in ICT use to others outside their school, where they charge SEK 1000/day. These are courses on desktop publishing, Excel, Word, PowerPoint, Internet, Lotus Notes, home page production, MS Access and Hyper studio.

The school faces financial difficulties. The local government has ordered the school to save SEK 4 million in the year of 2001. The

parents react to the cutbacks in finances by calling for all children at the school to go on strike. One day, in spring semester of 2000, they effectuated the strike.

The principal of grades 6-9, Eve, is in France during the spring of year 2000 for three months. One of the other principals is also on a leave of absence. One teacher says that it is unfortunate they are away at the same time. Teachers participating in the ITiS program have a lot of questions they want to pose to the local authorities. They have questions about network cards. They have questions about how to arrange staff hours for the upcoming fall. As difficult as it is having the principal gone, one teacher says it is worse when the cleaning woman is absent.

Unit 6-9 and The Barrel Team

In the unit responsible for teaching grades 6-9 there are 24 teachers (counted on an annual basis), which amounts to 7.2 teachers per100 students. On an average, there are 27.7 students in each class. The unit has two special education teachers employed. The teachers in unit 6-9 are divided into four teacher teams. The team studied in this thesis is called The Barrel Team.

They are physically located in an apartment building on Barrel Street, situated approximately one hundred yards from the main building. These premises have earlier been used as a youth recreation center. Now, the premises have been rearranged into four classrooms. In one of the classrooms there are two computers. In the staff room, a small room with a pantry, there are no computers. It is so small, that when the teachers have conferences, there is not room for all eight of them. At those times, they have to have their meeting in one of the classrooms. There are two other small rooms: one with two computers connected to a local computer network and one teacher workroom with a single computer. Four of the teachers on the team have their workplaces there.

The teachers say they enjoy working at The Barrel, even though one of them points to the building really being in need of restoration; the premises are not suited for academic work, he says. One teacher says that he would love to have the ceiling lifted and the walls torn down.

He jokes with the others, saying that it would be nice to make it into a convertible school! However, considering the financial status of the school, they are quite sure that nothing will be done to fix the school up in the near future. It does not matter that much, they say, since teachers on the team really take satisfaction in working there. The premises are small, but the staff is dedicated and the students are really nice to work with, one teacher says.

The teachers on The Barrel Team mainly teach the upper grades, but some of them teach younger students as well. When they teach at the building on Barrel Street, there are two grade eight classes, and one grade nine class with 29 students. In spring and fall of year 2000, teachers and students participate in the ITiS program. The grade 9 students are the ones involved in the ITiS student project.

There are eight teachers on The Barrel Team, and three of them can be considered fairly competent using ICT. John and Tom have extended competencies when it comes to using ICT, mainly appropriated in a different context than school. Both of them have used computers for many years outside of school. Tom knows PhotoShop and how to import sound, and John has extended competence as to technical matters, besides knowing several software programs as well. The others often come to John when they have problems with the computers. He has been offered to be a support person at Central school but rejected the offer, since it will take too much time from his teaching, he says. But in the fall of 2000 he accepts a position working as an ICT pedagogue at the schools nearby.

John is very interested in everything that has to do with ICT. He says that he has an drive to learn everything that is in his computer. When it comes to integrating ICT in teaching practice, he says.

> - To know a lot of computer software programs is not interesting per se, I want to take part of Karen's ideas so that I can get ideas for my own subjects.
> *Excerpt 1, #1524: focus group conversation*

John pursues their participation in ITiS along with Aron. Aron is the one that spends most time facilitating students when they are working with the project in the computer classroom. He is a social science teacher, and views ICT as a great tool to be used in his

subjects. He says that he is not good at handling technical problems, but the others view him as a competent ICT user.

Tom knows applications such as PhotoShop and how to integrate sound, and contributes by helping students to integrate sound in PowerPoint presentations. Furthermore, he has volunteered to be a facilitator for his colleagues in teaching them how to import sound, and how to use particular software programs that he knows. He is a music teacher, and uses the computer every lesson.

The other five teachers do not speak of themselves as being competent ICT users. Richard is the team administrator as well as an experienced teacher using the Learner Autonomy Assessment Method. He wants to develop his knowledge and learn home page production, which he considers of use in language subjects. He does not know how to produce a home page in practice, but has full confidence in his competent colleagues helping him to get over the hurdles, he says. He also foresees a possibility to enhance the use of technological communicative functions in the future.

Karen also has long teaching experience, but is not considered an experienced ICT user when they enter the ITiS program. She recounts how her competence has developed, writing the following in the final ITiS report:

> Those constant discussions around the Webquest, reading interesting articles and having discussions around the content, plus, having Mia from the University in Jönköping doing research and spending a lot of time with us; this has transformed me from being a regular schoolmarm to becoming a complete computer nerd! It has really triggered me, and my computer use has increased radically. I even used the computer in my grade eight English lessons. I have discovered that it's actually usable for something!
> *Excerpt 2, #2444: the Barrel Team ITiS final report*

Patrick is highly engaged in all discussions, and says that he takes all possibilities to learn more. He says that it is important to make ICT part of everyday practice. He strives to find ways to enhance his competencies by participating in the student project, and is scheduled to be with Aron and John in the computer classroom when the students work on their ITiS project.

Leonard is a special education teacher. He mostly works in his own classroom, with a few students at a time. He has many computers in the classroom, but most of them are old computers that he has picked up when nobody else wanted them. He cannot use them for much, since most of them do not even have a CD-drive.

Mike has been working at school for less than a year, and does not contribute as much as the others when they discuss with each other at conferences; he mostly observes and listens. He says that he wants to learn more about the ITiS student project on Values, where they use a method called WebQuest where they put links on the Internet for the students. The following year he will be more involved in the project since they are going to repeat the Webquest with another student group. Mike sometimes uses his breaks to visit the computer classroom in order to learn more.

The collective ICT competence on the Barrel Team can be described as fairly good: John has extensive technological knowledge as well as competencies concerning software programs. Aron and Tom describe themselves as quite good at using ICT, even if they do not consider themselves having extensive technological knowledge. The other five teachers have limited experience and have mostly been using the computer for word processing and sending e-mails.

In the year of 2000, The Barrel Team participates in the ITiS program. The principal, Eve, says that the teachers are engaged to an exceptionally high degree, and she did not have to convince them to participate. She asks them how their work is progressing, but other than that, it has been difficult for her to follow the project since she has been on a leave of absence for quite a long time. She emphasizes that she supports them morally, and she participates in the part of ITiS designed for principals. When there was a requirement that principals were to present something using PowerPoint, she had to learn the program. This program was new to her, something that she says she would not have taken the time to learn unless it was required from her as a participant in the program. Eve gets detailed information from John about ITiS. He is well informed since he is a contact person in the region for the ITiS program.

Teachers of the team say that their community is characterized by maintaining an ongoing, open pedagogical discussion. They state

there is a willingness to cooperate, to experiment with new teaching methods, and to explore new ideas. By participating in ITiS, the teachers see a chance to enhance their ICT competence during working hours, where they acknowledge that it will intensify interaction between them, which they express as a positive outcome. They expect to learn how to use ICT, and they also expect to be able to work closely together as a team. Karen writes:

> How fun, working together on the team on a mutual project. Besides, a whole lot of seminars and facilitation in computer use!
> *Excerpt 3, #2442: the Barrel Team ITiS final report*

Dealing with insufficient infrastructure

Teachers at Central School experience some infrastructural problems at the school. The school is constantly adding new computers, but teachers, students, and the principal consider the technical support at school insufficient. There is one teacher working part time (50%) with computer support, and John is teaching 40 minutes less a week than the others, in order to have time to help teachers teaching grades 0-5 with computer support. The principal hopes for one more full-time person in school for computer support. She is highly motivated to add the position, but there is no money. She adds that only a few workplaces resemble school, where the users deliberately sabotage their own equipment. This swallows a lot of the available support time, she says.

Not all teachers have access to the computer classroom, or, access to the cupboard where the digital camera is kept. Only three teachers in the school are entrusted with a key to the cupboard. Furthermore, the special computer room is not that easy to enter. One teacher on school, who is an ITiS-facilitator as well, has faced big obstacles when he was going to have a lesson in the special computer room. His key did not fit the lock. He asked an administrator if he could borrow the key. The person he asked looked at him and wondered if the visitor was noted on his schedule for computer science! The teacher says that it is one thing if you don't trust the students, but not trusting the teachers...

There is another infrastructural problem at The Barrel: they could only connect their stationary computers to the school network (three computers at the beginning of entering the program). Most of the teachers chose a laptop as their ITiS computer, but there was not any money left for network cards. That type of infrastructural problem is described as obstructing teachers' work.

Utilizing the computers to a greater extent than before, make teachers object to where the computers are physically located. Having to walk to a different building and signing up ahead of time to use the computer classroom inhibits them in using the computers in an effective way, they say. This becomes a topic for discussions among them.

Teachers at the Barrel cannot operate in isolation. They are dependent on other practices (Wenger, 1998), and on the organization's will to change the infrastructure, which might entail financial strain on the school. They cannot buy new computers to be used at The Barrel, or move the existing computers, unless the principal, and others working at Central School, agrees to them doing so.

After completing their ITiS project, they discuss how they could arrange for a computer classroom in their own building. In redefining their surroundings, they see a possibility to use the computers in a more effective way. They suggest this change to the principal. She supports them in moving the computers. By moving some of the computers to a classroom at the Barrel, they change their environment, without putting additional financial strain on the school. They act according to the school vision, where the principal has written:

> They know how to use the computers effectively in instructional design for teaching.
> *Excerpt 4, from the document Central School Vision for 2005*

The principal has not asked them to move the computers, but she is expecting them to use computers effectively. By arranging for a computer classroom at the Barrel, they align with the expectations of their employer. They become part of fulfilling the vision written by the principal.

They also express discontent as to there being no video projector, necessary software programs, they do not have needed cords or discs, and technical support is considered insufficient.

On the day of the strike, almost all of the grade nine students are at The Barrel, even though the parents have told them to stay at home. They have come to complete their ITiS project, which they are going to present the next day. There is so much to finish on their Power Point presentations that the students refuse to attend any other classes. When Karen tries to gather them for class in Spanish, they inform her that they are not coming. They are on strike! Actually, they are working to complete their ITiS project.

The teachers at the Barrel have decided that it is a good thing that the children are on strike this day. So many things must be attended to, especially since they are at the end of their ITiS student project. One teacher compares this project to someone putting on inline skates for a trip from California to New York instead of jumping on a flight. Two student projects disappear from the computers. One group loses all the sounds that they have imported. One teacher is missing a cord. It takes a long time to fix; a problem easily solved with the right equipment, Tom says.

Someone needs a disc, but there is not a single disc anywhere at The Barrel. Besides, when they do find one, it is not large enough for the information that is to be copied. One teacher helps them to zip the file. Of those working at The Barrel, only two teachers know how to do this. It is a good thing both are available all day, resolving all the problems that arise. If the students had not been on strike that day, they never would have finished the project in time, they say. Now, most of the problems have been taken care of, but one of the student groups cannot retrieve their Power Point presentation from the computer. They will make their presentation without ICT support.

The integration of ICT creates new situations, where teachers interact with each other in order to solve the problems that arise. When teachers are faced with a situation that makes them reflect on infrastructure, they affect practice. They draw attention as to not having network cards, and the principal promises to solve the problem. They borrow a video projector at the Audio Visual Center, and they borrow a software program from a student. They redefine

their environment, and are able to work more effectively, by moving the computers. The teachers at the Barrel do what needs to be done, regarding what they are able to do, to deal with infrastructural problems on their school.

Inside jokes and knowing laughter

Tom, the music teacher, is often in the main building, working with other students and other teachers than those on his own team. To some extent, it makes him a peripheral participant (Lave/Wenger, 1991). He talks about being a member of The Barrel Team in positive terms:

> - I don't feel marginalized at all. I've got something here that I actually haven't met anywhere before. This work environment is incredible, there is absolutely no prestige. We all respect each other for being the ones we are. We have a lot of fun together.
> *Excerpt 5, #695*

And another time he says:

> - If I'm going to stay at this school, I want to work with this team, definitely. It is really a fantastic team. It is…they get so much done. They are very effective, and we have a good time together.
> *Excerpt 6, #1169*

Having fun together is shown one day as they meet informally in the coffee room. John enters the staff room with a paper in his hand, submitted by a student. The paper is supposed to be about oxygen (Swedish: syre), but is about acid (Swedish: syra). It is an advanced account, and it is obvious to the teachers that this must be a paper downloaded from the Internet, not written by the student himself. Besides, the student has totally misinterpreted the assignment since this paper is on an entirely different subject. The student has written a few comments at the end, further confirming that he has misinterpreted the assignment. John says:

> -If you're going to cheat, you might as well go for it all the way!
> - I agree, cheating with style! Patrick responds.
> *Excerpt 7, #1307-1308: observation*

Cheating in school is not something new, but cheating using ICT is a new issue, and has to be dealt with in a new way. Enhancing the use

of ICT creates new problems for teachers to deal with, such as students downloading information from the Internet, presenting it as their own work.

Teachers at The Barrel say they believe in giving students responsibility to plan their own work and to work self-governed, and the students have had an assignment writing a paper on oxygen for two weeks. The matter is not discussed in any detail when they meet in the coffee room. They continue to make jokes about the rather advanced paper and, John says:

> - And the reason why he chose to write on this subject, was that he is very interested in 'the risks related to it and its history'. And listen to this one, it's quite good I think, I mean, considering this is a paper supposed to be about oxygen, and all that: 'I've learned to be careful using it and that you shouldn't be using it in the environment'."
> The others laugh.
> *Excerpt 8, #1295: observation*

There is a jargon in their communication, and a knowing laughter. They share a story, and make inside jokes about the local lore of how students may go about carrying out an assignment. There is also a rapid flow of information, as they informally meet in the staff room, which enables them to a very quick setup of a problem to be discussed (Wenger, 1998, p. 125).

Complementary contributions

They consider ICT competence on the team as being good, enabling them to help each other to develop their competencies over time. Mike says that participating in ITiS, has made them talk more often about computers.

All teachers on the team are engaged in discussing the student project using a Webquest, where most of them have been engaged in searching for links. But they have not participated in the ITiS program to the same degree. Patrick says:

> - Karen hasn't, or rather, she is the one that has participated the least. But she has figured out other ways to use ICT, in her Spanish class, so she has started to work with ICT in Spanish. So she is in this, doing it her own way, but not that involved in

166

the Webquest other than she has participated in the discussions around what we were going to work with, the overarching theme and things like that.
Excerpt 9, #603

They have different roles, and competencies, where mutual engagement involves complementary contributions, but also overlapping forms of competencies. There are applications that they are convinced everyone on the team needs to learn. They are discussing using the Portfolio method:

> - But all of us involved in this Portfolio thing in grade six have to be able to handle it then. I mean, knowing how to transfer pictures from the camera to the computer, and all that-- and I don't really know how to do that yet- so then I'd have to learn. And that's good
> Karen says:
> - I don't know how to do that either.
> *Excerpt 10, #1659-1660: focus group conversation*

A few minutes later, Richard says:

> - Like your individual competence development need; if you've got certain goals you want to reach, like using the Portfolio method in grade six and Webquest in grade nine, and so on, then you know what to...
> - Like starting out from that, John interrupts.
> - Right. But then we have to sit down and learn those things, so that we'll be able to do it, Richard concludes.
> John continues, saying:
> - We would need to know how to scan, we need this and that. Then you write it down on a list, or something
> - Yeah, like a checklist, Karen adds.
> Tom gets involved in the conversation:
> - Being together, sitting down at that time, if you've got that, helping each other
> - Making certain that everyone knows, and learns how to do it in practice, Karen says.
> *Excerpt 11, #1688-1695: focus group conversation*

Tom suggests that they should sit down next to each other, so that they can help each other. Earlier, he has given other suggestions of what that they could do in order to develop ICT use on their team. One such suggestion is that they could make a study visit, and learn from the school where he is taking night classes, IHM[36]. Schedules and

---

[36] Institutet för Högre Marknadsföring – Institute for Higher Marketing

other information for students are put on a webpage, and Tom says that it is very professionally done, and that he would find it very rewarding if they could start using something like that.

When they talk about what is possible to do with the aid of ICT, they find it meaningful to learn how to go about it in practice. They recognize possibilities over time, and are motivated to learn more.

> - I'm at the point now that I understand what possibilities there are. In some way it makes me realize that I know even less today, since I know how much there is to learn. But on the other hand, it has triggered me to learn more, so now when I have a real computer at home…
> *Excerpt 12, #664, informal conversation in the classroom*

At a facilitation meeting, they talk about the problems they are experiencing concerning the student presentation the following Friday. Tom has asked the facilitator to help them solve some technical matters, which he does not, and there are other problems, like not everyone knowing how to import sound. Aron says:

> - We don't all have to know it by Friday; it's good enough if somebody helps this student to fix this. We just need to keep things going. We can tick what we need to know, it becomes evident now, and we need specific knowledge. It becomes apparent what needs we have.
> *Excerpt 13, #341: facilitation meeting*

Individual competence becomes part of the collective competence on the team. They help each other to do what needs to be done. They establish who-knows-what in defining each other's competencies. John knows a lot about ICT, but recognizes the competencies that Karen has as a teacher with long experience in the field. Richard is quite confident that his colleagues will help him make a personal webpage, and Patrick, Leonard and Karen express that they practice on their computer at home, after seeking advice from John on particular applications. The teachers also make use of the ICT competencies of Tim, a colleague in the main building, and arrange internal courses with him as their teacher. So, they develop mutual relationships based on how they define each other and each other's competencies, and how each can contribute to develop competence on the team.

168

Participation as enabling

The special education teacher, Leonard, is one of the teachers who are in the periphery of the community of practice at The Barrel. He wants to work closer to the team, but other teachers on school maintain keeping him in a peripheral position by requesting that he works with a few students at a time in a special room. I ask him:

> - So you haven't been working on the team that much, Have you been working more alone earlier?
> - Yes, completely alone, actually. It has come to be that way. Some time ago, I was pretty much working in the classrooms, but now there is a request for helping those that need to work in peace and quiet, so I help them in Swedish and Mathematics. And I also have a group in English, two guys in grade eight. But one gets to be isolated. And it is difficult to have continuous coordination of activities. They often forget me, and that makes me lose some of the contact with the class, and stuff. But it has been relatively OK. It is difficult with coordination, it is, and it takes time.
> - So you want to work more with the team?
> - Yes, I think that is a lot more fun, it really is.
> *Excerpt 14, #751-754. Informal conversation*

The special education teacher's peripheral position, to a great extent maintained by other teachers at school (by requesting him to work with a few students at a time in a separate classroom) is before participation in ITiS a problematic position for him. His position inhibits him from drawing closer to the core of the team, his non-participation being "so ingrained in the practice that it may seem impossible to conceive of a different trajectory within the same community" (Wenger, 1998, p. 167). It prevents him from becoming a full member. Therefore, before ITiS participation, non-participation is the dominating aspect, which defines his restricted form of participation.

Teachers' having to participate as a team in ITiS, is a design that works in favor of Leonard, who has been working at Central school for 15 years.

> - So I asked John: Can I participate then? And he said "of course". And then, after our meeting, he went to the principal and asked her. So it was thanks to him that I became a participant. It was so great!
> *Excerpt 15, #744. Informal conversation*

John and Leonard have a shared history outside of the community at The Barrel, working with younger children at the school as well, in a different unit. John invites Leonard to discuss an issue out of a mutual experience (from a different context) in a focus group conversation, where they are asked to talk about how to develop methods that facilitate independent study.

> - How do they take it (responsibility)? I've been in a project on students taking responsibility and you have too, Leonard, at the Clarity school.
> - Yes.
> - But how... one can wonder in what way they take more responsibility working like that.
> *Excerpt 16, #1318-1320. Focus group conversation*

Leonard does not immediately pick up on the question, but a few minutes later, he says:

> - It has to be defined, what to achieve, and how to do it, conditions and things like that, otherwise they won't be able to play the game.

> But Tom does not view it the same way:

> - I think we are getting snowed-in on law now. I mean, defining this, defining that. What I say is that it was a damn good project we had! Distinct, there is the goal. But defining this and that...
> *Excerpt 17, #1348-1349. Focus group conversation*

John is inviting Leonard to share mutual experience they have from a different setting. He is viewed as a member and is not forgotten. The others recognize his contributions, and involve him in the practical work with the student project. He becomes one of them. As he participates in ITiS together with his peers, the participation aspect becomes the dominating aspect and defines his non-participation "as an enabling factor of participation" (ibid, p. 165).

His identity changes - he is no longer a "loner". He is part of a team, and he also contributes by being recognized by the others as the one on the team reading a lot of the recommended literature. His position on The Barrel Team changes, as well as it changes their team. Earlier, Leonard was responsible for teaching a few students, working alone with them in a separate room. Now, he is engaging in creating

mathematical problems to be used in class in the student project on Values by all students.

As a learned experience of agency, his identity has changed, and he is more content with his new role. His knowledge beyond taking care of students with special needs is recognized and legitimized. This changes his ability to act, and he is able to act on an extended arena. He is recognized as competent, and identifies with the community of practice at The Barrel who confer legitimacy to him as being part of their team, on a trajectory to further develop his competence within the frame of ITiS. Leonard appreciates all of this, since he did not think he was going to be asked to join the program at all, earlier having a sense of being marginalized.

Seminars and facilitation meetings

When teachers on the Barrel Team are offered an opportunity to participate in ITiS, several of them are under the impression that they are to be taught how to use ICT during facilitation meetings. However, learning how to use the artifact is toned down in ITiS, even though ITiS strongly indicates a focus concentrated on ICT.

ITiS does not state exactly how teachers are to pursue learning or what they are expected to learn, but the program focuses "pedagogically-oriented in-service training for teachers in teams" (Delegation for ICT in Schools, 1999). Teachers are to learn in everyday practice, but the program only offers basic courses to teachers who have no previous experience of ICT. The program is not designed in a way where teachers are offered courses to develop extended ICT knowledge. So, teachers cannot use the assigned 35 hours within the ITiS program to enhance their learning on how to use the artifact, which the facilitator points out.

> -Those things that you mentioned Tom, is not really something that's inherent in the ITiS project, but the part of regular competence development for teacher in-service training. So if there is something you need to know as to the basics, like handling the computer, connection and things like that, that is on the side of seminars and facilitation meetings.
> *Excerpt 18, #334, facilitation meeting.*

171

Teachers at The Barrel say that they have not been given necessary support for their competency development either from the facilitator, or at the seminars. When the team members are engaged in facilitation meetings at the Barrel, Oscar is the facilitator, a teacher who does not work at their school. Kate facilitates the seminars. Oscar and Kate present different versions of how the meetings are to be structured. Oscar says that they are to discuss literature at seminars, and Kate says that literature is to be discussed during facilitation meetings. Thus, Kate discusses literature with the three other teams during facilitation time. She is their facilitator as well as the moderator of the seminars, and does not want to discuss literature at the seminars. Kate says one thing, and Oscar says something contradictory to that. Neither leader assumes responsibility for discussions on the three overall ITiS themes or the recommended literature discussions. Oscar blames it on different training philosophies at different universities.

Kate emphasizes that during the seminars, they will discuss issues such as ethics and values. They can also discuss learning styles. She also stresses that it is important that everyone has a good time. When they meet, they will share experiences from everyday practice with each other, she says. The seminars that The Barrel Team are participating in, are designed in a way that on four occasions out of seven[37], a particular team presented there ITiS student project, leaving little time for discussion with the others. In the facilitation meetings, teachers at The Barrel talk to each other, but they say that they only had one interesting pedagogical discussion, which lasted for 20 minutes, during facilitation meetings.

Experiences at the seminars and facilitation meetings have made all of them critical of the ITiS structure. The critique teachers have toward meeting with the facilitator, and other teacher teams at seminars, is meetings not being meaningful to them and their practice, they say. They are of the opinion that the meetings do not enhance their learning in any significant way; the meetings are not fulfilling their expectations.

---

[37] The first meeting was mainly used for individual presentations of teachers on the four teams, another time they visited the MultiMedia bureau, a third time was an examination occasion.

Everyone on the team at The Barrel agrees that the first seminar was extremely disorganized: talking to someone they did not know, and then doing an oral presentation on the other person, which meant them spending almost all available time for personal presentations. It reminded John of the teacher-training program back in his university days.

All the teachers are largely disgusted with the seminars. Why drive a long distance to listen to a teacher team present the Storyline method when their own colleague Dan is already an expert on the Storyline method? they ask. Even more disappointing, the teachers making the presentation had just started working with the Storyline method, and were hardly using computers to do it.

Time during the seminars is distributed in favor of the presenting team occupying the available time space, providing little or no space for others to interact. John says:

> - The way it's been on ITiS until now, I guess that's part of the reason for having those seminars, but it doesn't work. We are way too many and I don't think it's taken to a theoretical level either, so that you can appropriate it. It may work for that small class that is just like that. But mostly, you just draw so many conclusions on your own. There is no follow-up discussion between us where it is tied together, which means that we're just out there doing this study visit that takes several hours.
> *Excerpt 19, #1479: focus group conversation*

Other critique expressed towards the ITiS seminars concerns the constellation of the group, where two of the three other teams teach younger children. Teachers on The Barrel Team teach students of upper grades. Aron says:

> - Basically, I think it's a good idea visiting another school to look at their projects, and all that. But on the other hand, I think it's stupid bringing together teachers teaching lower grades with teachers teaching upper grades.
> *Excerpt 20, #222: facilitation meeting*

John tries to persuade his colleagues of the worth in participating in the seminars. He gives an example of how he talked to some lower grade teachers at the seminar, and how they described how they had used the digital camera:

- They know a lot more than us when it comes to using it. How many of us know how to do that?
Excerpt 21, #142, observation of informal conversation

Even though John defends the ITiS design in front of his peers, and has accepted teamwork as an overarching idea, he sometimes expresses quite a contrary view when talking informally to me:

- I'm a little hesitant to team work, I want more, I would rather work more together with the peers that teach the same subjects as I do.
- Many science teachers say that, I respond.
-Yes, but planning your work, it's a lot of loneliness involved in being a team member and working with your own subject. One is caught trying to find things, how are we going to cooperate around these students, but the content in your instructional design, those things are left to you as an individual. That's why I think it is so nice when I'm with teachers teaching the same subjects as I do, when you plan (inaudible)…There are so many taboos, in some way. Now, it is so very trendy with teamwork, it is almost foul language to say that you don't want to work on a team.
Excerpt 22, #1258 – 1260, informal conversation

Teachers identified themselves *as* teachers teaching upper grades, but not *with* teams teaching lower grades, which created a distance between the teams at the seminars. When there is no identification with the others, there is little negotiability. Not identifying with the others, and not having a sense of negotiability at the seminars, becme a situation coined by non-agency for the teachers when participating in seminars.

Their facilitator tries to make them understand how sharing experiences between teams can be fruitful.

-…what Mike said here about the Portfolio method. That is something that definitely could be useful for upper grades. So, the methods as such, and how to go about teaching, are things that can apply no matter which grade you teach. For example, there is nothing saying that a Webquest wouldn't be interesting for pre-school or lower grades in the future. So sharing experiences across the borders constituted by student age is something that I personally think actually is a pretty good idea.
Excerpt 23, #262: facilitation meeting

Teachers who do not find participating in the seminars as something worth spending time on, make John and Oscar try to persuade them of the worth by pointing to reificative aspects.

If they had been given the opportunity to spend the time as they wish, they would have used it for discussions among themselves as a team, using each other as facilitators for learning how to extend knowledge around ICT use in their educational settings, they say. Next year they might be able to do so, they say, since they do not have to spend time attending facilitation meetings, John says:

> - Because next year we're not going to have a lot of facilitation and stuff like that, then there will be a lot more time than now. We really have to use that, so we don't go back to having a lot of…
> - Un-necessary meetings, Richard adds.
> *Excerpt 24, #1618-1619*

So, ITiS facilitation and seminars are viewed as hindering them to learn what they consider necessary to learn.

In spite of their lamenting, seminars are occasionally described as interesting. At one seminar, another teacher team is telling them about the Portfolio method and how they had used it. The teachers at the Barrel express how they got new strategies for future work. When the teachers talk about what they have seen and heard, they use their imagination and visualize how it might come to be at their school. Richard says:

> - No, but we could be like two or three teachers working with one class, using Portfolio
> John likes the idea, and responds:
> - That could be pretty fun, it could be like grade 7, grade 8 and grade 9, and then you could...
> - Test it, Karen interrupts. We can start when we're just having one class and see if we could handle it
> - Yeah, test it, Patrick agrees.
> - Because then we can have more Webquest in grade 9, and then we'll have...
> - Portfolio in another grade, John adds.
> - Yes, that way we would test some different methods, says Richard.
> - We'd be some awesome teachers! We would do all kinds of cool stuff. John laughs at the idea.
> - Then we get to learn some things as well, Patrick says.
> - And maybe we add a little Storyline method, Richard adds.

175

- Mix it with a little bit of teaching as well, John responds.
Everybody is giggling and laughing. John says:
- All that are to be involved in this Portfolio thing in grade six, have to be able to do it, transferring digital pictures to the computer and stuff like that, and I don't quite know how to do that yet, so I have to learn that, and that's good.
- I don't know how to do that either, Karen says. John continues:
- One thing that I think would be a lot of fun as well, as to the Webquest: if you imagine a mix of the Webquest and the Storyline method, that you are an imaginative person, and you've got a problem to solve, but in this same framework. You know the beginning and the end, and, being a creative person where something is to happen along the way. It almost sounds like a comedy: "And then, all the lights went out!" They all laugh.
Excerpt 25, #1647-1661: focus group conversation

When they come across something that they did not know before (the Portfolio method, presented by a lower grade teacher team), and which they acknowledge as a possible useful method in their own practice, they use their imagination in discussing a possible future design of instruction. They include their own history of using Webquest, and explore a possible future, integrating Portfolio and Storyline. An intertwining of participation and reification does it. They use what they have come to learn in discussions of how the methods can be used in their own context (participation). They visualize a possible future where they view themselves in a new light which includes learning new techniques for designing instruction in a new way (reification). They extrapolate their experiences, reach for the somewhat unknown, building on the known, which becomes a mode of belonging to the community of practice. They are engaged in discussions around practice, and foresee a possible change. The discussion concerning pedagogical models drove the conversation ahead, engaging them by imagining a possible way to change their practice.

Several of them also appreciated a presentation at the Multimedia Bureau, when they visited the bureau during one of the seminars. What the bureau can offer teachers was news to most of them. From the presentation, they learned how they can use the service of the bureau in the future. Mike says that he had never heard anything

about some of the things they were told, so he considers it very useful in giving him new ideas.

Richard says:

> - There was a lot that went over my head, but those that are doing things around here and that know how to do it, like John and those, this was very good and all that, so I guess it depends on what background you've got, how useful it was. What I found out was that the MultimediaBureau is something that one should look at a little closer, and learn how to use. It can be useful, that's what I learned.
> *Excerpt 26, #489, informal conversation.*

Teachers are discontent with the seminars, where one reason for discontent is them identifying themselves as teachers teaching upper grades but do not identify themselves with teachers teaching lower grades. Despite this content, they mutually engage in discussions around what they've learned from meeting with other teams. Learning about a new method, or what the Multimedia Bureau has to offer, is a response to being subjected to influences as participants at the seminars.

THEIR JOINT ENTERPRISE

ICT when appropriate and useful

Before entering the ITiS program, the teachers are organized into teams, and for some time they have been working regularly with themes. In their application for participation in ITiS, they describe how their team has competence in teaching most subjects offered to grade nine students. They propose a student project integrating most subjects by employing a method called Webquest, where the theme is "Values". Webquest is a method they have not used earlier, which they want to try out as participants in ITiS.

When they express what they want to accomplish as participants in the program, they write the following about their student project objective:

> The pedagogic aim with the Webquest is to deepen and refine knowledge. When the quest-work is completed, the students are to have analyzed a large amount of information in depth, formulated it in a way so that it becomes meaningful for them, being able to show an understanding of the material by creating something that others can reflect around.
> *Excerpt 27, # 2290. The ITiS final report*

Their plan is to facilitate student Internet searches, primarily by using the links they have put on the Webquest. In addition, the students will use word processing programs, Excel, and Photo Shop. The teachers also want students to explore the digital camera and scanner. In the final student presentation, students will present their project with the aid of PowerPoint. Most of these objectives have been met, primarily through: word processing, Internet searches, and PowerPoint presentations. The digital camera and PhotoShop have not been utilized at all during participating in ITiS, but Richard used a digital camera after the program was completed.

When applying for participation in ITiS, the team stated their task as "maximizing possibilities for learning" which can be viewed as their institutionalized enterprise. Stating that a teacher task is to maximize

possibilities for learning is hardly contested by anybody. On a national level, teachers have a mandate to facilitate student learning, which is joint for the Swedish community of teachers as a whole. But the joint enterprise of a community of practice is never fully determined by an outside mandate. The mandate affects the community where "practice evolves into the community's response to that mandate" (Wenger, 1998. p. 80). So, the enterprise is not once and for all determined; it is constantly negotiated and interpreted by the members of the community, who form a local response to the national commission. When they participate in ITiS, their joint enterprise is re-negotiated to include ICT to a higher degree.

John describes what he considers important regarding integrating ICT in instruction. He says:

> -But then, you have to tie the knot, because at the end you might know quite a few computer applications, different soft ware programs and what-not, you get a... you become an expert, like Tom and PhotoShop, but then you have to tie the know around the pedagogical bag, so it can be used for something. To know a lot of computer software programs is not interesting per se, I want to take part of Karen's ideas so that I can get ideas for my subjects.
> *Excerpt 28, #1524. Focus group conversation*

In his profession, he puts emphasis on ICT in relation to pedagogical issues, not ICT as a general phenomenon, even if he says another time that he is personally interested in learning all he can learn about ICT.

Aron considers his subjects, Swedish and social sciences, suitable for using ICT in instruction, but he only integrates new applications that he considers valuable in his teaching, he says. Webquest is such an application, not used at all on the team before entering the program. He considers it being a good idea to offer students links, since they do not have to spend a lot of time searching on the Internet. But he does not think it is appropriate to offer students links in all subjects, since it takes too much time to design a home page for each subject, he says. Besides, there is a point in teaching students how to search the Internet themselves, he says, since he considers this being valuable knowledge. Since PowerPoint presentations are required from the students when presenting their project on Values, Aron says that he finds it meaningful to learn how to use the program. ICT use per se is not interesting; it is when it is appropriate and useful. When carrying

179

through a large project where ICT is integrated, though, it all has to start in pedagogical discussions, he says.

Richard says that the time spent on learning something new, must be related to the time available for learning what needs to be learnt. If not, it is not useful to spend time learning new ICT applications. Time spent in school is limited, and using ICT is no goal per se. If he had a personal webpage with links, it would be of use to him and his students, but considering the time it takes to learn how to make one, since he does not know how to produce a webpage, he postpones it until he knows he will have enough time to learn. Hence, using ICT in the English subject is considered appropriate and useful but requires time to learn how to use it, and time to actually produce what is needed in order to facilitate student learning. He is not hesitant to use ICT, he considers it an excellent tool, but he evaluates available time and finds it difficult to spend time learning by himself. He acknowledges that he is able to get help from his colleagues, but it requires that they have time together, he says.

Karen shares his view on learning on your own as being difficult. Still, Karen finds ICT appropriate and useful to learn on her free time at home. She acknowledges how ICT use has become more and more of interest in school settings, and says that her students want to use ICT during lessons. What over time makes her become a "computer nerd" are the constant discussions around the Webquest that she has engaged in as a team member, the articles that they are to read as participants in the program, and having me as a researcher on the premises, following their work. She discovers that ICT is actually useful for something. This makes her even use ICT in a class that is not involved in the ITiS project.

Patrick and Mike cannot see the use of ICT in their subjects as being of use (physical education and math), but consider it useful to learn what is needed to learn in order to participate in the Values project where Webquest is employed. If they do not learn, their ability is limited when it comes to helping students, they say. It makes them motivated to learn more, and both engage in the project, Mike even during his breaks. In the future, they are going to be involved to a higher degree working with a Webquest, and therefore it is important to learn more about ICT since the appropriateness of use in the Value

project is not questioned, but rather considered very useful and a successful teaching method by both of them. Mike adds that ICT may be used for student and parent contacts as well.

Leonard has found too few useful programs at the Audio Visual Center, but there is too much play and too little pedagogy, according to him. But learning how to use digital cameras and searching the Internet appears very appealing to him, since that kind of knowledge would make it easier for him to plan his lessons. He needs to learn a lot in order to extend ICT integration in his subjects, but he cannot just learn on his own - it takes too much time, he says. He has to know how ICT works, and that it works in practice, then he is willing to use ICT to a greater extent.

Tom is the one who uses ICT every lesson, since his curriculum is built on a student-made digital music folder. ICT has revolutionized his teaching, he says, and he finds it most appropriate and useful in his subject: music. He says that he will learn PowerPoint as he goes along, when he works with it, so learning new applications is connected to usefulness in his teaching. He also views the use of ICT for student monitoring as appropriate.

ICT use for this teacher team is not a question of use or non-use; it's a requirement for participation in ITiS. They say that they talk more about computers, and they use ICT to a greater extent than before participating in the ITiS program. ICT is an integral artifact in order to fulfill their joint enterprise as negotiated while they participate in ITiS. Learning how to use ICT is not a trajectory out of context. Teachers on the team express that ICT in school is only interesting from the standpoint of appropriateness and usefulness in instruction, but in order to be able to utilize ICT fully, they need to extend their competencies on ICT use. Leonard says:

> - If you take a violin, you have to be able to handle the bow.
> *Excerpt 29, # 1472. Focus group conversation*

From this follows a special way of how tthey relate to the enterprise regarding their need of competency development. When the teachers define their enterprise as "maximizing possibilities for learning", referring to student learning, it is an enterprise which is determined by an outside mandate, appropriated in their local community of

practice at The Barrel. From their descriptions, their joint enterprise as a team can be established as: maximizing possibilities for learning with the aid of ICT when ICT is found useful and appropriate. Learning *how* to integrate ICT in educational settings and *what* to learn is a complex matter where their actions are interconnected by their engagement in the joint enterprise. ICT is considered useful and appropriate to use in instruction in many different ways, but several of the teachers express lack of competence in regards to how. However, when they participate in ITiS, ICT becomes a pivot for teachers' attention as to what they need to learn to carry through the joint enterprise.

Prioritizing the situation over instructional design

The following description shows an example of how the joint enterprise is prioritized, and teacher design made secondary in practice. A girl is printing out a culinary page in social studies class. When asked if she is allowed to do that at this lesson, she says she does not know, but assures that she has to, because she does not have a printer at home.

Aron, who is teaching a "Values" lesson in the computer classroom, pretends he does not see what she is doing. Earlier, Aron has said that his view on students using the computers is about prioritizing how to use the computers for something other than playing games. In general, he views students as great consumers of computers, but not really knowing much about regular software programs. Aron's way of ignoring what the girl is doing is a way to prioritize the joint enterprise at the Barrel. He abandons the rules, and acts in a way that he sees most appropriate for that contribution; he pretends that he does not see what she is doing. His contribution consists of him letting the overall aim of his teaching, which is to maximize possibilities for learning, which for him includes to enhance student learning in regards to learning how to use the computer for something other than playing games. The joint enterprise is prioritized - not the subject matter content or the teacher's design of the lesson.

When Aron chooses not to confront a student who is operating outside the prescribed curriculum, it indicates an instructional design

182

where the development of the student as a whole remains in focus. When Aron chooses not to see, he contributes to student learning and meaning, where the student has chosen herself what to prioritize regarding her schoolwork. Whether the student is working on a culinary project or the "Values" project is irrelevant. It is Aron's perspective on how he characterizes knowledge that frames the situation. This does not mean that Aron is not controlling the situation; it just means that it is a different kind of control. It is a form of invisible control, not necessarily apparent to the student. It is Aron's concept of knowledge that regulates to what extent he chooses a student to do something other than what was designed by him ahead of time. That is to say, the student is not learning what Aron had designed for ahead of time, learning something different instead. Aron facilitates her learning process, allowing the student to actively participate, making her own reifications, aside of the design. The joint enterprise – maximizing possibilities for learning - is in the forefront of his actions. When his design is found to be less meaningful to the student than her own design, he redirects her learning process when not making a fuzz over her doing something different than what he has planned for.

Participation as problematic

Tom can be described as a peripheral member on the team, but he does not feel marginalized by the others (*excerpt 5*). Tom is often engaged in their discussions, and uses ICT every lesson. He says several times that his task is to give students as good instruction as possible. But in a community of practice, engagement is not always something that develops the community (Wenger, 1998). Engagement is a mode of belonging, but it can also isolate a participant.

His engagement, manifested in his activities as a teacher, does not include attending all the seminars and facilitation meetings due to his discontent with how the meetings are designed. He says that he is not interested in

> - …small talk with other teachers, I want to learn something new.
> *Excerpt 30, #140. Informal conversation*

183

Tom chooses to participate on his own terms, not attending all the ITiS meetings. When Tom is asked what he is going to say if the facilitator tells him he has to give up his portable computer, since he has not been attending all the meetings, he says:

> - I would laugh right in their face. I would…I don't know, there are several possible things one can do. In the first place, I think that…that you shouldn't have a project where there are no goals, no distinct goals. I mean, what is it that you are supposed to achieve knowledge-wise… You should be able to show what you know, show what you do, and show that you know how to put it to use. The utilitarian aspect has to be very distinct. I mean…the opposite is going to some place, sitting, listening, but learning nothing. But you still go there, one-two-three-four-five-six-seven-eight-nine-ten times. You learn absolutely nothing. That is a hair-raising example. But then you get, you have fulfilled the formal requirements. But, formal requirements are…I think it's shit if there is no content, 'cause I want there to be a distinct goal. This is what you are supposed to do, and then you can add something, take it to a different level, and make it better for others, and so on.
> *Excerpt 31, #1158. Informal conversation*

In September 2000, The Barrel Team attends their last ITiS seminar, where they will present an obligatory, jointly written final report. The report is a document, which is going to be examined by a meta-facilitator from the university, where teachers on one of the other teams will act as critics. In this respect, their report connects the practice at The Barrel with the rest of the teachers participating in ITiS. The report is also available on the Internet which makes it possible for others than the teachers at the seminar, to take part of it. The report discusses the "Values" project that they have carried out with the students. All eight teachers at The Barrel, including Tom, have participated up until this date. Today, Tom is not coming along, since he has been told that he will not be able to get his diploma, due to him being absent too many times from obligatory facilitation meetings. In addition, he has had to give up his ITiS computer.

The Barrel's final report has an appendix at the end, with personal reflections written by each of the teachers, telling a little about their

experience from participating in the ITiS program. In this part of the report, they express both positive and negative experiences. One of the teachers from another team - appointed as critics of The Barrel report - reads out loud what Tom has written in his personal reflection, and reacts strongly to his writing.

> The visits at the other schools have not given me anything. It has been wasted time, since the projects there have been on a very basic level, and the computer knowledge of the personnel being close to non-existent.
> *Excerpt 32, #2456. The Barrel Team final ITiS report*

The teacher from the other team says that it is unpleasant to read; it overshadows a lot of other comments in their report.

Patrick concurs. He understands quite well why she reacts this way, he says. John emphasizes that those words are Tom's alone. Richard adds that no one else on the team is of the same opinion as Tom. When they do not align with Tom's ideas, and do not defend him in public, Tom ceases to be representative of anything else than his own view, as he isolates himself from the others on the team in pursuing his own enterprise. The report enables coordination between participators from different communities of practice, but Tom's individually written reflection at the end does not create a bridge between different perspectives.

Four months later, after their project is completed, they are asked to give their opinion on what is written about them in an initial analysis (The Barrel Story)[38]. They do not quite agree with what is written as being an accurate account of their team. There are two sentences written that they particularly react upon:

> The team is leaving for home, satisfied with their student project, but not completely satisfied with how the ITiS program has been structured. And definitely not satisfied that Tom has chosen to step aside.
> *Excerpt 33, writings from an initial analysis, later abandoned*

---

[38] The Barrel Story was an initial analysis made of the dynamics on the team, written as a narrative. These writings are not accounted for as it was written initially, but broken down into the three result chapters in a new way.

Aron says that this is Tom's personal choice. It has nothing to do with the others on the team. It is especially the words "definitely not satisfied" that are offensive to him. John comments on this:

> - I was thinking about that part 'definitely not satisfied with Tom choosing to step aside'; what's funny, is, it should have been a lot easier if Tom had said: 'I'm stepping aside because I don't give a shit about this. I'm pulling out.' But that didn't happen. I mean, Tom was in this all the way up to the end; he even wrote his personal reflection, so he was in it all the way 'til the end. But he didn't pass, so he didn't pull out voluntarily, like, 'I don't give a shit anymore.' I think that is kind of bad. It doesn't match the way I thought it would be, more like out of our own needs, and it's a pity it wasn't. But other than that, you choose yourself, and we don't beg anybody to be in it.
> - If anyone chooses to be on the outside, well, then that's OK, Richard comments:
> - Maybe it wasn't that good him not being objective in his...
> - ...in his evaluation, Karen adds.
> - ...in his evaluation. I think it hurt us to some extent, because it upset the others. I think he showed bad manners, Richard concludes.
> *Excerpt 34, #2552-2554: group conversation at follow-up visit*

This is the first time that the team marginalizes Tom. They respect his choice, but at the same time, it is not their responsibility as a team to defend his choice. They are neither satisfied nor dissatisfied. They do not share his opinion, but it is his right to have that opinion, as long as he does not include them. The team does not endorse Tom's vision, because he is not being loyal to the team. He has a different trajectory than the others on the team, which makes their marginalization of him understandable; he hurts them as a team.

Teachers on the team are a heterogeneous group; they do not express the same basic view on teaching and learning. Tom's rationale for his actions is not a problem to the others, as long as his actions are not hurting their team. They often listen to him and adopt his ideas, when there is a link to their joint enterprise; the idea Tom has, getting together once a week to learn ICT from each other, is an idea that sounds great to everyone on the team.

Tom says the laptop has totally changed his teaching. He says it has been revolutionized. He was not prepared to give it up for nothing; it was worth a try to keep it. He says that he is able to show that he has learnt a lot, and that he uses the computer in his teaching. However,

this alone is not enough to let him keep the computer. To be a participant is not only about being connected and engaged; it is about being active. Specific forms of participation, such as attending all the meetings, define being an active participant. Tom created meaning around his participation in ITiS by participating in his own way, which is not an acceptable way to go about your competence development as a participant in the ITiS program. Making him give up his computer enforces this demand.

The laptop is important to him, but, at the same time, it is more important to him to be freed from what he considers meaningless participatory aspects. He directs his engagement towards that which is the most meaningful to him, and he maintains a sense of self that he can live with.

The way ITiS is designed stood in opposition to how Tom had envisioned the program. Tom expresses the meetings as meaningless. So do some of his colleagues, but they do not rebel outside their own community of practice. Rebellion is not the same thing as not being engaged (Wenger, 1998). Actually, it is often a greater sign of engagement than passive adaptation. He knows that the consequence of his rebellion will be that he has to give up the computer, even though he is very engaged in using ICT in instruction.

He is peripheral in the group, and does not use his participation to draw closer to the community (Wenger, 1998). He uses non-participation to pursue a different trajectory than the others, advocating his right to do what is meaningful to him. He has a different rationale for his actions, and does not align his actions with the others. He gives priority to his own view, hurting the community of practice at The Barrel, according to his teammates. Tom is willing to take the consequences, since pursuing his trajectory is more important than the joint enterprise as it has come to unfold when they participate in the program.

Accountability to each other

Teachers are accountable to many different parties, such as: society, the National Board of Education, the political regime in their community, their principal, other teachers at school, students, parents.

They are also accountable to each other, which becomes an issue that is highlighted when they work more closely as a team during participation in the program. The following shows in what way they are accountable to each other, and how accountability to each other brings to the fore new questions to deal with in relations to ICT.

Teachers talk to each other about how they are going to deal with all the different issues that arise when the students are working on their student project on Values, using a Webquest. Each student group is going to present their project in the assembly hall. Karen has questions that she poses to the facilitator: How do I do printouts on my portable computer? How do I connect the portable computer to the Internet at home, where I have broadband? The mail function does not work. How do I download Adobe Reader? And Richard has questions around how to make a personal webpage adding links. Aron says:

> - We don't all have to know it by Friday; it's good enough if somebody helps that student to fix this. We just need to keep things going. We can tick what we need to know, it becomes evident now, we need certain knowledge. It becomes apparent what needs we've got, one can tell our position in this.
> *Excerpt 35, #341: facilitation meeting*

They recognize what knowledge they need in order to develop as individuals who work closely together on a team. They do not have to know everything inherent in the entire communal knowledge domain on an individual level, since they are mutually engaged in the joint enterprise as team members. They are accountable to each other for developing integral knowledge in the knowledge domain, having an all-encompassing theme to complete, but everyone is not accountable for all the different parts in the knowledge domain. As participants in ITiS, teachers are accountable as a team to facilitate student learning as a whole, where there is a recommendation from the ITiS delegation to integrate ICT in as many subjects as possible. They fulfill this expectation by being mutually engaged in fulfilling the enterprise, contributing in different ways, holding each other accountable to develop contributing resources.

Those that have limited knowledge on how to use the artifact are confident that their team members will help them to learn what needs to be learnt.

Mike writes:

> This fall, I hope to learn more about Webquest, webpage production, etc., from some of my colleagues on the team, who are very competent ICT users.
> *Excerpt 36, #2467,The Barrel team final ITiS report*

Learning everything on your own is considered time consuming. Richard says:

> …I can sit for six hours without getting it to work, but if I'd had you here to ask, maybe I could have had it done in like fifteen minutes. *Excerpt 37, #1482. Focus group conversation*

They recognize each other's competence, and are confident that they can help each other, which makes learning more time effective, than learning on your own. Working closely together on a team, holding each other accountable to different aspects of their pedagogical practice, helps develop a mutual regime of accountability as it unfolds in their particular community of practice with a negotiated joint enterprise. But what they are mutually accountable for differs on an individual level as to subjects taught.

The social science teacher says that it is meaningful for him to develop his competence in regards to Internet search, since the skill can be used in his subjects. Part of his contribution to the joint enterprise includes teaching students how to search for information on the Internet. The language teacher, though, discovers that it might be useful for him to develop communicative ICT functions, where he talks about the meaningfulness in using communicative functions in language instruction. There is a difference in ownership of meaning, which shapes their knowledge appropriation. They learn certain parts of the knowledge domain of their community.

In discussions with each other, they recognize what knowledge they need to develop as individuals working closely together on a team, and discuss strategies how to pursue their own learning.

Helping each other does not only apply among the teachers at The Barrel Team, but to the wider community at the school as well. John is in the computer room working with some students on the "Values" project when Lara, a colleague from the main building, comes into the classroom, asking for his help. She has a problem concerning a remote

connection, which she has not been able to solve on her own. John spends about ten minutes helping her. They communicate about the problem. As they go along, John explains to Lara what he is doing. Lara scribbles some notes down. When asked what she is doing, she says that she doesn't really know:

> - Don't ask me, I'm just writing it down and hope that it will work later.
>
> *Excerpt 38, #638. Observation from informal conversation*

Lara simply wants the remote connection on her computer to work. To her, it is meaningful to have the problem solved, so she can use the computer for teaching purposes. She is not interested in how it works, as long as it works, but she tries to understand what John is doing and scribbles some notes down, even though she does not quite know what he is doing.

Fixing the remote connection is meaningful to her in terms of how it enables her to act in a different way. She sees no need to understand how it works, or how it is fixed; she is content knowing that the connection will work. This does not mean that she understands less than John. Her understanding of fixing the remote connection is a matter of her being accountable to students to supply them with adequate instruction in order to maximize learning. The meaning of fixing the connection is a relation to the broader economy of meaning.

John has a special interest in ICT, valuable to all teachers on school. He finds it meaningful to help other teachers at school to fix what they cannot fix themselves. Meaning is inherent in him being accountable, as an ICT pedagogue at school, for helping teachers on other teams as well as his own. He is only designated 40 minutes/week as a computer support man at school, but spends many more hours doing it, he says.

John and Lara have different ownership of meaning as to their joint activity. They socially negotiate meaning around a remote connection by sharing that which is part of a broader economy of meaning and where the link for the two of them is integrating ICT in a pedagogical context to maximize student learning, or, in other words, to pursue their joint enterprise. Lara does not know how to make her remote

connection on the computer work, but she recognizes it as important in order to maximize student learning.

It is not a direct relationship between Lara and the artifact, but rather the relationship of her ownership of meaning to the broader economy of meaning, where meanings compete for the definition of certain actions. The meaning of learning "how to do it" competes with the meaning of "using it" in practice, where the latter is the most meaningful to Lara. To learn how to solve the problem herself is of less value to Lara than to John, where he in addition finds it meaningful to know how to do it. Being able to use the remote connection in everyday practice is of value to them both. Being accountable to each other, they help each other to do what needs to be done to fulfill the joint enterprise.

THEIR SHARED REPERTOIRE

Time

Before their participation in ITiS, all teachers knew the basics of how to use a Word processing program. All of them had also used the e-mail function, and all knew how to access the Internet. Several of them knew how to use software programs other than Word. This can be described as part of their shared ICT repertoire before entering the ITiS program.

When they participate in the program, several of them express that they have learnt that there is so much to learn, and they acknowledge that they can make use of the competencies on the team, in order to help each other learn, if they had the time.

Lack of time is expressed as a constant problem for collaboration, and spending time at seminars is viewed as wasted. Richard says:

> - It's the same as always. We are so used to an extremely high pace when we work, and as soon as we come to one of those lectures, sitting there presenting each other – it just makes me gasp for air! I agree that I think we should concentrate on our project, and I agree that it would be great if we could discuss questions like the one I had [integrating Internet in language instruction]. There is probably an endless range of questions. And getting tips what kind of texts we should be reading. I also think it is important discussing values, like you said, so we could have a discussion about what is good and what is not so good, well, that type of discussion. Besides, I lack a lot of technical knowledge, like knowing how to use different software programs and pedagogical applications of programs. I mean, I can see lists everywhere, but I can't gather all information, it is so dog gone much.
> *Excerpt 39, #255, facilitation meeting*

There are many things that Richard expresses that he would like to spend time doing, making better use of the available time than attending seminars. Their shared repertoire could be extended if they had the time, since there seem to be an endless range of questions to discuss, and literature that they could read.

There is time spent on compulsory activities at their school that they consider that they could do without, like attending meetings where teachers are put together who have a special interest. The principal agrees to free them from attending those meetings, and she decides that they do not have to attend regular conferences while they participate in ITiS.

They also foresee how they might be able to have more time in the future. As they find the ITiS meetings meaningless to attend, they discuss a possibility to use the equivalent amount of time next year (when they are not tied up by ITiS) to mutually engage in continuing to develop their collective competence, making use of each other as facilitators (*see excerpt 24*). There is broad competence represented on the team, and time will probably be available to a greater extent in the future, they say. They appreciate having time together for discussions, and look forward to developing their team in the future, making use of the competence on the team.

The ITiS program does not offer courses in extensive computer use, so teachers arrange for internal courses. Five of the teachers meet at a weekly teacher team conference, to reflect on their own learning and how they can arrange a collective form of enhancing individual competence by sharing experiences with each other, and by making use of their colleague Tim, who is a part-time ICT support person at their school. Richard says.

> - But it wouldn't be impossible to do it that way, if we create that time, if that time is available. We don't know that, but it ought to be there...that there would be a facilitator, I mean, we have such good competence in you [John], and Aron and you know a lot, so, it could work, setting your own goals, working on those goals on a regular basis, if you're around, so to speak, because it's just like what you're referring to when you say, "I'm going to record this", and then it doesn't work. I can sit for six hours without getting it to work, but if I'd had you there to ask, maybe I could have had it done in like fifteen minutes.
> - If we had like one hour together, we could help each other, says Tom.
> - But if an arrangement like that is going to work, you really need to have a number of questions to pose. Sorry, I interrupted you, Tom
> - No, that's OK.
> - It's OK? Well, what I mean is that you have to know what questions to ask, and it isn't easy to have questions when...it's

the same thing as for our students: you can't ask questions when you don't know what questions to ask. I mean, you can't ask: "Isn't there an audio recorder in the computer?" when you don't even know...it's like asking, "Where is the video recorder in the computer?" You might as well be asking that type of question, or like "Where is the video camera, should I push a certain button, or what?" But there isn't a video recorder in the computer. So why should there be an audio recorder?

- That's why it is so good to have a lesson with Tim once in a while, so when you learn something new..."Today we're going to learn this", then you realize, "Yes, that's smart", Patrick adds.

Excerpt 40, #1482-1487: facilitation meeting

Richard states that they have enough competence on the team, where John or Aron could act as facilitators in the future. Patrick also says that it is a good thing that they have had computer classes with Tim. Tim teaches them how to use certain software programs, like PowerPoint, which they consider necessary to handle since their students are using it for their presentations. So Tim holds courses that teachers at the Barrel have asked him to facilitate.

On an in-service occasion, Karen asks Tim about a web address including an underscore sign (_). Karen does not know that this is a sign, so she starts typing the word u-n-d-e-r-s-c-o-r-e, and fails to reach the page. To know that it is a sign is not complicated knowledge, but she does not know what Tim means and which button to push. The task of reaching the web page could easily have failed if she would not have had anyone close by to ask.

To have someone around to ask questions that arise as they are learning how to use ICT is considered more time effective than trying on your own. During the project, they planned to have an in-service every other Thursday. It did not quite work out that way, but they had workshops on three different occasions, learning how to use PowerPoint, and once John showed them how to make a personal webpage.

When teachers are engaged in an in-service, or on-site training, there is always someone around to ask for help. Besides, to a great extent, they have organized and designed the courses themselves by deciding what type of competence they need to develop. This gives them an opportunity to participate on their own terms. To use a particular software program, an example being a need to learn PowerPoint since

the students are using the program, is considered needed when they are mutually engaged in ITiS. Not knowing how to use the software program is a constraint in their teaching, not being able to sufficiently help students. This constraint triggers them to learn and they go about learning with the help of Tim. If they had not come across this constraint, they would not have had any reason to learn the program, according to Patrick.

They appreciate Tim's training, but in those cases where the course is designed in a way where the pace is too high, the learning process is impeded. Leonard tells of how he tried to make a PowerPoint presentation when he came home the evening after the course, but he did not succeed. The pace on the course was too fast for him, he says.

They do not ask for traditional courses in computer use, but rather that courses they are going to participate in are designed by them, where it is considered necessary that someone is around that can scaffold the process; someone that does not belong to their team, or, someone on the team.

Teachers on the team mutually engage in enhancing their learning, not as a result of the design of the ITiS program, but as a response to it by finding time to learn within their own context in courses designed by them.

Challenging facilitation

When teachers have the facilitator present, they mainly bring up questions that are related to the artifact: how to zip a file, how to make printouts at home, how to get e-mail to work with broadband at home, drivers, installations, etc., questions that the team experiences as problems of their particular community of practice, which they need help in solving. The facilitator understands that they are frustrated, but says:

> - I can appreciate what you're saying, but that is not quite my commission.
> *Excerpt 41, #337: facilitation meeting*

Oscar's instructions are that he is to focus on pedagogical issues that arise from everyday practice, and not teaching them how to use the

195

certain software programs, or help them with technical problems. Meetings with him are to resemble a study circle, he says, where the ITiS idea is learning within practice. He wants them to have a point of departure in The Barrel ITiS student project about "Values" when they have discussions during facilitation meetings. This suits the teachers well, they say, but when the facilitator adds that his commission is not to teach them how to use ICT, Tom gets upset, and says:

> - But your commission is to work on the project. We're in the practical phase. Can't we set the theoretical phase aside, since there are so many needs that aren't being fulfilled?
> *Excerpt 42, #338: facilitation meeting*

Aron says that he had hopes that discussions with the facilitator would move from an everyday practical problem to more general problems. According to the teachers, they did not get into such a discussion until their third meeting with the facilitator, when they discussed a problem Richard brought up about teaching English and using the Internet.

Internet use and World Wide Web has become the most used ICT tool in school during the past few years (Becker, 1999). However, integrating Internet use in social science, is expressed by the teachers as being easier, than using it in language subjects. The social science teacher says that he finds support in national curriculum goals to integrate Internet search during lessons. This has brought about discussions concerning how to deal with integrating Internet use in instructional design in language subjects.

For the language teachers, it is not obvious how the Internet can be integrated if teacher aim is to reach national goals. The Internet is viewed by teachers as a useful tool, but difficult to use in language subjects, since students spend too much time searching the Internet. The teachers view this problem as a genuine pedagogic problem in their practice, and they bring it up at the meeting with their facilitator. They discuss the matter for twenty minutes, and then their facilitator, Oscar, says:

> - But maybe, if I may challenge you a bit, maybe language training, or the English subject, is not that well suited for using the Internet world. I mean, if it is language training, or whatever notion there is to discuss about this, maybe there won't be that much of language training, really. When you get

196

down to the nitty-gritty, it might not be the best way to go
about it, using the rigid Internet world.
Excerpt 43, #445: facilitation meeting

Richard says nine months later that he felt cut off by the facilitator.
Aron says that the group spent perhaps twenty minutes discussing
the problem. That is far too little, according to him. Richard views this
type of problem as a huge problem: knowing how to make the
students speak English during the lesson when they usually just
disappear somewhere to a computer, sitting there through the entire
lesson, seeking online information. He says they speak Swedish when
seeking on the Internet, so they do not practice their English, which
Karen confirms. All the time is spent on something not relevant for
learning how to speak English. The teachers need to talk about these
things, according to Richard. They wish that they could have used
those thirty-five ITiS hours for that type of discussion. John talks
about the problems they experienced while participating in the
program, and what was wrong with it:

> - I think that, what was messed up was facilitation and
> seminars, there was no straight line, everything just floated
> around.
> - And I think that there were (inaudible), in ITiS as a project,
> also, I mean not being, or not starting from what we were to do,
> those things that we were to do ourselves, we didn't take a
> point of departure in what we wanted, what we would like to
> bring up. Didn't it feel as if it was laid upon us from above? I
> mean, if you have applied for participation, you have an
> interest in learning things, and you have, or rather different
> teams have different needs of what they need to learn. But it felt
> as if this is something that you have to read, this is ITiS, but
> nobody took charge of the interest that actually was there in
> different teams, and I think that is one of the things that the
> program has fallen short of, not using that.
> *Excerpt 44, #2559-2560, group conversation at follow-up visit*

When questioned if they can tell of another situation where they have
had a discussion with the facilitator around a pedagogic matter,
Richard says:

> - No, I remember getting irritated because he said that maybe
> one shouldn't use the computer, so we didn't discuss it further
> then. I didn't think it was…
> - It was the only sensible discussion we had, I think, where you
> start in a need and a problem, and then discussing how to go

> about it. We really had a discussion going on there, but he basically put a lid on the issue.
> *Excerpt 45, #2562-2563 group conversation at follow-up visit*

When they talk about the discussion described above, Aron says that it was the most interesting discussion they had during facilitation meetings. It was a problem derived from their practice. He even says that this was the *only* sensible discussion they had with the facilitator at the meetings. All teachers on the team, except Tom, are present when he says this, and none reject to the statement. After discussing what they did at other facilitation times, I intervene and ask:

> - Can you remember any pedagogical discussion related to ICT, that you had when Oscar was present.
> After thinking for 13 seconds, I say:
> - So you can't remember any other time?
> Aron answers, saying:
> - No, it was that one time, I'm definitely sure it was the only time; the only time that it got to be a little bit interesting
> - And you just got irritated, didn't you? John asks Richard.
> - Yes, but... so what. I felt cut off. Maybe I shouldn't be using the computers then.
> *Excerpt 46, #2569-2572: group conversation at follow-up visit*

The facilitator emanates from a pedagogical problem in their everyday practice, brought up by them. He does not supply them with fixed answers. But when he challenged them (Nordström, 2000), their experience nine months later is expressed as if Richard was cut off. They appreciated discussing the matter, but became frustrated when the facilitator provided resistance in the conversation.

It is noted that the type of questions they raise themselves when meeting with the facilitator are mainly questions around ICT use, not pedagogical questions. But teaches say they are frustrated about not being engaged in relevant discussions around pedagogical matters. When they do have such discussions, they feel cut off when the facilitator questions the Internet as a tool for language instruction. His commission is to focus pedagogical issues that are meaningful to them. Teachers say this is what they want, and that this was the only time it happened.

Let us go back to when they were engaged in the conversation, and show what teachers said after the facilitator had said that the rigid

Internet world may not be the best way to go about language instruction. Richard says:

> - But at the same time, it is such an enormous source for finding interesting material, which we would never be able to find in traditional educational material.
>
> - Yeah, that's right Oscar comments.
>
> - Yes, but what we need is a database with links, a really good database with links is what we need, Tom says.
>
> - In the English subject, you mean, or in language? Aron questions.
>
> - Yes, each subject in school should have a really good database with links
>
> - I think it's most urgent in language subjects, because I feel that they shouldn't have everything served. I mean, in practice, in life, they're going to have to know how to search for things. The search phase is important to be able to handle.
>
> - That might be in social sciences, but in English, they've got different needs
>
> - But in the language subjects it could be very important to spend time, because…
>
> Richard interrupts Aron:
>
> - Then there are a lot of already made databases with links, the National Board of Education have many, but theirs…one pedagogical problem is that, it is to make the students realize the difference, so to speak. I get so upset every time I start a new theme to work with. I just hear a "swisch", and everybody disappears from my classroom. How am I to know that they speak English if they just disappear like that. I'll be standing in the door opening, with my mouth open – tell me where you are heading at, what are you going to do? It works excellent in social sciences, but it doesn't work in language instruction.
>
> Karen gets involved in the discussion:
>
> - They don't speak English then, they don't. When they are sitting by the computer, they don't speak English. If they are in the classroom, then I can make them speak English. They do it reluctantly, but still…
>
> Aron continues:
>
> - But maybe you shouldn't work like that in English or Spanish class, maybe you should work like you've been doing, giving them already made texts, you downloading texts, making your own database of links, and then you can print…
>
> -…whatever there is to choose from, yes, Richard adds.
>
> Patrick agrees:
>
> - Yes, a limited choice, this is what you've got to choose from

> \- Having your own database of links, taking away the search phase all together, Aron says.
> John says:
> \- That's using ICT in instruction, even if the students don't sit there themselves and…
> \- Yes, exactly, Richard says.
> John adds:
> \- Making it available.
> Aron suggests:
> \- Or, the students can print it out, you don't need to sit before class and print everything, because that can be a huge job.
> *Excerpt 47, #446-463: facilitation meeting*

Looking back on the situation, and comparing it to the lasting impression of being cut off, it is shown that they *did* have a pedagogical discussion on the issue, they *did* arrive to a suggestion of how the Internet can be used in language instruction, and Richard *did* find the suggestion meaningful, shown in him acknowledging the suggestion by responding "exactly". The facilitator was almost not engaging verbally at all in their discussion. They did it all themselves, emanating from his challenging statement.

Instructional design

After having joked about the paper on oxygen (or acid), downloaded by a student, the teachers are having a meeting with their facilitator. When he arrives, he says that this is a good time to have a focus group conversation (he will not participate, he has to be with his wife who is at the maternity ward). Firstly, they are asked to talk to each other about how to develop methods that facilitate independent study.

They compare the "Oxygen" assignment to their ITiS project with the WebQuest. Tom says:

> \- He has not lived up to the responsibility given to him.
> \- No, and he didn't have any clear -cut goals either, like: you should make sure you've got this and that included, John says.
> Patrick intervenes:
> \- No, it's just a theme, just a theme…
> \- Yes. But we did have clearly stated goals on the Webquest, though, or rather, it was like questions that they were supposed to answer and stuff like that, so maybe we, I thought, too, that they took a lot of responsibility, but the question is if it

succeeded because it was a highly framed assignment, John says.
- It sure was, all the way through, from the start and all the way up to how they were to account for their findings, how you were going to grade them and everything, Patrick says. John adds:
- It was independent, but it was far from being loose.
Patrick agrees. Richard has been listening quietly, but now he extends the conversation by saying:
- Just because it's independent study, doesn't mean that they understand, I mean, the best way to learn and all that. Independent studying is one thing; I mean he has actually been studying independently, because he has submitted a paper, but that which he has submitted is something we shouldn't look upon as being something good. But he has actually taken responsibility for the assignment, doing it in a wrong way.
This makes John pose the question:
- But then you've got like: what does it mean to take responsibility for your own learning process? Is that the same thing as taking responsibility for an assignment?
Richard is just humming, so John continues by saying:
- In some respects, taking responsibility for your own learning and taking responsibility for an assignment, aren't quite the same thing
- No, it's not. You're right about that, Richard concludes.
Excerpt 48, #1327-1338: focus group conversation

The previous conversation about the "Oxygen" paper resurfaces, when they are asked to talk about methods that facilitate independent study. The conversation is the continuation of an ongoing process. John states that he has fallen short of his own teaching expectations when he looks back at the incident. He talks about the paper and considers the poor result being an effect of him not giving his students a clear purpose, which can be described as not sufficiently reifying the assignment. But he also expresses a lack of him actively participating in their learning process; he was only present for one lesson in a two-week period. Students were to work independently on the assignment, and he had not provided them with any questions to answer. They were simply given a subject and free access to the Internet.

When they assess the result of different teaching models, they conclude that the design of the ITiS project was much better than when they design instruction in other ways. The amount of students not being able to take responsibility and work self-governed was far

fewer, and fewer failed than when they design instruction in a more unstructured way, leaving more responsibility to the students.

Their discussion shows how the possibility for students to take responsibility is an issue of teachers taking responsibility for structuring the learning process as to instructional design (reification), as well as participating during lessons. Their responsibility is an integral part of students' possibility to take responsibility.

A discussion about cheating by downloading a text from the Internet, was turned into a discussion on instructional design, which made teachers ponder the balance of reification and participation in instructional design.

Developing a shared concept

Although the Oxygen-paper seems to be John's problem, they all engage in discussing it together. Leonard was not present earlier in the coffee room, but now engages in the discussion, adding a new dimension to the problem:

> - What is it that they are to take responsibility for? Design and content, carrying it through and all that? You just can't give them all that responsibility at once; it has to be focused around what their primary responsibility is, and what it is that we are responsible for. There's a certain division of labor, between the goals that we know that they are to reach within the subject, and the assumptions that are pretty clear ahead of time. I mean, time schedule and those things, and then, within that frame, that's where their work is to be fitted in. So, we can't give all that responsibility to them.
> - If we give them a fair frame to work within, then I think they are able to take it all, Patrick says
> Richard has a question:
> - But you always have to move from where they are. How much responsibility can they be given, how conscious are they?
> - And what prerequisites do they have for taking responsibility? Leonard adds.
> *Excerpt 49, #1386-1390: focus group conversation*

Their conversation is an example of how their discussion leads to teachers negotiating meaning around the everyday concept of "responsibility". When they first discussed the paper in the coffee room, they did not discuss the issue in depth, but mostly joked about

202

it. Whether the student has learned anything or not, was a problem easily solved in the coffee room, when Richard said:

> - Just talk to the student, and you'll see if he has learnt.
> *Excerpt 50, #1274. Observation from informal conversation*

They could have chosen to talk about anything within the broad theme given, but they had a current problem, a problem not fully solved in the informal setting earlier that day. Their conclusion is that, the student who cheated has taken responsibility for the assignment and studied independently. He has submitted a paper, even if he has cheated, and even if it was about a different subject. However, he has not taken responsibility for his own learning process regarding approptiating knowledge on acid, which was the intended learning objective.

The concept "responsibility" is not specifically attached to ICT, but an everyday concept used in pedagogical practice in school. Even though there always have been a possibility students cheating, ICT raises new questions, since ICT presents new possibilities. When they have an opportunity to develop their discussion in a conference in the afternoon, they negotiate meaning in a different way than when they were discussing it informally in the coffee room. They distance themselves from the actual paper; the student paper is merely used as a reference to have a conversation on a different level. Learning happens, although the situation is not designed as a learning occasion, but as a focus group conversation around a pedagogical issue, which started as an informal discussion in the staff room.

Issues on conceptual framework

Participation in ITiS requires that the teacher team write a joint final report. The Barrel team chose to state what they express as their theoretical standpoint in their report: the constructivistic view. Teachers on the team write that they do not believe in transmitting knowledge to students. Students are to construct the knowledge themselves by taking responsibility for their own learning processes. All of the teachers on the team have signed the report, implying that they are embraced by a conceptual framework which they label as constructivism.

This attracted the meta facilitator's attention at the examination seminar, where he questions if this view is shared among them. The meta-facilitator says that they have entered a delicate theoretical area. What type of constructivism are they referring to? He talks briefly about different interpretations of the concept, and then says:

> - If you choose to declare this, as you do, then it is interesting to examine your personally written reflections, because, what is expressed there is not a distinct aspect of the constructivistic view. So, then the question arises: is it the opinion of you as a group that is explicated in the report?
> *Excerpt 51, #2174: observation at ITiS examination seminar*

The meta facilitator does not expound his critique much further, and the discussion is left up in the air. He implies that the teachers have not discussed the constructivistic view to form a mutual view on what a constructivistic view on learning means in practice.

Later, they are asked to expound their constructivistic view in an informal conversation with me. Different aspects are brought forward, which shows a disparate view.

On the Webquest project, teachers use methods that encourage students to study independently, in groups of three or four. Patrick explains:

> - I guess you could say that it's independent studying, because they're working on their own stuff, and all that...and they can get in there and look...
> - They don't get everything handed to them; they're searching on their own, Tom adds.
> *Excerpt 52, #1323-1324: focus group conversation*

Aron says that knowledge is relative, which is something that Patrick to some degree contests since he believes that knowledge is objective. Leonard says that:

> -But I was thinking, isn't it that much is collectively construed knowledge which you so to speak take part of by heritage. Then, the collective process of knowledge is driven ahead, then it changes. Researchers make breakthroughs, then there will be a new paradigm, and so on.
> *Excerpt 53, #2677: group conversation, follow-up visit*

He continues saying that eventually, mutual thoughts and ideas are added.

Richard is of the opinion that a constructivistic epistemological view implies that students process the knowledge. Aron thinks that it is about the difference between knowing and understanding; one can know that a king died a certain year, but answering the question why he died, is to have a true understanding of the event. Richard draws a parallel, talking about language education: one can know 100 strong verbs, but that does not mean that you know how to speak the language.

Even if they have a disparate view on constructivism as a theoretical perspective, where the above points to them not having discussed this perspective extensively before writing their final ITiS report, the demand of writing a final report in an academic manner made them formulate a conceptual framework for teaching and learning.

Flexible schedule

When the teachers discussed integrating all subjects represented on the team (being a requirement for participating in ITiS) their discussion developed and turned into a discussion about flexible time for students, they say. In May 2000, they had not found time to discuss which model they were to use. When they are asked in a focus group conversation to talk about "try new ways to create a more flexible organization within the team", they take the opportunity to bring the issue forth. They have a lot to discuss regarding how flexible time for students should be carried through, since they have to find a solution before fall semester starts. Prior to the focus group conversation, they had not sufficiently discussed the matter among themselves in order to reach a decision on how flexible time was going to be carried out in practice.

Patrick is of the opinion that all students should be working on the same assignment during those hours, which John opposes since he thinks they should be able to choose what subjects they want to work with. Karen has another suggestion; they should use three weeks for English, then it should be used for another subject the next period. Patrick says:

> - We have to come to an agreement on these things. I have absolutely not been seeing it that way, but it could turn out to be a hit, says Patrick. Karen responds:
> - That's the way I've thought about it.
> Richard agrees:
> - Me too. Look at this; we're sitting here having totally different pictures in our mind.
> *Excerpt 54, #1441-1443: focus group conversation*

Patrick wants them to solve the matter, and continues the discussion:
> - Either we've got to have 'super control', or, we say that it's up to them to assume responsibility to control it all. By themselves.
> John elaborates on this, saying:
> - Yes, but you have to leave part of the responsibility to the students too, to really be able to do that. I mean, like, if they are to submit a paper in social science and in spite of that always do math work on flexible time, then it's like...they're stupid.
> *Excerpt 55, #1454-1455: focus group conversation*

They come to the end of their discussion, and Patrick says:
> - When they are going to work with this... well...I guess we don't call it periods, like being English for two weeks, math for three weeks. There won't be any tommyrot about that at all, will it?
> - No, if they have something to submit, they'll know what the score is.
> -So, we leave it to the students to decide, totally. Is that what we're going to do?
> *Excerpt 56, #1460-1462: focus group conversation*

There are two main problems that the conversation is based on: how they are going to monitor student attendance and achievements, and how the teachers are going to organize the different subjects. Since flexible time involves most of the teachers on the team, they cannot go about it in different ways, as when they teach their own particular subjects. They present their different views on the matter. They do not agree on how flexible time is going to be executed in practice. Even if they do not agree on how it is going to be done, they agree that it is going to be done. Therefore, they need to reach a decision.

In the discussion, they listen to each other's arguments. They weigh one view against another. The discussion includes tolerance and respect for each other's arguments, and the elements of collective effort of will make them strive for consensus. Consensus is not achieved, but they arrive to a contingent agreement on how they are going to carry out flexible time. Their conversation reflects the

complexity of being engaged in activities where certain objectives must be reached. Their activities cannot be decided by a mandate from the outside or by someone telling them what and how they should go about it. Nor can a single individual in the community of practice decide it. It is a process of negotiation among them. Their discussion shows how they negotiate meaning in striving to fulfill their joint enterprise. It is a collective process. They are a stable group where they have a possibility to renegotiate the matter in the future.

A new language

A shared repertoire at The Barrel includes (among other things) artifacts, tools, and ICT concepts. When discussing the student presentation of the ITiS project, which they are going to have in the school assembly hall, discussions arise as to ICT problems. One discussion is around "zipping a file". This is not part of a teacher's professional language. Aron believes that everyone should know how to zip a file, yet some of his teammates do not even know what it means to zip a file. Patrick and Richard have a private conversation, when their colleagues are discussing zipping files. Patrick says:

> - Listen to that language...I have no idea what they're talking about!
> - Well, to zip a file, it means packing it. I don't really know how it works (laughs), but it's possible to pack a file so it gets much smaller
> - You mean like "squeezing" it?
> - Yeah, you squeeze it so it gets a whole lot smaller, then you send it, and pack it up later
> - You wouldn't happen to know how you do this in practice, would you?
> - No way! Richard laughs out loud.
> *Excerpt 57, #309-314: facilitation meeting*

Even though Richard does not know how to zip a file, he knows that it is possible to do, and shares this knowledge with his colleague. In doing so, their repertoire develops. Participation cannot be disengaged from reifications, such as appropriating certain concepts. In this respect, the language used in conversation between the two teachers is reification as well as participation, enabling interaction with each other and possibilities to develop a shared repertoire.

When discussing the notion "zip a file", the knowledge of the possibilities becomes a learned experience for Mike, and an extension of the shared repertoire, when Mike learns what zipping a file is about. Neither teacher engaged in the discussion is able to zip a file in practice, but they are both competent teachers who can judge valid knowledge in the knowledge domain. One of them has experience of what it means to zip a file. When the other teacher adopts the explanation given, their shared repertoire develops.

Learning a new language is made possible "through an interplay of production and adoption of meaning" (ibid. p. 202). As participants in a conversation where the language is obscure and unfamiliar, they are participating in a situation where it is possible to learn a new language. Production and adoption characterize the interplay. The language already exists, so it is not mere production. And it is not mere adoption, because Richard and Aron are involved in a practice where some members already use the language, (as well as know how to do it in practice).

This does not mean that the two teachers described above discussing how to zip a file are able to change practice, but their discussion becomes a starting point since they learn what is possible to do, and know whom to turn to in order to learn how to do it. Neither one of them are marginalized from not knowing how to go about zipping a file in practice. Instead, by being engaged in a discussion around the issue, they contribute to the collective production of meaning. As they extend their repertoire, it transforms them and what they may be able to do. Learning and extending their shared repertoire increases the ability to negotiate meaning in practice in a productive way.

A new image of practice and self

At the Barrel, teachers are connected to global networks, and are able to use ICT as tools for searching information. Communicative applications are available as well, but the teachers do not use such possibilities to any great extent. Several have opened, read, and sent e-mail at home, but not all have used these functions in teaching. The teachers have not used a discussion platform like a chat room, either. Even if ITiS is not a program primarily focused on learning how to

208

use ICT, but rather on "pedagogically-oriented in-service training for teachers in teams" (Delegation for ICT in Schools, 1999), teachers enhanced their competence in regards to ICT use. Karen even considers herself a "computer nerd" nowadays. Karen says:

> - I've gotten my first e-mail from students, book reviews. I've had three late in submitting. I thought it was pretty fun this weekend, 'cause they were to submit them like on Friday, and some of them weren't ready. "It's on the computer at home", so I asked: "Have you got e-mail at home? Yes. Well, just send it then", I said, and they did. One didn't succeed, she was going to attach a document and it wasn't there, but I got two, so I'm into that too, now. It's so much fun!
> *Excerpt 58, #705: informal conversation*

Learning changes her identity, a complex interweaving where her experience as a participant in ITiS (as someone who is not considered particularly good at handling ICT), and her reificative projection as a "computer nerd" is inherent. Her identity is being formed as an experience of negotiating her self in participation as well as reifying herself and being reified by others. Patrick recognizes her change of identity and says that; even if she only is involved in the ITiS student project to a very limited extent, she has come up with other ways of integrating ICT by starting to use ICT in her Spanish classes *(see excerpt 9)*. His relationship to Karen constitutes who she is by stating what he knows about her contribution to the knowledge domain, thereby reifying her as a participant by paying attention to certain aspects useful to their team.

Her identity is a negotiated experience involving participation and reification. It is identity formation as an inside experience, as well as being formed from the outside. It is a learned experience of agency, which renders Karen power that enables her to participate in practice in a new way.

Richard´s identity formation is also shown in what he expresses concerning ICT use in instruction. He regards himself poor as to teaching intercultural matters, but foresees new possibilities using ICT.

> - You use the Internet, in some way, like discussion groups or chat or something, and then people from other countries can tell what it's like in their country. That way, you find out what's alike and what's different. I'd like to try that.

In September 2000, he writes the following in the final ITiS report:

> Communication with the aid of e-mail and chat is something than can show to be of great importance in the future as to language instruction.
> *Excerpt 60, #2434: the Barrel Team ITiS final report*

E-mail and chat changes the activity of communicating (reification) but it can also change the way one goes about communicating (participation). He knew about the possibilities before, but exploring what is possible, reflecting in interaction with others, and, orientating himself towards a different future affords him power to negotiate the direction of practice. As he explores future possibilities, his identity changes.

The teachers create a new image of their practice and of themselves. It is shown in them letting students use a new way of submitting papers, and in viewing e-mail and chat as useful in language instruction. Imagining a different way of doing things is a matter of identity transformation as a learned experience of agency, since it changes their ability to act as agents (Wenger, 1998). This becomes constitutive of the self as well as of their community of practice.

Monitoring student attendance

An issue envisioned in the school visionary plan by the head master, is:

> ...time schedules, attendance, grades, are being administered by teachers using ICT tools.
> *Excerpt 61: the principal's writing on Vision for Central School for 2005*

When the subject comes up, Richard says that he likes the idea of monitoring attendance with a computer program. But he changes his mind, because he does not quite see how his daily practice will improve, since it is going to be time consuming to learn how to use the program. There are always more important matters pressing for attention, so he suggests using a paper file instead. Patrick has another suggestion:

- Or, they should have a time clock when they get here! Wham! Show your card before you start...(laughter)
-The best thing would be, I mean when we've got these laptops, you just pick up that page where you've got that class listed, and then click, click, click, attendance, and everything. Then you just pull it to some central database, everything will be neatly stored. Nice, really nice, that's the way it ought to be, Tom says.
- I suggested a paper file, because it's easier to bring if you're going to, or if it's in the classroom...then you just pick it up in the afternoon. That way, you don't have to make a detour via the database. I think a paper file is better.
- Boring, but…Patrick says
- I think it's much cooler with one of those databases.

Excerpt 62, #1414-1419: focus group conversation

The teachers envision ICT as a useful tool, but they have experienced problems with insufficient ICT support when they are to learn a new application. For those not convinced; as long as they are not sure of the benefits in the long run, they are not willing to spend time learning how to do it. So, in the fall of 2000, they remain with the old system

Gradually, they align their activities to the vision written by the principal. A year later, teachers start using the software program for monitoring attendance. Richard, who was hesitant before, says that it has not been a problem at all starting using the program. So, over time, even those hesitant to using ICT for monitoring students, regard it as appropriate.

CONCLUSIONS AND DISCUSSION

There are three main conclusions discussed in this part of the dissertation, consisting of chapters twelve – fifteen. The first conclusion is that the teachers constitute a community of practice on all accounts. This has a multifaceted content, which will be further elaborated below.

The second conclusion is that teachers' view on learning is not a stable view; learning is expressed differently in different situations. Their seemingly paradoxical view on learning can be described as defined by the level of participation and reification in negotiations of meaning.

The third conclusion is that ICT catalyzes pedagogical discussions. When ICT is integrated to a higher degree than before in practice, teachers say that they talk more about computers than before, both in relation to what the computer can be used for, but also in relation to questions that arise as a consequence of integrating computers to a greater extent. Their discussions are often turned into a discussion on something that can be characterized as pedagogical discussions, where ICT is a catalyst, but often not the primary issue discussed.

Chapter fifteen is the last chapter in this dissertation, where the conclusions are summarized and further discussed in regards to the complimentary aim in this study. This chapter also includes personal reflections concerning the design of the study; methods and theories used.

HOW THE TEAM IS CONSTITUTED AS A COMMUNITY OF PRACTICE

Indicators that a community of practice has formed

Not all teacher teams can be viewed as a community of practice; there are indicators that a community of practice has formed (Wenger, 1998). The indicators are intertwined along three related dimensions of practice that the community "owns", which constitute it as a community of practice: mutual engagement, a joint enterprise and a shared repertoire[39]. These dimensions cannot be separated from each other in practice; they are "interdependent and interlocked into a tight system" (ibid p. 96).

It is argued that, the Barrel Team is a community of practice on all accounts, where "significant learning affects these dimensions of practice" (Wenger, 1998, p 95).

Mutual relationships are sustained. They are an existing team when they apply for participation in ITiS, and they continue to be a team after completing the program.

Relationships are harmonious or conflictual. Even if teachers on the team do not always agree on all issues, they are engaged with each other in negotiations of meaning, in discussions around pedagogical practice. Differences concerning how to pursue their joint enterprise become apparent in discussions about everyday practice. When the music teacher is on his own trajectory, pursuing his ownership of meaning, a conflict arises. This conflict is not damaging to the community of practice to begin with, but over time, the music teacher is marginalized as a response to him not prioritizing the joint enterprise.

Shared ways of engaging in doing things together. It is the ITiS theme and discussions around the theme that characterize "doing things together". When they participate in seminars and facilitation

---

[39] See chapter 5 this volume, p. 84

meetings, it is not expressed as "doing things together" concerning developing their competencies. However, these meetings generate communally shared knowledge, such as learning about a new teaching method (Portfolio). When teachers talk about doing things together, they express a wish to enhance interaction among themselves. Such encounters are viewed as a possibility to make use of the resources on the team, certain teachers on the team acting as facilitators. In other words: facilitation is expressed as desirable, especially when they talk about acting as facilitators for each other, where they share a positive view as to being engaged in facilitating each others' learning. They also enjoy being engaged as a team in the student project, where all teachers on the team contribute, in one way or another, to student learning.

The rapid flow of information. There is a rapid flow of information, as they meet informally outside the classroom as well as formally in weekly conferences, with or without the ITiS facilitator present. Working in the Barrel building, where the classrooms and the teacher room is located in a rather small, former, apartment, enables informal encounters. Problems are easily discussed in an informal way, particularly among the teachers that have their work place in the building. As to the music teacher, the special education teacher, and one of the physical education teachers, they spend less time than the others at the Barrel. To some extent, they are more peripheral members than the others.

The propagation of innovation. In discussions, they propagate in different ways for innovation, the team being characterized by teachers stating that they have open pedagogical discussions. As a response to participating in ITiS, their practice changes over time. They try a new method. They make use of available time in a different way than before. They initiate internal courses instructing each other. They include the special education teacher to a higher degree. They discuss another possible future as to teaching and organizing their time. They enhance computer use as well as discussions around ICT. They change the environment by influencing those responsible for school premises and ongoing activities.

Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process. This is exemplified when they continue the conversation on the "Oxygen"-paper, given the possibility to spend time discussing the matter further by a broad theme introduced in the meeting.

Very quick setup of a problem to be discussed. Since they work closely together in a small former apartment, there is a physical nearness among most participants on the team, which enables a quick setup for problems to be discussed. They also meet regularly in weekly conferences, where they have the opportunity to bring up urgent matters. In earlier years, they have spent much time discussing problems that arise in the student group. This year, they have a less problematic group, and spend more time discussing other issues, often issues that arise from them using the computers more.

Substantial overlap in participants' description of who belongs. They are tightly welded as a team, and pretty much run their own business, apart from teachers in the other buildings. In the beginning of this study, the special education teacher sometimes felt forgotten by his teammates, due to him mostly working with a few students in a different room. When they apply for becoming participants in ITiS, he is recognized and supported by the others as one on the team. They also mention the teacher being on a leave of absence as a participant in their community of practice.

Knowing what others know, what they can do, and how they can contribute to an enterprise. Over time, they have come to know each other well, and are aware in what way each individual can contribute to the enterprise. They make use of each other's competencies, where individual competencies constitute the collective competencies on the team. They make use of complementary resources in order to fulfill their joint enterprise.

Mutually defining identities. This is exemplified when Patrick recognizes Karen's changed identity, which she describes as turning into a "computer nerd", and Patrick in turn defines her identity as someone who has found other ways of integrating ICT. It is also shown by John acknowledging Karen's competencies regarding how she can contribute by sharing ideas from language instruction, ideas that can be used in natural science subjects.

The ability to assess the appropriateness of actions and products. There is an agreement on the appropriateness of certain actions and products when viewed as collective competencies on the team. The teachers state that not everyone has to know everything; it is quite enough that somebody on the team knows how to perform certain actions. Two of the teachers introduce the Webquest method, and act on behalf of the others to apply for participation in ITiS. They arrange how a Webquest can be used in their student project, and involve the others to different degree. Certain teachers have particular competencies, assessed as valuable for the others to take part of, like webpage production. One of the teachers offers to give the others a course; they assess webpage production as valuable knowledge for their educational practice. In addition, they assess the appropriateness of learning certain ICT applications (like PowerPoint) that may be of value in their community. Not all of them know how to go about it in practice, which also is shown in the discussion around using the Internet in language instruction, or zipping a file, but it is assessed as appropriate to learn how.

Specific tools, representations, and other artifacts. The school has a webpage. The team produces their own page, used for the WebQuest, also used to present the team members. The WebQuest becomes a specific tool for The Barrel Team.

Local lore, shared stories, inside jokes, knowing laughter. There is a local lore, and a knowing laughter, when they share the story on the "Oxygen"-paper. They know the particular student who has submitted the paper, and they acknowledge that he cannot possibly have written this paper himself. They make inside jokes about the lore of how students may go about carrying out an assignment.

Jargon and shortcuts to communication as well as the ease of producing new ones. There is a certain jargon in the group, shown when one of the teachers suggests that students ought to have a time clock. The others know that he is not serious, and do not question his suggestion. Shortcuts is shown when the music teacher talks about IHM. The others do not ask him what IHM is, they are all aware that it is the school where the teacher is attending night classes. There is also ease in producing a new type of

communication, when they discuss the "Oxygen"-paper - they question the design of instruction. It is done in a tolerant and accepting way, putting no blame on the teacher. They produce new communication as to what is important for them as to instructional design.

The above shows how the team is constituted as a community of practice on all accounts. As a community of practce, they are accountable to their joint enterprise.

Accountability to the joint enterprise

Teachers' general knowledge domain is expanding, not least due to the integration of ICT in educational settings, especially for teachers participating in the ITiS program where they are commanded to use ICT when participating in the program. When teachers in this study integrate ICT to a greater extent than before, they bring up what they need to learn, and what they are accountable for in respective subjects, if they are to use ICT to pursue the national commission. So, their participation in ITiS has shed light on what competence is needed, where accountability in relation to integral knowledge in the teaching profession cannot be referred to in specific terms; accountability is a relation to the joint enterprise as negotiated in a particular community of practice, which creates relations of mutual accountability beyond stated goals[40]. Accountability becomes an issue of seeking new meanings since teachers need to learn many new things, especially in regards to ICT issues.

There are systems of accountability and policies for teachers to work by, such as the national curriculum and the school-law. However, what emerges in response to institutional systems of accountability is defined in each community of practice's own regime of accountability in negotiating a joint enterprise, which gives rise to relations of mutual accountability[41]. In this respect, their negotiated response to it is, where there are certain requirements for participation such as attending the ITiS meetings, is a way to submit to institutional system

---

[40] See chapter 5 this volume, pp. 88-90
[41] See chapter 5 this volume, pp. 88-90

of accountable, the program stating that meetings are obligatory, based on their joint enterprise.

As participants in ITiS, teachers are accountable to the State, and to each other (as participants in the program) to attend the ITiS meetings, whether they acknowledge that they learn from them or not. They are accountable to the State to adapt to the design of the program, even if the teachers do not recognize the design as meaningful. When teachers choose to attend the meetings, it is a tacit acknowledgement of submitting to institutional accountability stating that meetings are compulsory, even if they find the meetings meaningless.

What one teacher is accountable for towards the others is a matter of how that individual teacher develops an identity to do his/her part as to the joint enterprise. Tom does not consider himself accountable to strive to fulfill their joint enterprise, if it includes identifying with the others at the seminars, or, if attending the meetings is an integral part of fulfilling the joint enterprise. He chooses to participate in a different enterprise than the others, and goes to night class at IHM instead. He does not view himself as accountable – to the State, to his peers, or to school management – to be present at meetings that according to him are totally meaningless.

Accountability to each other is about understanding the enterprise as negotiated in the community of practice, and contributing to its pursuit by aligning actions with others. Participating in the meetings is part of their joint enterprise, means to fulfill the overarching enterprise. To be good at something, like maximizing possibilities for learning integrating ICT, involves being able to judge the qualities of actions, such as attending the meetings. Tom does not attend the meetings. In this respect, he marginalizes himself. He is the one who has the answer to how the program should have been designed, and he demonstrates through his actions that he is not accountable to the others on the team[42], or, to their joint enterprise.

In regards to teachers developing competencies needed to pursue the joint enterprise, participating in ITiS has brought to the fore which competence is needed on the team. As they learn to identify which

---

[42] See chapter 5 this volume, p. 90

competencies they need to develop, and what they can do without, they hold each other accountable to different aspects of their knowledge domain. They recognize, and express, that everybody on the team does not have to know everything; they can use resources on the team to do what needs to be done in order to help students to carry through their presentation on the student project. So, what is viewed as important is not that everyone is accountable for everything; the important thing is that the knowledge experienced as necessary to complete the project is represented on the team, which is another way of saying that they are mutually accountable to the joint enterprise.

Karen is identified as having different experiences than the others from her teaching. Nobody expects Karen to contribute to enhanced ICT learning on the team, but they do acknowledge her pedagogical competence, and expect that she share her experiences from teaching language subjects so that her experiences can be a source for reflection for other teachers, who teach other subjects. They hold her accountable to a certain part of their knowledge domain. By inviting her to share her ideas, negotiability[43] is enhanced for Karen, even if she does not participate much in the student project. Specific competence is valued as legitimate in the community, but that does not mean that every teacher is accountable to develop the same type of competence, as everyone else on the team; to pursue the joint enterprise is to make use of contributing resources among the individuals on the team where each individual's identity is mould by identification and negotiability.

Being accountable to each other, means helping each other to fulfill the joint enterprise. By sharing knowledge, experience, and ideas, individual competence is made meaningful, as it becomes an inherent aspect of the collective competence. For a teacher like Lara, who does not have the status of being a competent ICT user, it is not embarrassing to ask John for help. Both are accountable to students to supply instruction to maximize possibilities for learning. John is accountable to school management to help the others with ICT problems. Both are accountable to society to develop ICT competence at school. In terms of being teachers engaged in practice at the same

[43] See chapter 5 this volume, p. 106-109

school, although not on the same team, ownership of meaning is a relation to the institutionalized enterprise where teachers are accountable to each other for helping each other to develop ICT competencies in order to maximize learning possibilities for students.

Another example shows how teachers talk freely about not being able to "zip a file"; they are not accountable to anyone for this type of knowledge. The interesting part of this conversation is how it relates to other conversations between teachers where ICT is not an inherent issue discussed. Not once in the quite extensive empirical material consisting of 2462 transcribed incidents (documents not included), do teachers question each other's pedagogical competence on the team, (even though one teacher questions his *own* pedagogical practice[44]). Neither do they question each other's competence in regards to subject matter content. It is taken for granted that they all have pedagogical competence and subject matter content knowledge, and that they are accountable to their enterprise regarding those issues. Hence, they do not engage in a discourse where they question each other's pedagogical competence. Empirical data do not support that such discussions occur, but seeking each other's help on matters regarding ICT is supported by extensive data.

The point is that they discuss ICT freely, since they are not accountable for that kind of competence. In discussions about ICT, they bring up pedagogical questions and their own role, and are not hesitant to show their lacking ICT competence. ICT challenges traditional pedagogy. Seeking each other's help on ICT issues does not appear to be a threat between teachers, since they are not accountable for that type of competencies.

Teachers who are competent ICT users do not compete for a position with those that are not. ICT competencies do not render any benefits, (e.g. higher salary). There is a gap between teachers that know how to use ICT, and those that do not, that can be put to use. There is an inherent ambiguity in this gap. The gap provides a space that allows dynamics as to creating meaning around what teachers are accountable for in regards to ICT competence, and what they view themselves as being accountable for when participating in a program

---

[44] See chapter 11 this volume, p. 201

where ICT is a central feature. It is not bound to a definite interpretation, but negotiated among teachers as they are in the process of integrating ICT in their pedagogical practice. What type of ICT knowledge teachers are accountable for on an individual level is an issue of meaning negotiations between teachers in relation to their joint enterprise, where individual competencies becomes part of the collective competencies on the team. This puts focus on the relevance of having time for negotiating the joint enterprise in order to establish what they are accountable for in the knowledge domain attached to their joint enterprise.

CONDITIONS FOR LEARNING

What the teachers learn

In spite of them not being content with the design of the ITiS program, learning happens, and their shared repertoire is extended. When it comes to teamwork, teachers say they have benefited from working closer to their colleagues when participating in the program. In regards to applying problem based learning methods, teachers try out a new method, which they describe as working out better than other methods tried. Mainly, this is due to the structure (reification) and teachers being present in the classroom to a higher degree (participation). In regards to the student project integrating ICT, the teachers have used the computers to a greater extent. They have learnt what they would not have found any reason to learn otherwise, like the PowerPoint program. Also, in meeting with other teams in seminars, even though teachers do not express this as enhancing their learning, there are instances when they have found the issues brought forth at the seminars as meaningful. Their identity is transformed as they use what they have learnt in meeting other teams when they place that knowledge in a local context.

The description below is a summary account of teacher competency development and how their shared repertoire is extended during, and after, their participation in ITiS.

They learn to work as a team. As they work with en all-encompassing theme, they engage in doing something together, which does not mean that they do the same thing, but rather that they find ways to integrate all subjects, and involve even those teachers that are not actively involved using the computers or the Webquest in their subjects. Collaboration and cooperation is enhanced; collaboration as for those directly involved with the students in the ITiS project, cooperation among all the teachers, by engaging in discussions around the Webquest method and helping to search for links.

They develop their shared repertoire in discussions with each other, exemplified by the discussion on responsibility where teachers are questioning instructional design as well as their role as teachers concerning participation and reification. They recognize in discussions that instructional design, and teacher participation in the classroom, is needed to a higher degree if student learning is to be better facilitated.

They produce own educational material such as the Webquest, or the digital music folder, and express that ICT is a useful tool for doing so. Learning is refined, and competencies enhanced, in developing something useful in practice.

They learn more about useful sites on the Internet, when designing the home page as a WebQuest. They also learn how to refine the search process on the Internet, since their student project requires them to provide links.

They learn how communicative functions, such as e-mail and chat, can be advantageous in teaching, which they foresee possible to use in future instruction

They express a need to learn how to use software programs that they expect the students to learn and use (like PowerPoint), so they arrange for internal courses on their school, using available competencies among own staff. At these courses, they learn home page production as well. They learn from each other, but also from students.

They learn about new teaching methods, like the Portfolio method, when they meet with other teacher teams in seminars

They learn to use other resources provided by state agencies, when they do study visits

So, even if teachers express discontent with the program, they learn what can be considered as significant learning for the development of their community of practice as a response to participating in ITiS.

Teachers' paradoxical view on learning

When it comes to learning from discussing pedagogical issues with each other, teachers do not express this as learning as long as it is "just" them involved in the discussion; they do not recognize the learning that is going on as learning[45]. When teachers talk about having pedagogical discussions with the facilitator, they view the 20-minute discussion on using Internet in English instruction as the only time they had a pedagogical discussion during facilitation meetings. However, it is shown earlier that significant learning happens, with or without the facilitator present, and that they do have pedagogical discussions with each other on many different issues.

There is a paradox in teachers' view regarding their own learning, since they request what can be expressed as vertical learning[46] (someone telling them what to do), at the same time advocating a desire to design their own competency development program. When they are to learn how to use ICT, learning is expressed as dependent on helping each other, or, getting help from the computer support person at school. But they are not embraced by the same view on learning from pedagogical discussions; they are irritated when the seminars are designed in a way where there is little time for interaction with the other teams. They are influenced by a constructivistic discourse, where they state that they have a constructivistic view on learning when talking about student learning; a view where the learner is to discover the knowledge, rather than knowledge being transmitted. However, this view does not apply when teachers talk about their own learning, learning how to use ICT. In addition, the interactional and contextual aspect of learning, not predominant in the Piagetian constructivistic view, is highly advocated by the teachers when learning from pedagogical discussions, an aspect that they express as missing during seminars.

At first, this paradox may appear difficult to understand. The example showing how they arrange for internal courses, and their statements of how they can teach each other different applications, show that a certain amount of institutionalized training, designed as computer courses, is expressed as needed, which is opposed to a constructivistic

---

[45] See chapter 5 this volume, p. 73
[46] See chapter 3 this volume, p. 39

view on learning. In pedagogical discussions with the facilitator, they also want the facilitator to take an active part in telling them "what-to-do" or "how-it-is", or, in other words; take on the role of "teacher-knows-best". The same is shown in their discussion about using Internet in language instruction; when the facilitator does not give them an answer, but challenges them, their remaining impression of the situation is that the teacher who brought up the question was "cut off".

However, there is a paradox in teachers pursuing that they do not want to waste time learning in a setting where someone else has set the agenda for their learning (as in the seminars). It is rather being able to develop their competence in interaction with each other on the team, and others at school, when the situation calls for it, and when the need arises, that makes them request computer courses. They initiate internal courses among themselves, and they involve the computer support person, and these courses are expressed as positive in regards to their own learning.

So, they re-present a view on learning which is expressed differently under different conditions. Students are to discover the knowledge, but teachers themselves need someone to scaffold[47] the process if it is about learning ICT, or, during facilitation meetings when their expectations are to be taught how to use ICT. They re-present a view on learning that is appropriate in a certain situation; they need expert help to learn how to use ICT. But they are not embraced by this view in a way that can be described as a stable view on learning[48], since it does not apply when learning from seminars. So, they re-present their view on learning in different ways, according to what situation prevails, which is a confirmation of the theoretical assumption in this dissertation that, learning is situated (Lave & Wenger, 1991).

At the time when they were discussing the problem with students spending too much time searching the Internet during English lessons, the facilitator did not supply them with an answer to their pedagogical problem, but challenged them in their conversation by saying that maybe the rigid Internet world is not the best way to go about language instruction. Looking in the rear-view-mirror nine

---

[47] See chapter 5 this volume, p. 81-82
[48] See chapter 5 this volume, p. 93-96

months later, their discussion was expressed by the teachers as interesting up to the point when the facilitator intervenes giving them resistance and questioning the use of Internet. Then, they say that they were cut off, but data from the occasion show that they continued discussing.

Their lasting impression of the situation is that the facilitator was the one who was going to give them an answer. This shows how the "teacher-knows-best-syndrome" applies when teachers participate in what can be interpreted as a formal learning situation. They expect the ITiS program to be designed in a certain way, and find the design unsatisfying, the facilitator not telling them "how-it-is" or "what-to-do". They occupy a traditional "student role": an "expert" is going to tell them what they do not know. This becomes a paradox if viewed in lieu of their expressed constructivistic view on learning.

In the discussion around responsibility, teachers came to the conclusion that learning to take responsibility for an assignment is not the same as learning to take responsibility for your own learning. When this point is brought to the fore, Richard adds: "No, it's not. You're right about that", which is an acknowledgement that he has learnt something new in their discussion with each other. Nobody is telling them how it is; they are discussing the issue in interaction with each other, and bring up different possible ways to view the issue.

They also talk of how having me present (among other things) has changed their view on what ICT may be used for, which here can be viewed as something new being learnt. I, as a researcher, do not tell teachers what to do. I rather do what a facilitator can do in a facilitation meeting, that is, listen to what they are saying about their own practice, and sometimes challenge them by asking questions, making them expound their view verbally.

The paradox understood in terms of participation and reification

How can their different view on learning, as related to the prevalent situation, be understood in terms of negotiations of meaning? When it comes to learning how to use the artifact, they want someone to tell them exactly what to do. However, in seminars, they do not want the

facilitator at the seminar to plan the meeting in a way where they have not been engaged in deciding upon the content as a group, besides being left without possibility to pose their questions, or, being left with no time to discuss the issues that are brought up by the other teachers.

The paradox can be understood in terms of participation and reification. The computer is an extreme reification, where the computer cannot be talked of in terms of being a participant in the learning process.[49] Participation is all left to the person using the artifact, where which buttons to push is not negotiable or subjected to interpretation. When a teacher does not know how to participate using the reification (what buttons to push), the situation is not meaningful to the participant. Someone is considered needed to scaffold the process in order to make participation meaningful. An extreme reification such as the computer, offers a lot of alternatives, but it does not to any extent offer alternative ways to participate when using a certain application. In other words: if a person writes a webpage address on an Internet site, it has to be written in a very definite way. It has to be spelled correctly, and the dots have to be in the right place. A mailman can deliver "snail mail" even if the zip code is missing, sometimes even if the address is missing, if the person is well known in the community. When an artifact does not offer alternative ways to participate to any great extent, participation may have to be supported by someone scaffolding the participative process. When the teachers are to learn ICT, they express that there is a need for an expert around who can tell them what buttons to push. But they do not want the expert to ramble on with his expertise, and not pay attention to the pace being too high, and they do not want traditional computer courses. They rather want to be able to participate and make local reifications, negotiating meaning as to their own computer problems, experienced in their own practice.

However, when teachers are engaged in pedagogical discussions with each other, it is a highly participative situation, with not so much reification involved (other than words used). In that type of situation, one could say that reifications are needed to balance participation.[50]

---

[49] See chapter 5 this volume, p. 104-105
[50] See chapter 5 this volume, p. 105

To concentrate around certain issues and make them visible, and thereby tangible and subjected to negotiations, is to increase reificative processes. A facilitator can make a statement that challenges what teachers are talking about, offer a reificative process (still on a verbal level) where the reification can be put to work in negotiations of meaning. Teachers want the meeting with "experts" on an issue to emanate from their own questions (even if the expert is a colleague). This does not mean that they do not want expert facilitation; it rather means that they want facilitation to be carried out on their own terms, emanating from *their* questions.

The "expert" is not throwing his expertise upon the learner, but interacts with him/her in a way where issues that are brought up can be lifted to a different level. Not by the expert telling them "how-it-is", but by posing questions that help the teachers and the facilitator to interact in such a way that they inform each other. There are two forms of knowledgeability that meet, where an example would be a computer support man being an expert on using ICT, meeting teachers that have little competence to use ICT. The expert is there to help when problems arise, but the teachers themselves have designed the course out of their own needs, and created a setting with an expert present which makes it possible to ask questions as they arise.

When a facilitator is present and involved in pedagogical discussions, it is not giving advice that is his/her primary task, but when teachers ask for advice, there is nothing hindering the facilitator to give advice, if he has the expertise. But this is not done immediately. By challenging them, the discussion can continue between the teachers, and they are given a possibility to reach *their* solution. The primary task of the facilitator, is to help people verbalize that which is often taken for granted, making it visible, which makes it available for critique and analysis (Markova, 1996).

I hereby argue that, if teachers would have been told what to do from the facilitator as to the problem with Internet and language instruction, which would have been a way to reify the situation in a very definite way, it would probably have made the participants end their discussion (since they got the answer – no need for further discussion!). When not supplying them with the kind of reificative language that gives them the answer, instead supplying them

resistance in their conversation, a different type of reification brought into practice, the teachers continue their pedagogical discussion and reach a solution on their own, without intervention by the facilitator. They were engaged in negotiations of meaning, participating and making reifications that were their own.

An expert facilitator being present, emanating from questions of the group, is not the same as traditional vertical learning. And it is not the same as traditional horizontal learning, "just" learning from each other as peers. It is something different. It is a matter of balancing participation and reification in negotiations of meaning where the role of the facilitator, or the expert, is to judge when it is appropriate to stimulate participative, or, reificative aspects, in order for participants to find the situation meaningful. In this respect, there are two forms of knowledgeability that meet, where they inform each other[51]. The facilitator may be an expert on ICT use or pedagogical issues, but the main issue is the process of making expertise effective, which requires horizontal exchange, not providing expertise, but as the meeting of two forms of knowledgeability. Balancing participation and reifications are significant dimensions of teachers learning in practice.

---

[51] See chapter 3 this volume, p. 39-40

ICT CATALYZES PEDAGOGICAL DISCUSSIONS

Beyond ICT use

As stated earlier, the ITiS program aim is "pedagogically-oriented in-service training for teachers in team" (Delegation for ICT in Schools, 1999, p. 3), where learning how to use ICT in pedagogical settings is strongly implicated, although the program does not offer extensive courses in ICT use.

Not focusing on ICT use, instead focusing on pedagogical change and development using ICT as a main component, ICT becomes a catalyst for discussions around pedagogical issues that stretch beyond how to use ICT in practice. Teachers emanate from a problem related to ICT, which often turns into a pedagogical discussion, sometimes on ICT issues, but often about other issues than ICT. ICT becomes a catalyst for pedagogical discussions, and thereby becomes more than a physical tool used in practice. Below, it is shown which issues and concerns teachers raise about pedagogical use of ICT.

Developing a concept as part of a shared repertoire

When a teacher receives a paper obviously downloaded from the Internet, it starts a discussion among the teachers. Their conversation can be understood as an example of how ICT catalyzes the discussion that arises, and how it leads to teachers negotiating meaning around the everyday concept "responsibility". Downloading from the Internet is a new problem, by teachers described as common in everyday practice. In the discussions between them – a discussion that was not designed as a formal learning occasion, but started as an informal discussion in the teachers' room – they reflect on practice out of experiences from everyday practice. When discussing informally, they do not develop the discussion regarding learning anything significantly new regarding how to deal with downloaded papers.

Whether the student has learned anything or not is a problem easily solved; "just talk to the student, and you'll see if he has learned".

When they have an opportunity to develop their discussion in a conference in the afternoon (designed as a focus group conversation), they reflect about everyday practice in a different way than when they were discussing informally in the coffee room. They distance themselves from the actual paper; the student paper is merely used as a reference to conduct a conversation on a different level. Emanating from the problem, the discussion becomes an opportunity to negotiate meaning around an everyday used concept. If they had not had a conference, and if they had not been subjected to talk to each other out of a broad question, they probably would have been satisfied with the conclusion they reached in the coffee room. Now, they developed a shared concept.

This exemplifies how teachers create meaning in their own learning process as they develop the concept responsibility in a discussion with each other. The concept is not particularly attached to ICT matters, but an everyday concept included in a pedagogical discourse. Their discussion is an example of collaboration around a problem from everyday practice, which they have a mutual engagement in solving. It was not a discussion on the issue "responsibility" to begin with, which shows that when teachers are given time to discuss pedagogical problems from everyday practice, there is a possibility that issues are brought up that they did not know they had. A theme was introduced, and they responded by bringing up a current problem. Had they not been subjected to a situation where they had been asked to talk about a theme in my presence, interested in what they had to say, but not intervening much, it is not likely that they would have developed the concept discussed informally in the coffee room.

Balancing participation and reification in instructional design

When teachers talk to each other on instructional design, they compare the oxygen assignment with the ITiS student project. They conclude that the design of the ITiS project was much better. The amount of students not able to take responsibility and work self-governed, were far fewer than when they design instruction in a more

233

unstructured way, leaving more responsibility to the students. Teacher discussion shows how the possibility for students to take responsibility is related to teachers taking responsibility for reifying the process, as well as participating during lessons. Their responsibility is an integral part of students' possibility to take responsibility.

Reification and participation form a fundamental duality where they imply each other.[52] They do not translate into each other. For significant learning to happen, it is not enough to say that students are to take responsibility for their own learning and expect them to work self-governed. If the point of departure is to maximize possibilities for student learning with the aid of ICT where it is found useful and appropriate, teachers are responsible for offering a context that creates a possibility for the student to create meaning, in order for significant learning to occur. Educational design is "fundamentally about pondering when to reify and when to rely on participation" (Wenger, 1998, p. 265). When teachers locate total responsibility to the student to work self-governed with an assignment, it can be compared to teachers abdicating from their responsibility. But it can be equally difficult for the student to create meaning around an assignment if there is an excessive emphasis on formalism.[53] The key idea is to strive for corresponding levels of participation and reification. So, ICT catalyzed a discussion that made teachers ponder on the balance of reification and participation in instructional design.

Learning cannot be designed

The possibility for a teacher to remain flexible to individual student learning is limited. Instruction in school, being a collective practice, is not easily structured in 30 individual, and different, ways. It is described in the result part how a teacher adapts to a learning situation, contributing to student meaning, when not making a fuzz over the student being engaged in a different subject than the one the teacher had designed the lesson by.

---

[52] See chapter 5 this volume, p. 103-105
[53] See chapter 5 this volume, p. 105

The most important is not what subject the student is engaged in as to a specific lesson; what is considered important is student development as a whole, which is prioritized in the learning process. The joint enterprise is given priority - not the reified rules. Participation and reifications are negotiable, as to the prevailing situation. Here, the teacher considers learning how to use ICT as more important than learning a specific content designed by him ahead of time. In completing a culinary assignment, the student is working with a school related assignment, so significant learning can be assumed, even if it is not the subject designed for by the teacher. Besides, the student practices to use ICT, which might not have been the case if the student was forced to work on the Values project when her mind was occupied by the culinary assignment. It boils down to how the teacher is interpreting what is most meaningful to the student, not letting go of his learning trajectory, but taking the situation in consideration.

Learning can be facilitated or frustrated, but it cannot be designed. It is not a result of design, but rather a response to design.[54] The girl is not learning what the teacher had designed for. This does not mean that she didn't learn. She learned something different, probably applicable in her culinary course, and maybe in her life. The situation is given priority over the design of a particular lesson, where teacher instructional design is secondary to student development as a whole. In this respect, available means, such as ICT, are incorporated into action in what initially would be considered as unanticipated ways.

Methods in instructional design

Teachers are hesitant towards attending seminars with other teacher teams. However, when they engage in external relations, it is shown that they learn, even if they are discontent with the design. They learn about the Portfolio method, and they use what they have heard by using their imagination in a discussion around how their own practice can change.

By using their imagination and negotiating the design of instruction in conversations with each other, they visualize a possible future where

---

[54] See chapter 5 this volume, p. 118

they view themselves in a new light, including learning new methods for designing instruction in a new way, as in the discussion about methods[55]. They extrapolate their experiences, reaching for the somewhat unknown, which becomes a mode of belonging to the community of practice. They combine engagement, alignment, and imagination[56] and learn in interaction with each other how a change of practice could be possible. It is the reasoning around pedagogical models that drives the conversation ahead, engaging them in changing their practice, catalyzed by discussions around methods and ICT at the seminars.

What they find useful at the seminars are those matters that the teachers can view as directly useful in their own practice. What they appropriate at the seminars, is the community of practice's interface towards the world around them. When using this interface to understand how their own practice can change, identities are transformed, which enables a transformed practice, at least on a verbal level.

Even if teachers are discontent with the seminars, where one reason for discontent is them identifying themselves as teachers teaching upper grades but do not identify themselves with teachers teaching lower grades, ICT catalyzes a discussion around a method valuable to them, which teachers adopt as a possible future teaching method, in discussions related to their own context.

Partiality of knowledge in relation to subjects taught

Being connected to a global network, with inherent possibilities, is not used as much in language subjects as in social science subjects on the team studied. Social science teachers find support in national curriculum goals to integrate Internet search during lessons. There is a link between national goals, the subject tradition as to seeking information, and ICT. For language teachers, it is not obvious how the Internet can be integrated if teacher aim is to reach national goals. There is no subject tradition as to seeking information in language subjects, which for the teacher makes it difficult to see a link between

---

[55] Excerpt 59
[56] See chapter 5 this volume, pp. 111-114

goals, subject tradition, and ICT use. This has brought about discussions concerning how to deal with integrating Internet use in instructional design in language subjects.

In discussions between the teachers, they come to the conclusion that providing students with links, instead of letting them search on their own, is a future possibility for using Internet in language subjects. This has brought about a need for the language teachers to learn how to set up links on the school webpage. As time passes, the language teachers also discover communicative functions as useful in instructional design. When integrating ICT in instruction, individual teachers discover what they need to learn in order to teach a certain subject, since what competence is needed differs in regards to subjects taught.

ICT is so vast as to possibilities and applications, that no individual can know everything. In discussions with each other, they recognize what knowledge they need to develop as individuals working closely together on a team, in order to contribute to the collective competence on the team. They rely on each other's competence, and are confident in being able to help each other to develop the knowledge they have experienced as needed in different subjects. They are part of a larger system where their own knowledge is partial. Appreciating that your own knowledge is partial is essential to being able to contribute.[57]

Conceptual framework for learning and instruction

Being a participant in ITiS requires the teacher team to write a final report. The Barrel team chose to state their theoretical standpoint on learning: the constructivistic view. Different aspects of this view was brought forward, which attracted the meta-facilitator's attention at the final seminar, where he questioned whether all of them were embraced by this view, since their writings implied that they were not.

There is an ambiguity in their definition of the constructivistic theoretical perspective, which creates a gap enabling the condition to be put to work to create new meaning. This gap is a possibility for

---

[57] See chapter 5 this volume, p. 75

meaning negotiations around the conceptual framework of constructivism and consequences from employing that view. They were not given the opportunity to do this at the seminar, nor did they insist on such a discussion themselves. Taken into account that earlier, there had been very few occasions to discuss issues during the ITiS meetings, it is a lot to ask of a team to initiate the discussion themselves. Besides, it is difficult to initiate discussion around issues when you do not know what questions to ask.

People do not always know what interests them (Dewey, 1916)[58]; they have to be subjected to different issues and perspectives in order to form their own view on what is interesting and meaningful as to inquiring. If teachers are not made aware of differences and consequences from differences in perspectives, and if those perspectives are not made visible, different perspectives will not be accessible for critique and analysis (Markova, 1996)[59]. Some basic elements of theory include discussions around ontological and epistemological views. This occasion was a possibility for creating new meaning as to such elements, but teachers were left without possibility to expand knowledge on the concept cnstructivism.

They participate in an institutional discourse on teaching including concepts such as a constructivistic view on learning, but lack a developed conceptual and theoretical understanding. If they were given a chance to discuss the matter further, a discussion which could have been initiated in facilitation meetings, they would have been given an opportunity to maybe understand practice in a new way, which could have been a way to create new meaning on the team. However, this did not happen.

When teachers described how they work with an Internet based method, ICT catalyzed a discussion around a conceptual framework. When there is ambiguity in teachers' expression of theoretical assumptions, it becomes an opportunity to put the assumptions to work in order to create new meaning. But they do not initiate such work themselves, since they do not know what questions to ask. When they have access to a facilitator, this is something that the facilitator could have used as a point of departure for bringing in

---

[58] See chapter 5 this volume, p. 97
[59] See chapter 5 this volume, p. 95

resistance in their conversation to be utilized to develop theoretical awareness around pedagogical issues. But... he did not.

Organizing and organization

Flexible time includes almost all of the teachers on the team, so they cannot carry it out in an individualistic way, which is possible at their regular lessons. When they talk about trying out flexible time the following semester, there is a point of departure where they have to find a mutual way of how it is going to be done.

They have a history together, which enables them to discuss about how they imagine flexible time as being relevant and meaningful in practice. They use their experiences as a point of departure for a new situation, where they intend to create a new practice. They decide on trying one of the models that arose during the discussion, and when they are approached with the question of how it turned out (nine months later), they have gained new experiences. They acknowledge that the model they created did not work as well as they thought it would. They evaluate their attempt, and continue to discuss how flexible time can be made more meaningful for students as well as for teachers.

Their discussion shows how they try to create a different way of relating to time and space. A space for learning can be viewed as a physical room. There is a room designated for learning at a specific time in the student schedule. This is what their discussion seems to be about when viewed up front. But a space for learning can also be viewed as a metaphor for a broadminded atmosphere, where everybody's ideas are listened to, and where all have the possibility to occupy available conversational space. In their conversation, different views are brought forth in a tolerant atmosphere, with respect for each other's differences in viewing the issue. They listen to each other, and strive to reach a solution collectively by coordinating their different perspectives. Those who do not initially share the solution that finally is decided upon, accept the solution. Accepting a solution is no problem, since it is a contingent solution, subjected to new negotiations in the future. Their conversation is an example of a

deliberative conversation (Englund, 2000)[60]. Gradually, practice changes, through negotiations among the participants in the community of practice, where they create meaning by negotiating around appropriate reifications and participation in everyday practice.

So, when teachers are compelled to integrate subjects within the ITiS program, it catalyzes a discussion on how to offer students a flexible schedule. In the discussion, teachers agree upon a contingent solution, which is possible since they are a stable group where they have a possibility to renegotiate the matter in the future. After renegotiations, they change practice out of their evaluation of their attempt with flexible hours.

Changing infrastructure

Utilizing the computers to a greater extent than before make teachers object to where the computers are physically located. After completing their ITiS project, they arrange for a computer classroom in their own building, and the principal supports them moving some of the computers. Offering the students a process (participation), working with the Webquest, are not sufficient conditions if the students are to learn with ICT as a tool, according to the teachers. The participative offer has to include a site for learning, with an adequate infrastructure (reification). In redefining their surroundings, the computers can be used in a more effective way.

Their principal is not a participant in the community of practice at the Barrel, but she and the teachers are interconnected in many different ways. For example, all teachers are to align themselves to the school vision, since they are part of a wider context. Teachers' alignment to the vision becomes a vehicle for arranging better-organized activities in interaction with the students.

So, when teachers are faced with a situation that make them reflect on infrastructure, they affect practice. They draw attention as to not having network cards, and the principal promises to solve the problem. They redefine their environment, and are able to work more

---

[60] See chapter 3 this volume, pp. 42-44

effectively, by moving the computers. The integration of ICT creates new situations, where teachers interact with each other in order to solve the problems that arise. The teachers at the Barrel do what needs to be done, in order to pursue the joint enterprise. An individual teacher cannot decide on moving the computers. But in discussions with others affected on school, teachers change infra structure, as it becomes apparent what is needed in order to integrate ICT in instruction.

To change practice of monitoring student attendance

Organizational change is not possible on an individual level; it includes all teachers at Central school. The teachers have been offered an opportunity to start using a software program to monitor student attendance. As long as teachers do not see the advantages of using the computer for monitoring student attendance, it is not meaningful to spend time learning how to do it, and they do not adopt the idea to begin with. They cannot afford to invest personal energy in something that is not meaningful since time is limited. To use the computer to monitor student attendance is implicitly expressed as creating too much insecurity for teachers not familiar with using ICT. They can acknowledge that the computer probably is a good tool for monitoring students, but having experiences how much time it takes to learn a new software program, they choose to maintain the old system. When teachers do not have experience of the computer being a useful tool for controlling attendance, it is not meaningful to spend time learning how to do it. Teachers are not willing to spend time learning something that they do not consider beneficial. Change, is a risky activity, which can make teachers experience frustration in having to leave old assumptions for something new, which they cannot know beforehand is for the better (Fullan/Stiegelbauer, 1991)[61].

Teachers learn about possible solutions by being subjected to influences from the outside. Fullan/Stiegelbauer argue that, it is important that the risky activity in engaging in a change of practice and learning how to do something in a new way is shared among the teachers.

---

[61] See chapter 4 this volume, p. 32

A year after they had discussed the issue of monitoring student attendance, they changed their practice, after concluding that using the computer to monitor student attendance is simplifying the process. Gradually, they change their practice in accordance with the principal's school vision. They align their energy to do what needs to be done.

CODA

Introduction

The aim of this study is to understand how a teacher team functions as a vehicle for the development of competencies in pedagogical use of ICT. In addition, there is a perspective at drawing conclusions for design of teacher competency development and in-service training, in particular of learning how to use ICT and developing pedagogical awareness of such use.

The overall question has been how the team functions: What characterizes a teacher team when they participate in a competency development program, which requires enhanced use of ICT in practice? The other three research questions highlight certain aspects of teachers learning as participants in the program: How do teachers use the resources offered by the ITiS program as well as other resources in their environment? What issues and concerns about the pedagogical use of ICT do the teachers raise, while they participate in the program? What are significant dimensions and content of teachers' learning in practice?

The conclusions have been accounted for and discussed in chapters twelve through fourteen as a narrative account. This type of presentation stands a risk that the conclusions may be blurred and difficult to grasp. In addition, there is also a risk that the conclusions seem trivial, maybe verifying what we already know. But sometimes it may serve a purpose that someone gives voice to that which we already knew.

> The production of a theoretical discourse is a consequential activity to the extent that it enables new ways of seeing, thinking, talking, and therefore acting. My sense is that the concept of community of practice has turned out to be surprisingly influential precisely because it produces such a discourse: it enable people to give voice to something they already knew, but did not quite have the language to act upon. The discourse is important, but it is only a small part. It serves the enterprise of a community, which uses it for acting in the

243

world and thus gives it its actualized meaning (Wenger, 2004, p. 1).

In this final chapter, some conclusions will be highlighted and further discussed, presented as *one* possible way to think, talk, and act in regards to teacher team practice and teacher competency development.

Summary of conclusions

In summary, the conclusions are:

> The studied teacher team is a community of practice on all accounts. Interaction among them is focused on mutual engagement for their joint enterprise where they develop a shared repertoire over time. In their pursuit of fulfilling the enterprise, they are accountable towards each other to help each other on the team to do what needs to be done to maintain and develop their community of practice. When they participate in the ITiS program, collaboration and cooperation is enhanced, and they develop their ICT competencies as well as learn from pedagogical discussions which each other and others in their environment.

> While participating in the program, the teachers on the team use the computers to a greater extent than before. The design of the program, (e.g. commanded collaboration, an ICT student project, facilitation and seminars) have worked in favor of teacher team development. The resources they use for learning how to use ICT are mainly each other, but also others on their school. This is a response to them not being offered ICT courses within the program. They seize hold of their own competency development, and do what needs to be done, in order to learn what they consider needed to be learnt to fulfill their joint enterprise. While participating in the ITiS program, they use resources supported by the principal who frees them from other school activities. When they are freed from other meetings, they recognize that time can be spent in a different way, which is used to raise ICT competence on the team, and which in the future may be used for competency development

244

on the team, learning from each other. They foresee a possible future practice, which includes closer interaction among them as a team, and a possibility to use each other as facilitators. They do not express ITiS facilitation and seminars - the way it turned out within the program - as resources for learning. However, they do use the facilitators and other teacher team as resources for learning. I am arguing that their lamenting is rather a matter of belonging to their community of practice than an expression of discontent with facilitation per se; they view facilitation in the future as a productive contribution to the development of their team, but they want facilitation to emanate from their experienced needs.

Teachers express a great need to learn how to use ICT, but they also appreciate being engaged in pedagogical discussions. When teachers have time to discuss issues significant to their own practice, and when there is no agenda regarding what they are to learn from such discussions, they do not express the learning that is going on as learning. In such discussions, it is shown favorable to bring in an outside perspective that can challenge their statements. When they raise questions related to ICT use in pedagogical practice, their discussions often turn into a discussion that goes beyond issues about mastering the artifact. In this respect, ICT catalyzes pedagogical discussions. Some of the issues and concerns discussed, are: new teaching methods; what the concept responsibility means in practice; that students' learning processes have to be viewed contextually and instruction adjusted to the prevalent situation; how to organize their work and how to affect their organization, which made them change infrastructure on their school; how to change practice on monitoring student attendance; that some ICT knowledge has to be shared by all on the team, but other competencies experienced as needed are related to what subject an individual teacher is teaching.

One significant dimension of teachers' learning in practice is how learning is situated where the conditions for learning is connected to the level of reification and participation in the learning situation. When there is a highly reified learning

245

situation (as when learning how to use a software program), learning is facilitated if there is someone around who can scaffold the process. Just trying on your own, limits participation. Having access to someone who can help them gives them an opportunity to participate more fully. However, the situation is different when there is a highly participatory learning situation (as when learning from pedagogical discussions). In this type of situation, teachers have a lot of competencies and experiences that they are eager to discuss. A competent facilitator does not intervene unnecessarily by providing advice, or reifications, but when there are ambiguities, or unclearly formulated ideas, or questionable statements, a facilitator can bring in resistance in the conversation which more or less forces the teachers to respond, thereby formulating themselves more clearly, or put in other words: make reifications that bring the discussion forward. The negotiation of meaning becomes organized around a focal point, where a question of resistance can be a reification put to use in the process of negotiating meaning. The facilitator contributes by giving the issue a certain form, a reificative process, which can serve as a new point of departure and bring the discussion to a different level.

The design of the ITiS program

As stated earlier, several of the teachers express lack of competencies as to how to use ICT. ICT is a central feature in carrying through their student project. Talking about computers more, using ICT to a greater extent than before, turns ICT into a pivot for teachers' attention regarding what they need to learn when they align their engagement in ITiS with their reified joint enterprise. Teachers are under the impression that they are going to learn how to use ICT as participants in the program, but this is toned down in the program aim.

It is frustrating to teachers that the design of the ITiS program is at the same time rigid (having to attend the meetings) and loose (having to find ways to learn ICT on the side). Even though they are discontent with the design of the program, they discover new ways to engage by arranging for internal courses, defining obstacles and means, and

establishing who is good at what and how they can make use of the internal competencies on the team in order to extend their shared repertoire.

There are several characteristics of the program that contribute to ICT becoming a pivot for teachers attention. Learning how to use ICT in pedagogical settings is an implicated intended goal, even if it is not stated in the prime aim. The ITiS program aim is "pedagogically-oriented in-service training for teachers in team" (Delegation for ICT in Schools, 1999, p. 3). Even if the aim does not state that in-service training primarily refers to learning how to use ICT in practice, there are several aspects of the program that point to ITiS as a program to develop teacher ICT competence[62]. Learning how to use ICT in pedagogical settings is expressed throughout the program.

The design of the program can be argued as being successful, since pedagogically-oriented in–service training for teachers in teams make them enhance their teamwork, besides turn ICT into a pivot for teachers attention regarding what they need to learn about ICT use. Teachers learn what is possible to do by integrating ICT in instruction as participants in the program, carrying out a student project that entails ICT. In addition, they enhance their teamwork, having an all-encompassing project to carry through, in addition to attending ITiS meetings, with three aspects of ICT as a guideline for their discussions.

Earlier initiatives have put emphasis on teachers learning how to use ICT in practice, with the result that pedagogical issues were thrown upon teachers' own resources where it was up to them to bring those kinds of questions to the fore. In the ITiS program, there is time set aside for pedagogical discussions in the presence of a facilitator, and at those meetings they are *not* to learn how to use ICT. It is shown from earlier research on teacher teams that teachers to a very limited extent can affect their work on the formal arena, as in conferences on school, where everyday lessons, or how teaching is to be designed, are hardly ever discussed (Ahlstrand, 1995)[63]. Time is spent dealing with other questions than those seen by the team as being the most central

---

[62] See introduction, p. 14
[63] See background, chapter 3, p. 39

to carry out their task (compare Kallos, 1985), when meeting in formal conferences.

The ITiS program, commands collaboration, compulsory attendance at facilitation meetings and seminars, and add characteristics from an informal arena (Ahlstrand, 1995) where it is up to the teachers to decide who should be involved in the program (although it has to be the whole team), which has to do with participation (participating teachers and students) and how to carry through the student project, the reificative aspect.

Negotiations of meaning[64] involve the interaction of the above mentioned two constituent processes participation and reification. In this respect, the program is designed in a way where teachers participate in settings where they are more or less forced to negotiate meaning in interaction with each other. Such negotiations include who is going to participate, and what reifications to make, aspects included in their initial application, an enterprise which includes using ICT when carrying through the program. The program being reified in a loose, but at the same time rigid way, is a structure that can be viewed as a top-down as well as a bottom-up design (Fullan/Stiegelbauer, 1991)[65], which works in favor for teachers learning many things related to ICT and other issues related to pedagogical practice, as well as learning how to work closer as a team.

It can be concluded that even if teachers express discontent with the ITiS design, they learn, and develop their shared repertoire: not as a result to the ITiS program, but as a response to participating in ITiS. Teachers have to participate in facilitation meetings and seminars, but in everyday work they participate in a way that is negotiated among them.

The design of the program can be viewed as a way to balance participation and reification, with a design built upon leaving much up to the teachers themselves, which they respond to. A vast national competency development program like ITiS has to be designed in some way. Since the design is somewhat open regarding how teachers choose to carry out their student project, the design does not steer

---

[64] See theory chapter 5, pp. 99-100
[65] See background chapter 4, p. 60

everyday practice. When it comes to extended learning of how to use ICT, there is no design within the program; the design of the program involves learning in everyday practice. The frustration of a fairly loosely designed program catalyzes evolution. When learning is frustrating, it triggers them to seek help from each other in order to learn how to use ICT on the side of the program, where they learn what needs to be learnt to fulfill their joint enterprise.

It can be concluded that teachers learning is a response to the design, rather than a result of the design, and in spite of expressed discontent with the design of the ITiS program. I hereby argue that, if the design is loose enough to allow a local response, a frustrating design can turn into triggering learning that which is experienced as needed to learn in their local community of practice.

Cultivation of communities of practice

There are seven principles[66] stated by Wenger et al (2002) that will be addressed here and related to the team and their situation.

Design for evolution. Designing a community of practice is not so much a matter of designing from scratch, as it is shepherding evolution Many teachers already work in teams, but demanding team participation is a way to build on what is already there, or, to make teachers form teams in order to participate in the program.

Teachers can be assumed to be competent in their field – teaching - but that does not mean that the teachers cannot further develop their profession, which may lead to a changed teaching practice. Demanding that teachers work as a team, is a way to catalyze evolution for teaching practice, where competencies on the team can become visible in pedagogical discussions, and develop. Such discussions can also reveal ICT competencies inherent on the team.

John's ICT competencies re highly valued in the community, and the larger community asks him to take on a position as an ICT pedagogue. Having people around that know how to use ICT becomes critical when ICT is to be used to a greater extent. Since most

---

[66] See theory chapter, pp. 116-118

schools are under financial strain, making use of the existent knowledge on the team is a way to shepherd the evolution of the community. When making use of existing resources on the team, teachers begin to see how they could use ICT for such things as building a webpage with links in subjects to be taught to students, or, how they could use each other as facilitators. Helping each other with ICT problems, or using each other as facilitators, precipitates the evolution.

When their principal frees them from other meetings in school, other than ITiS meetings, it is a way to catalyze evolution. When she suggests new ways to monitor students, it catalyzes evolution. When she agrees to move some of the computers to a different building, it catalyzes evolution. When the ITiS facilitator does not give them any fixed answers, it catalyzes evolution, and when teachers participate in seminars, it catalyzes evolution, because significant learning is occurring those meetings.

Open a dialogue between inside and outside perspectives. To be able to understand community issues requires a deep understanding of a particular practice, but often it "takes an outside perspective to help members to see the possibilities"[67]. In the ITiS program, the facilitator is a teacher, often from a different school. As a teacher, s/he is often well acquainted with the problems that can arise in educational settings. Besides, in the case studied, the facilitator was well acquainted with ICT issues. However, he was constrained to help his colleagues on ICT issues by his mandate, which was to refrain from answering questions around how to use the artifact, or solve technical problems.

It is shown in this dissertation that teachers need help with ICT issues as well as someone who moderates their pedagogical discussions. It is not a question of either or; both are considered necessary by the teachers. I hereby argue that using facilitators who pursue pedagogical issues is important for making teachers develop their shared repertoire as to pedagogical practice, since those questions often are not given attention due to teachers not prioritizing those questions themselves, often there being many other issues to attend

---

[67] See theory chapter 5 this volume, p. 116

to, besides not having time allocated for pedagogical discussion in the presence of a facilitator. However, if the facilitator had acted according to the wish of the teachers (teaching them how to use ICT, or helping them with technical problems), it is not likely that there would have been time for pedagogical discussions. Therefore, the program design has shown to be favorable for pedagogical discussions, since it forced the teachers to concentrate on pedagogical issues, not ICT use, when meeting with the facilitator. In addition, teachers developed ICT competencies since the program demands that teachers carry through a student ICT project. This design worked in favor of learning through pedagogical discussions, as well as learning how to use ICT.

On the other hand, having facilitators that can help them with their ICT questions is also needed, if teachers are to learn extended ICT use. I am hereby arguing that it is not a question of either or, but a question of having a sensitive ear in order to be able to judge when one or the other issue (learning from pedagogical discussions or learning how to use ICT in practice) is the most appropriate for the facilitator to pay attention to, in order to aid teacher team development. Or, it could be an issue of bringing in two different facilitators; one for pedagogical discussions, one for learning how to use ICT. In this respect, the program would probably have benefited from making it possible for teachers to learn how to use ICT, but not in replacement of pedagogical discussions, but as an addition to such discussions. If there had been an opportunity for that kind of expert facilitation on learning how to use ICT, teachers would have wanted the expert to emanate from their questions, where they themselves decide upon what courses they need and how they are going to be carried through. Teachers do not want to attend courses with traditional vertical learning. For courses to be meaningful, they want their participation to go hand in hand with reifications found meaningful in their own everyday practice.

Invite different levels of participation. People have different levels of interest in the community, and all participants can therefore not be expected to participate equally. When the team participates in ITiS, John and Aron are considered core members, and are the ones who have taken on the community project participating in the program, where they to some extent take on community leadership as

coordinators for the group. They write the ITiS application for participation, and they engage all the others in the Webquest. Richard, Karen, and Patrick, are active members of the team, partly probably because they have been on the team for a long time, having worked at Central school for many years as active participants on The Barrel Team. Besides, Richard and Karen work solely with the students at the Barrel. Mike is a newcomer, and more peripheral than the others. Mike, as well as Tom and Leonard, are peripheral members since they work with many other teams on school, teaching younger students as well. Even if they are peripheral members, they are not passive members. Mike attends the computer classroom on his breaks. Leonard is more than willing to search for links for the Webquest, once the others ask him to contribute, and Tom is highly engaged as a teacher on the team, praising how much fun it is to work on the team, but chooses to rebel by not attending the ITiS meetings.

People in a community move along these levels of participation: core participation, active participation, and passive participation. People at the core of practice can draw others closer to the fire in the center of the community. John invites Leonard to draw closer to the community by suggesting participation in the program. Karen, who is not involved much in the project, is drawn closer to the core by sharing experiences from her practice, where John wants to get ideas from her that he can use in his practice.

The core members do not force anyone to participate (they did not force Tom to participate in the program), but "build benches" and make opportunities for those on the sidelines, which keeps the peripheral members connected. At The Barrel Team, John and Aron are two dedicated teachers that believe in trying out a new teaching method. They invite the others to participate in the adventure, and doing so, they draw members into more active participation, by including all of them in the Webquest work, including Leonard who before ITiS was a peripheral member.

Develop both public and private community spaces. The seminars can be viewed as open to community members, but closed to people outside the community. It is a limited form of openness, since it is only open to community members that participate in ITiS, where access to particular seminars involve a few particular teacher teams. But it is

open to the public by the World Wide Web, where all teams post their final reports. It can therefore be regarded as a more public space than when teachers have weekly conferences. Such meetings are much richer when individual relationships among community members are strong. The team studied, does not have rich relationships with other community members that they meet at the seminars. The meetings were not designed to strengthen individual relationships between members, although the first assignment (getting to know someone from another team, presenting each other) was probably meant to be that kind of activity. At the seminars, the teachers did not experience a possibility of active participation, and they were not included in making reifications during the seminars that mattered to them. They experienced a lack of being able to negotiate meaning.

Focus on value. When teachers enter the program, the ones who are not competent ICT users express a wish to learn how to use ICT as participants in the program. Once they are in the program, they discover that the program is about issues other than learning how to use ICT in practice. The value of being engaged in pedagogical discussions is expressed as a favorable outcome of participating in ITiS, but the time for doing so, is viewed as far too short. It is shown, though, how they are engaged in discussions with each other where teachers gain many insights on things that they did not know were useful until they started to discuss the issue. This is shown when they discuss the Oxygen paper, where they gain insights on instructional design and develop their shared concept responsibility. They also got an idea from Tom, where he suggested that they could meet with each other regularly and teach each other ICT applications that particular teachers on the team know about. This idea was partly tried in practice since they had in-service training for each other, but often an idea can take months to be realized. Teachers say they do not have enough time to interact with each other, but they express it as valuable to try to make use of each other's competence in the future, in order to learn from each other.

A facilitator can make teachers explicate their ideas by being curious, asking questions that make them verbalize their ideas, challenge their statements, which can be a first step towards changing practice. Members of a community can find participating in discussions as valuable, even though they are not able to identify any particular

253

value, as in the case with the facilitation meetings. But even if they complain, and have a hard time assessing community value, early discussions without set goals can help the community members to later understand the impact for the community.

Combine familiarity and excitement. A community can be a place where people can ask for candid advice, and try their half-baked ideas without being embarrassed or stand the risk of repercussion. They are familiar with the context, and comfortable to bring anything up that comes to their mind. It is shown how teachers freely reveal their incompetence when discussing zipping a file. The teachers are not embarrassed to ask each other for help on ICT issues, or having the meaning of a notion explained. They try their half-baked ideas on how to combine different teaching methods, and they also listen to each other's advice, with no obligation to take it (as when Tom is offering to teach them how to import sound, or make a study visit to IHM).

In the flexible time schedule discussion, it is shown how they are engaged in divergent thinking regarding an up-coming activity. And they are engaged and excited in their discussion around how their practice could change combining different teaching methods.

Create a rhythm for the community. Rhythm in life contributes to a sense of familiarity. Teachers meet regularly with the facilitator and other teams as they participate in the program, which becomes a rhythm during the time they participate in ITiS. They also have a tradition of meeting weekly with each other in conferences at school. The rhythm can be too fast, as when the computer support person shows them how to use PowerPoint. But it can also be too slow, as described when meeting with other teachers at seminars. Richard says they are used to such a high tempo, that when they sit down at those meetings it just makes him want to gasp for air!

When teachers carry through their student project, it gives the community "a beat around which other activities find their rhythm"[68]. It breaks up the regular rhythm, and directs their energy in a certain way, all being engaged in completing the project. It is about finding the right rhythm as a key to a community's development where a mix

---

[68] See theory chapter 5 this volume, p. 117

of idea-sharing forums (like the facilitation meetings and seminars) and tool-building projects (like the student project or their in-service on-site training).

Possible implications

This team is fortunate to have competent ICT users on the team, which probably shapes their community in a special way when they participant in ITiS. Not all teacher teams have extensive ICT competence on their team, and even if they do, it is not probable that all teacher teams can be viewed as a community of practice. Since there is only one team studied, I have no comparative material, or empirical evidence, for stating anything about teams that are not communities of practice. However, this team can serve as a reference, where it is up to the reader to create meaning around the findings; through fittingness or dissimilarities. In this respect, other teacher teams and principals may find ways to cultivate their own communities of practice. This does not mean that all data collected from The Barrel Team points to a direction of pedagogical change at their school, or that facilitation per se is something beneficiary to team development; it merely shows that cultivating a community of practice is a complicated endeavor, where this study shows how a team can function as a vehicle for competence development.

Design for evolution
Teacher engagement does not have to be mutual. A teacher can be highly engaged on an individual level, and there is nothing legally regulating that teachers have to cooperate with each other as a teacher team. However, Swedish teachers are more or less "forced" to join a team, which has become the predominant organizational form for teacher work. Therefore, teamwork can be a point of departure to start cultivating communities of practice. To cultivate a community of practice is to design for evolution. To build a design for evolution is to recognize what is already there; structure, and knowledge, that already exist.

The design of the ITiS program is building on what is already there; teamwork, teachers' own questions as starting point for pedagogical discussions, and a student project that is part of regular teaching

255

activities on the schools. I am arguing that these aspects are favorable for teacher competence development.

Since teamwork is the predominant organizational form in Swedish schools, I am arguing that teams can be cultivated in a way that combines bottom-up as well as top-down strategies (Fullan/ Stiegelbauer, 1991). The design of the ITiS program is to some degree a top-down design, by the teachers in the study experienced as rigid when it comes to certain aspects (e.g. having to attend the meetings, or, which is not expressed by this team but something that may be experienced as rigid by others: having to apply as a team). However, the rigidity of the program has forced the teachers to participate in activities that they did not know beforehand would be for the better. In addition, working on a joint student project, has increased interaction among them.

There is also a bottom-up design inherent in the program, which promotes evolution by letting the teachers choose how they will use the computers, and what the student project is going to be about. Besides, the teachers are left to decide what issues to discuss during facilitation meetings, as long as it is not about learning how to use ICT. This makes it possible for them to make local reifications to level their participation, emanating from experienced needs of issues to be discussed. But it is also an opportunity to let issues evolve over time, since facilitation meetings are recurrent. In addition, there are no goals set regarding what is to be accomplished during the meetings, which is a possibility for evolution of that which cannot be foreseen ahead of time.

The program also involves principals, but at a different level. In the particular case studied, the principal intervenes very little in the student project or in teacher competence development. The teachers are left to each other to find ways to enhance their competence, but the principal's way of freeing them from other school activities facilitates the process. The principal becomes a vehicle for making change possible, shepherding evolution by listening to the teachers and acknowledging what is meaningful to them.

Having the opportunity to use time to interact with each other is crucial for the possibility of interaction between teachers. Time for interaction is included in the program by offering teachers facilitation

and seminars. Teachers are commanded to interact in a presence of a facilitator, who brings in new perspectives and questions their statements. Even if the facilitation meetings and seminars are expressed as a constraint for competency development for this particular team, it is shown that they do learn from those meetings.

I am arguing that their lamenting over the seminars is an expression of belonging to the community of practice at The Barrel. They are engaged in their own team and align to each other's perspectives, and have difficulties imagining that other teachers, teaching other grades, may have something to add to the development of their own practice. Their lack of alignment, engagement, and imagination regarding interaction with other teams, is a combination that strengthens their own community by lamenting over the meetings.

Even though the seminars are expressed as "a waste of time", mainly due to the teachers on the team, who teach upper grades, view themselves as having little in common with lower grade teachers, it is shown that they *do* learn from meeting with other teachers. When they do engage in aligning to the others by adopting what they have heard and seen, they start using what they have learnt, and imagine a different way of doing things in their own community. They are combining the modes of belonging in an effective way.[69] Bringing in outside perspectives help the teachers to see new possibilities, fructiferous to open up a dialogue between outside and inside perspectives. But, the question is whether the time spent at seminars is proportionate to the learning outcome.

The seminars are expressed as consisting of too many participants, and there are too few opportunities to interact with the others around issues that are relevant to the Barrel Team. The teachers would probably have benefited from meeting in smaller groups. Maybe there should have been around ten teachers from lower, middle, and upper grades, instead of twenty-five teachers. This would have enabled a closer interaction among them, making it easier for the teachers to raise *their* questions, concerning the presentations on different student projects.

---

[69] See theory chapter 5, p. 110

Another issue that is of interest to rise here is whether some of the seminars could have been focused on particular teacher groups, such as upper grade teachers teaching the same subject. I am not suggesting this type of seminars *instead* of seminars consisting of teachers teaching different grades, but rather that there may be a need for *additional* types of seminars in order to cover as many needs as possible that teachers may have regarding their competency development. It is shown in this dissertation that some competencies experienced as needed is related to which subject an individual teacher is teaching. This is expressed regarding ICT competence, but the same is probably applicable when it comes to pedagogical discussions. Often, there are preexisting personal networks among teachers, which could be a design element to catalyst evolution. One of the teachers says that he is not sure that teams that are put together to represent different subjects, like The Barrel team, always is the best design for helping the teacher to plan his personal work. He wants to have a possibility to discuss issues within his particular subject domain with peers that teach the same subject as he does. My suggestion is therefore rather a matter of building on that which evolves, like informal interaction between teachers, and formalize informal meetings by allowing time for such interaction.

Facilitation as a possibility for teacher competency development
The ITiS design includes time set aside for facilitation and pedagogical discussions. When engaged in pedagogical discussions, teachers do not always know what type of knowledge they are looking for, and therefore are not in a position to ask for it. But they are competent teachers that know how to raise pedagogical issues. The facilitator is there to challenge what they say, which can make them view the issue in a different way and take their discussion further.

Facilitators in the program do not need to be experts on ICT issues or pedagogical content, but I am arguing that they need to be experts on facilitation. Being a facilitator the way suggested in the program - a colleague who is not to supply teachers with expertise, but make them talk to each other around pedagogical issues meaningful to them - is not an easy task. It requires knowledge about this type of facilitation, and experienced facilitators. In the ITiS program, teachers have been educated to facilitate. It is shown, though, that even if teachers have

258

an experienced facilitator (Oscar, the studied team facilitator, facilitates 15 teams), it is not an easy task.

More than 1100 teachers have been educated as facilitators within the ITiS program, but what happens in the future, the formal ITiS program having come to an end? Are the facilitators going to be used in the future? And to what extent are municipalities contributing to *facilitators'* competency development?

Facilitation is stated as one of the central positive outcomes in the National Evaluation of the ITiS program (Chaib/Tibelius, 2004). It seems like a waste of resources not making use of them, but it is a political question, undermined by communal financial restrains, whether these facilitators are going to be used or not in the future. And if they are going to be used, they too will need to develop their facilitation skills through further training, which puts additional financial strain on municipalities. However, making use of existing facilitators, train new ones, and offer further training, could be one way to cultivate teacher teams in a direction to change pedagogical practice.

The object of this study is not facilitation, and the unit of analysis is not the facilitator. If facilitation had been the main issue studied, I would have engaged more actively in searching for documents, finding out more about facilitation in schools, nationally as well as internationally. Even if the study is not on facilitation, it tells something about the design of the ITiS program and how teachers' ICT competence, as well as pedagogical awareness, can be supported. It seems rather unique that, a national program aimed at teacher competence development and a change of pedagogical practice including using ICT, does not offer teachers ICT courses or facilitation on how to use the artifact. Nowhere, have I come across a similar program, which does not mean that it does not exist in some other country. It merely suggests that it is a remarkable program, where the facilitator is to stand back with expertise on ICT and pedagogical content, in order to facilitate teacher competence development by building on what is there, and facilitating a process where teachers are to learn bottom-up. The design of the program has shown that teachers do extend their competencies in ICT use, as well as learn

259

from pedagogical discussions, where facilitation can be a means for developing educational practice.

Someone to help teachers learn how to use the artifact

When the facilitator in this study does *not* provide help regarding how to use ICT, the teachers get frustrated, and seize hold of their own competence development regarding learning how to use ICT in practice. They are fortunate to have competent ICT users as peers on the team, and they can also request help from their computer support man on school. But not all teams have the advantage of having competent ICT users among their peers.

As concluded above, in a highly reified learning situation, someone may be needed to facilitate participation. In this respect, teachers express a need for someone that is available who can help them learn how to use ICT in practice.

The National Evaluation of the ITiS program (Chaib & Tibelius, 2004, p. 41) supports this result, where it is stated that the program would have benefited from offering teachers more ICT training. But what kind of ICT training is it that teachers request? Is it traditional courses, with an expert giving a class on a particular software program? And who is to decide what courses to participate in?

In this study, teachers' competency needs become apparent over time when using ICT to a greater extent in their profession, and the teachers request and decide on what courses to participate in. They do not request traditional ICT courses decided above their heads. Instead, they want someone who emanates from what they experience as their need of competency development, such as learning how to use PowerPoint when they demand that students know how to use it. According to the teachers, it is crucial that there is someone around who can help them with ICT problems, and someone who can help them when they experience a need to learn new software programs.

On this team, teachers use available resources, which include helping each other, and, initiate internal courses with the computer support man as an instructor. The main issue concerns teachers being able to decide on the content, and set the pace themselves. Keeping in mind that individuals do not always know what to ask for in regards to

learning that which they do not know, calls for ample opportunities to discover what possibilities there are. I am arguing that interaction with people from the outside (who know how to facilitate pedagogical discussions, as well as know how to answer questions around ICT), and extended interaction between teachers on the team, are both needed to develop competence and change pedagogical practice. It is a matter of letting practice be its own curriculum[70], at the same time bringing in outside perspectives to help teachers see possibilities. But bringing in someone from the outside is not always something that teachers can decide upon themselves, since it is a financial issue.

Teachers are accountable to society for developing practice, but society is accountable towards teachers to make development of practice possible. When it comes to cultivating communities of practice and teachers' competency development, politicians and school management are responsible for making it possible for teachers to develop competencies. This goes for learning from pedagogical discussions as well as learning how to use ICT. As stated earlier, in order to develop and change practice, teachers may need to be involved in pedagogical discussions *and* ICT courses. Learning how to use ICT, as well as learning from pedagogical discussions, can be facilitated by someone who can scaffold the ongoing learning processes. I have no suggestion regarding how to financially do this, but it seems reasonable to suggest that the issue is worth a close scrutiny by local municipalities, as well as by state authorities.

Helping each other
Possible tasks for teachers to execute during working hours have increased, and so has available knowledge. There are also new tools, based on ICT, to be used in instruction and administration, tools that many teachers do not know how to use. ICT is so vast as to possibilities and applications that no individual teacher can know everything related to ICT in educational settings. The above points to the suggestion that the teaching profession cannot be sufficiently upheld any longer by individual teachers that do everything themselves. They have to be mutually engaged with their colleagues regarding what they are there to do, and what they are not to do. This calls for strategies that help teachers make use of the inherent

---

[70] See theory chapter 5, p. 105

competencies on the team as well as develop new knowledge among the participants.

Teachers have different experiences of using ICT, and how they can contribute to fulfillment of the joint enterprise. Individual experiences and ideas become structuring resources for developing communities of practice, when shared among the teachers on the team. All do their part, but those teachers who have ownership of meaning which include being interested in ICT, have a great value to the community when their competencies are viewed as assets, and not threats to the others. In this respect, some meanings achieve special status.[71] When teachers socially negotiate and share meaning, participation increases ownership of meaning. Their negotiations become a way of drawing peripheral members closer to the core. Not (yet) being accountable for knowing how to use ICT makes it easy to seek each other's help. For a teacher who does not have the status of being a competent ICT user, it is not embarrassing to ask for help, since there is no tradition within the teacher profession of ICT use in practice.

Experiences of knowledge around ICT differ from other type of teacher professional knowledge, such as pedagogical awareness or knowledge in subject domains. Teachers not being accountable to society for knowing how to use ICT creates a gap between present, and probable, future accountability concerning ICT in school. As a consequence of this reasoning, I am arguing that *now* is a time for learning and changing practice with the aid of ICT. If teachers had the time on hand, there could be ample opportunities for teachers to seek each other's help to learn how to integrate ICT in pedagogical practice, since there is no threat asking for help. It is reasonable to assume that future teachers will be competent ICT users if they have a recent teaching diploma. Once teachers become accountable for being competent in the ICT field, and accountability as to ICT issues become further institutionalized, it will probably be more difficult to turn to each other for help, as it appears to be when it comes to subject matter content, or, pedagogical competencies.

Do teachers, in general, know which colleague to turn to for help on different issues? Has anybody on the school made an inventory of

---

[71] See theory chapter, p 108

which competencies may be inherent among staff on the school, and how it could be put to use? How are teachers with special competencies beyond subject matter content going to be remunerated? These are questions that can be asked, and where the answers may reveal that teachers are competent in many different areas that could be used to develop contributing resources in order to develop educational practice. Competencies which go beyond subject matter content need to be recognized and put to use, which in turn calls for someone who has the authority to make it worthwhile for teachers to spend time helping each other. Teachers in the community of practice at the Barrel help each other to a great extent, without getting any extra pay, just like it often is in a community of practice. They say that it is possible putting in extra time when you have a particular project that has to work, like the student ITiS project, but in the long run, they need formalized time for informal interaction.

Do state and local authorities, politicians ultimately responsible for school development, recognize the potential force inherent on teacher teams, and what teachers may be able to accomplish if they are given the possibility? Needless to say, a functional infrastructure is a necessity. But in addition, it seems to be a matter of teachers having the possibility to structure some of the available time, in addition to bringing in a few people outside the team that can help them overcome obstacles.

Reflections on the study

This study takes a point of departure in an explicit theoretical premise that learning is situated. I am well aware that the results can be interpreted differently, if a different theoretical stance is taken, and I am not trying to provide empirical evidence to prove that learning is situated; it is merely a premise for the account given. There are many other studies of social processes, but the account given is built upon a tight relation to the theory used. It can be stated that the given description of the results substantiates that learning is situated where the results show in what way learning is situated for this particular teacher team. Even if this dissertation does not aim for generalizations, since such methods are not built into the design, I will cautiously point to some writings that maybe can be interpreted as

263

fuzzy generalizations from the results, suggesting that in some cases it may work to talk about learning as related to the level of participation and reification. This mainly concerns the account of how reification and participation is balanced in teachers´ view on learning. Teachers' view on learning cannot be talked of as a stable view; teachers re-present their view on learning differently in different learning situations. Hence, learning is situated, and here argued as related to the level of participation and reification.

When I did early analysis on the material, I was puzzled by the fact that teachers expressed their view differently, in different situations. Students were to learn by discovering knowledge on their own, in accordance with a Piagetian constructivistic view. But when teachers themselves were to learn, they expressed a need for an expert on ICT use in order to learn how to use ICT. This seemed to be confirmed in pedagogical discussions as well, since they wanted the facilitator to tell them "how-it-is" or "what-to-do". So, for some time the analysis seemed to confirm that teachers had a stable view on their own learning, even if it was not confirmed in regards students learning. However, I was not content with this result when discovering that teachers were upset when the content of the seminars were imposed on them, somebody else setting the agenda for their learning. When I found Wenger's theory Community of Practice, the theory provided me with an analytical tool to understand their disparate view on learning, and why it is a different learning situation when learning how to use ICT, and learning from pedagogical discussions. The theory has been a productive and valid tool to understand learning as situated, and how the learning process is connected to negotiations of meaning and the two joint processes reification and participation.

Using one theory extensively has made me pose the question of what I may be missing in this study. Not using culture as a central concept means that I probably have missed some interesting aspects on a macro level, ideologically and historically. Neither have I studied teachers' life outside of school, which probably would have added some aspects on a micro level. However, a doctoral thesis is a limited type of work, where one has to outweigh the advantages and disadvantages of such issues in relation to time spent and the possibility of getting the work completed.

One decision made during data collection was to add the method focus group conversation, not a method pre-dominant in ethnographic studies, but viewed as a possible method from start. This showed to be an economic way to collect data. The above result pointing toward situated learning is mainly drawn from the discussion in the focus group conversation. As a researcher, performing a focus group with low moderator involvement, I was the one introducing the themes they were to talk about, but the themes introduced were derived from what I then knew about the teacher team practice that I was studying. In this respect, one could say that the focus group conversation emanated from issues that I knew teachers had a need to talk about, a theme presented in quite general terms, but leaving it up to them to decide exactly what they discussion was to be about. This resembles how a facilitator can initiate and execute a facilitation meeting.

Looking back, I realize that it probably would have been rewarding to use focus group conversations to a greater extent than I did for collecting data for this type of study. If I were to do a similar study, I would use the method more extensively. There is a problem with teachers' schedule, though, trying to gather eight teachers for a joint meeting where there is no time set aside for such interaction. This was a problem when I did follow-up visits; all teachers on the team were not able to participate at those times.

I have also reflected on the limitations of an ethnographic methodological approach for this type of study. While in the midst of the process of writing, ethnographic method seemed a prolix way to complete a dissertation, having a lot of data, which did not fall into place easily. At times, I have considered the possibility of presenting a doctoral dissertation consisting of previously published articles, but giving an ethnographic account, drawing on findings where the results are tightly intertwined and interrelated, made me rule out that type of dissertation. I needed the whole picture before I was able to say anything about the parts.

I have not used interviews to any great extent, and the prepared interviews I did – with the principal and students – gave me data that I hardly used at all. The strength of data used for analysis, rather lies

in informal conversations and observations, as often is the case in ethnographic studies.

Another reflection around collecting data concerns which settings I chose to observe. I have not been present at all their facilitation meetings, which I today regret. At the time, I did not find it necessary to attend *all* the meetings since my dissertation was not focused on facilitation. Besides, I had taken Kvale's (1996) advice, and tried to refrain from ending up with 1000 pages of transcripts. Another reason is that I found that the teachers had pedagogical discussions when the facilitator was not around as well, which supplied me with useful data.

On two of the facilitation occasions, the facilitator was inhibited from participating due to paternal leave. One of the times, I filled in for him, requesting to have a focus group conversation with the teachers, which I have earlier pointed out as providing me with useful and interesting empirical data for understanding how a teacher team functions, and which conclusions can be drawn for pedagogical practice, the complimentary aim of the study.

So, what can be learnt from this study? Does the study contribute in any significant way to inform teaching practice in general, and teacher competence development through teamwork in particular? These questions do not suggest that this study is to be placed on an equal level with a study based on cause and effect. Such conclusions are not possible to draw from this study. However, the results point to a relation between the design of the ITiS program and theory, which can provide us with partial knowledge where there is a possibility that some of the implications presented above, may contribute by enabling the reader to view teacher team work and teacher competence development in a new way.

In summary, it can be concluded that teachers need possibilities to mutually engage in fulfilling their joint enterprise, and develop a shared repertoire, which requires time for interaction. Someone taking them on a journey to a place where they have mapped out the route themselves can facilitate teachers competency development. But they may also need someone who can take them on a journey to a place they did not know exists.

266

References

Aftonbladet IT. (2001). *Sverige bäst i världen på IT [Sweden best in the world on IT]. 7, 14-15*

Ahlstrand, E. (1995). *Lärares samarbete – en verksamhet på två arenor. Studier av fyra arbetslag på grundskolans högstadium. [Teacher Collaboration – an Activity on Two Scenes of Action. A study of four teacher teams at compulsory school's senior level].* Dissertation, Linköping: Studies in Education and Psychology, 43

Alexandersson, M. (1994). Fördjupad reflektion bland lärare – för ökat lärande [Deepened Reflection among Teachers – for Enhanced Learning]. In T. Madsén (ed.) *Lärares lärande. Från fortbildning till en lärande organisation.]Teachers' Learning. From in-service training to a learning organization]* (pp. 157-173). Lund: Studentlitteratur

Alvesson, M. & Sköldberg, K. (1994). *Tolkning och reflektion. Vetenskapsfilosofi och kvalitativ metod [Interpretation and reflection. Science philosophy and qualitative method].* Lund: Studentlitteratur

Arfwedson, G. (1985). *School codes and teacher´s work. Three studies on teacher work contexts.* Dissertation, Stockholm University. Malmö: Liber förlag/Gleerup

Assermark, G. & Sörensson, K. (1999). *Arbetslag i skolan [Teacher teams in Schhols}* Stockholm: Liber

Ball, S. (1981). *Beachside Comprehensive. A case study of secondary schooling.* USA: Cambridge University Press

Bassey, M. (1999). *Case Study Research in Educational Settings*. Philadelphia: Open University Press

Bassey, M. (2002). Case Study Research. In M. Coleman & A. Briggs (Eds.) *Research Methods in Educational Leadership and Management* (pp. 108-121) Londond: Paul Chapman Publishing

Baszanger, I. & Dodier, N. (1997). Ethnography: Relating the part to the Whole. In D. Silverman (ed.) *Qualitative Research. Theory, Method and Practice* (pp. 8-23**).** London: SAGE Publications Ltd.

Beach, D. (1995). *Making Sense of the Problems of Change: an ethnographic study of a teacher education reform.* Dissertation Gothenburg University. Göteborg: Acta Universitatis Gothoburgensis

Becker, H. J. (1999). *Internet Use by Teachers: Conditions of Professional Use and Teacher-Directed Student Use.* Teaching, Learning, and Computing: 1998 Survey. Report # 1. Center for Research on Information Technology and organizations. The University of California, Irvine & The University of Minnesota. Retrieved from www.crito.uci.edu/TLC/findings/Internet-Use/startpage.htm

Becker, H. J. (2000a). *Findings from the Teaching, Learning, and Computing Survey: Is Larry Cuban Right?* Revision of a paper written for the January, 2000 School Technology Leadership Conference of the Council of Chief State School Officers, Washington, D.C. Retrieved from www.crito.uci.edu/tlc/html/findings.html

Becker, H. J. (2000b). Pedagogical Motivations for Student Computer Use That Lead to Student Engagement. University of Californina, Irvine. In *Educational Technology*, September-October 2000. Retrieved from www.crito.uci.edu/TLC/FINDINGS/spec_rpt_pedagogical/

Bell, D. (2001). Yes Virginia, There is a Feminist Ethnography: Reflections From Three Australian Fields. In A. Bryman (ed.) *Ethnography Vol III* (pp. 84-99**).** London: SAGE Publications Ltd

Berger, P. & Luckman, T. (1967). *The Social Construction of Reality*. London: Penguin Books

Bergström, A., Cullblom, E., S. Lindberg, & S. Nyberg. (1993). *Det kreativa arbetslaget [The Creative Teacher Team]*. Rapport från ett forsknings- och utvecklingsprojekt. Högskolan i Luleå: Arbetsrapport 11:1993

Bernstein, B. (1996). *Pedagogy, Symbolic Control and Identity. Theory, Research, Critique.* London: Taylor & Francis

Bernstein, B. (1997). Official Knowledge and Pedagogic Identity. In I. Nilsson, & L. Lundahl (Eds.) *Teachers, Curriculum and Policy. Critical Perspectives in Educational Research* (pp. 165-179). Department of Education, Umeå University

Bernstein, B., Lundgren, U. P., & Dahlberg, G. (1983). *Makt, kontroll och pedagogik; studier av den kulturella reproduktionen [Power, control, and pedagogy; studies of the cultural reproduction].* Stockholm: Liber förlag

Bertilsson, M. & Christiansen, P. (1990). Inledning Charles Saunders Peirce (1834-1914). Intoduction. In *Pragmatism och Kosmologi; valda uppsatser i översättning av Richard Matz [Pragmatism and Cosmology; selected papers in translation by Richard Matz]* (pp. 7-36). Göteborg: Daidalos

Bliding, Marie. (2004). *Inneslutandets och uteslutandets praktik. En studie av barns relationsarbete i skolan [The Practice of Inclusion and Exclusion A study of relations between children in school].* Dissertation, Göteborg: Acta Universitatis Gothoburgensis

Bogdan, R. C. & Knopp-Biklen, S. (1982). *Qualitative Research for Education. An Introduction to Theory and Methods.* USA: Allyn and Bacon, Inc.

Brettell, L. (1986). *Arbetsenheterna i skolan [The Work Units in Schools).* Stockholm: Liber Utbildningsförlag

Brorman, A. (1999). *Möjligheternas möte? Rapport om ett utvecklingsprojekt. En förändrad lärarroll – arbetslagets praktiska vardagsarbete med fokus på barns läs- och skrivutveckling och tematisk undervisning.[Encounters of Possibilities? Report from a developmental project. A changed teacher role – the teacher team's practical everyday work with focus on children's development in reading and writing and thematic instruction]].* Högskolan i Borås: Centrum för skolutveckling. Skrifter om skolutveckling, 1999:4

Brown, R. D. (2000). Early American Origins of the Information Age. In A. D. Chandler Jr. & J. W. Cortada (Eds.). *A Nation Transformed by Information. How information has shaped the United States from colonial times to the present* (pp. 39-53). New York: Oxford University Press

Bruner, J. S. (1974). *Beyond the Information Given. Studies in the Psychology of Knowing.* London: Allen & Unwin Ltd.

Bruner, J. (1990). *Acts of Meaning.* Cambridge, Massachusetts: Harvard University Press

Burr, V. (1995). *An Introduction to Social Constructionism.* London: Routledge

Castells, M. (1996). *The Information Age. Economy, society and culture Vol 1. The rise of the network society.* Massachusetts, USA. Blackwell Publishers Inc

Chaib, C. (1996). *Ungdomsteater och personlig utveckling. En pedagogisk analys av ungdomars teaterskapande [Youth Theater and Personal Development. A pedagogical analysis of young people creating theater].* Dissertation Lunds universitet: Pedagogiska institutionen

Chaib, M & Orfali, B. (1995). Inledning [Introduction]. In M. Chaib & B. Orfali (Eds.) *Sociala representationer. Om vardagsvetandets sociala fundament [Social Representations. On the social foundation for common-sense knowledge]* (pp. 15-24). Göteborg: Daidalos

Chaib, M. & Karlsson, M. (2001). ICT and the Challenge to Teacher Training. In Chaib (ed.) *Perspectives on Human-Computer Interactions. A multidisciplinary approach* (pp. 141-172). Lund: Studentlitteratur

Chaib, M., Bäckström, Å., & Chaib, C. (2001). *"Detta är bara början..." Erfarenheter och reflektioner från sex arbetslag ["This is just the*

beginning...". Experiences and reflections from six teacher teams. Nationell utvärdering av IT i skolan. Högskolan för lärande och kommunikation i Jönköping: Rapport 1:2001

Chaib, C., Chaib, M., & Ludvigsson, A. (2004). *Leva med ITiS. Nationell utvärdering av IT i Skolan [Living with ITiS. National Evaluation of IT in School]* Högskolan för lärande och kommunikation i Jönköping/Encell. Rapport 1:2004.

Chaib, M. & Tebelius, U. (2004). *ITiS-satsningen 1999-2002. Sammanfattning av den nationella utvärderingen [The ITiS National Action Programme 1999-2002. Summary of the National Evaluation].* Retrieved 2004-09-11 from www.skolutveckling.se/skolnet/pdf/itis_slutrapport.pdf

Chaiklin, S. (1997). The Zone of Proximal Development in Vygotsky's Analysis of Learning and Instruction. In A. Kozulin, B. Gindis, V. S. Ageyev, & S. M. Miller (Eds.) *Vygotsky's Educational Theory in Cultural Context* (pp. **39-64).** Cambridge Universtiy Press

Chandler, A. D. Jr. (2000). The Information Age in Historical Perspective. In A. D. Chandler Jr. & J. W. Cortada (Eds.) *A Nation Transformed by Information. How Information Has Shaped the United States from Colonial Times to the Present* (pp. 3-37). New York: Oxford University

Chang-Wells, G.L.M. & Wells, G. (1993). Dynamics of Discourse: Literacy and the construction of Knowledge. In E. A. Forman, N. Minick, & C. A. Stone *Contexts for learning. Sociocultural Dynamics in children's Development* (pp. 58-90). New York: Oxford University Press Inc.

Cherryholmes, C. H. (1988). *Power and Criticism. Poststructural investigations in education.* New York: Teachers College Press, Columbia University

Cohen, L. & Manion, L. (1989). *Research Methods in Education, 3rd ed.* London: Routledge

Cole, M. (1995). Socio-cultural-historical psychology: some general remarks and a proposal for a new kind of cultural-genetic methodology. In J. V. Wertsch, P. del Rio, & A. Alvarez (Eds) *Sociocultural Studies of Mind.* (pp. 187-214). USA: Cambridge University Press

Collis, B. & Moonen, J. (2001). *Flexible learning in a digital world: Experiences and expectations.* London: Kogan Page

Colnerud, G. & Granström, K. (1996). *Kompetensutveckling och lärande. Om tre olika former för lärares fortbildning och utveckling. [Competency Development and Learning. Ont three different forms of teacher in-service training and development].* Miljon-projektet, rapport nr. 8. Linköpings universitet, Lärarutbildningens lilla serie

Colnerud, G. (2001). Etik och IT. *Pedagogiska magasinet,* Lärarförbundet *01, 3, 58-63*

Cuban, L. (1986). *Teachers and Machines. The classroom use of technology since 1920.* New York: Teachers College, Columbia University

Cuban, L. (1993). *How Teachers Taught. Constancy and change in American classrooms 1880-1990 2nd Ed.* New York: Teachers College Press

Cuban, L. (2003). *Why Is It So Hard to Get Good Schools?* New York: Teachers College Press

Dahl, E-L. (1998). *Ideologi och institution. Kyrka, stat och reformpedagogik [Ideology and Institution. Church, the state and reform pedagogy].* Gothenburg University (unpublished manuscript).

Dahlgren, L-O. (1998). *Problembaserat Lärande – idé, praktik och effekter [Problem Based Learning – Idea, Practice and Effects].* Linköpings universitet. Retirieved from (www.itis.gov.se/studiematieral/kopia/db/itl_grund/282.html)

Davidsson, B. (2002). *Mellan soffan och katedern. En studie av hur förskollärare och grundskollärare utvecklar pedagogisk integration mellan förskola och skola*

269

[Between the Couch and the Teacher's Desk. A study of how pre-school teachers and elementary school teachers develop pedagogical integration between pre-school and school]. Dissertation, Göteborg: Acta Universitatis Gothoburgensis

Dawes, L. (2001). What Stops Teachers Using New Technology? In M. Leask *Issues in Teaching Using ICT* (pp. 61-79). London: Routledge Falmer

Delamont, S. (1992). *Fieldwork in educational settings. Methods, pitfalls & perspectives.* London: The Falmer Press

Delegation for ICT in Schools. (1999). *The National Action Programme for ICT in Schools. ITiS.* Stockholm: Ministry of Education and Science.

Delegation for ICT in Schools. (1999). *The National Action Programme for ICT in Schools. ITiS.* Stockholm: Ministry of Education and Science. Retrieved from www.itis.gov.se/English/about.html, 2002-02-21, 2002-07-01

Dewey, J. (1916). *Democracy and Education.* Retrieved 2004-09-11 from http://www.ilt.columbia.edu/publications/Projects/digitexts/dewey/d_e/chapter01.html

Dewey, J. (1926/1984). *The later works, 1925-1953 Vol 2, 1925-1927. Essays, reviews, miscellany, and The Public and Its Problems.* B. A. Walsh (ed.). Carbondale, Ill: Southern Illinois University Press, Cop.

Donmoyer, R. (2000). Generalizability and the Single-Case Study. In R. Gomm, M. Hammersley, & P. Foster *Case Study Method; key issues, key texts.* (pp. 45-68). London: SAGE Publications Ltd.

Dryden, G. & Vos, J. (1994). *Inlärningsrevolutionen. [The Learning Revolution book].* Jönköping: Brain Books

Ehn, B. (1996). Närhet och avstånd. In B. Ehn & O. Löfgren *Vardagslivets etnologi. Reflektioner kring en kulturvetenskap [Everyday Life Ethnology. Reflections on a cultural science] (*pp. 89-180). Stockholm: Natur och kultur

Eliasson, R. (1995). *Forskningsetik och perspektivval. [Research Ethics and Choice of Perspective).* Lund: Studentlitteratur

Ellström, P-E. (1992). *Kompetens, utbildning och lärande i arbetslivet. Problem, begrepp och teoretiska perspektiv. [Competene, Education, and Learning in Working Life. Problems, concepts, and perspectives].* Stockholm: Publica, CE Fritzes förlagen

Emsheimer, P. (1994). Behovsanalys och uppföljning – för bättre fortbildningsplanering [Need Analysis and Follow-up – in order to plan in-service training in a better way]. In T. Madsén (ed.) *Lärares lärande [Teachers' Learning]* Lund: Studentlitteratur

Engeström, Y. (1986). Developmental Work Research. The Approach and an Application in Cleaning Work. In *Nordisk Pedagogik, 1, 2-14*

Engeström, Y. (1994). *Training for change: New approach to instruction and learning in working life.* Geneva: International Labour Office

Engeström, Y. (1996). Developmental work research as educational research. In *Nordisk Pedagogik,* Vol 16. *3, 131-143*

Engeström, Y (1999). Situated Learning at the Threshold of the New Millennium. In J. Bliss, R. Säljö & P. Light (Eds.) *Learning Sites. Social and Technological Resources for Learning. (*pp. 249-257) Oxford: Pergamon Earli

Englund, T. (1995). På väg mot undervisning som det ordnade samtalet [Approaching instructional design as arranged conversation]. In G. Berg, T. Englund, & S. Lindblad. *Kunskap Organisation Demokrati* (pp. 4p-70). Lund: Studentlitteratur

Englund, T. (1996). Pedagogikens uppgifter. Att utveckla kunskap om socialisations- och kommunkationsprocesser som meningsskapande

[The pedagogical task. To develop knowledge of socialization and communication processes]. *Pedagogisk forskning i Sverige 1, 1, 40-53*

Englund, T. (2000). *Deliberativa samtal som värdegrund – historiska perspektiv och aktuella förutsättningar [Deliberative Conversation as Foundation for Values – historical perspectives and current conditions].* Skolverket. Retrieved 2004-09-11 from http://www2.skolverket.se/BASIS/skolbok/webext/trycksak/SDF?FORM_C=och&FORM_OB=PUBLSORT&FORM_SO=Minskande&MULTI=&MULTI_O=inneh%E5ller+alla&TITLE=Deliberativa+samtal+som+v%E4rdegrund&TITLE_O=inneh%E5ller+alla

Europeiska Kommissionen (1996). *Vitbok om utbildning. Lära och lära ut. På väg mot kunskapssamhället. [Whitebook on Education. To learn and To Teach. Heading towards knowledge society).* Luxemburg: Byrån för Europeiska gemenskapernas officiella publikationer.

Farr, R. M. & Moscovici, S. (1984). *Social Representations.* Cambridge University Press

Fetterman, D. M. (1998). *Ethnography. Step by step 2nd ed.* Applied Social Research Methods Series, Vol 17. Thousand Oaks, CA: Sage Publications Inc.

Fullan, M.G. & Stiegelbauer, S. (1991). *The New Meaning of Educational Change.* London: Cassell Educational Limited

Gadamer, H. G. (1994). *Truth and Method. 2nd ed.* New York: The Continuum Publishing Company

Geertz, C. (1993). *The Interpretation of Cultures.* New York: Basic Books

Gergen, K. J. & Gergen, M. (1992). Toward Reflexive Methodologies. In F. Steier (ed.) *Research and Reflexivity* (pp. 76-95). London: Sage Publications Ltd.

Gomm, R., Hammersley, M. & Foster, P. (Eds) (2000). *Case Study Method: key issues, key texts.* London: SAGE

Granström, K. & Olsson, K. (1987). *Arbete i arbetslag och arbetsenheter inom grundskolan. Några utgångspunkter [Work in Work Teams and Work units Within Elementary Schools. Some starting points.* Universitetet i Linköping. 1987:1

Greenfield, P. M. (1999). A Theory of the Teacher in the Learning Acitvities of Everyday Life. In B. Rogoff & L. Lave *Everyday Cognition. Development in social context* (pp. 117-138). New York: Harvard University Press

Grossman, P. L. (1990). *The Making of a Teacher. Teacher knowledge & teacher education.* New York: Teachers College Press, Columbia University

Hagström, S. (1995). *Kunskapssamhället [Knowledge Society].* Göteborgs universitet, rektorsämbetet

Hammarström-Lewenhagen, B. & Ekström, S. (1999). *Det mångtydiga mötet. Ett försök att förstå komplexiteten i pedagogisk handledning med yrkesverksamma [The Meeting of Many Meanings. An attempt to understand the complexity in pedagogical supervision with professionals].* Stockholm: HLS Förlag

Hammersley, M. (1998). *Reading Ethnographic Research. 2nd ed.* United Kingdom: Addison Wesley Longman Limited

Hammersley, M. & Atkinson, P. (1989). *Ethnography: Principles in Practice.* London: Routledge

Hammersley, M. & Atkinson, P. (1995). *Ethnography: Principles in practice. 2nd ed.* London: Routledge

Hammersley, M. & Gomm, R. (2000). Introduction. In R. Gomm, M. Hammersley, & P. Foster (Eds.) *Case Study Method; key issues, key texts* (pp. 1-16). London: SAGE Publications Ltd.

Handal, G. & Lauvås, P. (2000). *På egna villkor. En strategi för handledning [On own terms. A strategy for supervision].* Lund: Studentlitteratur

271

Handy, C. (1995). *Paradoxernas tid.* Jönköping: Brain Books AB

Hanson, N. R. (1958). *Patterns of Discovery.* Cambridge University Press

Hartman, S. G. & Lundgren, U. P. (1980). Inledning [Introduction]. In John Dewey *Individ, skola och samhälle. Pedagogiska texter [Individual, School, and Society. Pedagogical texts* (pp. 9-37). Stockholm: Natur och kultur

Hernwall, P., Kelly, A., & Pargman, D. (1999). *I början av en revolution? [In the Beginning of a Revolution?]* Slutrapport Stockholms stads skolutvecklingsprojekt "Den totalt IT-anpassade skolan" samt "Framtidens samhälle i dagens skola". Stockholms universitet: Pedagogiska institutionen. Pedagogik & Media-seminariets skriftserie, *6*

Hutchins, E. (1997). Mediation and automatization. In M. Cole, Y. Engeström & O. Vasques (Eds.) *Mind, Culture, and Activity. Seminal papers form the laboratory of comparative human cognition* (pp. 338-353). USA: Cambridge Universtiy Press

Hylander, I. (1998). *Fokusgrupper som kvalitativ datainsamlingsmetod [Focus Groups as Qualitative Method for Collecting Data].* Linköpings universitet, institutionen för pedagogik och psykologi. FOG rapport, *42*

Höglund, A. & Karlsson, K-G. (1998). *IT i skolan – vision och verklighet [IT in School – vision and reality].* TELDOK rapport 126. Stockholm: Nykopia Tryck AB

Isaksson, Paula. 2001: Homo Zappiens håller rätt kurs i informationsfloden. [Homo Zappiens Is on The Right Track In the River of Information]. In A. Ludvigsson & L. Winald-Möller (Eds.) *ITiS sätter spår i skolan!* Svallvågor efter symposiet i Jönköping 8-10 maj, 2001. *[ITiS leaves traces in school. Surges after symposia in Jönköping May 8-10, 2001].* Högskolan för lärande och kommunikation i Jönköping

Israel, J. (1995). Efterord – några reflektioner [Epilogue – some reflections]. In M. Chaib & B. Orfali. (Eds): *Sociala representationer. Om vardagsvetandets sociala fundament [Social Representations. On the social foundation for common-sense knowledge]* (pp. 211-216). Göteborg: Daidalos

Jacobson, D. (1991). *Reading Ethnography.* Albany: State University of New York Press

Jarvis, P. (1992). *The Paradoxes of Learning. On becoming an individual in society.* San Francisco: Jossey-Bass Publisher

Jedeskog, G. (1998). *Datorer, IT och en förändrad skola [Computers, IT and a changed school].* Lund: Studentlitteratur

Jodelet, D. (1995). Sociala representationer. Ett forskningsområde under utveckling [Social Representations. A research area under development] In M. Chaib. & B. Orfali. *Sociala representationer. Om vardagsvetandets sociala fundament [Social representations. On the social foundation for common-sense knowledge]* (pp. 27-56). Göteborg: Daidalos

John Dewey, American Pragmatist. Retrieved 2004-09-11 from http://dewey.pragmatism.org

Junefelt, K. (2001). *Sociocultural Theory and Methods – from the Standpoint of a Linguist.* In U. Sätterlund-Larsson (ed.) *Socio-Cultural Theory and Methods. An Antology.* (pp. 87-117). University Trollhättan/Uddevalla, Department of Nursing

Jönsson, H. (2000). *Skolan, arbetslagen och ledarskapet. Lärarnas, lagledarnas och rektors ansvar, funktioner och roller i lagutvecklingen [The school, The Teacher Teams, and The Leadership. The teachers', team managers', and principals' responsibility, functions, and roles in team development.* Bräcke Tryckeri

KK-stiftelsen. (2001). *Användning och attityder till IT. Elever, lärare, skolledare [Use and Attitudes Towards IT. Pupils, teachers, principals].* Gallup-gruppen. Retrieved from www.kks.se/publikationer/

Kallos, D. (1985). *Arbetsenheter och arbetslag i grundskolan [Work Units and Teacher Teams in Elementary School].* Pedagogiska institutionen Lunds universitet: Pedagogiska rapporter, 1985:40

Karlsson, M. (2001). *IKT i lärarutbildningen. Ett sociokulturellt perspektiv på grundskollärar-studenters uppfattning om sitt IKT-lärande under utbildningstiden [ICT in Teacher Education. A sociocultural perspective on teacher students' comprehension of learning ICT during their education].* Rapportserien INSIKT 2001:1. Högskolan för lärande och kommunikation i Jönköping

Keisu-Lennerlöf, L. (1984). Framtiden och datoriseringen [Future and computerization]. In *Datorer i undervisningen. Inför datasamhället [Computers in Education. Approaching computer society].* En skriftserie för skolan. Stockholm: Liber Utbildningsförlag

Keller, C. & Keller, J. D. (1993). Thinking and Acting with Iron. In S. Chaiklin, & J.Lave (Eds.) *Understanding Practice. Perspectives on activity and context* (pp. 125-143). USA: Cambridge University Press

Koschmann, T. (1996). Paradigm Shifts and Instructional Technology: an Introduction. In T. D. Koschmann (ed), *CSCL: Theory and Practice of an Emerging Paradigm* (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum

Koschmann, T., Kelson, A., Feltovich, P. & Barrows, H. (1996). Computer-Supported Problem-Based Learning: A principled approach to the use of computers in collaborative learning. In Koschmann, T. (ed.). *CSCL: Theory and Practice of an Emerging Paradigm* (pp. 83-124). Mahwah, NJ: Lawrence Erlbaum

Koschmann, T. (2000). Tools of Termlessness: technology, educational reform, and Deweyan inquiry. In *T. O' Shea (ed.), Virtual environments* (in press). Mahwah, NJ: Lawrence Erlbaum

Kozulin, A. (1998). *Psychological tools. A sociocultural approach to education.* USA: Harvard university press

Kozulin, A. (2003). Psychological Tools and Mediated Learning. In A. Kozulin, B. Gindis, V.S. Ageyev & S. M. Miller (Eds.) *Vygotsky's Educational Theory in Cultural Context* **(pp. 15-38).** USA: Cambridge Universtiy Press

Krueger, R. A. (1994). *Focus groups. A Practical Guide for Applied Research.* Thousand Oaks, CA: SAGE Publications Ltd

Krueger, R. A. (1998). *Moderating Focus Groups.* Thousand Oaks, CA.: SAGE Publications Ltd

Kullberg, B. (1996). *Etnografi i klassrummet [Ethnography in the Classroom].* Lund: Studentlitteratur

Kvale, S. (1996). *InterViews. An introduction to Qualitative Research Interviewing.* London: SAGE Publicatins Ltd

Lgr 69: Läroplan för grundskolan [National Curriculum for Compulsory Schools]. Skolöverstyrelsen. Vällingby: Liber läromedel/ Utbildningsförlaget

Lgr 80: *Läroplan för grundskolan [National Curriculum for Compulsory Schools].* Allmän del. Skolöverstyrelsen. Stockholm: Liber Utbildningsförlaget

Lgr 80. Kommentarmaterial till läroplan för grundskolan [Commentary material to the National Curriculum for Compulsory Schools]. *Samarbete i arbetsenheter och arbetslag [Collaboration in work teams and teacher teams]* 1980:6 Skolöverstyrelsen. Stockholm: Liber Utbildningsförlaget

Larsson, S. (1986). *Kvalitativ analys - exemplet fenomenografi [Qualitative Analysis – the Phenomenographic Example].* Lund: Studentlitteratur

Larsson, S. (1994). Om kvalitetskriterier i kvalitativa studier [On criteria for quality in qualitative studies]. In B. Starrin & P-G. Svensson (Eds).In *Kvalitativ metod och vetenskapsteori [Qualitative Method and Theory of Science and Research]* (pp. 163-189). Lund: Studentlitteratur

Larsson, S. (1998). Om skolning av fältforskare [On schooling of field researchers]. In *Pedagogisk forskning i Sverige. 3, 3, 161-175*

Lauvås, P. & Handal, G. (1993). *Handledning och praktisk yrkesteori [Supervision and practical work theory].* Lund: Studentlitteratur

Lauvås, P. & Handal, G. (2001). *Handledning och praktisk yrkesteori. 2ra upplagan [Supervision and practical work theory 2nd ed.].* Lund. Studentlitteratur

Lave, J. (1988). *Cognition in Practice.* USA: Cambridge University Press

Lave, J. (1996). The practice of learning. In S. Chaiklin & J. Lave (Eds.) *Understanding Practice. Perspectives on activity and context* (pp. 3-32). USA: Cambridge University Press

Lave, J. (1997). Learning Apprenticeship, Social Practice. I *Nordisk pedagogik,* 17, 3, 140-151

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate Peripheral Participation.* USA: Cambridge University Press

Liedman, S-E. (1997). *I skuggan av framtiden. Modernitetens idéhistoria [In the Shadow of the Future. Ideological history of modernity].* Falkenberg: Bonnier Alba AB

Lincoln, Y. S. and Guba, E. (2000). The Only Generalization is: There is No Generalization. In R. Gomm, M. Hammersley & P. Foster (Eds.) *Case Study Method; key issues, key texts* (pp. 27-44). London: SAGE Publications ltd.

Lindh, J. (1993). *Datorstödd undervisning i skolan – möjligheter och problem Computer supported instruction in school – possibilities and problems].* Lund: Studentlitteratur

Lindström, B. (2003). *Information and communication technologies and the development of schooling – Multiple roads to change of learning practices.* Invited paper presented at the LearnIT-conference, Göteborg, Sept 3-4.

Liljequist, K. (1999). *Skola och samhällsutveckling [Schools and Societal Development].* Lund: Studentlitteratur

Linn, M. C., Songer, N. B & Eylon, B. S. (1996). Shifts and Convergences in Science Learning and Instruction. In D. C. Berliner & R. C. Calfee. *Handbook of Educational Psychology* (pp. 438-490). USA: Macmillan

Litowitz, B. E. (1993). Deconstruction in the Zone of Proximal Develpment. In E. A. Forman, N. Minick & C. A. Stone (Eds.) *Contexts for Learning. Sociocultural Dynamics in Children's Development.* (pp. 184-196). New York: Oxford University Press

Lpo 94: *Läroplaner för det obligatoriska skolväsendet och de frivilliga skolformerna [National Curriculum for Compulsory School and the Voluntary School Forms].* Utbildningsdepartementet.

Lundmark, E. (2000). *Uppdrag lärande och IT? Pedagoger om utvecklingsambitioner på skolans arena [Assignment Learning and IT? Developmental ambitions on the school scene by pedagoguges.* Dissertation. Luleå: Institutionen för lärarutbildning. Centrum för forskning i lärande

Lycken, M. (1999). *Effektiva arbetslag i skolan: tankar, idéer, verktyg [Effective Teacher Teams in Schools: thoughts, ideas, tools].* Jönköping: Brain Books

Lärarförbundet, Lärarnas Riksförbund, Svenska Kommunförbundet. (1996). *En satsning till tvåtusen [Investment in the year 2000].* Stockholm: Kommentus förlag litteratur

Löfstedt, U. (2001). *Förskolan som lärandekontext för barns bildskapande [Pre-school as Learning Context for Children Creating Pictures].* Dissertation, Göteborg: Acta Universitatis Gothoburgensis

Madsén, T. (1994). *Lärares lärande. Från fortbildning till en lärande arbetsorganisation [Teachers' Learning. From in-service training to a learning organization]* (pp. 13-20). Lund: Studentlitteratur

Marcinkiewiecz, H.R. (1993-1994). Computers and Teachers: Factors Influencing Computer Use in the Classroom. In *Journal of Research on Computing in Education 26, 2, 220-237*

Markova, I. (1996). Towards an Epistemology of Social Representation. In *Journal of History for Social Behaviour 26, 2, 177-197.* United Kingdom: Oxford

Mattson, K. & Nyman, I. (1994). Kompetensutveckling i skolan och statliga insatser [Competency development in schools and national investments]. In T. Madsén (ed) *Lärares lärande. Från fortbildning till en lärande arbetsorganisation [Teachers' Learning. From in-service training to a learning organization]* Lund: Studentlitteratur

McDermott, R. P. (1996). The acquisition of a child by a learning disability. In S. Chaiklin & J. Lave (Eds.) *Understanding practice. Perspectives on activity and context (*pp. 269-305). USA: Cambridge University Press

Mead, G. H. (1995/1934). *Medvetandet, jaget och samhället. Från socialbeavioristisk ståndpunkt. [Mind, Self, and Society. From the standpoint of a social behavioirst].* Lund: Argos

Mead, M. (1970). *Kultur och engagemang. En studie av generationsklyftan. [Culture and Commitment. A study of the generation gap].* Stockholm: Rabén & Sjögren

Mehan, H. (1996). Beneath the skin and between the ears: A case study in the politics of representation. In S. Chaiklin & J. Lave (eds.) *Understanding practice. Perspectives on activity and context* (pp. 241-268). USA: Cambridge University Press

Merriam-Webster Dictionary. Retrieved 2003-01-13 from www.m-w/cgi-bin/dictionary.

Morgan, D. L. (1997). *Focus Group as Qualitative Research. 2nd ed.* Thousand Oaks: SAGE Publications

Morris, C. W. (1995). George H. Mead som socialpyskolog och socialfilosof [George H. Mead as Social Behaviorist and Social Philosopher]. Introduction to G. H. Mead *Medvetandet, jaget och samhället från socialbehavioristisk ståndpunkt [Mind, Self, and Society. From the standpoint of a social behavioirs].* Lund: Argos

Moscovici, S. (1984). The Phenomenon of Social Representations. In M. Farr, & S. Moscovici *Social Representations* (pp. 3-69). Cambridge University Press

Moscovici, S. (1988). Notes towards a description of Social Representations. In *European Journal of Social Psychology 18, 3, 221-250.*

Moscovici, S. (1995a). Förord av Serge Moscovici [Foreword by Serge Moscovici]. In M. Chaib & B. Orfali (Eds). *Sociala representationer. Om vardagsvetandets sociala fundament [Social Representations. On the social foundation for common-sense knowledge]* (pp. 9-13). Göteborg: Daidalos

Moscovici, S. (1995b). Från kollektiva till sociala representationer: en historik. [From collective to social representations: history] In M. Chaib & B. Orfali (Eds). *Sociala representationer. Om vardagsvetandets sociala fundament. [Social Representations. On the social foundation for common-sense knowledge]* (pp. 57-82). Göteborg: Daidalos

Moscovici, S. (1997) *Social Represenations Theory and Social Constructionism.* Retrieved 2003-01-16 from
www.nsu.ru/psych/internet/bits/mosc1.htm

Moscovici, S. (1998). The history and actuality of social representations. In. U. Flick (ed.) *The Psychology of the Social.* Cambridge: University press

Nolan, R. L. (2000). Information Technology Management since 1960. In A. D. Chandler Jr. & J. W. Cortada (Eds.) *A Nation Transformed by Information. How information has shaped the United States from colonial times to the present* (pp. 217-256). New York: Oxford University

Nordström, E. (1999). *Lärande samtal som redskap i handledning – några tankar och erfarenheter i anslutning till ITiS [Learning through conversatin as tool in supervision – some thoughts and experiences with reference to ITiS.* Delegationen för IT i Skolan.

Utbildningsdepartemenetet. www.itis.gov.se

Näslund, J. & Granström, K. (1995). *Professionell utveckling hos lärare genom handledning. [Professional Teacher Development Through Supervision].* Linköpings universitet: Lärarutbildningens lilla serie, Miljon-projektet, rapport, 6

Näslund, J. & Granström, K. (1998). Professionell utveckling hos lärare genom handledning. [Professional Teacher Development Through Supervision]. Linköpings universitet: FOG rapport 40/98

Näslund, J. (2004). *Insyn i grupphandledning: ett bidrag till förståelen av ett av de människobehandlande yrkenas hjälpredskap [Insight on Group Supervision: a contribution to the understanding of a tool for one of the professions dealing with human beings].* Dissertation, Linköpng: Studies in education and psychology.

Olson, D. R. (1995). Writing and the mind. In *Sociocultural Studies of Mind.* J. V. Wertsch, P. del Rio & A. Alvarez (pp. 95-123). USA: Cambridge University Press

Ozmon, H. & Craver, S. (1995). *Philosophical Foundations of Education.* New Jersey: Prentice-Hall, Inc.

Papert, S. (1980). *Mindstorms; Children, Computers and Powerful Ideas.* New York: Basic Books

Papert, S. (1993). *The Childrens' Machine: Rethinking school in the age of the computer.* New York: Basic Books

Patton, M. (1980). *Qualitative Evalutation Methods.* London: SAGE Publications

Patton, M. (1990). *Qalitative Evaluation and Research Methods. 2nd ed.* USA: Sage Publications

Pea, R. & Seely-Brown, J. (1993). Series foreword In S. Chaiklin & J. Lave (Eds.) *Understanding practice. Perspectives on activity and context* (pp. vii-viii). USA: Cambridge University Press

Pedersen, J. (1998). *Informationstekniken i skolan. En forskningsöversikt [Information Technology in Schools. A research overview].* Stockholm: Skolverket

Pedersen, J. (2000). Kommer informations- och kommunikationstekniken att förändra skolan?[Is information and communication technology going to change schools?) In T. Tydén & A. Thelin (Eds.) *Tankar och lärande om IT – en forskningsöversikt (Thoughts and learning about IT – a research overview)* (pp. 15-30). Stockholm: Skolverket

Pedhazur, E. & Schmelkin, L. P. (1991). *Measurement, Design, and Analysis. An integrated approach.* New Jersey: Lawrence Erlbaum Associates, Publishers

Peirce, C. S. (1990). *Pragmatism och Kosmologi [Pragmatism and Cosmology].* Göteborg: Daidalos

276

Pelgrum, J. & Plomp, T. (1993). *The IEA Study of Computers in Education: Implementation of an innovation in 21 education systems.* U.K: Pergamon Press

Persson, S. (1999). *Utveckling genom handledning [Development Thorugh Supervision].* Malmö högskola. Rapporter om utbildning 3, 99

Postman, N. (1995). *The End of Education. Redefining the value of school.* New York: Alfred A. Knopf, Inc.

Potter, J. & Wettherell, M. (1996). *Discourse and Social Psychology.* London: SAGE Publications

Prop. 1975/76:39. *Om skolans inre arbete m. m [On the Inner Work at schools, etc].* Utbildningsdepartementet

Prop. 1990/91:18. *Om ansvaret för skolan [On the Responsibility for Schools].* Utbildningsdepartementet

Prop. 1995/96:125. *Åtgärder för att bredda och utveckla användningen av informationsteknik [Actions to Widen and Develop the Use of Information Technology].* Statsrådsberedningen

Prop. 1997/98:176 *Lärandets verktyg – nationellt program för IT i skolan. [A Tool for Learning – National Action Programme for IT in School].* Stockholm: Utbildningsdepartementet.

Prop. 1999/2000:135: *En förändrad lärarutbildning [A Changed Teacher Education].* Utbildningsdepartementet.

Punsch, M. (1994). Politics and Ethics in Qualitative Research. In N. K. Denzin, & Y. S. Lincoln (pp. 83-97). *Handbook of Qualitative Research.* Thousand Oaks, USA: SAGE Publications

Qvarsell, B. (1994). *Tillbaka till Peirce? Tankar och begrepp inom den pedagogiska etnografin, med exempel från pedagogisk barnkulturforskning [Back to Peirce? Thoughts and concepts within pedagogical ethnography, with examples from pedagogical research on children's culture].* Stockholms universitet: Utvecklingspsykologiska seminariets skriftserie 1994, Nr. 43.

Qvarsell, B. (1996). *Pedagogisk etnografi för praktiken – en diskussion om förändringsfokuserad pedagogisk forskning [Pedagogical Ethnography in Practice – a Discussion About the Focus on Change for Pedagogical Research].* Stockholms universitet: Pedagogiska institutionen. Texter om forskningsmetod, 2

Repstad, P. (1993). *Närhet och distans: kvalitativa metoder i samhällsvetenskap. 2:a upplagan [Closeness and Distance: qualitative methods in social sciences 2nd ed).* Lund: Studentlitteratur

Richards, C. (2001). Metaphor, Education and Computer Interaction. In Chaib, Mohamed (edit.) *Perspectives on Human-Computer Interactions. A multidisciplinary approach* (pp. 50-71). Lund: Studentlitteratur

Riis, U. (1991). *Skolan och datorn. Satsningen datorn som pedagogiskt hjälpmedel 1988-1991 [The School and the Computer. The Program: The Computer as a Pedagogical Resource 1988-1991].* Tema T, Rapport 24, Linköpings universitet

Riis, U. (2000). Skolans datorisering under 1980- och 90-talen [Computerization of Schools during the 1980's and 90's]. In U. Riis (ed) *IT i skolan mellan vision och praktik – en forskningsöversikt.* Stockholm: Skolverket

Riis, U., Holmstrand, L. & Jedeskog, G. (2000). *Visionär entusiasm och realistisk eftertänksamhet. KK-stiftelsens satsning på 27 "fyrtornsprojekt" 1996-1999 [Visionary enthusiasm and realistic thoughtfulness. The Knowledge Foundation program on 27 "lighthouse projects"].* Uppsala universitet.

Rogoff, B. (1995). Observing sociocultural activity on three planes: participatory appropriation, guided participation, and apprenticeship.

In J. V. Wertsch, P. del Rio & A. Alvarez *Sociocultural Studies of Mind* (pp. 139-164). USA: Cambridge University Press

Rogoff, B & Gardner, W. (1999). Adult Guidance of Cognitive Development. In B. Rogoff & J. Lave *Everyday Cognition. Development in Social Context* (pp. 95-116). New York: Harvard University Press

Rorty, R. (1989). *Contingency, Irony and Solidarity.* England: The Press Syndicate of the University of Cambridge

Rönnerman, K. (1998). *Utvecklingsarbete – en grund för lärares lärande [Develpmental Work – a Foundation for Teachers' Learning.* Lund: Studentlitteratur

Selinger, M. (2001). The role of the teacher. Teacherless classrooms? In M. Leask (ed.) *Issues in Teaching using ICT* (pp. 83-95). London: Routledge Falmer

Schön, D. (1983). *The Reflective Practitioner: How Professionals Think in Action.* New York: Basic Books

Senge, P. (1993). *The Fifth Discipline. The art and practice of learning organization.* London: Century Business

Shotter, J. (2000). *Conversational Realities. Constructing Life through Language.* London: SAGE Publications, Ltd.

Skeggs, B. (2001). Situating the Production of Feminist Ethnography. In A. Bryman (ed.) *Ethnography. Vol III.* (pp. 60-83). London: SAGE Publications Ltd.

Skolverket (1995). *Det svenska skoldatanätet. Information om utvecklingsarbetet [The Swedish School Computer Net. Information about the developmental work]* Stockholm: Liber distribution

Skolverket, (1996). *Datorsatsning och sedan…En uppföljning hösten 1995 av ett antal DOS-projekt [Computerization and Then...A follow-up in autumn 1995 of a series of DOS projects].* Skolverkets rapport 98

Skolverket (1997). *Vilken betydelse har externa projektmedel för IT i skolan? Nittiosju kommuners arbete med att utveckla skolan genom IT [How important are external fundings to IT in School? Ninety-seven communities' work in regards to developing school through IT].* Skolverkets rapport 137.

Skolverket (1998). *Skolans datorer 1997. En kvantitativ bild [Computers in Schools 1997. A quantitative picture].* Skolverkets rapport 147

Solso, R. L. (1991). *Cognitive Psychology.* Needham Heights: Allyn and Bacon

SOU 1948:27. *1946 års skolkommissions betänkande med förslag till riktlinjer för det svenska skolväsendets utveckling [The 1946 School Commision's Report with Proposals for Guidelines for Development of the Swedish Educatonl System].* Stockholm: Ecklesiastikdepartementet

SOU 1974:53. *Skolans arbetsmiljö: betänkande av utredningen om skolans inre arbete [The work environment in schools: report by The Investigation of the Inner Work at Schools].* Utbildningsdepartementet

SOU 1995:68. *IT-kommissionens arbetsprogram 1995-96 [The working Program of the IT Commission 1995-96].* Statsrådsberedningen

SOU 1999:63. 1999: *Att lära och leda. En lärarutbildning för samverkan och utveckling [To Learn and To Lead. Teacher eduacation for cooperation and development].* Lärarutbildningskommitténs slutbetänkande. Stockholm: Utbildningsdepartementet

SOU 2001:13 *Nya villkor för lärandet i den högre utbildningen [New Conditions for Learning in Higher Education].* Utbildningsdepartementet

Stacey, J. (2001). Can there be a Feminist Ethnography? In A. Bryman (ed.) *Ethnography Volume III* (pp. 50-59). London: SAGE Publications Ltd

Stake, R. E. (1994). Case Studies. In N. Denzin & Y. Lincoln (Eds.) *Handbook of Qualitative Research* (236-247). USA: SAGE Publications

Starrin, B. & Svensson, P-G. (1994). *Kvalitativ metod och vetenskapsteori [Qualitative method andTtheoretical Science and Research].* Lund: Studentlitteratur

Stensmo, C. (1994). *Pedagogisk filosofi [Pedagogical Philosophy].* Lund: Studentlitteratur

Stone, C. A. (1993). What is Missing in the Metaphor of Scaffolding? In E. A. Forman, N. Minick & C. A. Stone *Contexts for Learning. Sociocultural Dynamics in Children's Development* (pp. 169-183). New York: Oxford University press

Sturman, A. (1999). Case Study Methods. In J. P. Keeves & G. Lakomski (Eds.) *Issues in Educational Research* (pp. 103-112). The Netherlands: Elsevier Science Ltd.

Sundgren, G. (1996). *Kunskap och demokrati [Knowledge and Democracy].* Lund: Studentlitteratur

Svenska Kommunförbundet (1995). *Redogörelse för ÖLA 2000 [Account of ÖLA 2000].* Stockholm: Commentus förlag

Svingby, G. (1993). *Samhällsorienterade ämnen: huvudrapport i den nationella utvärderingen av grundskolan våren 1992 [Social Science Subjects: main report from the national evaluation of compulsory school spring 1992].* Skolverkets rapport Nr 17

Säljö, R. (1992). Kontext och mänskliga samspel. Ett sociokulturellt perspektiv på lärande [Context and Human Interaction. A sociocultural perspective on learning]. In *Utbildning och demokrati. 1, 2, 21-36.*

Säljö, R. (1996). Samtal som kunskapsform [Conversation as a form of knowledge]. In C. Brusling & G. Strömqvist (Eds.). *Reflektion och praktik i läraryrket [Reflection and Practice in the Teaching Profession].* Lund: Studentlitteratur

Säljö, R. (1997). *Learning and Discourse: a sociocultural perspective.* Great Britain: The Education Section of The British Psychological Society

Säljö, R. (2000). *Lärande i praktiken. Ett sociokulturellt perspektiv [Learning in Practice. A sociocultural perspective].* Stockholm: Prisma

Säljö, R. (2001). Concepts, learning, and the Constitution of Objects and Events in Discurcive Practices: The situated nature of human understanding. In Sätterlund-Larsson, U. (ed.): *Socio-Cultural Theory and Methods. An Antology* (pp. 119-144). University Trollhättan/Uddevalla, Department of Nursing

SÖ. 1980: *Datorn i skolan. SÖ's handlingsprogram och slutrapport [The Computer in Schools. SÖ's action program and final report].* SÖ-projekt 628. Stockholm: SÖ

SÖ. 1984: *Datorer i undervisningen. Inför datasamhället. En skriftserie för skolan [Computers in Education. Approaching computer society. A series of texts for schools].* Stockholm: Liber Utbildingsförlag

Tapscott, D. (1998). *Growing Up Digital.* New York: McGraw-HillCompanies, Inc.

Tapscott, D. (2001). Growing Up Digital. Retrieved from www.dontapscott.com/thebooks_growing.html (last updated 011201)

Taylor, S. J. & Bogdan, R. (1984). *Introduction to Qualitative Research Methods. 2nd ed.* USA: John Wiley & Sons, Inc.

Tengström, E. (1997). Lärarens roll i kunskapssamhället [The Teacher Role in Knowledge Society]. *Didaktisk tidskrift, 1, 2, 4-10*

Thiel, M. (1997). *Handledning i rektorsutbildningen [Supervision in education for principals].* Uppsala universitet. Rapport 2

Tiller, T. (1998). *Lärande i vardagen om lärares lärande. [On Teachers' Everyday Learning].* Stockholm: Förlagshuset Gothia

279

Toulmin, S. (1995). *Kosmopolis. Hur det humanistiska arvet förfuskades [Cosmopolis: the hidden agenda of modernity].* Stockholm: Ordfronts förlag

Turkle, S. (1995). *Life on the Screen.* New York: Simon and Schuster

UFB 3. 1997/98, SFS 1996:913. *Utbildningsväsendets författningsböcke. Universitet och Högskolor. [Constitutional books on the educational system. Universities and College Universities].*

Unenge, J. & Unenge, G. (1997). *Datoranvändning under tredje skolåret. Arbetsrapport från projektet Datorn i grundskolan – "DIG-projektet"[Computer use during the third school year. Working report from the project Computers in Compulsory School].* Ansats 1997:4. Jönköping: Högskolan för lärarutbildning och kommunikation

Utbildningsdepartement. 1998: *Lärandets verktyg. Nationellt program för IT i skolan [A tool for learning – National Action Programme for IT in School].*

Vedin, B. (1999). *IT-Sverige – en vision från Dataföreningen [IT Sweden – a vision from the Computer Association].* TELDOK rapport 131. Stockholm: Nykopia Tryck AB

Veen, W. (2001). *Homo zappiens.* ITiS-symposiet *Sätter ITiS spår i skolan? [Are there any traces of ITiS in schools?]* 2001-05-10. Högskolan för lärande och kommunikation i Jönköping.

Vygotsky, L. S. (1978). *Mind in Society. The Development of Higher Psychological Processes.* Massacusetts, U.S.A: Harvard University Press

Vygotsky, L. S. (1999). *Tänkande och språk [Thought and Language].* Göteborg: Daidalos

Wallström, M. (1999). Asien hetaste IT-marknaden [Asia – the hottest IT market]. In *Computer Sweden 17, 37, 10*

Wenger, E. (1991). *Toward a theory of cultural transparency: elements of a social discourse of the visible and the invisible.* Dissertation. Palo Alto, CA: Institute for Research on Learning.

Wenger, E. (1998). *Communities of Practice. Learning, Meaning and Identity.* USA: Cambridge University Press

Wenger, E., McDermott, R. & Snyder, W. (2002). *Cultivating Communities of Practice.* Massachusetts: Harvard Business School Press

Wertsch, J. V. 1993a: *Voices of the Mind. A Sociocultural Approach to Mediated Action.* Massachusetts: Harvard University Press

Wertsch, J. V. (1993b). Ett sociokulturellt perspektiv på mental handling [A sociocultural perspectiv on mental action]. In *Spov 20* (2-12). Härnösand: Institutet för pedagogisk textforskning, Högskolan Sundsvall/Härnösand.

Wertsch, J. V. (1995). The need for action in sociocultural research. In J. V. Wertsch, P. del Rio & A.Alvarez *Sociocultural Studies of Mind* (pp. 56-74). USA: Cambridge University Press

Wertsch, J. V. (1998). *Mind as Action.* USA: Oxford University Press

Wertsch, J. V., Tulvistle, P. & Hagstrom, F. (1993). A Sociocultural Approach to Agency. In E. A. Forman, N. Minick & C. A. Stone *Contexts for Learning. Sociocultural Dynamics in Children's Development* (pp. 336-356). New York: Oxford University Press

Wertsch, J. V., del Rio, P., Alvarez, Á. 1995: Sociocultural studies: history, action, and mediation. In J. V. Wertsch, P. del Rio & A. Alvarez *Sociocultural Studies of Mind.* (pp. 1-34). U.S.A: Cambridge University Press

Wibeck, V. (1998). *Att arbeta med fokusgrupper [To Work with focus Groups].* Arbetsrapport 1998:1 Tema Kommunikation, Linköping

Wibeck, V. (2000). *Fokusgrupper. Om fokuserade gruppintervjuer som undersökningsmetod [Focus Groups. On focused groups interviews as research method].* Lund: Studentlitteratur

Wingård, B. (1995). *Det kontraproduktiva arbetslaget? En fallstudie av Björnskolan i Aspeberga kommun [The contra productive teacher team? A case study of Björnskolan in Aspeberga community].* En rapport från SLAV-projektet. Uppsala: Pedagogik forskning i Uppsala, 117

Åberg, K. (1999). *Arbetslag i skolan [Teacher Teams in Schools].* Stockholm: Ekelunds förlag

Åberg, K. (2000). *Pedagogisk grupphandledning mellan lärarkollegor Pedagogical Group Facilitation Between Teacher Colleagues* (unpublished thesis). Ersta & Sköndals Högskola

Åberg, K. (2004). *Group Facilitation for Practising Teachers in a School Context.* Abstract. Postgraduate Study in Learning and Communication (unpublished manuscript). Jönköping university: School of Education and Communication

Appendix 1

This inquiry is included in the National Evaluation of ITiS. Your team will not be subjected to this type of inquiry chart in the future; the study is mainly a qualitative study, dependent on us visiting your school and observing what happens. However, in this initial stage, we would like to create a picture of the teachers involved on your team. We are therefore most thankful if you kindly would fill out this inquiry.

Name:_____

School:
_____

Age:_____ Sex: _____

Teaching the following
subjects:_____

Hours of duty at school in %:
_____

I have the following education (also include other than teaching credentials)

_____

Other work experience than being a
teacher:_____

_____

Earlier experience of using ICT (privately or at school):

_____
_____
_____
_____
_____
_____

Thank you for helping us out!
Mia and Thina

Bilaga 1

Denna enkät ingår i den nationella utvärderingen av ITiS. Ert arbetslag kommer inte att utsättas för en mängd enkäter från oss, den studie vi gör är huvudsakligen kvalitativ och bygger mycket på att vi är med i skolan och observerar vad som händer. Men så här i inledningsskedet, vill vi skapa en bild av vilka lärare som ingår i ert arbetslag, och därför är vi mycket tacksamma om ni fyller i denna enkät.

Namn:_____

Skola:
_____

Ålder:_____ Kön: _____

Undervisar i följande
ämnen:_____

Tjänstgöringsgrad: _____

Jag har följande utbildning (avser ä ven annan än lärarutbildning)

_____

Annan yrkeserfarenhet än lärare:
_____

Tidigare erfarenhet av att använda IT (privat eller i skolan):

_____
_____
_____
_____
_____
_____
_____
_____

Tack för din hjälp!
Mia och Thina

Fokusgruppsamtal – Focus Group Conversation

Teman att diskutera kring:

> utveckla arbetssätt och arbetsmetoder som bland annat gör att ungdomar tar ett mer självständigt ansvar för sitt eget lärande
> pröva nya vägar för att skapa en mer flexibel organisation inom arbetslaget
> utveckla lärarnas egen kompetens inom IT-området

Themes to discuss:

> develop ways to work and methods that, among other things, make youngsters take greater responsibility for independent studies as to their own learning
> try out new ways to create a more flexible organization within the team
> develop teachers' own competencies within the ICT area

Bilaga 3

Guide för elevintervju
1. Datorer hemma, I skolan – gamla? Nya?
2. Datoranvändning hemma, i skolan?
3. Sitter man ensam vid datorn, eller tillsammans med någon annan?
4. Program som används hemma, i skolan?
5. Hur tror ni att datorerna kommer att användas i framtiden?
6. Problem med IT I skolan?
7. ITiS projektet –
    a. Hur mycket visste ni om projektet innan ni gick med i ITiS?
    b. Hur mycket har ni varit med och fattat beslut som rör projektet?
    c. Vad tror ni att projektet har betytt för lärarna?
    d. Skrev ni loggbok under projekttiden?
    e. Hur tycker ni att projektet blev?
8. Något mer som ni vill berätta för mig?

Appendix 3

Guide for interviewing four students

1. Computers at home, in school – old, new computers?
2. Computer usage at home, in school?
3. Using the computer alone or in interaction with someone else?
4. Programs used at home, in school?
5. Future use?
6. Problems with ICT in school?
7. The ITiS student project:
    - how much did you know about the program before participation?
    - how much have you been involved in decisions around the project?
    - what do you think the project has meant to teachers?
    - did you write a logbook during the project?
    - how did your project turn out?
8. Anything else you would like to tell me?

Bilaga 4

Intervjuguide – rektorn

1. Din övergripande syn på ITiS projekten på din skola – svårigheter? Elevdemokrati?
2. Skillnader i jämförelse med andra kompetensutvecklingssatsningar?
3. Hur många lärarlag har deltagit? Kommer det att vara fler från din skola i framtiden?
4. Skillnader och likheter mellan deltagande arbetslag? Samarbete mellan dem?
5. Generell IT-kompetens på skolan?
6. Din syn på IT i skolan.
7. Någon personal som har ansvar för IT support?
8. Hur många datorer? Elever?
9. kommunalt stöd? Hur stödjer du deltagande lärare?

Appendix 4

Guide for interviewing the principal

Overall view of ITiS projects on your school – any difficulties?

Student democracy?

Differences in regards to other competence development projects?

How many teams have participated? Will there be others in the future?

Differences or similarities between participating teams? Collaboration between them?

General ICT knowledge among teachers on school?

Your view on ICT in schools

Assigned staff to support teachers using ICT?

How many computers, students?

Support from municipalities?

Your own support to teachers?

To what degree are you informed regarding teachers work while participating in ITiS?

Future plans?

Has participating in ITiS affected other decisions on your school?

Other comments?

Bilaga 5 – Appendix 5 – Excerpts in Swedish.

Excerpt 1
- …att kunna en massa dataprogram är ju inte intressant i sig, utan jag vill ju ta del av Kerstins idéer för att jag själv ska kunna få idéer i mina ämnen

Excerpt 2
Och genom dessa ständiga diskussioner om arbetet med webquesten, läsning av intressanta artiklar och diskussioner om dessa plus Mia från högskolan i Jönköping som forskar och som tillbringade en massa tid hos oss resulterade det i att min förvandling från en alldeles vanlig fröken till en datanörd hade påbörjats. Det hela smittade av sig och även på mina engelskalektioner i åttan ökade datoranvändningen radikalt. Det gick ju faktiskt att använda till nåt!

Excerpt 3
Vad kul att jobba tillsammans hela laget i ett gemensamt projekt och dessutom en massa seminarier och handledning i datoranvändning.

Excerpt 4
De vet hur de ska använda datorerna effektivt i undervisningen.

Excerpt 5
- Jag känner mig inte utanför alls här, jag har nånting här som, jag har faktiskt inte mött det någon annanstans, det är en otroligt prestigelös arbetsmiljö där vi respekterar varandra för dom vi är, vi har kul ihop.

Excerpt 6
- Om jag är kvar vill jag jobba i arbetslaget, helt klart, det är ett fantastiskt bra arbetslag alltså. Det är, får jättemycket uträttat. Det är väldigt effektivt, vi har trevligt.

Excerpt 7
- Alltså jag tycker att om man ska fuska så får man ju fuska ordentligt.
- Ja man får ju fuska med stil då.

Excerpt 8
- Och anledningen till att han valde detta var att han var mycket intresserad av "dess risker och dess historia". Och att, den är ganska rolig också om man tänker att detta är ett syre, arbete om syre och så. " Jag har lärt mig att vara försiktig och att man inte ska använda det i sin omgivning" (skratt).

Excerpt 9
- Karen har ju inte, är väl den som varit med minst då, men har istället tänkt ut andra sätt att arbeta med IT i spanska då, så att hon har börjat jobba med IT i spanska, då va, så hon har ändå kommit igång på sitt sätt då, men ändå inte så delaktig i webquesten då, annat än att hon varit med i diskussionerna kring vad vi ska jobba med, övergripande teman och så.

288

Excerpt 10
- Alla lärare som ska vara med på den här portfoliosvängen i sexan måste ju klara av det då, med hur man lägger in digitalbilder och så, och det kan jag ju inte riktigt än så det måste jag ju lära mig, så det är ju bra.
- Det kan inte jag heller

Excerpt 11
- Ja och det där med den enskilda utvecklingsbehovet, om man har såna mål att nu ska vi ha portfolio i sexan och wq i nian och så då vet man ju vad man måste
- Hm, då kan man utgå från det
- Ja, då måste vi sätta oss ner och lära oss det så att vi kan göra det
- Då behöver vi kunna scanna, då behöver vi det och det och det, och så skriver man ner det på en lista eller nåt
- Ja en checklista
- Ja,
- Sitter man tillsammans på den här tiden då om man har det, hjälper varandra
- Ser till så alla lär sig det och klarar av det.

Excerpt 12
- Visst, visst, har man kommit så långt så man fattar möjligheterna, det är ju det som gör det att man känner att man kan ännu mindre nästan för man vet hur mycket det finns nu att lära sig. Men å andra sidan så har man blivit lite sugen att lära sig, va, så när man har en riktig dator hemma så

Excerpt 13
- Vi kommer inte att behöva kunna det till på fredag, utan det räcker att nån hjälper den här eleven att fixa detta, kan, bara vi får det flytande, att vi bockar det här behöver vi kunna, det märker vi nu, det här behöver vi kunna. Då får man vilka behov man har, då ser man ju läget i det.

Excerpt 14
- Har du inte arbetat så mycket med al, du har jobbat ganska mycket ensam tidigare?
- Ja helt och hållet ensam här egentligen, det har blivit så. Ett tag var jag rätt mycket ute i klasserna, men nu nu är önskemålet att de behöver lite lugn och ro och lite mer hjälp, och då hjälper jag dem i svenska och matte. Så har jag då en grupp i engelska också, två killar i 8C. Men man blir isolerad. Och det är svårt att ha en kontinuerlig samordning av aktiviteterna. Ofta blir man bortglömd, och då blir man, man tappar lite kontakten med klassen och så. Men det har gått relativt OK ändå, det är svårt att samordna, det är det, och det tar tid.
 - Men du vill gärna jobba mer i laget?
- Ja, jag tycker det är roligare, det är det faktiskt.

Excerpt 15
Då frågade jag Jonas, jovisst det kan du, sa han. Så han gick direkt till rektorerna efter det mötet vi hade och frågade och det var ju tack vare honom att jag kom med, och det tycker jag ju var jättekul.

Excerpt 16
- Hur tar dom egentligen? Jag har ju varit med om ett sånt ansvarsprojekt, det har ju du också Leif då, ansvarsprojektet på Kulan.
- Ja
- Men hur, på vilket sätt tar de egentligen mer ansvar genom att arbeta så här kan man j u tänka?

Excerpt 17
- Det måste ju definieras, vad de ska uppnå och hur de ska göra, förutsättningar och så, annars kan man inte spela spelet.
- Jag tycker vi snöar in på juridik nu, definiera ord hit och dit liksom. Jag menar det var ett jävlig bra projekt det som genomfördes, tydligt, där är målet. Men just liksom definiera hit och dit.

Excerpt 18
- Men just de grejerna som du tog upp nu då Tom, detta ligger egentligen inte i ITiS-projektet, utan det är den delen som är så att säga i kompetenshöjningen vad det gäller vanlig fortbildning, så att de behov man har i grundhänseende, att hantera datorn, att koppla ihop och såna saker, det ligger liksom utanför seminarier och handledningstider.

Excerpt 19
- Så som det har varit på ITiS nu, det är väl på nåt vis syftet sådär med seminariegrupperna på samma sätt, men det funkar ju inte där. Vi är alldeles för många och jag tycker det förs inte ut på nåt teoretiskt plan heller, så att man verkligen kan ta till sig det, utan det funkar för den där lilla klassen som är precis sån. Och så man drar så väldigt mycket slutsatser själv, sen så blir det ingen uppföljande diskussion där man diskuterar, där man kan knyta ihop nånting, utan man går ut och gör ett studiebesök som tar flera timmar.

Excerpt 20
- Jag kan tycka att själva idén är bra att man åker ut och blir, tittar på skolor och tittar på deras projekt och så, däremot så kan jag tycka att det är lite korkat att man lägger ihop det till att man har lågstadiearbetslag tillsammans med högstadiearbetslag.

Excerpt 21
- Det är ju de mycket bättre på än vi är, hur många av oss vet hur man gör det?

Excerpt 22
- Jag är lite sådär mot arbetslag, jag vill mer, jag skulle mycket hellre vilja arbeta mer i mina ämnesgrupper

290

- Det säger många no-lärare
- Ja, fast att lägga upp arbete, det blir ganska mycket ensamarbete när man arbetar i arbetslag med sitt eget ämne. Man sitter och försöker hitta saker, hur ska vi kunna samarbeta här med de här eleverna, men själva innehållet i sin undervisning, det får man ju ta hand om så väldigt mycket själv då. Och därför tycker jag det är skönt när man sitter i ämnesgrupper och lägger upp (ohörbart). Det är så tabubelagt på nåt vis, nu är det ju så väldigt fint med arbetslag så nu är det nästan fult att säga att man inte vill ha arbetslag sådär va.

Excerpt 23
- Det Martin tog upp här om portfoliometoden är ju nånting som definitivt skulle kunna gå att förverkliga, en fortsättning på högstadiet, eller en uppföljning på högstadiet, så att metoderna som sådana och arbetssätten som sådana kan man ju faktiskt få oavsett stadium. Få ganska, jag menar det finns inget som säger att en webquest variant för förskole eller lågstadieelever skulle kunna bli aktuell om några år, va. Så att utbytet mellan stadierna tror jag är en ganska, tror jag personligen är ganska bra.

Excerpt 24
- För att nästa år kommer vi ju inte att ha en massa handledning och så, då kommer det ju att finnas mer tid än det finns nu. Och då får man ju verkligen utnyttja det så man inte halkar tillbaka och har en massa…
- Onödiga möten ja

Excerpt 25
- Nej men man kunde va ett par tre lärare som jobbade runt den klassen och den portföljen då
- Det skulle va ganska kul, och så skulle det va 7an, 8an, 9an då och så kunde man…
- Testa. Vi kunde börja med det när vi har en klass och se om vi klarar av det
- Testa det lite ja
- För då har vi kanske mer webquest till 9:orna och så har vi…
- Portfoliiommetoden där
- Ja, så prövar vi lite olika saker
- Vad tuffa vi blir, bara såna där fräcka saker (skratt)
- Då får vi lära oss också lite
- Och så lite storyline (skratt)
- Blanda in lite undervisning också
(Fniss och skratt).
- Alla lärare som ska vara med på den här portfoliosvängen i sexan måste ju klara av det då, med hur man lägger in digitalbilder och så, och det kan jag ju inte riktigt än så det måste jag ju lära mig, så det är ju bra.
- Det kan inte jag heller

- Nåt som jag känt med skulle va väldigt kul med webquest också, om man tänker sig en blandning mellan webquest och storylinesgrejen, att man är en person, att man har nån sorts uppgift som figur att lösa då, fast har det med samma, dom här ramarna. Att man vet början och slutet och, att man är en fiktiv person där nånting ska hända. Det låter nästan som den där Lorry, och sen blev allt svart (skratt)

Excerpt 26
- Det var väldigt mycket som jag inte hängde med i så, men dom som håller på här som kan, John och dom, det här var ju väldigt bra och så, så det beror ju på vilken bakgrund man har, hur mycket man fick ut. Vad jag fick ut av det var att Multimediabyrån är nånting som man ska se till att gå in och titta på vad det är för nåt och lära sig använda. Det kan man ha nytta av, det lärde jag mig.

Excerpt 27
Webquestens pedagogiska mål är fördjupad och förfinad kunskap. När questen är slut ska eleverna ha analyserat en mängd information på djupet, formulerat den på ett sätt så att den blir meningsfull för henne/honom och visat en förståelse för materialet genom att skapa något som andra kan reflektera över.

Excerpt 28
- Men sen måste man knyta ihop det, för till slut så kan man ganska mycket data, lite olika program och sånt där va, man får en, man blir expert. Tom i Photoshop och sånt, och det är ju jättebra, men sen att man kan knyta ihop det pedagogiskt, att det blir nåt, att kunna en massa dataprogram är ju inte intressant i sig, utan jag vill ju ta del av Karens idéer för att jag själv ska kunna få idéer i mina ämnen.

Excerpt 29
…om det handlar om en fiol så måste man kunna föra stråken så att det blir nåt av det också.

Excerpt 30
- Jag är inte intresserad av att sitta och småprata med andra lärare, jag vill lära mig något nytt.

Excerpt 31
- Jag skulle skratta dom i ansiktet, Jag skulle ta. Jag vet inte, det finns flera olika saker man skulle kunna göra. För det första så tycker jag ju att, att, att man ska inte ha ett projekt om man inte har mål, tydliga mål, alltså vad skall man uppfylla kunskapsmässigt, vad, alltså vad har, man ska kunna visa vad man kan, man ska kunna visa vad man gör, man ska kunna visa att man har nån nytta, nyttoaspekten måste vara med väldigt tydligt. Alltså, om att, man kan, alltså, det som är motsatsen är att man går till ett ställe och sitter och lyssnar men man lär sig ingenting. Men man går dit en två tre fyra fem sex sju åtta nio tio gånger, men man lär sig ingenting, man utvecklas absolut ingenting. Det är skräckscenariot. Men då får man, då har man

uppfyllt de formella kraven. Men, formella krav det är, det tycker jag är skit om det inte finns nåt innehåll, för jag vill istället att det ska finnas ett tydligt mål, det här ska du uppfylla, och så kan du tillföra nånting, kan du lyfta det här och göra det bättre för andra osv.

Excerpt 32
Besöken på andra skolor har inte givit nåt. Det har varit bortkastad tid, då projekten där har varit på en mycket basal nivå och personalens datorkunskap, i det närmaste obefintlig.

Excerpt 33
Arbetslaget åker hem, nöjda med sitt projekt, men inte helt nöjda med hur ITiS är upplagt. Och definitivt inte nöjda med att Tom valde att ställa sig åt sidan.

Excerpt 34
- Jag tänkte på det där med att definitivt inte nöjda med att Tom ställde sig utanför. Det som blir lite konstigt med det hela, det skulle va lättare om Tom sa så här att jag ställer mig utanför och skiter i det här, och drar mig ur, men det skedde ju inte. Jag menar, utan Tom var ju med ända till slutet, han skrev ju till och med sin reflektion, så han var ju med ända till slutet. Men där blev han ju inte godkänd, så han drog sig ju inte ur frivilligt på det sättet att han, nej nu skiter jag i det här. Jag tycker det är dåligt, det passar inte det behovsinriktade upplägget som jag hade tänkt, och det var ju lite synd kan jag tycka. Annars tycker jag att det är ju ett val som man gör själv, och vi trugar ju inte nån att vara med såhär, utan om nån väljer att vara utanför, då får man va utanför.
- Det kanske var lite dumt att han var lite osaklig i sina…
- …i sin utvärdering
- … i sin utvärdering, jag tror det skadade oss till viss del för att det upprörde de andra, det tyckte jag var dålig stil.

Excerpt 35
- Vi kommer inte att behöva kunna det till på fredag, utan det räcker att nån hjälper den här eleven att fixa detta. Kan, bara vi får det flytande, att vi bockar det här behöber vi kunna, det märker vi nu, det här behöver vi kunna, då får man vilka behov man har, då ser man ju läget i det.

Excerpt 36
Under hösten hoppas jag att få lära mig mer om webquest, hemsideproduktion mm av några mycket kompetenta lärare inom data i vårat arbetslag.

Excerpt 37
- … så sitter jag i 6 timmar och jag får det inte att fungera men om jag kunde frågat dig så kanske jag skulle gjort det på en kvart.

Excerpt 38
- Fråga inte mig, jag bara skriver, och hoppas att det ska fungera

Excerpt 39
- Nej, men jag tycker det är som alltid, vi är så vana vid ett jättehögt tempo, när vi jobbar, och så fort man sätter sig på en sån föreläsning och ska sitta och presentera varandra man tappar bara luften liksom så, och jag håller med här, jag tycker vi ska koncentrera oss på vårat projekt, och jag håller med det vore jättebra om vi kunde ta upp såna frågor, till exempel som den jag hade, det finns säkert hur många som helst, och att vi kunde få tips på vad är det för texter vi ska läsa. Och likaså så tycker jag det är viktigt med just som du sa värdegrunden, kanske att vi också kunde få tips om vad är, så vi kan ha en diskussion om vad är det som är bra och vad är det som inte är bra, liksom eller, ja, den diskussionen då. Och sen tycker jag också det att jag saknar också mycket rent teknisk kunskap liksom om olika program och pedagogiska tillämpningar av program liksom, så va. Jag menar jag kan ju se listor överallt liksom, men jag orkar inte samla all info det är så himla mycket.

Excerpt 40
- Men det är ju ingen omöjlighet om man skapar den tiden, t ex, om nu den tiden skulle finnas, det vet vi ju inte, men den borde kunna finnas, att det finns en handledare, jag menar vi har ju sån bra kompetens i dig, och Aron och du kan ju en hel del så att, man skulle ju kunna sätta upp egna mål och sitta och jobba med det regelbundet, om ni finns i närheten så att säga, för det är ju som du säger att "Nu ska jag spela in", så funkar det inte, så sitter jag i 6 timmar och jag får det inte att fungera men om jag kunde frågat dig så kanske jag skulle gjort det på en kvart..
- Hade vi haft en gemensam timme här liksom så hade man kunnat hjälpa till med det då
- Men då måste man ju ha ett antal frågor, oj nu avbröt jag dig Tom,
- Nej det är OK
- Det är OK? Nej men då måste man ju ha ett antal frågor, och det är inte lätt att ha frågor när man, det är ju som eleverna, det är inte lätt att ha frågor när man inte vet vad man ska fråga. Det går ju inte att fråga så här: "Finns det ingen ljudinspelare i datorn? När man inte ens har kommit på att, var är videospelaren i datorn, kan man lika gärna fråga, eller var är videokameran nånstans, ska jag vrida fram så, men det finns ju inte, nähä. Varför skulle det då finnas en ljudinspelare?
- Så därför är det bra att ha en "Timlektion" (Tim=IT-supportläraren) med jämna mellanrum så när man lär sig nya grejer, nej idag ska vi lära oss detta, så kommer man på, jaha, det var ju smart.

Excerpt 41
- Jag förstår synpunkten, men det är inte riktigt mitt uppdrag då.

Excerpt 42
- Men ditt uppdrag är att jobba med projektet, vi är i den praktiska fasen, kan vi lägga den teoretiska fasen efter, eftersom det finns så mycket behov som inte är tillfredsställda.

Excerpt 43
- Men det kanske är så om man utmanar lite granna här, att det egentligen, i princip så är det inte engelskan kanske, eller språk, är ett ämne som lämpar sig att i så hög grad att använda just Internet, om det är språkträning och språkbad och allt vad man nu kan diskutera för begrepp, att det blir nån språkinlärning, att det är det det gäller, så är det kanske inte den stumma internetvärlden egentligen.

Excerpt 44
- Det som var strul med vårat tycker jag var just handledning och seminarier, det blev ju inte någon rak linje i det, det bara flöt ju iväg.
- Sen tycker jag att det fanns (ohörbart) i ITiS som sådant, också, just det här att det inte var, vi utgick ju inte egentligen för det som var, som man skulle göra själv, som man hade önskat. Nej men att kändes det inte som att det kom lite mycket uppifrån, jag menar har man sökt det projektet så har man ju ett intresse av att lära sig saker, och man har ju , eller olika arbetslag har ju olika behov av vad man behöver lära sig, men det kändes ju som att det här ska man läsa, så här är ITiS, och det tillvaratogs ju inte speciellt mycket av det intresset som faktiskt fanns i de olika arbetslagen, och det tror jag att man faller väldigt hårt på att man inte utnyttjade det

Excerpt 45
- Nej jag kommer ihåg att jag blev irriterad där därför att han sa att det kanske är så att man inte ska använda datorer sa han, så vi diskuterade inte det mer då, jag tyckte inte det var…
- Det var ju den enda vettiga diskussionen, kan jag tycka, som kom, där man utgår från ett behov och ett problem och sen diskuterar hur gör man för att komma åt detta.Där hade vi ju en diskussion på gång men det var ju locket på i stort sett.

Excerpt 46
- Kan ni komma på nån sån här pedagogisk diskussion som rör IT som ni hade med Oscar
Tänker mycket länge, vid 13 sekunders tänk säger jag - Ni kommer alltså inte på nån sån?
- Nej alltså det var där, det var där, jag är absolut tvärsäker på att det var den enda, det var den enda gången det blev lite småintressant också
- Och du blev bara irriterad där
- Ja men vadå, det kändes avsnoppande, jag ska kanske inte använda datorerna då.

Excerpt 47
- Men samtidigt har du ju en enorm källa till intressant material som vi aldrig kan få i våra läroböcker
- Ja just det
- Ja men det som behövs är ett länkbibliotek, ett riktigt bra länkbibliotek är det som behövs
- I engelska då, eller i språk.
- Ja för varje ämne i skolan så borde det finnas ett riktigt bra länkbibliotek.
- Det är ju akutare i språken då, för jag kan tycka att De ska ändå inte ha allt serverat, för att jag menar, i praktiska livet så kommer de att behöva kunna leta efter saker, sökfasen är ändå viktig att klara av
- Men det är i So då, men just i engelska har de andra behov
- Men just i språken skulle det kunna vara jätteviktigt att lägga ner tid för…
- Sen finns det ju förstås många färdiga länkskafferiet också, Skolverket har ju många sådana, men deras, ett ped problem är att, det är ju att få eleverna att inse skillnaden, så att säga va, för jag får ju spader varje gång jag börjar ett arbetsområde, det säger bara swisch, så försvinner alla bara från mitt klassrum. Hur ska jag kunna veta att de pratar engelska om de bara försvinner så här. Jag står ju där i dörren och gapar, sätt e liksom, tala om vart ni ska, vad ska ni göra liksom. Och det funkar ju utmärkt i So, men det funkar ju inte i språk.
- De pratar ju inte engelska heller då, det gör dom ine. När de sitter vid datorn så pratar de inte engelska. Om man har dem i klassrummet liksom, då kan man få dem att prata engelska, med viss möda men,
- Men man kanske inte ska jobba så i engelska eller spanska, man kanske ska jobba så som du har gjort här då att du har gett dem färdiga texter, att du har laddat ner texterna, så att du gör ett länkbiblio9tek för dig själv så skriver du ut
- …vad som finns att välja på ja
- Ja ett begränsat helt enkelt, att detta är vad som gäller
- Att man har ett privat länkbibliotek så man plockar bort sökfasen helt
- Det är väl ändå IT i undervisningen även om inte eleverna själva inte sitter och
- Ja, precis.
- Tar fram det
- Eller så kan eleverna själva skriva ut det, du behöver ju inte sitta innan lektionen och skriva ut allting för det kan ju också vara ett jättearbete
Excerpt 48
- Han har inte levt upp till det ansvaret han har fått.
- Nej, Och han har ju inte fått några klara mål heller, att det och det ska du ha in eller nåt sånt.
- Nej, utan det är bara ett tema, bara ett tema liksom

296

- Ja, fast vi hade ju ganska klara mål på webquesten i varje fall, eller det var ju ett antal frågor nästan som skulle besvaras och de skulle göra sånt, så vi kanske, jag tyckte också att de tog ett stort ansvar, men frågan är om det var för att det var ändå ett ganska inramat arbete
- Hela vägen var det ju det, från start till och med hur de skulle redovisa, hur ni betygsatte och allting
- Det var ju självständigt men det var ju inte liksom fritt på nåt sätt
- Nej
- Men bara för att det är självständigt så behöver det ju inte betyda att de förstår, vad som är bästa sättet att lära sig så, självständighet är ju en sak, jag menar han har ju varit självständig, för han har ju faktiskt åstadkommit, fast det han åstadkommit är ju liksom nåt som är väldigt dåligt. Men han har ju egentligen tagit ansvar för uppgiften, men han har gjort det på fel sätt
- Fast då är det ju den saken, vad är det att ta ansvar för sitt lärande, är det samma sak som att ta ansvar för en uppgift?
- Hm.
- Nå nåt sätt är ju att ta ansvar för sitt lärande och att ta ansvar för en uppgift det är ju inte riktigt samma sak.
- Nej, det är det inte. Nej det har du rätt i.

Excerpt 49
-…vad är det de ska ta ansvar för, om det då, dom ska ta ansvar för planering och innehåll och genomförande och allt, man kan liksom inte ge dem allt, man kanske får fokusera på vad är de primärt ska ta ansvar för, och vad vi ska ta ansvar för, det är ju en arbetsfördelning, mellan liksom målen som vi vet att de ska ha och förutsättningarna - -
- Har vi ju klart för oss med schema och tider och så vidare, och sedan då inom den ramen så får de göra ett arbete. Så att de kan ju inte ta hela ansvaret
- Om vi ger justa ramar så tror jag att de kan ta rubbet sen
- Ja precis
- Men man måste ju alltid utgå från vad de är, hur mycket ansvar kan de ta, hur medvetna är de.
- Och vilka förutsättningar har de att ta ansvar

Excerpt 50
Det är ju bara att sätta dig och prata med honom så ser du ju om han förstår eller inte.

Excerpt 51
Om man väljer att deklarera som ni gör så är det intressant med de personliga reflektionerna, för det som kommer till uttryck är inte entydigt en konstruktivistisk uppfattning. Så då kommer frågan är det gruppens uppfattning som kommer till uttryck i rapporten?

Excerpt 52

- De arbetar ju lite självständigt så där väl, för de håller på med egna grejer, och de kan gå in och tita i
- De får inte allting serverat utan söker själv

Excerpt 53

Men jag funderar, är det inte så att väldigt mycket är kollektivt konstruerad kunskap som man så att säga får ta del av som ett arv, sen den kollektiva kunskapsprocessen den drivs ju framåt, så ändras det, forskare gör genombrott så blir det nya paradigm och så.

Excerpt 54

- Det där måste vi komma överens om, så hade jag absolut inte tänkt, men det kanske är jättebra
- Så hade jag tänkt.
- Ja jag också, ja just det nu sitter vi här med varsina bilder

Excerpt 55

- Antingen får vi ju ha järnkoll, eller så är det upp till dom att de har ansvaret då, att hålla kollen lite, själva
- Ja fast man måste ju lämna ansvaret till eleverna en viss del också, faktiskt kunna göra det, jag menar om dom ska lämna in ett SO arbete och de ändå sitter på sin flextid jämt och räknar matte, då är det ju, då är dom ju dumma.

Excerpt 56

- När de ska jobba med det, ja, alltså så kallar vi inte period för nu är det engelska i två veckor, nu är det matte i tre veckor, det är inget tjafs om sånt alls?
- Nej men är det inlämning så vet ju de att det är det som gäller
- Ja vi lämnar det till eleverna alltså, helt och hållet? Ska vi göra det?

Excerpt 57

- Vilket språk…jag vet inte alls vad de pratar om
- Jo zippa, då packar man ihop, jag vet inte alls hur det går till (fniss) men det går att packa ihop filer så de blir mindre
- Man knör ihop det alltså?
- Ja man knör ihop det så det blir jättelite, så skickar man det så packar man upp det sen
- Men du vet inte hur man gör?
- Näää(stort garv).

Excerpt 58

- Jag har fått mina första e-mail från elever, i book review har jag fått hem tre stycken, dom som var försenade. Jag tyckte det var jättekul nu i helgen, för dom skulle ha lämnat in dom i fredags och så var det några som inte var klara, "Ja det sitter på datorn hemma" "Har du e-maiL"? "Ja" "Då kan du skicka det sa jag" och dom gjorde det. En hon lyckades inte, hon skulle lägga till det som dokument och hade inte

fått med det, men två fick jag, så jag har börjat med det också. Det är jättekul

Excerpt 59
- …så använder man nätet på nåt sätt alltså diskussionsgrupper eller chat eller nånting och låter folk ifrån andra länder berätta hur det är hos dom, och på så sätt så hittar man skillnader och likheter hur det är här och så, det skulle jag gärna vilja pröva,

Excerpt 60
Kommunikation med hjälp av e-post och chat är något som kan komma att ha stor betydelse för språkundervisningen. Här kan även franskan och övriga andraspråk komma att kunna vara med.

Excerpt 61
…shcema, närvarokontroll och betyg administreras av lärarna genom att de använder IT.

Excerpt 62
- Eller att dom, dom skulle ta nig fasiken haft en stämpelklocka när dom kommer! Chakon! Visa kortet innan dess…(skratt)
- Det bästa vore att ha en, när man har en sån där laptop, då ta man upp sidan där klassen är, och så klick, klick, klick och frånvaro och allting, så drar man iväg det till nån central databas, så blir det allting lagrat, skitsnyggt, jättebra, så borde det va
- Jag föreslog en pärm egentligen, för det är lättare att ta med sig om man ska, står i klassrummet, och så tar med sig den på eftermiddagen så, slipper man gå in i en databas. Det är bättre med en pärm tycker jag (skratt)
- Trist, men…
- Men det är fräckare med en sån databas.