

# **Productive interactions in ICT supported communities of learners**

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## Acknowledgements

*“As a young teacher I yearned for the day when I would know my craft so well, be so competent, so experienced, and so powerful, that I would walk into any classroom without feeling afraid” ( P. J. Palmer 1998, p. 57).*

To be a teacher or a teacher educator means to participate in an ongoing professional but also personal learning process. Writing this thesis has been a further step on the road of learning to know more about myself and the world I live in. I have always believed and told my students that it is decisive for learning to experience that other people believe in what you are doing. Still I have never experienced this so strongly myself as through the work on this thesis. Without support and trust from other people my work would never had been finished. I want to thank my supervisor Rune Krumsvik for his support. Further my other colleagues in teacher education. This community has been a support for me from the first day I met my dear colleagues Marit Ulvik and Ragna Aadlandsvik. Thank you Kari Smith for having brought the world into this environment and us into the world! Further I want to thank Sølvi Lillejord for the support she has been to me from the day I wrote the first words of my project proposal.

Support is also the key-word for what I always experience from my family and friends. Anyway, this time I have to bring up one family member before all the others. Thank you Anne! And of course Sigurd who always understands what kind of support I need in any situation.

Voss 18<sup>th</sup> of December

Ingrid Helleve

## Introduction

The thesis is closely connected to my personal interest in how to improve practicum for students and teachers. I worked as a teacher and principal for many years before moving into teacher education. One of my main interests has always been to guide pupils, and students, in their learning processes in schools and teacher education. While I was working as a teacher I was invited to participate in an innovative action research project that lasted for nearly four years (Ve, 1998). Later when I worked as a principle the whole school joined a three year Scandinavian action research project (Arnesen, 1994). My experiences from these action research projects changed my life as a teacher. Through the experience of action research, as a methodological approach to teaching, I understood that educational inquires lead to knowledge of self, and that being a teacher means to be in a continual learning process, not just as an educator but also as a human being. I also learnt how closely connected my personal values and attitudes are to my profession as a teacher. This thesis is based on my experiences as a researcher in three different educational contexts where the aim of the activity each time was collaborative writing by means of educational technology. Communication and language is the basis for education. The focus of the thesis is to understand more of how learning communities, that are supported by educational technology are established and developed, and how analysis of oral and written language can help us to understand more of the communication that takes place within these communities. Doubtless the introduction of ICT in Norwegian schools and teacher education contexts represents an additional challenge for teachers, and teacher educators, when they are supposed to design and guide learning communities. In spite of the great investment from policy-makers recent research reveals that there is little in-depth pedagogical reflection on the use of ICT in Norwegian schools, and that lack of sufficient digital competence is an obstacle for teachers as well as teacher educators (Arnseth *et al.*, 2007; NIFU STEP, 2008). Through the thesis I want to show how educational technology is used as a tool for collaboration. The thesis also shows how the complexity and challenges teachers have to face when designing for learning activities supported by ICT has utterly strengthened the importance of participation through action research. Focus is on the students' experiences, but also on the consequences for me as well as other teachers who are designing new learning communities supported by ICT. I

hope my experiences as an action researcher can be an inspiration for other teachers to do the same.

## Summary

The aim of this thesis is to single out what characterises productive interactions in ICT-supported communities of learners, based on research from three different case studies. The methodological approach through action research reflects my own learning processes as a teacher as well as a researcher (McNiff, 2002). The thesis is based on the assumption that when teachers are designing and guiding learning communities there are some common features across age-groups. Common for the three communities is that educational technology is supposed to serve as a space for collaborative writing activities. The study is conducted during a period of time from 2001 to 2004. Study 1 is carried out in 2<sup>nd</sup> grade in primary school where the students were supposed to write common texts by means of stand-alone-computers in the class-room. Study 2 concerns the experiences of distance learning student teachers using educational technology to give and receive feedback on written portfolios. Study 3 is based on student teachers' experiences with implementation of ICT as a tool for written communication for campus students. In 2003 the Norwegian Research Council asked for research on what they called *productive interactions* defined as learning situations of high quality. Referring to the results from the ICT-supported SLANT project in England they conclude that further research within this field will bring research and practicum many steps further.

The thesis is based on a socio-cultural, and situated perspective on learning, assuming that meaning is created in the tension between the learners' different voices. Further that the computer can serve as an inter-subjective space for *productive dialogues* or *productive interactions* given some preconditions that I wanted to investigate. The term *community of learners* with shared responsibility for learning between teacher and students is essential for the interpretation of the case studies. Three analytical concepts are used for analysing the activities going on within the communities: Inter-subjectivity as *having something in common*, as a *space for respectful disagreement* and as *human agency*. Action research is the methodological approach. Through the parallel learning process; as a researcher and a teacher I have had the following focus: What can I learn for future design of new learning communities? Accordingly, one study builds on the other illustrated through a stepwise analysis. Through fieldwork I have used classroom observation, interviews and observations of oral as well as written communication.

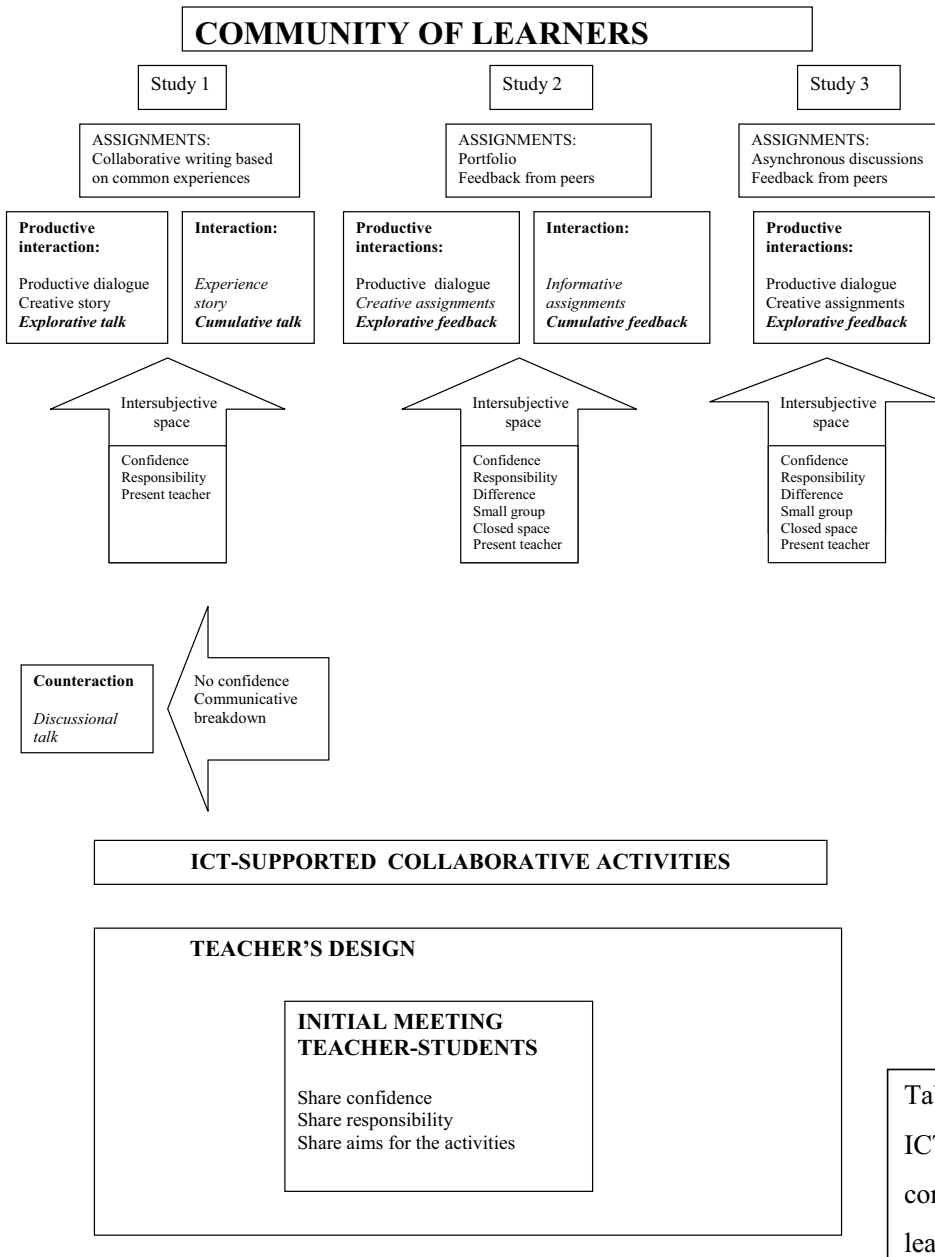
There are some general findings across the three communities. Fundamentally, the teacher should have a holistic view on the pedagogy that is going to be conducted. Pedagogy here is to be understood as the interactive process by which students learning is mediated using a range of artefacts for example language and computers. While the teacher meets the learning community with a design of activities and assignments he or she should be aware that for successful shared responsibility to take place the initial meeting seems to be crucial. There must be confidence between students and teacher, and they must work together to create the aims, the activities and the assignments that are going to be shared and solved. Another finding across the three studies is that when students are collaborating by means of the computer the teacher's position is changed from that in an ordinary class-room. However the students still want the teacher to be present. The challenge is to figure out how?

Finally I will present the findings from the three studies separately based on my observations of oral and written collaboration. I observed the students in study 1 in two different writing activities; *experience* and *creative story*. I found that if the students did not share basic confidence they developed what I called *counteraction* or *discussional talk*. This means that there was no communication at all. Either one student wrote the whole text or none of them wrote at all. Given basic confidence and *interaction* the conversation was dependant on what kind of assignments the students were given by the teacher. *The experience story* asked the students to retell what they had done in the workshops. The students were accumulating knowledge and I decided to call this conversation *cumulative talk*. In the *creative story* on the other hand the teacher read a thrilling story before she suddenly stopped and asked the students to continue. They were challenged to use their imagination through argument and creativity. I classified this kind of conversation as *explorative talk* which in this thesis is used as an equivalent to *productive interactions* or *productive dialogue*.

What I recognized in study 2 was that the same concepts were adequate for the mutual feedback process between the student teachers. If they were asked to retell information regarding what the *informative assignments* asked for, then they developed *cumulative feedback*. If on the other hand their personal attitudes and values were challenged, as the *creative assignments* allowed for, they developed *explorative feedback* understood as *productive dialogue* or *productive interactions*.

In study 3 productive interactions is understood as feedback from peers, and participation in asynchronous discussions. The study shows how and why the students experience online

reflective dialogues to be qualitatively different from face-to-face collaboration. Due to distance in time and space the productive interactions are significantly different. They get more time, and they find it easier to “form” the other person. Asynchronous discussions are experienced to include more students than face-to-face discussions. Finally they find that by the end of teacher education the closed space with their written texts has grown to a “property chest” they can visit whenever they want to.



## List of publications

- Helleve, I. (2003). Samspel med data? (Interaction with ICT?), *Nordisk pedagogik*, 3, 161-170.
- Helleve, I. (2007). In an ICT-based teacher-education context: why was our group "The magic group"? *European Journal of Teacher Education*, 30(3), 249-267.
- Helleve, I. & Krumsvik, R. (In press). If ICT is the answer- what should be the question? In R. Krumsvik (Ed.). *Learning in the network society and digitized school*. New York. Nova Science Publishers.



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## **ENCLOSED**

### **PAPER 1, 2, 3**

#### **APPENDIX 1:**

Informed Consent  
Letter of concessions NSD 1  
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#### **APPENDIX 2:**

Core questions to the pupils	Study 1
Interview questions to the teacher	Study 1
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Assignments for the portfolio	Study 2
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#### **APPENDIX 3:**

English version of paper 1

# 1. Papers

In order to give the reader an impression of the content of the study at an early stage of the reading process I have chosen to present a summary of the three articles in the initial chapter.

## 1.1.1 Paper 1: Interaction with the computer? (Samspel med data?)

This study is conducted in a classroom where the students are required to make common texts by means of using the computer. The aim is to understand more of the interaction between the students themselves, and between teacher and students when the computer is part of the learning environment. The study shows that the initial meeting; the *reflection hour* every day was important to the students for two reasons. Firstly, in order to gain and maintain confidence both with each other, and with the teacher and secondly to share the aims of the learning activities they were going to participate in. The learning activities were completed through the common collaborative text-writing. I observed the students participating in two different learning activities which I chose to call *experience story* and the second *creative story*. In *experience story* the teacher told the students a story from history or geography. They were then asked to go to workshops, to make figures in different materials and to play with them. The final activity was to retell the story of their experiences by means of the computer. The background for the *creative story* was that the teacher started to tell a thrilling story. Suddenly she stopped and asked that the students to continue the composition of the story together. Through observations and tape-recordings of the collaboration in front of the computers, communication was classified. Depending on how the students reacted towards each other two concepts were developed; *counteraction* and *interaction*. *Counteraction* is also called *discussional talk*. *Counteraction* or *discussional talk* means that there is a breakdown in the communication between the participants. Opposite, *interaction*, means that the students met with a friendly attitude to each other, and to the collaborative writing activity they were supposed to do together. When I analysed the conversations I found that the assignments the students were given through either *experience* or *creative story* was decisive for what kind of interaction they developed. If they were

asked to collect common information and retell what they had done as in the *experience stories* I called this approach *cumulative talk*. If on the other hand, they were invited to use their creativity, imagination, personal opinions and even disagree and discuss as in the *creative stories*, they developed what I called *explorative talk*. In the thesis explorative talk should be understood as *productive dialogue* or *productive interactions*. Observations and interviews show that most of the students appreciated the collaborative writing instead of individual for different reasons.

So what are the consequences for teachers' future design? Summing up, the study shows that together with the students the teacher is creating a shared focus for the activities they are going to participate in. Most of the students experienced that they learned from participating in the collaborative activities. It also shows that the way the teacher designs the assignments is decisive for which type of interaction the students are going to develop. If the participants share a common trust, the creative assignments offer them possibilities of "respectful" disagreement. The study also shows that when the pupils are collaborating by means of the computer the teacher has different role than in an ordinary classroom. However the students still want the teacher to be present, and engaged in their work.

### **1.1.2 Paper 2: In an ICT-based context: Why was our group "The Magic group"?**

The aim of this study is to understand why a group of distance learning students, experienced their own learning process to be kind of "magic". The students were expected to compile their own portfolios, and they published their texts within a closed space of a learning management system (LMS) where nobody other than the group and the teacher had insight. The texts were based on assignments given by the teacher educator. The students were to give feedback to two other students on each text. Altogether they wrote 15 texts. After a few weeks the students reported that they experienced a productive learning process. As their teacher educator I also realized that the Dewey group spent more time on the writing process as well as on the feedback process than the other groups. Often the feedback resulted in a continuing dialogue between the students.

By the end of teacher education the students were interviewed. The research question was: What are the most important assumptions for the productive learning process the "magic group" experienced? I noticed that in the same way as in study 1, the assignments were performed in two different ways which again influenced the students' choice of approach.

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*Informative assignments* asked the students to collect information about for example a text they had read in their curriculum. They were not invited to contribute with their own personal opinions and experiences. In the feedback they gave to each other they were collecting common knowledge, but their attitudes and values were not challenged. I chose to call this kind of feedback *cumulative*. The opposite was the fact with what I called *creative assignments*. These assignments asked for the students personal opinions and were challenging their personal attitudes and values in *productive dialogues* through *productive interactions*. The creative assignments opened for feedback from peers that I chose to call *explorative feedback*. I then analysed the texts from the feedback process according to the different assignments

Through the semi-structured interviews I tried to get hold of the students' arguments as to why the learning process had been so successful, in order to learn as much as possible. The aim was to look at the consequences for future design of learning communities supported by ICT. What the students mentioned as very important was the three days' face to face seminar at the beginning of the programme. During these days they established a group identity, mutual confidence and trust. The perception of confidence seems to be basic for their future collaborative process. They appreciated their joint similarities in the sense that they experienced mutual respect and commitment. However, their difference concerning attitudes and values was also appreciated. The mutual confidence they shared meant that they were able to disagree and discuss. An important factor for the students' willingness to share their deep-rooted values is that the space should be closed and only the teacher should be present.

### **1.1.3 Paper 3: If ICT is the answer- What should be the question?**

This study is based on my experiences as a teacher educator participating in the local part of the innovative ICT-supported national project PLUTO (2000-2003) (ITU, 2000-2003b); INVITIS (2001-2003) (ITU, 2000-2003a) at the University of Bergen. INVITIS was initiated and planned by a research group of four language didactics from January 2001. As a pedagogue I joined the project in August 2002. The expectations from the research group was to develop an alternative online model for education of language teachers; a model that could serve as a platform for these future teachers' abilities to become creative and innovative. Due to these intentions many different activities had been initiated by the research group before I joined 1 ½ years after the project had started. The expectations were

that I should join the research group, plan and organise innovation of pedagogy by means of education technology for the students, and do action research into the project.

My responsibility was to arrange and organize for pedagogy. The different themes like i.e. classroom management were dealt with in lectures for the whole group of 80 students, in face-to-face discussions in seminar groups and in portfolios where the students gave feedback to each other.

		<b>Face-to-face meetings</b>	<b>Online activities</b>
<b>Seminar group</b>	20 students	Met once or twice a week during the theory period	Asynchronous discussions
<b>Basic group</b>	4-5 students within the seminar group	Practicum at the same school	Compile portfolio + give and receive feedback from peers

Table 2: Organization of pedagogy.

I was supposed to be an action researcher into the project, but experienced that there was little or no time for reflection. The fact that I had joined the project a long time after it had started meant that I had no ownership to it. This was a frustrating experience, and in addition I experienced the students to be frustrated. In order to see what I could possibly learn from my own, and the student teacher's, frustrations, I decided to have interviews with the students who were at the end of their teacher education. The semi-structured interviews of ten students were conducted in two sessions. Through the interviews I wanted to focus on three areas. Firstly what the students looked upon as the most important learning activities during teacher education, and secondly how they experienced participating in such an innovative project. The third point was *if* and eventually *how* the educational technology had been a support for their learning process.

Concerning the first topic all the students agree that practicum was above all the most important learning activity. Additionally the new way of organising teacher education, with small groups consisting of basic and seminar groups, was looked upon as a solid base for confident reflective discussions of what they had experienced in practicum. When it comes to participation in the innovative ICT-supported project, the study shows that the students had experienced that it was important to know something about ICT in education before they entered schools. However they experienced the way they were introduced to the online activities to be provocative. The main reason for their frustration was that were never told



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why these activities were so important, and they could not understand why they were forced to communicate online with people that they met every day. The students were never told why they had to do all the different ICT supported activities, and therefore never felt any ownership to the project. Additionally, the students reacted to the fact that all the ICT supported activities were compulsory, while they listened to teacher educators telling them about the importance of pupils' autonomy in schools, and the importance of listening to them. They saw no connection between what they were asked to do and their future work as teachers.

By the end of teacher education some of the students saw that the educational technology had been a support to their productive learning process. The activities they mention were to compile portfolios with feedback from peers, and participation in asynchronous discussions. They found online communication to be qualitatively different from face to face collaboration. Among other reasons because they had time to think before they gave feedback to other students' texts, or arguments, this gave them more time to reflect before they responded than in face to face collaboration. They also found it was easier to grasp the other students' opinions when they could read their arguments. Distance in time and space opened for a deeper reflection. In oral discussions only a few students participated. This was different in the asynchronous forums. According to the students the theme for the discussion should be decided by the teacher, and should be performed in ways that opened up for them to give their personal opinions. By the end of teacher education the students realized that within the closed space of the LMS they had built a "treasure chest" of their own texts that were available for the whole group. An important assumption for the students was to know each other and feel confident before the online collaboration began. They missed having a teacher educator as a guide during the online learning process.

So what should be the assumptions be for myself and other teachers when designing new communities of learners supported by ICT? Building a confident community as a fundament for productive learning seems to be important. The students' lack of ownership to the aims of the activities caused frustration. This is an important factor to be addressed. Online collaboration is qualitatively different from face to face collaboration. Asynchronous forums in closed spaces within an LMS where the students know each other seems to be best suited for activities like compiling portfolios, giving and receiving feedback and discussions. According to the students, the teacher should be an active participator in the activities.

The answer to the question raised in the headline is that if ICT is supposed to serve as a tool for learning in education, then I think the teacher should engage in the process through participatory action research.

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## 2. Educational technology as a tool for learning?

The aim of this chapter is to show that the Norwegian educational system is in a critical situation concerning research on ICT<sup>1</sup>. Introduction of educational technology in education has caused both dilemmas, and possibilities, for teachers and students. There seems to be a gap between political intentions and the reality in schools and teacher education.

When it comes to the use of digital artefacts Norway is in an outstanding position. The density of computers is fairly high in the society as such. Further, Norway has good access to technology in schools and education compared to other countries (OECD, 2001, 2003). This means that most young people grow up with the computer as a part of their daily life. The strong emphasis on ICT<sup>1</sup> as an artefact for learning is underlined in The National Curriculum Plan from 2006. “Knowledge Promotion” (MOK, 2006)<sup>2</sup>, claims that digital competence should be one of five basic competences combined with reading, oral expression, writing and mathematics. The discussion of how ICT should be integrated makes it imperative for teachers to know more about the possibilities offered by educational technology for creating productive learning activities.

For a long time focus in national plans and curriculum has been on acquiring equipment and learning how to use the technology (Krumsvik 2006; Krumsvik, 2007). The Action Plan for ICT in Norwegian Education for the period 2000-2003 initiated a change to this. Combined with increased focus on educational technology, the plan acknowledged previous difficulties, and emphasised the need for knowledge and experience on how to make ICT an integral part of education. What the plan seems to advocate is what Koschmann (1996) calls Computer Supported Collaborative Learning (CSCL) which is a change from behaviouristic and cognitive, to a socio-cultural way of viewing ICT and learning in education. Program for digital competence (2004-2008), states that Norway should be ranked on top of the world list when it comes to utilizing ICT as a tool for learning. In the midway report, the government ascertains that 98 % of upper secondary schools now have access to an LMS<sup>3</sup>. The high

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<sup>1</sup> Information and communication technology

<sup>2</sup> The Knowledge Promotion <http://odin.dep.no/kd/english/topics/knowledgepromotion/bn.html>

<sup>3</sup> Learning Management System

density is regarded as a blessing without any discussion. The same report claims however, that focus should be changed from investment in equipment to understanding learning purposes. Taylor (1991) defines three reasons for malaise of modernity in our society. First he mentions the influence of individualism. Second the economic rationality basic for efficiency and economic rationality and finally the effects of individualism and rationalism on escape from political participation. Concerning the second point, the aura surrounding technology seems to be automatically accepted by policy-makers as advancement. Instrumental rationality makes us think that technology can solve all kinds of challenges (Taylor, 1991; Castells, 2002). This claim leads to the question that should be raised within all educational institutions; how to balance the use of technology with the educational needs of the student (Burbules & Callister, 2000). The social activity which is perhaps most challenged by the swift move towards what is called the network society is education. Politicians as well as educationalists argue that we need a new kind of pedagogy enhancing flexible thinking skills, learning to learn and creativity. The real problem, however, is not a lack of a will to change, but a lack of any clear vision of how to change (Wegerif, 2007). According to McFarlane (2001) there has been a confusion of purposes concerning use of educational technology at the heart of policies in England. McFarlane mentions three partly contrary areas. First, ICT is defined as a set of skills or competences, second as a vehicle for teaching and learning and finally as an agent for transformative change. I think the Norwegian context has been characterised by the same confusion. This thesis is going to focus on possibilities, dilemmas and challenges for students, teachers and teacher educators within the field of educational technology.

### **2.1.1 Educational technology as a challenge for the teacher**

In Norwegian newspaper debates teachers are accused of having withdrawn or even abdicated from responsibility the last few years. According to research they are leaving too much responsibility for the learning process to the students. The result is that the students are left on their own (Dale & Wærness, 2003; Klette, 2003; Haug, 2005).

The introduction of educational technology as part of the learning environment has made the question of responsibility even more relevant for discussion. The digital revolution taking place within the last few years has opened up possibilities, but also caused dilemmas and challenges both for teachers and teacher educators. Educational technology with its interactive abilities opens for communication with the rest of the world. The walls of the

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classroom no longer limit contact between students and educators inside the room and the rest of the world. According to Cuban & Tyack (1998) computers are the most powerful teaching and learning machines. Students and teachers can interact with computers in ways that are impossible with other media such as film or television. Seymour Papert (1984) went as far as to say that in future there would be no more schools because the computer would change it all. Following the same argumentation Säljö (2000) says that the computer can be the most serious challenge to the traditional classroom as we have known it for thousands of years (ibid. p.46).

In spite of the relatively high density of computers within Norwegian education ITU monitor (Arnseth, *et. al.* 2007) revealed that there is still no depth in pedagogical reflection on the use of ICT among teachers in Norwegian schools. A Norwegian study concerning use of educational technology in teacher education shows the same tendency among teacher educators (NIFU STEP 2008). There seem to be a disconnection between the rhetoric in political documents and the actual situation in schools. Combined with use of e-mail the LMS or VLE<sup>4</sup>equipment is looked upon as a way of transmitting and storing information. For some schools acquiring an LMS combined with use of e-mail seems to be the only aim of digitalized school development (Kløvstad *et al.*, 2005; Krumsvik 2006, 2007).

There might be many possible reasons for the discrepancy between the political request and reality inside schools and classrooms. One possible reason is that the initiative to the investment in educational technology does not come from schools and teachers themselves. While political documents recognize the computer as an instrument for learning, many teachers are sceptical. The decisions are made from the top-down without possibilities for teachers to participate. If computers are placed inside a class-room this seems to be perceived as a guarantee that learning will take place (Cuban 2001). Teachers are not consulted even if they are the actors that are supposed to use the computers in their education. The initiatives and premises for introduction of educational technology in classrooms have been decided outside of schools and teacher education institutions. There seems to be a gap between political aims and reality, reinforced with a strong belief in the fact that if educational technology is introduced as part of the learning environment learning is going to occur (Cuban 1986; Arnseth, 2000; Ludvigsen, 2000; Kløvstad *et al.*, 2005). This

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<sup>4</sup> Virtual Learning Element

problem is not exceptional to the Norwegian context. Around the world, when visionary policy initiatives result in minimal change in classroom practice evaluators tend to blame teachers and urge more training for them (Somekh, 2008). Teachers' resistance is looked upon as the main obstacle against development. What these evaluators tend to overlook is firstly the relationship between teachers' beliefs concerning pedagogical reasoning and the affordance of technology, and secondly that in a socio-cultural understanding of learning, teachers and classrooms cannot be considered in isolation from the framework of local and national cultures.

The discussion of technology as either good or bad is perhaps not fruitful since computers are here to stay. What is needed is a critical view on the use of technology. Instead of blaming individual teachers for lack of change, radical changes to schools and educational systems are needed if education is to be transformed by ICT. A broad range of research shows that legislative frameworks and organisational structures of schooling makes it impossible for ICT tools to be appropriated pedagogically (Cole, 1996; Crook, 2001; Säljö, 1999; Sutherland, 2004). What happens is that the technology is used as cultural artefacts mediating pedagogies of blackboard and chalk. Burbules & Callister (2000) propose three challenges that should be discussed. First, they question the phrase informational technology, which is referred to as neutral information. The authors argue that what is called information actually is searched, selected and interpreted. The Internet is by no means a neutral political medium. Further they propose a rational view concerning the changes technology has brought to our culture when it comes to social interactions and institutions. Finally, they argue for a post-technocratic society that anticipates emergent ways of utilizing, benefitting from, but also continuously discussing problems associated with using the technologies. This underlines the need for research within ICT-supported learning environments including pupils in school as well as students in teacher education as I have focused on in my thesis.

### **2.1.2 Productive interactions**

The term *productive interaction* is used by a research group appointed by The Norwegian Research Council (2003). The group was given the mandate to give advice for future research within the field of learning and information technology in Norway. In the report the concept *productive interactions* is used as a synonym for "high quality" learning situations. Referring to Kulik, 1994; Scardemalia & Bereiter, 1994 and Rochelle *et al.*, 2000, the

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research group claims that educational technology contributes to productive interactions when the following conditions are present; active engagement, group work, systematic interaction and feedback, and assignments that are realistic and motivating. These aspects are mutually supportive of each other. According to the report *productive interactions* means that students construct new knowledge supported by educational technology. Teachers are important actors in creating new ICT-supported learning activities. The report from the Norwegian Research Council claims that knowledge is situated and constructed within social practice, but that schools and education are characterized by knowledge, understood as information, transmitted from teachers to students. As an example of research within the field of *productive interactions*, the group from the Research Council mentions the SLANT-project<sup>5</sup> (Wegerif & Schrimshaw, 1997; Wegerif, 2007). Through this research-project specific applications supposed to stimulate productive interactions in the classroom were evolved. The conclusion from the Norwegian Research Council is that “further research in this field should contribute to bring science and practice many steps further” (NRC, 2003, p. 18) (My translation). My study is going to contribute to this field of research.

### 2.1.3 SLANT

The SLANT-project was conducted by The School of Education at the Open University (Wegerif & Schrimshaw, 1997; Wegerif, 2007). The research consisted of a number of studies. Through experimental design and comparative analysis the researchers were able to compare children’s conversation when they were collaborating in front of the computers. Teachers and pupils from different schools participated. The material consisted of observation notes and 50 hours video-recording. The aim of the project was to explore ways in which teachers could improve the quality of children’s discussions around the computer, as well as making the best possible use of computers within the class-room. Ground rules for communication supposed to enhance collaborative learning and thinking, were promoted to the pupils. They were told that the point of the collaborative activity was not just the curriculum learning goal, but also the quality of their talking and thinking. The computer supported collaborative activities were based on soft-ware supposed to enhance collaborative problem-solving. The rules for communication were based on the idea of

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<sup>5</sup> The Spoken Language and New Technology

*exploratory talk* which had been influential in education in the United Kingdom for many years. Three different concepts were developed in order to classify conversations between the students in front of the computers; *disputational-*, *cumulative-* and *exploratory talk*. *Disputational talk* is characterised by disagreement and individualised decision making, while in *cumulative talk* the members build positively, but uncritically on each other's utterances. The discourse in *cumulative talk* is recognised by repetitions and confirmations. *Exploratory talk* is identified through communication where students critically but constructively are building on each other's statements. Statements and suggestions are offered for joint consideration. In *exploratory talk* knowledge is made more publicly accountable and reasoning is more visible in the conversation (Wegerif & Mercer, 1997). *Exploratory talk* with its emphasis on explicit reasoning has been regarded as a way of enhancing higher order thinking, something which has been highly valued within education (Wegerif, 2007). The theoretical foundation of higher order thinking is based on reasoning: "adolescence memory is so localized that remembering is reduced to establishing and finding logical relations" (Vygotsky 1978, p. 51). The most important finding from the SLANT- project according to (Wegerif, 2007) was that it is important for the teacher to design the learning context as a complete unit. The claim was that *exploratory talk* was a well suited framework for promoting argumentation, which is considered a form of higher order thinking. This again was used as an argument for a need for change in the overall pedagogy of the class-room.

As one of the researchers responsible for the SLANT-project, Wegerif revisits and re-evaluates the findings in 2007. What he now argues is that the strong emphasis on reasoning makes it a limited model. His conclusion is that reasoning is not the most important way of using language as a tool for thinking. Including himself he refers to Vygotsky, Wertsch, and Mercer, amongst others, claiming that the reason why they have looked upon argumentation as an ideal in communication is that they believed in acquisition of knowledge. He argues that the notion of knowledge as closely related to *arguing* is limited. He admits that since they were looking for argumentation between the pupils, data-material concerning creativity was left out. Referring to Bakhtin, Wegerif now argues that what is important is to open up a dialogic space between people "in which creative thought and reflection can occur" (Wegerif, 2007, p. 57). Higher order thinking here is understood as an ongoing dialogue, internal and external, where creativity is an important aspect. In order to add creativity to the explicit notion of reasoning expressed in the concept *exploratory talk* he wants to change it



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to *reflective dialogue*. According to Somekh (2007) the SLANT project is tightly focused on the conduct of children's talk with or without stimulus from ICT. Teaching children to conduct group-work within grounded rules enhances rather than disrupts preparation for national tests" (ibid. p. 38). What Somekh brings up as a positive effect of the SLANT project is the important impact of collaboration between researchers and teachers in action research.

Even though I was inspired by the concepts used in the SLANT project, my study is different in many aspects. The assignments the students were given in the SLANT-project were pre-produced software and computer-games that the pupils were expected to respond to. The students' communication was mapped according to the three pre-designed categories; *disputational*, *cumulative* and *exploratory talk*. They were even drilled in using explorative talk before they started to collaborate. In the SLANT-project the researchers were searching for *explorative talk* in order to detect argumentation in students' communication. My study is going to contribute to the research in a field where the students were collaborating on producing their own texts based on assignments given by the teacher.

#### **2.1.4 Action research and innovation by means of ICT**

My research is concerned with educational technology as a means for collaborative text-based interactions. Each study builds on the knowledge gained from the previous one. Throughout the three case studies my focus has been to investigate what it was that students and teachers experienced to be productive interactions, and furthermore to understand as much as possible of the presuppositions or preconditions for these interactions. As I have explained previously study 1 was inspired by Wegeriff & Mercer, (1997). Further influence from research within the socio-cultural research field has been Mercer (2000), and Wegeriff (2007). The methodological approach to the study is action research. Bridget Somekh (2007) argues for action research as an entry to ICT and learning. She claims that research on educational technology has to be understood as innovation in progress. Innovation is predicted by two premises. Firstly, that the interrelationship between multiple levels of human activity constructs change, and secondly, that there is an active, interventive role for the researcher in supporting this process. Action research ensures these premises through transferred pedagogy. Somekh mentions two countries that have been concerned with transferred pedagogy; Finland and Norway. Influenced by the socio-cultural perspective on

learning these countries have adopted models which involve the entire learning system and its stakeholders. As an example of transferred pedagogy through innovation and action research Somekh refers to Krumsvik (2006) and the school at Godøysund as part of the national PILOT-project (Project of Innovation, Learning, Organisation and Technology) (ITU, 1999). According to Somekh the whole school developed their own “digital epistemology” through an innovative action research process. The action research project in which the teacher in study 1 participated is another example. Fourteen different schools and teachers participated in the project where the question was how to use educational technology in the development of texts among pupils in primary schools “Collaborative writing by means of ICT” (Trageton, 2000). Yet another example is the PLUTO (Program for teacher education, technology and change). PLUTO was initiated by the Department for Education and Research. The main aim was to develop new pedagogical and organizational models for designing and guiding learning environments where ICT was to play an essential part. Based on a change in perspective on learning and an acknowledgement of educational technology as a possible support, many teacher education institutions in Norway changed their pedagogy through action research. Examples are Department of Teacher Education and School Development at the University of Oslo (Ludvigsen & Flo, 2002) and Stord/Haugesund University College (Engelsen, 2002). My own experiences as an innovator through action research in the local part of PLUTO; INVITIS at the University of Bergen is described in study 3. Study 2 does also have an innovative action research approach. It was completed at the same time, within the same teacher education context, but not as a part of PLUTO. The study has its focus not just on the contextual conditions for productive interactions but also on the dialogue and feedback process between students in online communication. Nyhus & Norkvelle (2003) argue that research has identified important assumptions for successful online communication. Still it is impossible to draw any conclusions because the studies’ lack of a common didactic. What they argue is that for online supported communication a new conceptual framework should be identified. Sjøhelle (2007) argues that before new concepts are developed, we should try to understand what online communicative competence actually is. According to her Norwegian research on student teachers’ communication by means of educational technology is limited. My research interest is inspired by CSCL and the collaborative and situated perspective on learning. But I am also concerned with language as the primary artefact for learning. My studies are clearly inspired by two Norwegian researchers who have had an important impact

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on research within the dialogic perspective on learning; Olga Dysthe and Torlaug Løkensgard Hoel (Dysthe, 1995, 1996, 2001, 2002); (Dysthe *et al.*, 2000, 2008); Hoel (1994, 2000a, 2000b, 2001, 2002a, 2002b, 2003); Hoel *et al.* (1999, 2003). Both researchers are concerned with collaboration as a potential for productive online learning. Based on two case studies, on productive learning among University students, Lillejord & Dysthe (2008) argue that understanding learning as action entails developing the students' argumentative competency. Another important inspiration for me has been the REFLECT-project (Hoel & Gudmundsdottir, 1999). Their studies of student teachers' communication by means of e-mail have been an important inspiration. Written communication is used as tool for reflective dialogues. Another research on asynchronous discussions as learning communities is done by Dagrún Sjøhelle (Sjøhelle, 2007). Her conclusion is the same as Hoel & Gudmundsdottir; that there is a connection between the establishment of a confident learning environment and the development of communicative competence. Still another study from the University of Bergen based on teacher education and student teachers' asynchronous communication is within the field of English didactics (Skulstad, 2005). Skulstad argues that the students are continuously negotiating and re-negotiating their positions as teachers and student teachers when they give feedback to each other. These negotiations and the uncertainty of which position they possess complicates their interaction. My conclusion is the same as Sjøhelle's. If students and teachers manage to create a community based on confidence it is then possible to balance discussions and negotiations of positions in a way that can enhance productive learning (Sjøhelle, 2007).

### **3. Aims and research questions**

In this chapter I will give an outline of my research questions and focus in the three articles. I will also elaborate on the research questions and design of the thesis.

#### **3.1.1 Research questions**

The main research question is:

What characterizes productive interactions of ICT supported communities of learners?

The sub-questions are:

What are the most important tasks for the teacher to consider when designing a learning community supported by educational technology?

How does the performance of the assignments influence the interaction?

#### **3.1.2 Research design**

My dissertation research is originally planned as an ethnographically inspired and theoretically interpreted qualitative study (Meriam, 1998). The methodological approach is through action research (Stenhouse, 1975; Carr & Kemmis, 1986; Tiller, 1999; McNiff, 2002) applied to three case studies (Yin, 1994; Merriam, 1998). The case studies are based on many different data sources and combine different ways of collecting data. The intention of the research is to understand as much as possible of the interaction between students and teachers in learning communities where educational technology is an essential part. The basic theories are collaborative learning perspectives based on a socio-cultural perspective on learning (Dysthe, 2001). The research questions indicate that it is important to grasp the participants' point of view. This means that an important part of my research is carried out through observations and semi-structured interviews. The purpose of the qualitative research is to understand different sides of the participants' daily life from their own point of view. Qualitative research takes the researchers' communication as an explicit part of knowledge instead of deeming it an intervening variable. The subjectivity of the researcher and of those being studied becomes part of the research process. Researchers' reflections on their actions and observations in the field become data in their own right, forming part of the interpretation. The empirical starting point is the subjective meaning the individuals attribute to their activities and environments. My intention through the three studies has been a

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genuine interest in learning as much as possible about how I could improve my own future design of ICT supported learning environments. This interest has however been combined with a wish to influence and change. Teaching is deeply rooted in personal values and attitudes (Palmer, 1998). Action research is often criticized for being based on personal ideological theories and personal values (Krumsvik, 2006). The most common position of a researcher has been and still is to be an observer. Traditionally the researcher is supposed to possess competence about theoretical and methodological questions based on objective, de-contextualised knowledge (Engelsen, 2006). An answer to this is that valueless research is impossible. All scientific knowledge contains subjective elements and is based on personal values (Ziman, 2000). According to Gadamer (2003) understanding is not a method, rather an uncontrollable part of being a human. This means that research is interpreted through human socio-historic perspective, and that researchers should be aware of this perspective as a necessary aspect of the interpretation. What distinguishes action research as a methodological approach from many other ways of approaching research, is that its value-based intentions and objectives is made distinct and clear (Krumsvik, 2006). The main aim and motivation for my research was to understand what characterises learning environments where the students experience productive learning interactions. This means that I had to use different methods like class-room observation, observation of the ICT supported collaborative writing processes and verbal conversations as well as interviews for data collection. Through the fieldwork (Hammersley & Atkinson, 1996) of study I discovered patterns that I later wanted to follow up in the second and third study. An assumption was that I had to be open and enquiring without having control over the events going on around me. My motivation was my own curiosity and learning process. During a period from 2001 to 2004 I participated in three different learning communities where educational technology was intended to support the students' learning processes. My own position was partly to be a researcher, and partly to be the teacher responsible for designing the learning activities. The socio-cultural approach to learning has been a support to me in the analysis of the data. My way of understanding and the development of the research questions has been a "whirling movement" between theory, methods and empirical data (Kvale 1997; Wadel 1991).

## 4. Theoretical approach

The aim of this chapter is to describe the theoretical framework for my thesis. I will start by giving a statement of how I understand learning in a socio-cultural approach and a situated perspective. Based on my understanding of the terms productive interactions and productive dialogues I will give an explanation of the concepts inter-subjectivity and dialog, which I look upon as closely connected. I will discuss the term *community*, as ICT-supported learning has made the use of the concept *community* even more current than earlier. Finally I will argue why I find the term *community of learners* to be helpful in analysing and understanding more of the learning processes going on in the three educational contexts I have studied.

### 4.1.1 The socio-cultural perspective on learning

My studies are based on a socio-cultural approach to learning. A socio-cultural perspective on learning should rather be looked upon as a family of approaches that are “friendly” to each other rather than as one united theory. “The goal of a socio-cultural approach is to explicate the relationship between human mental functioning on the one hand, and the cultural, institutional, and historical situations on the other”(Wertsch *et al.*, 1995, p.11). The perspective has been developed by different scholars and environments partly based on the Soviet *cultural-historical school* like Vygotsky, Luria and Leontjev, and partly on *pragmatism* rooted in theories from James and Pierce, but also Dewey and Mead. *Cultural psychology*, based on Luria and Leontjev’s theories are further developed by Cole, Wertsch, Bruner, Lave and Rogoff. *Activity-theory* as described by Engeström and Cole is also rooted in theories developed from Vygotsky and Leontjev. The *socio-cognitive* tradition is grounded in the belief that knowledge is socially constructed and that there is a close connection between learning and identity as an aspect of activity in the world (Lave, 1992). The last group I will mention within the socio-cultural approach to learning is *dialogism* (Bakhtin, 1981, 1986, 1990). According to Rommetveit (1992) this is the dialogically based socio-cognitive approach to human cognition and communication. Inter-subjectivity and the ability to take into account the perspective of others is an essential presupposition for communication. Essential for scholars like Bakhtin, is that meaning is created in interaction.

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The main aim of my thesis is to find out what characterizes productive interactions in ICT supported learning communities

#### 4.1.2 Individual and situated perspectives on learning

The last few decades there has been a debate going on between “cognitivists” on one hand and a situated perspective on learning on the other. In a cognitive view learning is understood as the consequence of inner mental processes; in a situated perspective as a result of social practice. The article *Cognition and Learning* written by Greeno *et al.*, (1996) outlining different views on learning, started a broad discussion between researchers. An article written by Anderson *et al.*, (1996) was the starting point for a debate in *Educational Researcher* where Greeno’s situated view on learning was challenged (Anderson *et al.*, 1996). Here the authors argue against situated learning through four statements; action is grounded in the specific situation, knowledge is not transferable, abstract training is useless and finally instruction should take place in complex, social situations. Concluding, Anderson *et al.* acknowledge that the situated perspective has served a role in the consciousness of what learning actually is like, but also to a certain degree contributed to confusion. They claim that the situated perspective ignores the fact that cognition is partly context dependent but also independent. Consequently, individual training and abstract instruction might sometimes be the best alternative (Anderson *et al.*, 1996).

Greeno (1997) answers with a statement saying that Anderson *et al.* have based their article on wrong premises. When the presuppositions are different you get the wrong answers by asking the wrong questions. He argues that the term *knowing* and *generality of knowing* is more precise than *transfer of knowledge*. The cognitive perspective is concerned with the individual’s ability to acquire representations and procedures for new situations. The situated perspective is concerned with interaction that succeeds over a broad range of situations. Participation and internalization models reflect two different worldviews and thereby provide different research goals and methodology. In the paper, Greeno is responding to the implications of the four questions raised by Anderson *et al.* To the first question his answer is that the situated view on learning requires sampling across a domain of situations in which participation involves the kind of knowing that is of interest. Further that the social conditions of learning should be arranged in order to enhance activities of inquiry as well as acquiring skills. Concerning abstract training and transfer, he answers that the implications for educational practice is to take into account what kind of activities are

observed, and design learning environments where students can develop abilities to participate in practices that are important to them. To the final question, Greeno argues that school learning should provide students with resources for reasoning *in*, as well as *with* the concepts of the subject matter domain in order to make it beneficial beyond the class-room.

Some years later the authors from both sides wrote an article together, the so-called “consensus-article” where they identified several points on which they judged the two perspectives to be in agreement (Anderson *et al.*, 2000). This article states that cognitive as well as situative approaches highlight different aspects of the educational process. Consequently they are fundamentally important. Further they state that learning can be general, abstractions can be efficacious, and that educational innovations should be informed by the available scientific knowledge base and should be evaluated and analyzed with rigorous research methods. However, the discussion outlined through the initial articles is a good illustration of the two different perspectives on learning. Matusov has the following comment to the debate: “Attempts to bridge these dualistic gaps seem problematic because these dual abstractions mutually constitute each other and, are thus, inseparable from the beginning”(Matusov, 1998, p.326). I find the situated perspective on learning relevant in order to answer the main research question of my thesis. The question of what characterizes productive interactions of ICT supported learning communities can only be answered through research on participation over a broad range of situations. The situated perspective on learning is closely connected to the concepts of *productive interactions*, *community* and *inter-subjectivity* which are important concepts in my interpretation of the three studies constituting my thesis. In the next paragraph I will give an account for my interpretation of the concept *productive interactions*.

### **4.1.3 Productive interactions**

The introduction of information and communication technology in educational contexts has made the question of what learning actually means even more urgent to answer. Confusion in terminology among politicians as well as educationalists causes a lot of problems (Somekh, 2008). Knowledge is equated with information. In a cognitive view learning and knowledge is looked upon as de-contextualized elements of information that can be transferred from one situation to another. In this way of understanding learning the human mind is seen as a container, while learning and knowledge are seen as products (Biesta & Miedema, 2002; Hager, 2004). Educational technology has increased the accessibility and



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possibilities to store information and thereby intensified the relevance of defining how learning and knowledge should be understood in educational environments. The search for a solution may explain the growing popularity of the term *productive learning* (Lillejord & Dysthe, 2008). This term illuminates the relationship between learning as a process and learning as product. The socio-cultural perspective on learning is often accused of having an unbalanced focus on the process at the expense of the product. This means that the term *productive* simultaneously embraces learning as process and learning as product. The term *productive* implies a value judgement (Dysthe *et. al.* 2008). In this thesis I make a distinction between *interaction* and *productive interaction*. If learning is productive, learning means to see something in a new perspective. This perspective on learning goes beyond an information sharing understanding by focusing on a co-construction of knowledge. The core of Bakhtin's notion of dialogue is that meaning is created in the tension between different voices; that answers gives rise to new questions, and that dialogue is an end in itself. This way of understanding learning has consequences for what it is that constitutes productive learning interactions. In my opinion the important question is what it is that characterises such processes and what makes them productive in the sense that they produce knowledge? This leads directly to the main research question of my thesis which is: What characterises productive interactions in ICT- supported communities of learners? The way I understand the term *productive interactions* is that learning is not merely accomplished through the interactions of the participants, but also consists of those interactions in the inter-subjective space in what I choose to call *productive dialogues*. In this thesis productive interactions are illustrated through *explorative talk* and *explorative feedback*. I think this is illustrated through Christian's statement in Study 1. I asked what the two students did if they had different ideas. The 8 year old boy answered: "Then we just take the ideas and make a new idea together, and then we write it". I find the term inter-subjectivity essential for understanding the conditions of the space where the *productive dialogues* or *productive interactions* are taking place.

#### 4.1.4 Intersubjectivity as a space for reflective dialogues

In a socio-cultural approach to learning meaning is created through human interaction. According to Mead (1964, p.292), "we must be others if we are to be ourselves". This sums

up his notion of inter-subjectivity as basic for human relations. Based on empirical findings it is possible to distinguish different levels of inter-subjectivity. Research within social psychology has proved that humans have an in-borne capacity for what might be called altero-centered participation. This ability can be defined as a capacity to experience what another person is experiencing (Trevarthen, 1979; Bråten, 1998). It is the basic inter-subjective capacity that makes imitation, empathy, sympathy, emotional contagion, and identification possible (Bråten, 1998, 2008). “The path from object to child and from child to object passes through another person” (Vygotsky, 1978, p. 30). Bakhtin claims that:

“..words are, initially, the other’s words, and at foremost, the mother’s words. Gradually these “alien words” change, dialogically, to become one’s own alien words until they are transformed into one’s own words” (Bakhtin cited in Smolka *et. al.* 1995, p. 181).

In a complex reality with different perspectives, multiple meanings and different private worlds, communication makes states of inter-subjectivity possible. “Inter- subjectivity must in some sense be taken for granted in order to be achieved. It is based on faith in a shared world, what Rommetveit (1979) calls a “temporarily shared social world” (ibid. p. 100). What Rommetveit refers to, is the tacit assumption between people as well as circumstances, space of encounters, time for sharing- a “dialogic state” (Smolka *et al.*, 1995, Linell, 2008). Basic premises for inter-subjectivity such as complementary of intentions and capacities for de-centred categorization, might be understood as a capacity for adopting the perspectives of others who are different. The inter-subjective space might be looked upon as a meeting-place between learners where meaning is created. The reason why we understand each other is that we establish a temporarily shared social reality (Rommetveit, 1974). Truth is between people collectively searching for it (Skidmore, 2000). The concept inter-subjectivity is traditionally defined as agreement among participants. Agreement is valued while disagreement is de-emphasized. Agreement and disagreement are aspects of the same process; one aspect cannot be fully understood without the other (Rommetveit, 1985). They might reach a perfectly shared reality if they assume the same point of view concerning the object of the activity or the topic (Rommetveit, 1979).

Matusov (1996) argues for a definition where inter-subjectivity is understood as a process of coordination of individual participation in joint socio-activity rather than as a relationship of correspondence of individual’s actions to each other. The unit of analysis is thereby joint activity rather than individual perspectives and functions. He claims that inter-subjectivity does not require either “faith in a mutually shared world” or constant suspicion and misunderstanding. There is a tendency to understand inter-subjectivity as a harmonious state

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of conditions. Inter-subjectivity has been analyzed as implying communicative instances, involving dyadic face-to-face relationships, and has generally been restricted to cognitive development (ibid.). Traditionally the term inter-subjectivity has been defined as a state of overlapping individual “subjectivities” or “prolepsis” referring to something that is taken for granted or understood without explanation. The traditional interpretation is based on a notion of sharing subjectivities among participants (Rommetveit, 1979; 1985; Cole, 1991). Matusov’s argument is that this can lead to a static comparison among individuals. Focus is on what is common and how to standardize the participants’ contributions. This focus should be turned from the individual level to show how different contributions are coordinated with each other during the activity.

I understand the inter-subjective space as a meeting-place between learners where meaning is created. Rommetveit (1979) uses the expression *temporarily shared social world* to explain that we are ethically responsible for others. To negotiate meaning is a mutual obligation. In an educational setting where composition of common texts is the main aim of the activity, there must be a willingness to participate and share. For the students in Study 1, mutual trust turned out to be fundamental for *interaction*. *Counteraction* was the result if they missed this basic sense of confidence. The other two studies also show that confidence is essential for the willingness to participate in reflective dialogues. The inter-subjective space should not necessarily be a harmonious state, it might be the exact opposite, characterised through different opinions, argumentation and creativity as illustrated through *explorative talk* and *feedback*. Still I think it is crucial that the sense of participation in a socially shared world of understanding is based on a willingness to interact based on trust and confidence. *Productive dialogues* rest on trust and mutual respect.

#### 4.1.5 Productive dialogues

In a dialogic perspective on learning conversation is important for learning and the development of knowledge. Meaning is created between people and cannot be transferred from one person to the other. The concept *dialogic* is widely used in literature concerning education. References are often given to the Russian literary theorist and philosopher, Michail Bakhtin (1895-1975). *Dialogism* as an epistemological paradigm means that any communicative act is interdependent of what has gone before and what is to come. There is in other words a continuum in the term. As Bakhtin himself says

“The word in language is half someone else’s. It becomes “one’s own” only when the speaker populates it with his own intention, his own accent, when he appropriates the word, adapting it to his own semantic and expressive intention” (Bakhtin, 1981, p.293).

Single sentences are understood as part of the context. The term *dialogism* is used by others than Bakhtin himself to describe this way of understanding language as a bridge for an ongoing dialogue (Sjøhelle, 2007). Linell (2003) makes the following definition of the concept *dialogism*:

“It is a name for a bundle of, or combination, of theoretical and epistemological (and mutually related) assumptions about human action, communication, and cognition that include *interactionism, contextualism, social constructionism* and *double dialogiality*” (ibid. p. 220).

Double dialogicality is defined as dialogue on at least two levels, as interaction taking place in all situations, and as socio-cultural praxis within (situation-transcending) traditions. Linell underlines that dialogism uses talk-in-interaction as a model and metaphor for human communication and cognition which is possible to be applied to written texts and online communication. It is an ontological as well as an epistemological approach.

Bakhtin (1981) makes a distinction between the concepts authoritative and internally persuasive discourse.

“The tendency to assimilate others’ discourse takes on an even deeper and more basic significance in an individual’s ideological becoming, in the most fundamental sense. Another’s discourse performs here no longer as information, directions, rules, models and so forth-but strives rather to determine the very bases of our ideological interrelation with the world, the very basis of our behaviour; it performs here as authoritative discourse, and an internally persuasive discourse “ (Bakhtin, 1981, p.342).

Referring to Bakhtin’s concepts *monologism* and *authoritative* discourse, Skidmore (2000) uses these term *pedagogical dialogue* to illustrate what happens when one individual in the community acts as if he or she possesses the truth. He shows how the opposite term, *dialogism* enhances an internally persuasive dialogue (Skidmore 2000). The way Bakhtin uses the term does not mean that the members of the community should agree. Bakhtin is not consensus-oriented. On the contrary different voices and opinions are appreciated. Even silence. Utterances are linked in a chain of other utterances something which is central to the socio-cultural perspective on learning. In order to illustrate the use of the concepts he makes a contrast between the terms *dialogic* opposed to *monologic*. *Dialogic* is defined as “..any dyadic or interaction between individuals who are mutually co-present to each other and who interact through language or some other symbolic means” (Linell, 1998, p. 9). Monologism is concerned with one-way transmission of knowledge; dialogism is concerned with construction and transformation of understanding through multiple perspectives and opinions (Linell, 2008, Rommetveit, 1974; Linell, 1998; Lillejord & Dysthe, 2008). Based

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on an understanding of the concept *dialogic* as a way of creating meaning, I include oral and written communication as well as face-to-face and online communication in my understanding of the term. My studies differ as to whether the students are “co-present” to each other in the physical sense of the concept. They are also different when it comes to oral or written communication. In study 1 the students communicate face-to-face when they are composing common texts. The conversation is recorded and analysed. In study 2 the students’ analysis of the texts is based on online written communication. Understanding learning as meaning created in a tension between different voices means that response and feedback from others is the main reason for understanding. Understanding is created through response or feedback in dialogue with existing voices or with other kinds of texts, current or historic (Dysthe, 2001). Implicit in any utterance is an expectation of an answer.

Concluding, in a dialogic approach to learning *meaning* is seen as created through collaboration. Consequently oral and written communication cannot be studied isolated from the context. This means that the conditions constituting the learning environment are fundamental for understanding. Sjøhelle (2007) claims that educational technology is particularly well suited for test and control of students’ abilities to collect and repeat information. Similarly I want to focus on ways of using the educational technology in a dialogic perspective on learning. Such a perspective relies on the importance of belonging. The educational technology offers a space outside the ordinary room that is suitable for reflective dialogues. In the next section I will discuss different aspects of the term *community*. Finally I will focus on the term *community of learners* as a way of understanding educational contexts that I find meaningful for analysing the activity taking place in educational contexts.

#### **4.1.6 What is a community?**

According to Dewey, a community is a place where men live in virtue of things they have in common. He links two other words to community, and says that there is more than a verbal tie between the words common, community and communication. Communication ensures participation in a common understanding (Dewey 1916, p. 4). This notion of a community makes us think of a democratic society where committed people are collaborating towards a shared aim (Macintyre, 1981; Darling, 2001). Etienne Wenger (1998, p. 288) is referring to Williams (1976) when he claims that *community* is the one term which is consistently used

with positive connotations. It gives a notion of something safe and familiar. A community might be defined as a spatial or territorial unit of social groupings in which people have a sense of belonging and identity. Burbules & Callister (2000) argue that the notion of a community can be described as a state of affairs or an ideal. Building on Anderson (1991) Wertsch (1998) makes a distinction between what he calls *implicit* and *imagined* communities. An implicit community is a group of individuals who use a common set of cultural tools and make no effort to create or reproduce any kind of collective. Instrumentality is the only reason for joining the community. An *imagined community* on the other hand, has its emphasis on recognising or imagining the collective and to create and reproduce it. The notion of being Norwegian is an example of an imagined community. The term *imagined* is used because the members may not know the others- still they imagine the communion. Cultural tools serve to create a collective that is clearly recognised. Members are committed and loyal (Wertsch, 1998). An imagined community as defined by Wertsch can be associated to the term community of practice (Lave & Wenger, 1991; Lave, 1992, 1996; Wenger, 1998), a concept that has been used and interpreted in many different ways (Barab *et al.*, 2004). Cox (2005) shows how the interpretation of this term has changed over time, and Gee (2005) points out that Wenger has been careful not to define exactly what a community of practice actually is.

The idea of community might be said to rest between two opposite sets of values. On one hand the idea of cooperation, shared responsibility and communication as basic for a democracy, and on the other the idea that differences, plurality and coexistence are the ties that connect a society (Burbules & Callister, 2000). The notion of a community can be interpreted as a good, safe and nurturing place based on trust. Cooperation and shared responsibility provide the best context for human effectiveness in accomplishing social goals (Burbules & Callister, 2000). This way of judging what a community should be like is criticized for being romantic and old-fashioned. It holds the possibility of a place for hope in which understandings of common goods are shared, and compassion and generosity are abundant (Bellah *et al.*, 1986; Darling, 2001). The harmonious notion of the concept bears little resemblance with modern forms of life. Yet another question is if a safe and stable situation is a desirable condition for an educational setting. Wenger (1998) defines community as “ a way of talking about the social configurations in which our enterprises are defined as worth pursuing and our participation is recognizable as competence” (ibid. p. 5).

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He raises the question of agreement and homogeneity as a supposition for a community. Wenger answers that in his definition the interrelations arise out of mutual engagement in practice and not from an idealized view of what a community should be like (Wenger, 1998, p.76-77). Still the definitions might be so vague that he might be misinterpreted and understood as an advocate for a “harmony-model”. Also against the harmony-model Rogoff (1994) argues that community-members are not homogeneous. Rather they are in complementary roles as parts of a coordinated organization. According to a socio-cultural perspective people learn through disagreement and diverse opinions (Rogoff, 1994; Matusov & Rogoff 1995; Mercer, 1995; Rogoff, Matusov & White, 1996; Matusov 2001; Lillejord & Dysthe, 2008).

The extensive use of the concept *community*, particularly connected to online communication, makes it imperative to have an awareness of what the term community means. My interpretation of the concept is that we need both ways of understanding. Fundamental for the existence of a community is that there is a common interest of shared aims (Dewey 1916). I think the educator has a special responsibility, as well as the possibility, for the creation of a confident atmosphere whenever a new learning community is created. Students must share trust, responsibility and a wish to communicate. This does not indicate that the community members have to agree and live in harmony. In study 1 and 2 the possibilities for creativity disagreement and argumentation are built into the assignments. People learn from argumentation with people they trust, but with whom they disagree. In study 2 Jill said that she did not think she had changed her fundamental opinions, but the other members’ different attitudes gave her a more nuanced way of understanding.

#### **4.1.7 Creating and maintaining a community**

Burbules & Callister (2000) indicate three conditions for creating and maintaining a community. Firstly the community is mediated, secondly it is based on political, and finally on spatial conditions. All human actions are *mediated* through interaction; either face-to-face, through a telephone or online. The variety of social practices that govern human actions defines the community. In a situated perspective on learning social practices are crucial for development of human identities. Identity practice is defined as “individual and interactive moves that social actors make as a way of forming, expressing and defending their practices” (Burbules & Callister, 2000, p. 159). *Political* conditions refer to the

previous mentioned set of values. On one hand the vision of a democratic community based on homogeneity and familiarity, on the other the perspective of homogeneity and familiarity as incompatible with community within a public sphere. The third element refers to *space* and *place* as conditions for a community. Spatial arrangements or places can be seen as ways of shaping and constraining possibilities for a community. Private as well as public spaces might be familiar places where humans know how to act. Sometimes people transform spaces into places through architecture to make them their own. Burbules & Callister (2000) explain this transformative process as adopting activities to fit the space, and the space to fit the activities, through a mutual process. The architecture directs the activities while the activities reshape the architecture along five different dimensions; movement/stasis, interaction/isolation, publicity/privacy, visible/hidden, and enclosure/exclusion. Architecture here is understood as the design of communities such as class-rooms or online spaces. The five dimensions are the polarities along which these communities are established and develop.

Based on the framework of these three conditions, Burbules & Callister (2000) turn to the virtual communities. ICT has brought a new dimension into the discussion of what a community is like. For teachers and teacher educators the new challenge is to design for online learning communities in addition to the ordinary classroom. The new information technology has opened for the possibility of this to take place. What the authors argue is that an online community is as imagined and real as any community. For some people the virtual encounters are said to be more important than real life meetings. Following the framework of mediation, political conditions and architecture they claim that the Internet is not a community, but what they choose to call a meta-community; or a media for comprising numerous communities within which collaborative activities are mediated. These communities might be hermetically sealed off by firewalls or they may be open to anybody. The Internet offers spaces for people to interact. Online as well as face-to-face communities are built along the five dimensions mentioned above. Which of the five dimensions teachers choose will decide the degree of confidence and security the members are going to experience. According to Burbules & Callister the same tension between what kind of values should be the basis is essential for an online community. The tension between openness and diversity, security and confidence constitutes the debate. For teachers it is essential to have a reflective attitude to the question of why an online community should be open or closed. The findings in study 2 and 3 in this thesis underline that when the aim of the online activities is



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to reflect on personal attitudes and values connected to teaching the principles for architecture should care for the exclusion and privacy for the members of the community including the teacher.

#### 4.1.8 Could an educational context be called a community?

As referred to earlier the term *community* is more than any other concept consistently used with positive connotations. Gee (2005) claims that the idea of community carries connotations of “belongingness” and close-knit personal ties among people. This notion of membership and of having something in common is not suitable for modern classrooms. Instead of membership in a community he argues for the term space and “semiotic social spaces” as places where people get and give meaning to signs. Space here is to be understood as physical as well as virtual places where people meet and create meaning. Semiotic social spaces are identified through generators or portals, and internal and external grammar. The generator gives a set of signs and a set of possible relations among them. The inner grammar is the design of the content while the external grammar illustrates patterns of thought, deeds and interactions. Instead of regarding the class-room as a community Gee’s suggestion is to look upon it as a *semiotic social space*. Through eleven features based on semiotic social spaces and ideas from global high-tech new capitalist world he defines what is called an “affinity space” identified through i.e. common endeavour, newcomers and masters sharing a common space, and different routes to participation. Leadership is porous and leaders are recourses. Transferred to a classroom context the generator or the source of the sign system (content) might be a textbook, the teacher or a computer. The design of the content or the internal grammar influences and reshapes the external grammar expressed through values and attitudes as well as the other way round. Referring to the concept *community of learners* as defined by Brown & Campione (1994) Gee argues that what they describe through students and teachers working in teams by means of mediating external devices, drawing on expertise inside or outside the classroom, can be explained as *affinity spaces* and this would even be a better alternative. Further he argues that young people enter more and more affinity spaces outside school while few educational institutions practice affinity spaces and that this may lead to young people asking “why school”?

I think Gee’s question is highly relevant. The possibilities that educational technology opens up has made this question even more urgent to answer. Why should students go to

school? The internet as a meta-community gives them access to countless spaces or communities. These communities are perhaps easier to enter outside than inside a school building. Is the sense of community as a space and place for belongingness and personal ties too old-fashioned? Should the teacher be regarded as a generator of semiotic social spaces and affinity spaces? These are questions that policy-makers should answer.

#### **4.1.9 Educational technology as a space for reflective dialogues**

Artefacts like computers are neither good nor bad (Burbules & Callister, 2000; Burbules, 2006). The computer can be used just as well as a tool for the one sided way of understanding knowledge, either through the transformative approach where the teacher is the director of the communication, as well as the opposite where students are left alone by the computer. However, the computer might also offer an extra space for participation and collaboration. Normally we distinguish between two different concepts: co-operation and collaboration. Co-operation is regarded as product-oriented. The group members are in the process dividing the work-load. Collaboration, on the other hand, might be understood as students working together on different parts of the common exercise (Salmon, 1995; Bruffee, 1999). The educator is given new possibilities for collaborative learning activities when planning teaching designs in learning communities supported by ICT. The space offered by the educational technology can function as a space for collaborative reflection. Yrjö Engeström (1998) uses the concept the *zone of possibilities* as an equivalent to Vygotsky's *zone of proximal development* ZPD (Vygotsky, 1978, p.86). What Engeström wants to show is that people working cooperatively not only acquire existing knowledge, but that they also renew existing knowledge. He points to the human ability of renewal through creativity and play. In a socially-shared world of understanding, the members create a common zone of development. I think this is an equivalent to what Rommetveit (1974) calls *a temporarily shared world*. An alternative expression is *the interpretive zone* (Wasser & Bresler, 1996; Hoel, 2001). This concept refers to the common interpretive processes we enter when we are engaged in collaboration with other people. Both the individual's personal zone and the group's common zone develop according to the process of interaction. According to Wegerif (2007) this collaborative zone should be addressed as a dialogic space where students and teachers engage in order to see the task through the eyes of the other. What the students in study 1 and 2 experience is to meet in the zone of possibilities or shared world of understanding through *explorative talk* and *explorative feedback*.

The computer as a possible collaborative space might as well be part of the classroom or online through LMS. As a mediating artefact for learning, educational technology can contribute to the creation of new virtual communities with other functions other than face-to-face meetings. Unlike a spoken uttering, the written text is visible for the other members at all times. Another difference is the computer's ability to store information. A written text becomes a common text, offering members the opportunity to build further on each others ideas (Säljö 2000; Wegerif, 2007). When students collaborate on a text, their initiatives have consequences for the rest of the group, creating a possibility for the members to build on each others' ideas. Research shows that online collaborative activities have a potential for supporting a more egalitarian style of communication than face-to-face collaboration. The reason is that it is easier to participate than in a face-to-face discussion. Another advantage is that the distance in time and space, gives more time for reflection before the participants have to respond (Wegerif, 2007).

Despite the possibilities and advantages mentioned about the potential for computer-mediated communication to support and promote collaboration, there are limits as well. Online collaboration means that the collaborators are invisible to each-other, and therefore lack the possibility of interpreting non-verbal communication. The communication is body-less (Burbules & Callister, 2000). Research shows that a sense of trust and a highly structured framework is decisive for participants in an online environment in order to engage in collaborative activities (Light & Cox 2001; Hoel, 2003; Thurston 2005; Sjøhelle, 2007; Wegerif, 2007). Wegerif's conclusion is that in spite of many enthusiastic things said about the potential for computer-mediated communication to support and promote higher order thinking, this potential appears to be seldom realized (Sjøhelle, 2007; Wegerif, 2007, p. 253). The findings in my thesis confirm the possibilities as well as the pitfalls of online collaboration mentioned above. This means that to design for productive dialogues or productive interactions is a huge challenge for teachers because the process is difficult to control. In the next section I will give an explanation of the concept community of learners which I find suitable for analysing the activities taking place in educational contexts, face-to-face as well as online.

#### 4.1.10 Community of learners

A situated perspective might be understood as a process of transformation of individual participation in socio-cultural activity in communities (Lave & Wenger, 1991; Rogoff, 1994; Rogoff & Gardener, 1999). Transformation of participation involves negotiation of responsibility and redefining of membership in a community. Participation refers to a more comprehensive process of active participation in practice combined with construction of identities (Collins *et al.*, 1989; Lave & Wenger, 1991; Wenger 1998; Ludvigsen 2000, 2002). Communities are characterized by its members through common engagement, tasks and shared repertoire. There is a close connection between participation, identity and learning because learning is changing who we are as individuals. Learning, meaning and negotiating identity is deeply rooted in the cultural context. According to a situated perspective on learning, psychological phenomena like thinking, memory and reflection cannot be separated from the activity. We are always reflecting or thinking about something. Reflection is therefore deeply grounded in people's background and community. What is changing is the activity in itself through the individual's participation. The activities are validated by the community and skills are embedded in the activity.

The term *community of learners* refers to community where the main purpose is advancement of learning (Brown, 1994; Brown & Campione, 1994; Matusov & Rogoff, 1995; Rogoff, Matusov & White 1996; Mitchell & Sackney, 2000; Wubbels 2007). A community of learners constitutes a context where continual learning is practice. These contexts might include classrooms, schools, universities, museums, or any kind of community where the aim of the activity is advancement of learning. This means that the community of learners might as well be an online community as a face to face meeting-place. A community of learners is independent of age. The learners might as well be children in a classroom, students, teachers or visitors in a museum.

A learning community is based on a set of values that this specific community validates as important. Learning to write collaborative texts supported by educational technology is an example of a validated activity. Learning activities taking place in a classroom might be planned but the contributions from students and teachers may result in an activity that goes far beyond what the teacher had initially designed. Schools and educational institutions are examples of communities where certain goals are defining what should be validated as important. What students learn might or might not be what they were expected to learn.

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Learning occurs anyway, the question is “what they learn and how much is what they learn expected and valued by the participants” (Matusov, 1998, p.344). For students to learn to write collaborative texts means to become members of communities where collaborative writing is valued (Lave & Wenger, 1991; Lave, 1992; Wenger, 1998). Schools are expected to teach students the knowledge that is valued as important by their society. Participation is essentially collaborative in a situated perspective on learning. A jazz concert is an example of a joint activity where it is impossible to single out the individual voice and value it. This activity might be compared to the productive learning process the “Magic group” experienced. This is also true in a classroom community. Teachers and students collaborate on the joint activity. The teacher has planned for the learning activities he wanted to take place, but often something quite different than planned for happens. A new emerging curriculum from the joint activity in the community is the shared result that is impossible for an individual to plan in advance. A community of learners corresponds to the socio-cultural approach to learning assuming that socially mediated education and psychological development mutually constitute each other. The individual learner contributes to the further development of the community (Greeno *et al.*, 1996; Matusov & Rogoff 1995; Rogoff, Matusov & White, 1996; Matusov, 1998, 2001; Mitchell & Sackney, 2000; Wubbels, 2007).

A way of explaining the concept *learning community* is to contrast it with other ways of understanding learning. Opposite to the community of learners where educator and learners share the responsibility in the process of transformation through participation, other models place the responsibility for learning on either side as transmission and acquisition of knowledge. Both perspectives can be described as one-sided, because the responsibility is left either to the teacher or the students. According to a behaviouristic approach to learning, learning is behavioural change (Thorndike 1922, Hull 1943, Skinner 1938, Gagne 1965). Consequently, the educator is responsible for guiding the process and also for creating the curriculum, and designing the education programme. The learner is depending on external input. Facts and skills are transmitted from the teacher to the learner. The cognitive approach to learning is in contrast to the behaviouristic. Learning is looked upon as a development from simple to more and more complex mental models. According to the cognitive approach to learning inspired by Piaget, learning is a question of knowledge construction. Information is interpreted and connected to previous knowledge. Mental structures are reorganized in order to adapt new knowledge (Piaget 1972). Consequently the acquisition approach leaves the responsibility for the learning process to the learner. The most important task for the

teacher is to prepare the conditions for learning and to guide the student in the learning process. In the last few years Norwegian teachers have been accused of abdicating their responsibility and leaving the floor of the classroom to the pupils.

The understanding of a *community of learners* combines and goes beyond the two previous views, focusing on joint activity and guidance, rather than on control by one of the sides. Learning occurs through participation. The purpose of contrasting is to show that different aspects of learning are focused. In the transmission perspective students learn pieces of information and are able to demonstrate that they can reproduce it. Learning within an acquisition perspective means to learn through exploration which is not necessarily connected to current or historic information. Students should not be left totally alone to their own discovery, but rather experience a guided discovery together with the teacher (Brown, 1992; Brown & Campione, 1994). Students learn through collaboration with other students and teachers in activities (Rogoff, 1994). Bringing the ideas of learning communities and teaching together, may transcend the antithesis of transfer of knowledge and the teacher as expert on the one hand, and the self-developing knowledge of a community of practice on the other (Wubbels, 2007).

The outline of the concept *community of learners* has been criticized for making an idealised or a glossy image of an educational setting. Linehan & MacCarthy (2001) claim that they acknowledge and appreciate the metaphor *community* as a substitute for an individual focus on pupils and teachers in order to describe a situated perspective on learning. What they argue is that the term *community of learners* as described by Rogoff, Matusov & White (1996) is limited in describing the development of the individual. Linehan & MacCarthy ask for the possibility of understanding individual questioning, resistance, creativity and ethical dilemmas within the community. They claim that the term community of learners is limited in its account of the development of identity and of the relation between individual and the community. Another complaint is that while Rogoff *et al.* (1996) claim that the concept *community of learners* represents a genuine philosophy they also describe it as a prerequisite of what an educational setting should be like. The way a *community of learners* should be practiced and understood is given as a recipe to how people should behave within a community. According to Linehan & MacCarthy, the concept *community of learners* is not analytically helpful unless described as specific relations in specific settings. The term community of learners has also been criticised for making an idealized picture of what an educational context should be like. Burbules & Callister (2000)

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argue that “if categories like ‘learning communities’ are understood in a too homogeneous manner, then students with different learning styles may be left out” (Burbules & Callister, 2000, p.177). From my point of view the concept community of learners should be understood as an ideal based on the socio-cultural perspective of learning that I as a teacher, and teacher educator, find suitable for understanding, interpreting and analysing any educational setting.

#### 4.1.11 The teacher as a learner

According to Dewey, the teacher participates in the social process constituting the group or community. Still, the educator is the one responsible for guiding collaboration and communication (Dewey, 1998). The notion of a *community of learners* acknowledges the asymmetric difference between the teacher on the one hand, and the student on the other. Teacher here is understood as the educator responsible for designing and planning the activities, and participating in the learning activities. The teachers or educators might as well be instructors or parents as an educational institution. What is reflected is that the educator has a different kind of responsibility than the student. The teacher is responsible for designing the educational programme before meeting the students, and to engage and participate in the students’ learning process. The concept *teaching design* involves a dynamic understanding of local goals and global purposes of education. Being a teacher means to be in a continuing learning process in how to design and participate in communities of learners. What characterizes teaching as a practice is his or her deliberate attempt to involve another person in the learning process (Matusov, 1998, Matusov, 2001).

As I have accounted for earlier, Bakhtin is essential for my understanding of dialogic education. Bakhtin is often referred to by educationalists. Bakhtinian philologists have blamed educationalists for misunderstandings and incorrect interpretations. They ask if it is possible to use Bakhtin’s scholarship to inform educational research and if Bakhtin’s scholarship is misinterpreted by educators. Matusov (2007) answers these questions. He also addresses the question if Bakhtin’s scholarship possibly is suitable for informing education and for pushing its limits. His answer to the first question is that there is no reason why philologists should have more of a monopoly on interpreting Bakhtin than educationalists. Still he admits and illustrates that there are examples of superficial interpretation of Bakhtin’s concepts in educational research. To answer the next question, Matusov addresses the terms *authoritative* and *internally persuasive discourse* as examples of concepts that

might push education beyond its limits (Matusov, 2007). He argues that the internally persuasive dialogue cannot sustain without authority. Transferred to education, teachers' authority is necessary in order to jump-start an authentic learning process. Thus dialogical pedagogy has to be based on authoritative as well as internally persuasive discourse. The teacher must gain control in order to lose it later when mutual confidence is established between students and teacher. From that time students and teachers should share the responsibility for learning. Through transition from authoritative to internally persuasive discourse the teacher loses authority. This means that a notion of *internally persuasive discourse* is established in teachers as well as students. This is the basis for understanding the theory and the position of the teacher in a *community of learners*.

In a situated perspective on learning, the teacher is a mentor, engaging in the professional activities of creating, and using, disciplinary knowledge, exemplify valued practices of these communities, and guiding students as they gradually become more competent practitioners (Greeno *et al.*, 1996). The students on the other hand, should learn to take responsibility for their own learning guided by the teacher. Another important task is to share responsibility for the group functioning and thus to serve as a resource for each other. Learning, development, and transformation are lifelong processes for educators as well as learners. This way of understanding learning, supports and enhances action research as the methodological approach. Action research here understood as a self-reflective enquiry undertaken by teachers in order to improve practice (Carr & Kemmis, 1986).



## 5. Analytical concepts

Matusov (2001) initiates three definitions of the concept inter-subjectivity as a reflective tool for analysis of pedagogical designs and processes within *communities of learners*. In the article he argues that the notion and three definitions of inter-subjectivity seem to be relevant for understanding how to guide educators on how to improve teaching design. The three different notions are inter-subjectivity as *having something in common*, as a space for *respectful disagreement* and as *human agency*. In the following chapter I will give an outline of the three concepts that I also find relevant for the analysis of my own thesis. In all the three studies the initial meeting, where a common agenda was created, turned out to be an important factor for the students further learning processes. An important aspect for the students in study 2 was to discuss respectfully with someone that they disagreed with. All the studies show how disagreement had to be based on mutual confidence in order to become a productive interaction. Lack of *having something in common* is illustrated by the students in Study 3 who lost the opportunity of sharing the aims of the activities.

### 5.1.1 Inter-subjectivity as having in something in common

Since entering a socially shared world of understanding is fundamental for the notion of inter-subjectivity, an important and challenging aim for the teacher then becomes to create a common focus for the learning activities and the planned assignments. Learning activities are the basic fundamentals in a community of learners. An important assumption is to share responsibility for the aim of the activity and the assignments. The responsibility for designing the programme is left to the teacher. Another aspect of this responsibility is to include the students in negotiating the aims of the activities. It is essential for developing inter-subjectivity that the teacher is concerned with what the object of the activity is for her/himself and her/his students both in the preparation of, and during the teaching of, the programme. The three prerequisites for inter-subjectivity might be considered to be; *communication, sharing the object and authenticity*.

A sense of “having something in common” is necessary in order to achieve inter-subjectivity. The teacher’s responsibility should include creating a recursive communicative process that makes the students interested in the subject as well as in each other’s contributions. In order to describe what it means to understand what is taken for granted,

Rommetveit (1989) uses the expression *shared prolepsis*. He wants to illustrate that the participants constantly adjust their expectations to others' contributions and feedback. "It (the truth) is on each occasion situated, or bound by an inter-subjectively accepted perspective and a joint concern. And situated, concerned cognition implies necessarily perspectival reality" (ibid. p. 206). Inter-subjectivity as having something in common characterizes an optimal situation where there is no resistance between the participants; described as the attunement to the attunement (Rommetveit, 1984, 2008). For a teacher designing a learning community, this means that students should become interested in each others' contributions. A mutual communicative process has to be designed to be proleptic (Rommetveit, 1989). It should be explicitly expected and set at the beginning of the activity and reflected upon by the teacher during the activity. To get to know each other through the initial meeting makes students and teachers feel more confident. They share a basic trust.

Emotions should also be considered as an important part of communication when teachers and students are negotiating the socially shared world of understanding. Rommetveit (2008) argues that within the cognitivist paradigm, language and emotions have been studied as two separate phenomena. What he underlines is that feelings become embedded in language when children are very young. He argues that feelings without understanding make people blind, and understanding without feelings is empty. Dewey is also occupied with the shared focus of attention as a presupposition for joint activity within a community. "Men live in a community in virtue of things they have in common, and communication is the way in which they come to possess things in common. What they must have in common in order to form a community or society are aim, beliefs, aspirations, knowledge – common understanding – like-mindedness" (Dewey, 1916, p.4). While individual objects are determined and exact, common activities open for new possibilities and different objects. Participants might have different views and interpretations of the object. In a community of learners the learning activities form the base. "The object is the societal motive of the activity. It defines the activity and separates activities from each other" (Virkkunen & Kuuti, 2000, p.301). In order to achieve the notion of a common goal, the teacher should set the expectations as something that the group will try to accomplish together, explain what the activity is about, why they are doing this particular activity, and how the students can contribute to it. The notion of object of activity involves participants' desires, motives and interests. The aim cannot and should not be the same for teacher and student. The teacher should focus on the subject matter as well as the guidance of the students. All the three studies show that the students

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want the teacher to be present even when they are collaborating with each other by means of the computer.

The third prerequisite for inter-subjectivity is *authenticity*. Learning activities initiated by the teacher are not isolated. Students are human beings with moral, intellectual and emotional reactions. The notion of authentic activity is based on the relationship between the given activity and other spheres of the participants' life. Authentic engagement combined with the goal of the activity seems to be important (Dewey (1916).

“If we understand schools as places where pupils are introduced to participation in socio-cultural practices, this introduction is better when the “virtual practice” as set up in the school retains the essential characteristics of the actual practice (Wardekker, 1998, p. 147).

Learning activities should not be disconnected from the students' experiences in the world outside the learning community because this makes it difficult for students to attach meaning to what they are learning (Vygotsky 1978). Schools are often accused of presenting de-contextualized knowledge in order to make students able to participate in future, cultural traditions. Concepts are learnt by heart without any real understanding. In order to stimulate reflection the concepts must be “genetically adequate”. Concepts should be experienced and understood in real life situations. In all the three studies reflective dialogues are based on students' own experiences. Students asking why they have to go to school often get the answer that they will need the knowledge later in their lives. The concepts are supposed to be stored away for a later occasion. What Wardekker, 1998, calls *fossilized concepts* are concepts that are just memorized without understanding. This leads to the question if we need schools at all. Some scholars advocate apprentice-ship and learning in meaningful contexts outside schools (Lave, 1996). Perhaps the most important reason for answering that we still need schools is that they provide admittance to practices that otherwise would have been out of reach for many students. In an educational setting individuals come to the activity with their own subjective ways of making sense of it. Part of the teacher's responsibility will be to work for some mutually agreed upon or inter-subjective understanding (Tudge, 1992). The teacher should start with authentic inquiries and focus on their recursive transformation (Tharp & Gallimore, 1988).

Summing up; if the notion of having something in common is to be seen as a pre-supposition for inter-subjectivity, then the teacher should construct the learning community such that it becomes a confident socially shared world where common aims for authentic learning activities are negotiated by both stakeholders. The notion of inter-subjectivity as

having in common might be interpreted as an ideal state where there is no disagreement. This leads us to the next section where inter-subjectivity is understood as a space for respectful disagreement.

### **5.1.2 Inter-subjectivity as a space for respectful disagreement**

One of the features of a community of learners is that it promotes different ways of organizing activities with an emphasis on group-work (Brown, 1994). Designing a teaching programme where the students are supposed to collaborate by means of educational technology means that the teacher has to plan what kind of activities the students are going to collaborate on. The notion of inter-subjectivity as having something in common might lead to the conclusion that consensus-oriented group activities or assignments should be preferred. Matusov (1996) however, initiates an additional approach to inter-subjectivity. He claims that the new approach is not rejecting the traditional one, but rather raises new questions and provides different explanations. Diverging perspectives, oppositional ideas, resistance to communication, and other disharmonious episodes should not be looked upon as failed attempts of inter-subjectivity (Wertsch *et al.*, 1995). It might be argued that “if the subject is semiotically constructed, by the other or by the word, the nature of the constitution process must imply what is different, not just identical” (Smolka, *et. al.* 1995, p. 183). Group disagreements and misunderstandings coming from the participants’ diverse concerns should be accepted and valued as points of growth and learning rather than hurriedly resolved and avoided.

Two traditions within developmental psychology have focused on inter-subjectivity in joint activity. The Geneva school, inspired by Piaget (1929, 1932) is grounded on the “conflict perspective”, the term “conflict” referring to cognitive conflict. When individual perspectives differ, the socio-cognitive conflict might lead to new insights through conflicts which in turn lead to a mutual understanding of different views. The socio-cognitive perspective stresses that conflict is an important element if learning is to occur between equivalent participants (Foreman & Cazden, 1985). The Vygotsky-tradition, however, maintains that knowledge can also be developed between equals without any element of conflict. The notion of inter-subjectivity is based on the assumption that inter-psychological processes are internalized into self regulation through individual mastery (Matusov, 1996). A critique against this theory might be that the joint activities preceding the results of this research were conducted in laboratories. The constructed activities were consensus-oriented

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with no element of conflict. If agreement did not occur between the participants, the joint activity was judged as a failure (Smolka, *et. al.* 1995; Wertsch, *et. al.* 1995). Bakhtin on the other hand is concerned with the importance of different voices in dialogue as a way of extending our understanding:

..all languages of heteroglossia, whatever the principle underlying them and making each unique, are specific points of view on the world, forms for conceptualizing the world in words, specific world views, each characterised by its own objects, meanings and values. As such they are juxtaposed to one another, mutually supplement one another, contradict one another and be interrelated dialogically (Bakhtin, 1981, pp. 291-292).

Bakhtin regards everything as a dialogue that can enrich our understanding. This perspective is supported by researchers who look upon learning as an inter-subjective activity driven by disturbance and disruption (Mercer, 1995; Engle & Conant, 2002; Hattie & Timperley, 2007). To be challenged by others is seen as an assumption for productive dialogue or productive interactions. Lillejord & Dysthe (2008) claim that there seems to be an agreement that differences enhance learning, but disagreement as to whether conflict and dispute is productive.

Research connected to collaborative activities by means of computers has also stressed the importance of argumentation and disagreement. It is maintained that learning is explained through what we call knowledge creation or the knowledge advancement metaphor. In this perspective learning is seen as analogous to the innovative processes of inquiry where something new is created. The initial knowledge is either substantially enriched or significantly transformed during the process (Paavola *et al.*, 2005). The term argumentation is here understood as any form of collaborative activity that involves confronting cognitions and their foundations. Argumentation as referred to here is a language-based activity, regarded as epistemic as well as semiotic. It is an epistemic activity since it involves expressing knowledge (Andriessen *et al.*, 2003). According to Andriessen *et al.* the field of CSCL research has reached the point where it needs to focus on learning from one particular type of collaborative activity, argumentation. Here, the concept of argumentation is understood as confronting cognitions and their foundations (Andriessen *et al.*, 2003). According to Taylor (1991) a great challenge in our society is that people reject discussions with each other because they are afraid of being too direct. Accepting the notion of respectful disagreement as a perspective on inter-subjectivity should include an acknowledgement of learning activities and assignments that promote disagreement and argumentation. If the interactions are going to be productive, argumentation is not a question

of winning a debate. Rather arguments and creative questions are leading to new questions and arguments.

### **5.1.3 Inter-subjectivity as human agency**

In a community of learners students and teachers with different agencies meet each other. The term human agency might be defined as the final cause of the individual's action (Matusov, 2001). The challenge for the teacher is to engage the individual in the common agency of the learning activity. As stated earlier, this requires a common goal-defining for all the members. For the teacher this is a crucial moment to either take responsibility for the entire activity or to abdicate from any kind of responsibility and leave it to the student alone. Gaining a shared responsibility requires that the teacher and the students co-participate in goal-defining. There should be a non-authoritarian authoritative discourse used to develop a shared attention based on the students' trust in the teacher. This discourse should generate more student-teacher trust, and thus facilitate more authoritative discourse (Matusov, 2004, Matusov, 2007). Still, there should be confidence in the final authority of the individual learner. This again means that the participants should share the ownership of the common goal based on their own individual agency, mutual faith and trust. The teacher acts as a facilitator, guiding the learning adventure (Brown, & Campione, 1994). Negotiating ownership towards a common goal is closely connected with the notion of caring about others. To care for others involves deep emotional, cognitive, and volitional concern about wellbeing and mutual concern. When people share care they meet each other with openness and concern. Through dialogue the participants are building a common reference. To share care means to share concern. Teachers should possess a capacity for connectedness, making them able "to weave a complex web among themselves, their subjects, and their students, so that students can learn to weave a world for themselves" (Palmer, 1998, p.11). The core of collaborative learning is to share goals, perceptions, understandings, and actions through building on each other's ideas (Salmon, 1995; Brufee, 1999). The unreachable distance collaborators keep from each other should be accounted for. In collaboration people need each other, not simply because they help each other accomplish some common goals, but because they define common, dialogic agency in each other. Confidence is essential for learning to take place.

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#### 5.1.4 The connection between theoretical and methodological approach

The approach to my study is complex. The thesis combines children's face-to-face collaborative activities by means of stand-alone-computers, with distance and campus student teachers' experiences using written online communication. The studies were conducted from 2001 to 2004 during a period of implementation of ICT-supported activities online, as well as in classrooms in Norwegian schools and teacher education. In spite of its' relatively short history, learning with computers has already gone through three different periods or "paradigms" according to Koschmann (1996). The first one is called CAI (*Computer Assisted Instruction*) and is based on a behaviouristic view on learning. The most important function of the computer in this view on learning is to help the pupil to find correct answers. The next two paradigms; Information Processing Theory and Logo-as-Latin are based on the individual learner constructing his own knowledge by means of the computer. The fourth "paradigm" is called CSCL (*Computer Supported Collaborative Learning*) and deals with the interaction between the individual learner and the group (Koschmann, 1996; Lipponen, 2002). It also addresses the fact that the social and cultural contexts are the objects of study, not computer-technology in isolation (Salmon, 1995; Wertsch, 1998; Bruffee, 1999; Andriessen *et al.*, 2003). CSCL-models challenge our notions of what learning and knowledge are all about. The aim of the research questions within this paradigm will be to see how learning is reflected through the language of the learners, how the social aspects influence the learning process, and how the technology is used collaboratively. An important point is to understand the conversation from the learners' point of view and how the computer suits, changes or supports the dialogues between pupils and teachers. Research within this field has mainly focused on how the educational technology can develop and support learning processes built on collaboration and mutual knowledge construction. The CSCL paradigm is often related to activity theory. The interpretation of my thesis is inspired by the CSCL paradigm. Additionally the situated and dialogic aspect which I have given an account for has been important to me. *Dialogic* here should be understood as verbal as well as non-verbal interaction. This means that I am drawing on the theoretical foundation of the CSCL paradigm and in addition on the socio-cultural and dialogic perspectives that are not necessarily fully built into the CSCL paradigm. In study 1 and 2 I have studied the influence of the social aspects and how learning is reflected through the language of the students when they collaborate by means of

the computer. Wells (2002) argues for a model that focuses the interaction between the participants as an activity. Firstly, that the action is one of creating meaning, and secondly, that the object of the activity is the focus of joint consideration. In study 1 and 2 the performance of the assignments is the object. The third consequence of this way of viewing learning is that the outcome of the activity is an enriched understanding of the object individually as well as collectively. In order to understand as much as possible of what characterises productive interactions in ICT supported learning communities I chose action research as the methodological approach to my thesis. Action research is an interpretive approach to research that requires a theoretically grounded detailed description of what is going on within the field. My understanding of action research is that it is a particular way of researching your own learning. It is a practical way of looking at your own practice in order to check whether it is as you feel it should be. Educational inquiries lead to knowledge of self within a world which the researcher co-creates with others who are similarly occupied (McNiff, 2002).



## 6. Methodological approach

### 6.1 Methodological foundation

#### 6.1.1 Qualitative research

There is a close link between research and philosophical orientation (Merriam, 1998, 2002; Hatch, 2002, Flick, 2006). Based on the researchers' philosophical background, three research fields concerning education are mentioned; *positivist*, *interpretive*, and *critical* approach. From an interpretive perspective on research, education is looked upon both as process and as lived experience. I believe my thesis should be placed within an *interpretive* approach. Qualitative research helps us to understand and explain the meaning of social phenomena. It is based on the philosophy that reality is constructed by individuals interacting in the social world, and that meaning is embedded in experiences. Qualitative research is grounded on some basic foundations. The first is that the researcher tries to understand the phenomenon from the participants' perspective. Furthermore, that the researcher is the primary instrument for data collection and that qualitative research often is based on fieldwork. Finally, qualitative approach employs an inductive research strategy and collects a richly descriptive product (Geertz, 1973). It is the researcher's orientation, the purpose of the research and the type of knowledge produced that should decide the orientation (Merriam, 1998).

#### 6.1.2 Action research

The methodological approach to the three studies is action research. Throughout the three different studies I had two different positions; partly as a teacher and partly as a researcher. In the first study I entered the field as a researcher. Gradually I realized that it was difficult to be "a fly on the wall" and I found myself collaborating with the teacher. In the second study I started as a teacher. Discoveries I made during the programme, made me curious to investigate more. Consequently, my position gradually changed from teacher to a researching teacher. In the third study I was participating in a national innovative ICT-supported project where I was expected to be a teacher as well as a researcher. An important

thread through my research has been my own learning process both as a teacher and as a researcher. What I have learnt in one study has influenced what I have done and discovered in the subsequent one. Unlike quantitative research, qualitative methods take the researchers' communication as an explicit part of knowledge instead of deeming it an intervening variable. The subjectivity of the researcher and of those being studied becomes part of the research process.

Action research can be described as “a particular way of researching your own learning” “self-reflective practice, or as learning in and through action” (McNiff, 2002, p.15). McNiff defines the term action research as a process of improving one's own understanding of how to improve social situations. Knowledge is understood as something people *do*. There are no fixed answers. Rather answers are transformed into new questions. A classic definition of action research is: “Action research is simply a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which these practices are carried out” (Carr & Kemmis, 1986, p.162). McKernan (1996) underlines the close relationship between action and understanding. Action research is described as a systematic way of collecting information in order to solve problems and improve practice. According to Stenhouse (1975) teaching and research are closely related. As a form of curriculum theorizing, teachers in collaboration with higher education should reflect critically and systematically on their own practice. Berge & Ve (2000) argues that the general political aim of action research is to change what already exists, and in order to change you have to understand. This view is supported by Kemmis *et al.*, (1998) who claim that action research can help people to examine their own situation in order to change it and help them change it by examining it. Tiller (1999) makes a distinction between the concepts *action research* and *action learning* and defines the first as “the elder brother of the latter” (ibid. p. 38). He raises the question if teachers possibly can be regarded as researchers. His conclusion is that action research is the activity researchers do when they are collaborating with teachers and principles. Action learning is defined as the activities teachers and principles do on their own. In my understanding a teacher can be an action researcher.

McNiff (2002) is critical to the earliest action research models for different reasons. She argues that the definitions are performed like recipes or prescriptions of how the research process should be conducted, and also because, as opposed to life in schools and classrooms, they are linear and sequential. Her third argument is that action research might be

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interpreted as if the initiative to doing research has to come from the researcher from higher education. In her view there is a considerable divide between this group and the other group who aim at developing new metaphors which show life and living in educational contexts as fluid processes. The first category of action research, called *interpretive and critical theoretic*, works at the level of abstraction and use metaphors of static reality. The purpose of this kind of research is to observe, describe, and understand behaviour. The second category called *living theory approach* moves beyond the first one. McNiff (2002) underlines that in addition to making observations and descriptions the researcher should generate and show his own process of learning and development. The difference between a researcher in sociology and education, according to McNiff is that for a sociologist it is possible to keep a distance as an external researcher. Education is predicated on values. How we act as action researchers will depend on what we believe we are acting for. Action research in an educational setting is a way of researching one's own learning process; a process in which all participants are prepared to grow, and not one where one individual is just instructing the others. Educational inquiries lead to knowledge of self within a world which the researcher co-creates with others who are similarly occupied McNiff, (2002). I am going to discuss my own learning process and position separately in the general discussion of the thesis as well as part of each case study.

Action research is often used as a methodological approach to ICT supported learning environments (Krumsvik, 2006). One explanation might be the one given by Koshmann (1996) that the important research question to ask, is how learning is reflected through collaboration and conversation of the learners. This kind of knowledge can only be gained from an inside position. Bridget Somekh (2008) claims that action research is the research approach that is best suited for teachers and schools because it is based on the values and context in which it takes place. Accordingly it fits in with everyday practice and focuses the participants' concern. In order to understand the ICT- supported communication I analysed in the three communities I had to make an interpretation of the whole context.

### **6.1.3 The case study**

The case study is a research tool suitable for research questions that arise from a desire to understanding complex, social phenomena. Yin (1994) mentions three conditions that can help us to decide when to use different research tools or strategies. These are the research questions, the researcher's extent of control over the events, and the degree of focus on

contemporary versus historical events. The conclusion is that a case study is appropriate when *why* and *how* questions are being asked about a contemporary set of events over which the researcher has little or no control (Yin, 1994, p. 9). The case might be seen as “a thing, a single entity, a unit around which there are boundaries” (Merriam, 1998, p. 27). Summing up, as the product of research, a case-study is an intensive, holistic description and analysis of a single entity, a phenomenon, or a social unit (Merriam, 1998). The process of conducting a case study begins with the selection of the “case”. According to Hatch (2002), defining the boundaries, or specifying the unit of analysis is the key decision point in case study design. The unit of analysis in my three case studies is students’ experiences with communities of learners supported by ICT.

Merriam (1998) gives three characteristics of qualitative case-studies. First, they are *particularistic* in the sense that they focus on a special event, situation or phenomenon. Second, case studies are *descriptive* because they are supposed to give a thorough description of the situation. Finally, they are *heuristic*, which means that they illuminate the reader’s understanding (Merriam, 1998). As a research tool used in education, case studies draw on theory, methods and tradition from sociology, anthropology and psychology. Educational contexts are complex. Case-studies as tools for research can offer possibilities for a better understanding of human relations and interactions. The case study has been characterized as a way of obtaining knowledge, connected to a limited field, through one or more units of observation (Firestone, 1993). In order to differentiate between qualitative case studies orientation within education, Merriam (1998) uses the categories; *descriptive*, *interpretative*, and *evaluative* cases. In fact, these categories are related to the overall intention of the case study. There are no strict limits between the categories, and often two of them are combined. The descriptive case study presents a detailed account of the studied phenomenon. The intention is often to describe innovative programs and practices in education, and the data might form a data-base for future comparison and theory building. An interpretive case study also contains rich, thorough descriptions, however the data from interpretative case studies is often used to develop conceptual categories or to illustrate and support theoretical assumptions. An interpretive case study might develop categories and typologies that conceptualize new approaches to the field. The term *multiple case studies* is used when researchers conduct a study using more than one case. Instead of studying one unit, the phenomenon can be collected and analyzed from different angles. By looking at the

phenomenon in different similar or contrasting ways the precision, validity, and stability of the findings are strengthened (Merriam, 1998).

My thesis can be described as a multi-descriptive and interpretive case study piece of research. It has developed through three different studies with the same unit of analysis; students' experiences with communities of learners supported by ICT. It started with fieldwork and a fairly broad research question in the first study. Through empirical data combined with theory I developed categories and concepts. This means that the findings I had in the first study ignited my curiosity to start the second and third study. Below I will describe the research process as it has developed through the fieldwork that constituted the three case studies.

#### **6.1.4 Fieldwork**

Fieldwork is a broad concept embracing many different methods, in particular qualitative research (Wadel, 1991). Fieldwork includes qualitative as well as quantitative approaches though combinations of in-depth interviews and questionnaires (Solberg, 1983), and requires different tools for producing data. The theoretical perspective and concepts are essential for this production. Fieldwork as an approach to research is one way of seeking answer to human behaviour, and it is characterized by the fact that the researcher is situated amongst the subjects he/she is going to study. The researcher is taking part in the daily routines of the participants of the community over time, observing what is going on, taking notes and asking questions (Hammersley & Atkinson, 1996). There are two elements in qualitative researchers' tendency to insist on participating in the observation. Firstly, the fact that face to face collaboration is the best way of gaining as insight into other people's culture and society. Secondly, that according to Mead (1964) you have to participate yourself in order to take on the role of the other (Wadel 1991). In order to understand the interactive processes between students and computers I had to look at the human activities and the total environment, not just the isolated collaborative activities. This meant that I had to triangulate different methods for producing data. The research had to be a continuing process, and I myself had to be a participator. In the following chapters I will give a stepwise description that shows how I have gathered and analysed the data. According to Haavind (2000) fieldwork is difficult to mediate through articles. Interpretations emerge from an alternation between observations and theoretical perspectives that makes it difficult to split into the

article form normally used in sociology and psychology. The reason why the presentation of these three studies is fairly broad is that I want to illustrate the stepwise learning process.

	<b>Study 1</b>	<b>Study 2</b>	<b>Study 3</b>
<b>Title</b>	Samspel med data? Interaction with the computer?	In an ICT-based teacher education context: Why was our group "The Magic group"?	If ICT is the answer- What should be the question?
<b>Research questions</b>	*What kind of interaction develops between teacher and pupils when they are collaborating by means of the computer? *What are the most important contextual assumptions for this development? *What kind of learning strategies are the pupils developing?	*What are the most important assumptions for the productive learning process the "magic group" experienced? *What are the most important consequences for teacher educators in terms of the future planning of net-based study programmes for distance learning teacher students?	*What did the students look upon as the most important learning activities during their teacher education? *How did they experience participation in an innovation project? * If, and eventually how the educational technology had been a support for their learning process.
<b>Sample</b>	24 students in 2nd grade The teacher	5 student teachers	10 student teachers
<b>Methodology</b>	*Action research *Fieldwork	*Action research *Fieldwork	*Action research
<b>Data-collection</b>	*Diary: Observations and reflections *Tape-recording *Interviews	*The assignments *Observations of the feedback process *Texts from the feedback process *Interviews *Reflection papers	* Interviews
<b>Findings</b>	*Most of the students preferred collaborative writing * <i>Interaction</i> : Reasons for collaboration: Support, common aims, creativity, confidence. * <i>Counteraction</i> : Discussional-talk. Broken communication *Collaborative learning strategies: Cumulative talk Explorative talk *Assumptions: Design of assignments Composition of groups	Assumptions: <i>Reflection</i> influenced attitudes and values as teachers. <i>Feedback</i> from peers most important <i>Basic</i> : Confidence, mutual respect, obligation, sensibility, engagement. <i>Difference</i> concerning values and attitudes Consequences: Design of assignments: Informative-assignments: Cumulative feedback Creative –assignments:	Activities: Asynchronous discussions enhance reflection Open questions Assumptions: Did not share aims of the activity Teacher was not present Important to be -a small group -trust the other students -LMS should be a closed space Differences: Distance opens for reflection Get more time for reflection Easier

	Work on social relations Teacher should be present	Explorative feedback Teacher should be present	-to participate in a discussion -to understand the others' thoughts
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Table 3: Overview of the study.

## 6.2 Study 1: Interaction with ICT? (Samspel med data?)

### 6.2.1 Context

Time	January 2001
Students	24 students
Subjects	Collaborative text writing
Organisation of school-day	Reflection hour Activities preparing for the collaborative writing process based on a story told by the teacher
ICT supported activities	Collaborative writing by means of computer Two students collaborating

Table4: Study 1

The class in which I conducted my research participated in a national action research project called "Collaborative writing by means of ICT" (Trageton, 2000). An articulated aim for the project was that students were to write collaborative texts supported by educational technology. Altogether 14 Norwegian schools participated in this project. I was curious to know more about collaboration and learning strategies in communities of learners supported by ICT, so I decided to choose one of these classes for my fieldwork. The reason for my choice was that the school was within a geographical distance that made it convenient to reach. The class consisted of 24 eight year old pupils, and the teacher. There were two computers available. Two pairs of pupils wrote collaborative texts by means of educational technology on each of the days that I made my observations. The other pupils wrote collaborative texts by means of pencil and paper. The fieldwork was conducted from January to June 2001. During this period I spent one day, consisting of four lessons, each week together with the pupils and the teacher in the classroom.

Time	Activity	Activity	Participants
Shift 1 Reflection hour	Sharing experiences Making common goals	Sharing experiences Making common goals	Students and teacher

Shift 2 Learning activity	Experience story: Practical activities the students are supposed to write about later	Creative story: The teacher starts a story. The students are supposed to finish the story later	Groups of students
Shift 3 Learning activity	Collaborative writing	Collaborative writing	Couple of students

Table 5: Overview of the school day

Each school day started with a meeting. During this meeting which I called the *reflection hour*, the teacher encouraged the pupils to share some personal experiences either from leisure time or from school. Also at this time she shared the goals for the learning activities she had designed for the day with the pupils. The pupils were asking questions and discussing these plans. The teacher then continued by telling a story to the class. In shift 3 the students were expected to write. During the period I stayed in the classroom I observed two different kinds of stories which I gave different names; *experience story* and *creative story*. Based on the *experience story* which might be about the lives of the Indians or the Samis, the teacher invited the pupils in groups to make figures based on the story and to play with the figures. Later they were asked to write common texts by means of the computer explaining their activities. An example of a creative story might be a story about a little girl who was lost in the wood or a cat who crept into the room where the family kept their tasty food. Common to all the *creative stories* was that the teacher started the engaging story. Suddenly she stopped and invited the students to finish the story through collaborative writing either by means of the computer or by pencil and paper.

### 6.2.2 Entering the field

What I knew beforehand, was that in this classroom the pupils were going to collaborate by writing common texts. I knew little about the conditions and assumptions for the work. I was curious to understand what happened when the computer became a part of the learning environment. Thus my approach was fairly open. I wanted to know more about what kind of interaction the pupils and the teacher developed. I also had the idea that it would be interesting to understand what kind of learning strategies the pupils developed when they were collaborating by means of the computer. Learning strategies understood as *different*



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*ways to approach a learning task*<sup>6</sup>. Before I started my fieldwork I had formulated the following sub-questions: “What kind of learning strategies do students develop when they are collaborating by means of a computer? What kind of interaction develops between students and also between the students and the teacher through the collaborative process?, and What are the most important assumptions for this interaction?” I wanted to stay in the classroom over an extended period of time and get to know the students and teacher through the different activities going on. Time is often an underestimated factor in the study of social life (Hammersley & Atkinson 1996). My main concern was the collaborative writing activities going on by means of the computer. However, I knew that I had to look at the whole environment and the chain of activities going on, and not just at the ICT supported activities as an isolated part. It also meant that I had to use different analytical tools in order to answer my research questions. This was the background for my desire to participate in the classroom while the students in 2<sup>nd</sup> grade were writing collaborative texts by means of ICT.

### 6.2.3 Gaining confidence

An important part of the fieldwork was to gain the confidence of the teacher and the pupils. In order to be accepted and get information from the participants, confidence is essential (Hammersley & Atkinson 1996). The critical point is what kind of status the researcher is able to negotiate, and what kind of arenas the negotiated status opens access to (Wadel 1991). My own background as a teacher and principal in different schools might be as much of an advantage as a disadvantage concerning my status in the classroom. A stranger who knew the field may well represent a threat, in terms that they may advocate support for another school or type of classroom. I had my first contact with the teacher, who I chose to call Randi, by telephone. I immediately felt that she appreciated the fact that I wanted to do my fieldwork in her classroom. Using the computer as a tool for learning in the classroom in 2001 was rather controversial. As a participator in the project “Collaborative writing by means of ICT” (Trageton, 2000) she met with different attitudes among other teachers. Some were enthusiastic and curious, while others were sceptical. I think that, in itself was an important factor, in her decision to welcome a researcher in her classroom. No doubt her positive attitude was important for my accessibility to all kinds of data in the classroom.

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<sup>6</sup> [http://www.pisa.no/pdf/nera\\_hopfenbeck.pdf](http://www.pisa.no/pdf/nera_hopfenbeck.pdf)

Teachers are used to having other teacher in the classroom. After a short while I experienced that Randi looked upon me as a kind of an assistant and a discussion partner. I also experienced the pupils to be very accommodating. From the first lesson, they involved me by using my first name and ask me for help. Apparently, they were used to different adults coming and going in the classroom, and I was just another one of those. This means that I soon felt I had gained the confidence of the community.

#### **6.2.4 My own position**

Another important aspect concerning the entrance to the field was how I related to my own position. Before I started the fieldwork, I thought it would be possible to just be there and make observations. Soon I realized that I also influenced the learning environment by just entering it and that my position there within had to be negotiated. I experienced that it was impossible to be invisible. In a way I had forgotten that I perhaps was the most important tool for the research. The pupils involved me from the first lesson, using my first name and asking me for help. I was fascinated by the way they addressed me, and I was used to guiding students when they asked for help. Working as a teacher I was also used to taking charge of what was going on in the classroom. I found it difficult to just sit there without participating, so I was glad when Randi said she appreciated having another grown up in the classroom. My relation to the students caused the same dilemma. My intention was to understand as much as possible of the collaboration between students and teachers. I wanted to be a “fly on the wall”. Gradually I realized that this was a problem because some of the pupils were more pre-occupied with me than with the teacher. Particularly some of the lonely students were actively contacting me and wanting me to collaborate with them. When I became aware of this fact, I withdrew from the activities, something which turned out to be a better situation. The status as an observer can be difficult for a person coming from outside without any duties towards the joint activities going on. The researcher’s own position has to be negotiated (Solberg, 1982; Fuglestad, 1997).

#### **6.2.5 The diary**

I wrote my diary every day throughout the period I stayed in the classroom. I started along with the class in the *reflection hour*, sitting like one of them in the ring. In the beginning the students were curious about my writing, but after a while they seemed to forget it. Regarding the activities in shift 1 and 2, I also chose to use field notes instead of a tape recorder. I

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wrote a brief description of the activities. The main focus of which was on the interaction. I tried to write as many examples and comments as possible that would enable me to understand more of the collaborative activity.

### **6.2.6 Recording conversations**

My main tool for describing the activities going on by means of the computer was the tape recorder. Initially I thought of using video, but found that there would be too much commotion around me if I did so. I spoke to each pair of pupils and explained to them why I was going to use the tape recorder. I also asked them if they wanted to speak into the tape recorder and listen to the recordings. Actually, there was little interest for it. Of course there were exceptions, but my experience was that the students soon forgot the tape recorder. I always asked for permission before I made the recordings, and I was always given permission. My interpretation was that the students enjoyed my interest in their contributions, combined with the fact that they soon forgot that the tape recorder was there. I recorded all the conversations the students had. Two pairs were writing at the same time, and I divided the recording time between each pair. I myself sat between the two pairs, continuously making notes about how the students were acting and collaborating. I tried to be as descriptive as possible concerning their gestures, the way they spoke to each other and their position according to the screen. At the end of the day I transcribed the conversation from the tape recorder and added my own notes. I made it a rule to transcribe the tape recordings the same evening as I had made my observations. I found it important to combine my diary notes with the transcribed observations while I still had the faces, the gestures and the situation as a whole as close as possible. I wrote precisely what the students said. When I later read the conversations with more distance, and highlighted by theory, initial categories started to develop.

### **6.2.7 Verbal conversations**

During the fieldwork I had many short conversations with the pupils and the teacher. All of which served as important supplements to the observations. Participation in fieldwork means interacting with other people. Observation and interaction creates questions (Lofland *et al.*, 1995). This means that mini interviews were taking place all the time. These short conversations were useful, and helped me to understand more of what was going on. However, I decided to make individual interviews with all the pupils at the end of the field-

work period. I wrote many questions during the time the fieldwork lasted that I wanted answered. These were the questions that I wanted to go into in more depth. I assumed that the students would have gotten to me and would be more confident than if the interviews had been taking place at the beginning of the fieldwork period. Through observations and transcriptions of tape recordings I had created an impression of the interaction going on in the classroom, and in front of the computer. Through the interviews I wanted to get hold of each student's own voice and listen to their opinion about collaboration. There were many students in the classroom, and I wanted to make sure I had listened to everyone.

### **6.2.8 Semi-structured interviews**

With regard to the focus of the interviews, they were structured in order to ensure that everybody was asked the same questions (Kvale, 1996). However the conversations went in different directions depending on the student's answer. The structure of the interview guide (Appendix) ensured me that I would "visit" the same questions, and that was a security for me. But at the same time it was possible to follow the pupils associations and encourage them to speak.

The questions centred the students' experiences with collaborative activities and learning strategies supported by the computer. The main focus was on collaboration and learning. I was eager to know what the students thought of writing alone, compared to collaborative writing, and how they handled the situation if both of them had ideas simultaneously. I was interested in knowing their interpretation of the requirement that the teacher expected them to write collaboratively. I was also interested in knowing who they preferred to write with. Of course there were individual differences regarding both their ability to express themselves, and their abilities to perceive the questions. There was a marked variety in the answers to my question about *why* they thought the teacher wanted them to write collaboratively. Some students answered that they thought it was because she wanted them to learn to collaborate and to support each other, while others answered that more pupils could write at the same time. However all of them had personal opinions about the majority of the questions they were asked. I conducted an interview with the teacher after the fieldwork was complete. (Appendix). The main aim of this interview was to establish her experiences of the action research project. As for myself, the interviews were informative and an important supplement to my observations.

### 6.2.9 The collected material

The diary from my observations in the classroom

Reflections after the fieldwork

Interviews

Texts written by the students

Tape recordings

	Time	Students
January-May	5-10 minutes each couple	2 couples writing together

Table 6: Tape-recorded material

I will now give a description of how the analysis was conducted. Gradually I discovered patterns that I have described as steps. One step is building upon the other.

### 6.2.10 Analysis step 1: Describing basic patterns

While I was in the classroom I wrote my immediate observations. When I came home I connected my reflections and interpretations to what I had observed. My first coding was totally descriptive according to what I had observed in the classroom. I discovered that there was a basic pattern in the way that the teacher had planned for the collaborative writing. Through the reflection hour (shift 1) students and teacher established confidence. They were sitting ring-side without any distraction in front of them. Events from their daily lives were introduced to the community, Ann was caring for her cat, and we were all eager to hear news about Peter's newborn sister. When students and teacher were sharing their personal experiences from leisure time and school an atmosphere of what was coded as *basic confidence* was created. The next step was for the teacher to introduce the aim for the learning activities prior to the collaborative writing. She presented it to the students and they then negotiated the plans for the activities that were to occur that day. In my material this activity was coded as *sharing aims*. They also shared a common experience central to the common computer supported writing process. In shift 2 the students had a common experience through the story told by the teacher and the succeeding activities. These activities were coded as *common experiences*. Summing up, before the pupils started their collaborative writing by means of the computer I discovered a pattern where the teacher had planned for *basic confidence*, *sharing aims* and *common experiences*.

### 6.2.11 Analysis step 2: Observing a simple dichotomy

When coding the conversation between the students in front of the computer, I gradually saw the emergence of a distinct pattern. The students met in front of the computer in order to create a collaborative text. What I observed was that they met in one of two opposite ways concerning interaction. If in the first instance they met with a friendly attitude to each other and the work they were going to do together, they immediately started collaborating and writing collaboratively. In my material this was coded as *interaction*. In the opposite case, if the students were disinterested in each other in some or other way the collaborative activities never started. This might either mean that one of the students took over all the work, that one was dominating the other, or that neither of them were engaged in the writing activity. There seemed to be nothing in between. A code for this lack of interaction was called *counteraction*. The concepts *interaction* and *counteraction* are connected to and fundamental for the relationship between the pupils.

### 6.2.12 Analysis step 3: Initial categorization

My next step in the analysis process was to search for patterns in the conversations between the pupils in front of the computer. After each sequence of transcribed text, my own reflections and interpretations of what I had found was added. In addition to the transcribed texts, I wrote what I had observed before the collaborative writing took place, and immediately added my own reflections.

Initially, I was open and curious as to what type of information the observations on the collaborative activity would give me. Large amounts of data made it impossible to manage any more than to transcribe the conversation, re-write the notes from my diary, and write my immediate interpretations and reflections. Not until later was it possible to go back to the material and make relevant categories according to the research question.

I was interested in patterns in the interaction between the students, and between students and the teacher during the collaborative writing process. I was also interested in patterns that could tell me something about what kind of learning strategies the students used in order to complete the assignments or exercises that the teacher had given them. Additionally I was curious to know as much as possible about the contextual impact on the learning processes. I started out with the following way of categorizing the conversations: Firstly, in order to trace the collaboration between the participants the code *initiative and follow-up* was made.

This means that I searched for initiatives and the way the other participant was responding. I made codes for mutual positions between the students, and between students and teacher.

### 6.2.13 Analysis step 4: Developing categories

What I discovered through the initial coding process was that there was a connection between the way the teacher had presented the assignments and the way the pupils responded. The *experience story* and the *creative story* had led the students into two different kinds of interaction. The *experience story* presented the opportunity for them to write a story about the activity they had been working on together. They had made the figures and played with them in groups. They were then to reproduce the activities through the creation of a common story. What happened was that the students collected information and reconstructed the activities they had taken part in. The *creative story* asked the students to continue as authors on a thrilling story initiated by the teacher. The students were asked to use their personal opinions, creativity and engagement.

The fact was, however, that if the students met in counteraction, then there was a breakdown in communication. Usually no text was produced at all. Alternatively, one of the participants wrote the text while the other one dropped out entirely from the activity. I chose to call this category *discussional talk* and have defined it the same way as in the SLANT-project. The conversation is characterized by the fact that an initiative from one of the participants, this might be a suggestion, a hypothesis or an instruction results in the one partner taking over, or that neither of the participants take any decision. Often one student took over and wrote the text alone. One partner dominates the other, decisions are taken individually and the participants act like they are in a competition. What happened between M. and P is described in the following example:

Transcribed and translated:

P: "Er det greit at eg visker"? (Is it OK that I erase)?

M: (Bestemt og irritert): "Ja, og eg skriver" (Determined and irritated): Yes, and I'll write.

P: "Ja, og eg visker" (Yes and I erase).

M: "Okei (Ok)

P: "Eg vet kje ka det er eg s-" I don't know what I s...

M: "Neei". (Nooo)

P: "Her er eg. Der er det" (Here I am. There it is).

M: "Eg spør Randi om hon kan hjelpe oss" (To me): "Where is Randi"? (I'll ask Randi if she can help us. (To me): Where is Randi?

Both are silent while they are waiting looking in a different direction.

M: "Randi-" (Banker I bordflaten) (Randi- (knocking on the table).

M: "Randi, kordan får man vekk en sånn dings"? (Randi, how do you get rid of one of these things?)

R: "Å, ja har du gjort det ferdig"? (Oh, yes have you finished?)

M: "Randi, eg vil ha kjeempestore bikstaver. Ikke rør sa eg." (Randi, I want to have veeeeery big letters. I told you: Don't touch!)

Initially P. is taking an inferior position. He is asking in a very subservient and careful way. M. is obviously very irritated. He offers to be the one who is erasing the text. She demonstrates by calling for the teacher (Randi), and while they are waiting there is no interaction between the two. When the teacher arrives she is trying to make them go on, but finally she has to join them and help them to compose a text.

### 6.2.14 Analysis step 5: Cumulative talk

What I further discovered was that there was a difference between the way the assignments were carried out, and the learning strategies. During the first period I stayed in the classroom, the students were writing *experience stories* based on the story the teacher had told them about either Sami or Indians. The students went to different workshops where they made figures from the story in clay, textile or wood. Based on their experiences from the workshops they were then to write a collaborative story. I decided to call the interaction I observed when the students were writing their experience stories *cumulative talk*. Cumulative talk is characterised by the existence of mutual trust and confidence between the participants, and a willingness to collaborate and share. The discourse is known by repetitions and confirmations. Here is an example of the conversation between V. and M. when they are making a collaborative text based on their joint experiences from the workshop. The teacher has told them about the Sami and the students have made figures and played with them. Here they tell their story.

Transcribed and translated:

V:"Og vi lagde egg." (And we made eggs).

M:"Ja." (Yes)

V/M:"Ooo-" (I kor) (Ann... (Together)

V:"No kan du skrive litt." (Now you can write a bit)

V/M:"Laa gg de egg". (I kor) (Maadde eg (Together)

M:"Nei, vi må gå tilbake, vi må ha enda en G i egg." (No, we have to go back. We must add another g in eggs).

M:"Vi lagde samene sitt hus." (We made the Sami's house)

V/M:"Viii llllaaggddee ssaaammmeennee – samene- siiit – h uu s." (I kor)

(We made the Sami's house (Together).

M:"Saaammmeennee sitt hus." (Sami's house).

V:"Hus." (House)

The pupils are sharing knowledge through a common perspective. They are accumulating common knowledge through retelling their experiences and collaborating on how to spell the words. One participant builds on what the other says without asking questions. They are



collecting information, but the assignment does not challenge their own opinions. What they are asked to do is to merely retell the story that they have just created .

### 6.2.15 Analysis step 6: Explorative talk

In the next period I observed the students' when they were writing what I have called *creative stories*. The *creative story* leads to what I chose to call *explorative talk*. These assignments invite the students to use their imagination, to disagree and to argue. Initiatives are challenged, but the discussion is not threatening because the students feel confident. New knowledge is constructed when students discuss with people they disagree with and additionally they use their imagination and creativity. In the following example the teacher told a story of a cat who was hungry and who saw the opportunity of stealing food from his hosts. The cat is full from eating the stolen food and very tired. An excerpt from the conversation between G. and J. based on the *creative story* is used to illustrate explorative talk.

Transcribed and translated:

- J.: "Ka skal vi skrive?" (What are we going to write?)  
 G: "Mons gikk inn i kjøkkenet." (Mons went into the kitchen)  
 G/J.: "moonss jjiikk iinn-" (I kor). (mons went intoo.(together).  
 J.: "Med to n'er." (With two n's).  
 G.: "I sjøø— (In the kitch...)  
 J.: "Nei, kjøkken- det skrives kj- kj." (No, kjøkken – is written with kj )  
 G/J.: "Skjøkkenet, sjøkkenet." (I kor, begge ler) (the sitchen) (Together. They are both laughing)  
 G.: "Sjøkkenet, det var rart." (Sichen, that's funny)  
 G/J.: "Skjøkkenet, nei kjøkkenet." (I kor) Sischen, no kitschen (Together)  
 J.: "Nei, det skrives ikke med s." (No it is not spelt with s)  
 G.: "kjø- sånn, er du fornøyd, nå da?" (Begge ler) (well then, are you satisfied now?) (Both are laughing)  
 Seinare: (Later)  
 J.: "No er det din tur til å skrive litt igjen." (Now it is your turn to write again)  
 G: "Og da Birgitta kom inn så var fatet helt tomt. Men vi må ta vekk men" (Forslag) (And then Birgitta entered and noticed that the plate was completely empty. But we have to remove it but? (Suggestion)  
 J.: "Nei, vi må ta vekk også." (No, we need to remove also)  
 G.: "Jammen —" (Yes but--)  
 J.: "Ooog sååå vvaarr haann sååå trøøtt aatt-." Annd soo hee waaas sooo tiiiiires thaaat)  
 G.: "Nei, dette blir teitt." (No, this is silly)  
 J.: "Nei." (No)  
 G.: "Så trøtt at han sovna på gulvet." (So tired that he fell asleep on the floor)  
 J.: "Nei, han sov na på hyllen." (No, he slept on the shelf)  
 G.: "Nei, eg syns han sovnet på gulvet for da kom Birgitte inn." (No, I think he should fall asleep on the floor and then Birgitte enters)  
 J.: "Nei, han sovnet på hyllen," (No, he slept on the shelf)  
 G.: "Nei, han sovnet på gulvet." (No, he slept on the floor)  
 J.: "Nei, han sov oppå en hylle og så falt han ned på gulvet." (No, he slept on a shelf and then he fell to the floor)  
 G.: "Ja, han var så tung at hyllen falt ned." (Yes, he was so heavy that the shelf broke)  
 J.: "Det hadde vært mye gøyere om han hadde falt-" (It would had been more funny if he fell--)  
 J.: "Så falt han oppi en suppe sånn at han døde." (And then he fell into the soup and died)  
 G.: "Nei, ikke sånn at han døde." (No, he should not die)

J.: "Jo, en muggen suppe falt han oppi." (Yes, he fell into a mouldy soup)  
 G.: "Men han døde ikke." (But he did not die).

The pupils use creativity and imagination. They discuss, they disagree and they argue. The disagreement however, is never a threat for the collaboration. Subsequently, the dialogue continues and is not broken like in the *discussional talk*. The dialogue goes on. As opposed to *discussional talk* the students seem to enjoy the discussion. What characterises *explorative talk* is that the assignments open up for the students own opinions, for discussions and for creativity. There is no correct answer. *Explorative talk* has all the same characteristic features as *cumulative talk*. This kind of assignment opens for innovation and exploration. The pupils support each other, they have a common aim and they are confident. Additionally this example reveals that the participants use their creativity and imagination. Within the approach to learning that the *explorative assignment* opens for there is room for development of new knowledge through creativity, respectful disagreement, and the possibility of asking critical questions. These are criteria that cannot be witnessed in the examples I have given from *cumulative talk*. *Explorative talk* equals what I have described earlier, and defined as *reflective dialogues* or *productive interactions*.

### 6.2.16 Analysis step 7: Categories for collaboration

The further categories regarding collaboration came through from the coded material of the interviews with the students. They had different and partly overlapping explanations for why they wanted or did not want to collaborate with each other. The majority of the pupils; 19 out of 24 said that they preferred collaborative writing activities to individual writing activities. Within the *interaction* dimension the categories are called *support*, *efficiency*, *common aims*, *creativity* and *safety*. *Support* means that it is nice to be able to help each other. *Efficiency*, means that it goes faster when peers are collaborating. *Common aims* refer to the fact that the students appreciated having a common experience to write about, and *Creativity* means that two people have two imaginations to draw in, not just one. The last category, *confidence*, implies that it is important to be confident and to trust your peer. Within the main category, *counteraction*, three different sub- categories were found; *simplification*, *efficiency* and *silence*. *Simplification* means that it is easier to write alone because you do not have to reach on agreement. This is closely linked to the next category, which says that it is faster to write alone. The third category, *silence*, deals with the fact that

peace and quiet is necessary for a good writing process to take place. The table shows examples from the different categories

<b>Interaction</b>	<b>Examples</b>	<b>Counteraction</b>	<b>Examples</b>
Support	"I always ask K. (peer) first before I ask Randi (teacher)"	Simplification	"Because sometimes I want to write something that the other person does not want to"
Efficiency	"It goes faster because we help each other"	Efficiency	"I don't have to wait for the other person when I am writing"
Common aims	"It is so nice to talk about what we are doing together"	Silence	"It is better to write alone because than it is calm around you"
Creativity	"You become more creative- you have in a way got two imaginations"		
Confidence	"It is best to write with M. because we have known each other from we were two or three years old"		

Table 7: Categorization of the interviews

## 6.3 Study 2: In an ICT-based context: Why was our group "The Magic Group"?

### 6.3.1 Context

Time	From autumn 2002 until spring 2004
Students	20 distance learning student teachers living geographically spread.
	Divided into four groups: Vygotsky, Dewey, Comenius, Piaget
Organizing	Started with a seminar at a hotel Face to face meetings at one-day seminars: 3 times
	Closed space within the LMS for collaboration
ICT-supported activities	The students were supposed to write 15 texts for their portfolio based on assignments given by the teacher. Each student gave feedback to two other students' texts each time The teacher gave feedback to the group

Table 8: Study 2

### **6.3.2 Entering the field and developing research questions**

This study was conducted from the autumn of 2002 until the spring of 2004. The 20 distance learning student teachers lived geographically spread over a large area. They had finished their master studies and were working as unqualified teachers. During this period as PGCE-students they were supposed to study pedagogy and didactics in two subjects combined with practicum. The students started with a seminar where they stayed together in a hotel for three days. The aim of the seminar was to get to know the other students and to become aware of the aims of the project. The data-material in the study of “the magic group” is concerned with pedagogy. Most of the study programme was based on collaboration by means of the computer. The 20 students were divided into four groups and each group had their own closed space within an LMS for collaboration. Within this closed space they were expected to publish 15 texts for their portfolio and to give and receive feedback on these texts from their peers. The teacher and the five students in the group were the only ones who had access to the closed area.

### **6.3.3 My own position**

My own position throughout the fieldwork was to be one of the two teachers who had designed the teaching programme prior to the students starting. I was also the contact teacher for two of the groups; the Dewey group and Piaget group. The students lived far apart from each other and were totally dependent on the computer as a collaborative tool for their learning process. As teacher educators, we ourselves had no previous experience with designing a teacher education programme supported by ICT. During the fieldwork I experienced that my position changed. The change from one position to the other started when the Dewey-group met face-to-face for the second time and explained to us that they had experienced a productive learning process. All the participants agreed that they had worked hard, but that they had enjoyed their work, and they had learnt a great deal. As a teacher educator I had also noticed the difference between the Dewey group and the other groups. The students in the Dewey group seemed to spend more time on writing texts for their working portfolio, as well as on the feedback they gave to their peers. This made me curious to understand more about the reasons for this successful collaboration. Gradually, I became increasingly interested in understanding more of the productive interactions that the

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group experienced. My focus gradually changed from teacher to researching teacher during this period.

From study 1, I had learned that the productive interactions the students developed were connected to the creative assignments initiated by the teacher. This inspired me to investigate further what these grown up students experienced as *productive interactions* in their educational context. I began to wonder if there was any general connection between the way that the students in the two different communities experienced the collaborative learning process? Another interesting question was if there was any connection between the performance of the assignments, and the students' choice of learning strategies in two such different groups as these two. The groups were not only different in age. In the first study the students communicated by means of stand-alone computers in the classroom. In the second they were communicating *through* the computer. I became more and more interested in these questions and decided to observe the feedback process between the students with that as my focus. I decided to observe the feedback process between the students with that focus. I developed the following research questions:

\* What are the most important assumptions for the productive learning process the magic group experience?

\* What are the most important consequences for teacher educators in future planning of net-based study-programmes for distance learning students?

I wanted to listen to the students' voices about their own experiences, after the teaching programme was finished, through semi-structured interviews. I also wanted to look at the students' final reflection paper which was connected to their portfolio. My research interest was to investigate what the students regarded as the most important foundations for the productive interactions they experienced, and to further look at the consequences of their experiences for myself and other teachers when designing new education programmes.

### **6.3.4 The collected material**

Overview of the assignments

Observations of the feedback process

Texts from the feedback process

Interviews with the five students

Reflection papers

I will now give a description how the analysis was conducted. Each step builds upon the previous one.

### **6.3.5 Analysis step 1: Discovering basic patterns**

Based on the effect of the performance of the assignments that I had observed in study 1, I decided that first of all I had to investigate the way the assignments were performed in this study. What I wanted to find out, was if the assignments in study 2 influenced the students' choice of learning strategies in the same way as in study 1. Throughout the teacher education programme the students were asked to write texts for their working portfolio. They were given 15 assignments that they were required to respond to at certain deadlines. The assignments were created before the programme started. The reason why they were made before the students met was so that they could get an overview of the course, and have the opportunity to reflect and write whenever they wanted. When the text was published they generally had two weeks to respond and give feedback to two other students' texts.

When looking closer at the assignments, I discovered two different kinds of assignments. There was a dividing line between those assignments that asked for the student's personal experiences, attitudes, values and opinions and those that did not. Similar to study 1, there was one category that asked the students to give a description, or collect information, and there was one that asked for the student's own personal opinions based on their experiences. In the first case they were expected to collect information and reproduce this information into their own words. In the second they were also asked to collect information, but these assignments opened for creativity and different opinions, and consequently for argumentation and discussion between the students.

Based on this difference I called the assignments that asked for information *informative assignments*. The assignments that asked for the students' personal experiences and opinions were called *creative assignments*.

I have chosen two examples from the list of assignments as an illustration:

Informative assignments	Creative assignments
<p>Example 1.</p> <p>Please comment on one of two texts in your curriculum.</p>	<p>Example 2.</p> <p>The Norwegian Unitary School System – One School for All?</p> <p>Please give your theoretical and personal opinion</p>

Table 9: Examples of informative and creative assignments

### 6.3.6 Analysis step 2: Observing the feedback process

Becoming aware that there may be a possible connection between the way the teacher had constructed the assignments, and the learning strategies the students developed in study 1 and 2, I decided to study this systematically. (Appendix). What I noticed was that there was more personal engagement in the peer feedback when the students were asked about their opinions based on their experiences as teachers. Through these assignments the students' attitudes and values seemed to be provoked and this again seemed to influence their engagement when they gave feedback to each other. Through the feedback process they were arguing and discussing. Often the feedback resulted in a continuing dialogue between the two students.

I have picked two examples from the feedback process that showed me how the two different ways of designing the assignments invited the students to choose different learning strategies.

Feedback to *Informative assignment* in example 1: Jill's comments to Peter:

It was very interesting to read your text. You have a fine introduction where you tell the reader what you will discuss. I think you must have understood Hargreaves correctly. Like you, I am unable to see what he thinks a postmodern school should look like. As far as I understand Hargreaves he is concerned with describing the background for the schools' challenges. He presents many paradoxes which describe postmodernism as a phenomenon as well as a challenge that schools in general, and especially the leaders, are facing.

The example made me aware that the participants were collecting information. I noticed that they were sharing knowledge through a common perspective. The students were collecting

common knowledge and there was little room for personal opinions. The participants are accumulating and sharing given information.

Feedback to *Creative assignment* in example 2: Sara' comments to Jill:

Your text is well-written and interesting. I find it especially interesting that we have written about the same subject – comparing the Norwegian and the American school system. We agree and disagree on certain points. We agree on equal rights to education, and your personal examples stress this. This is a decisive point, but after this our disagreement begins. Perhaps we disagree due to our different cultural backgrounds? Anyway, it's incredibly instructive to discuss with someone one disagrees with. We both want the best system to win. And, as you say, Knowledge is something that grows and grows as you share it with others.

This is an excerpt of the feedback that covers two pages. What I observed was that the students' personal engagement was present. In addition to asking for information, the creative assignments invited the students to discuss and reflect upon a subject that influences their personal attitudes. The example also shows how the two participants disagree and argue for their own point of view.

### **6.3.7 Analysis step 3: Further development of categories**

When I had discovered the dichotomy between the two kinds of assignments, I gave the categories names that were closely related to those in the first study. The feedback the students gave to *informative assignments* was called *cumulative feedback*. To illustrate what kind of response the students gave to *creative assignments* I called this category *explorative feedback*. Cumulative feedback gives limited room for disagreement and reflection because it does not challenge the students' personal attitudes. The *creative assignments* ask the students for information, but in addition they challenge their personal opinions and values. They have to reflect and argue. New knowledge is constructed when the students discuss with people with whom they disagree in *productive interactions* or *productive dialogues*. According to Jill the other members' opinions gave her a more nuanced way of understanding.

### **6.3.8 Analysis step 4: Discovering reasons for interaction**

Characteristic for the collaborative activity in study 1 was either *interaction* or *counteraction*. When the students in study 2 reported that they experienced a productive collaborative learning process it made me curious to understand what they regarded as the most important reasons for the *productive interaction*. I wanted to learn how each student had experienced the learning process and what they understood as productive learning. I also



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wanted to listen to their arguments regarding the reasons, and their advice to future teachers when designing new programmes. I decided to wait until the study programme was finished before I made the interviews. (Appendix). For practical reasons four of the interviews were carried out in my office, and the fifth one in a café in another city. Each interview lasted from half an hour to one and a half hours. The interview guide was semi-structured with a set of common core questions given to all the students. I wanted to make sure that everybody had the opportunity to answer the same questions. But since the students had different responsibilities when working in the team, I also found it interesting to know more about how they had experienced their own participation in relation to the other members.

The first step in the analysis was to focus on the process. I made a description of how each member had experienced the development of the collaborative interaction. I was looking for differences as well as similarities. Then I made a description of the development of the group process as each of the members saw it. Later on, I selected examples that could illustrate the reasons the members saw for the development of the productive interaction.

The overall impression was that the first face to face meeting had been decisive for the students. The confidence they had established was essential for further collaboration. Another important finding was that the students highly valued the mutual respect, obligation and commitment they had developed through their collaborative learning process.

### **6.3.9 Analysis step 5: Important to be different**

The perception of confidence, trust and mutual respect seemed to be common for the whole group. They felt a strong commitment and an obligation towards the other members. Another effect seemed to be that the confidence and mutual respect made them feel it worthwhile to invest time in deep discussions concerning their basic values and attitudes. The analysis of the interviews and the observation of the feedback process also showed that the students valued that they had different backgrounds, and ways of understanding life. While the group appreciated similarity, they also stressed the importance of being different, mainly referring to the possibility of viewing issues from different angles. The Dewey-group represented different school districts and they worked with different age groups. They mentioned differences in age and gender as an important contribution to the productive learning process. One of the group members represented another national culture, and the rest of the group mentioned this as a positive contribution. The fact that they were teaching different subjects was also judged as a strength with regard to the reflective process. But what

seemed to be most important was the difference represented in attitudes and values. The students experienced that their own fundamental opinions were challenged, and they really had to reflect on what they thought and why they thought this, and to *argue* for it.

## 6.4 Study 3: If ICT is the answer-what should the question be?

### 6.4.1. Context

Time	2002	2003
Students	20 students	20 students
Subjects	Didactics in two languages	Pedagogy
Activities	Different LMS, participate in asynchronous and synchronous discussions, compile portfolios, collaborate with teachers outside the institution, computer-games, Powerpoint, make web-pages	Compile portfolio + give and receive feedback from peers. Participate in asynchronous discussions.

Table 10: Context study 3

### 6.4.2. Entering the field

During the period from autumn 2002 till spring 2003 I participated in the national project PLUTO<sup>7</sup> which ran from 2000 to 2003 (ITU 2000-2003b). As a teacher educator at the University of Bergen I took part in the local project INVITIS<sup>8</sup> (2001-2003) (ITU, 2000-2003a). PLUTO was initiated by the government through legislation. Teacher education was to be changed and ICT was meant to play an important role. Based on the CSCL paradigm educational technology was supposed to be a tool for collaborative learning activities (Ludvigsen & Hoel, 2001). Parliamentary Proposition no. 27; (2001-2002) the so-called "Quality reform" (MER, 2001) concerning higher education in general, and the National Law for Teacher Education (MER, 2002) initiated great changes in formative assessment, a closer follow up of the individual student, and learning activities supported by ICT.

<sup>7</sup> Program for teacher education, technology and change

<sup>8</sup> Innovation by means of ICT in education of language teachers

The aim of the INVITIS project was to develop an alternative model for the education of language teachers. This model was to create a platform for language teachers' abilities to become creative and innovative in the traditional classroom. The project was initiated and ran by a group of four language didactics from 2001 until I, as a pedagogue, joined the research group in August 2002. This meant that I joined an action research project where I had not participated in the construction of the aims. My responsibility was to arrange and organize for pedagogy. I was expected to join the research group, to plan and organize innovation by means of ICT, to complete action research and to teach the students. The different themes in pedagogy like classroom management were dealt with in lectures for the entire group of 80 students, in face-to-face discussions in seminar groups, and in portfolios where the students gave feedback to each other.

		<b>Face-to-face meetings</b>	<b>Online activities</b>
<b>Seminar group</b>	20 students	Met once or twice a week during the theory period	Asynchronous discussions
<b>Basic group</b>	4-5 students within the seminar group	Practicum at the same school	Compile portfolio + give and receive feedback from peers

Table 11: Organizing of pedagogy

The semester started with an Introduction week for the seminar groups. During the theoretical part of the study the students met face-to-face once or twice a week. The aim was to establish confidence, to become familiar with the main goals of teacher education and the INVITIS- project, and to learn how to use the technology. In order to prepare for the online collaboration, students in the basic groups had to write texts and give feedback to each other face-to-face. Participation in seminar groups as well as on-line activities was compulsory. Based on a procedure decided by the teacher educator, each student gave feedback to two peers on each assignment in the portfolio. Face-to-face as well as on-line discussions took place either between the members of the seminar groups or in the subject- related groups. As a participator of the research team I was expected to complete action research on the innovative activities.

### **6.4.3 My own position**

As the project progressed, I had mixed feelings. I was supposed to combine innovation, teaching and research. For a long period teaching and innovation required all my attention. Little time was left for systematic reflection and research. This was a frustrating experience. Looking back, I can see that this frustration probably made me more alert and that this attention contributed to an analytical understanding (Solberg 1996). As a parallel to my own frustration I experienced that some of the students complained about the INVITIS project. Many of them were frustrated. Some of them said that it was impossible to understand why they had to collaborate by means of ICT when they were speaking to each other face to face every day. They also complained about all the different ICT supported activities they had to participate in. One of the students even told me that she considered quitting teacher education programme because of the INVITIS project. This made me determined to try to understand more of the students' experiences with the implementation of the INVITIS project, and to understand what I as a teacher educator could possibly learn from their experiences. The main research question I wanted an answer to was: How did the student teachers experience the ICT-supported innovation project and what could I possibly learn from their experiences?

I decided to make interviews with the students after their graduation from teacher education. I also decided that I wanted to keep the same perspective as in study 1 and 2. The first aim was to try to get hold of the students' experiences, and the second was to understand more of what consequences the students' experiences would have for me as a teacher educator in future design of online learning communities. I was uncertain if the students had experienced ICT as a support for their own learning at all. And if they did, then what kind of activities they felt to be most beneficial.

### **6.4.4 Conducting the semi-structured interviews**

The interviews were conducted in two sessions. I conducted the interviews with the first group of five students in June of 2003, and the second in December of 2003. The group of students graduating each semester was around 20 students. All of the students were female. I decided to interview one group of five students in spring 2003 and another group in autumn 2003. The selection is non-probability (Merriam 1998) and based on purposeful sampling (Patton, 1990). The students were all between 25 and 30 years old. The interviews were

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conducted according to Kvale's seven stages for interview investigation; thematizing, designing, interviewing, transcribing, analysing, verifying and reporting (Kvale, 1996). The interviews took place in my office at the University. Each interview lasted between half an hour to three quarters of an hour. I used a tape recorder, and I transcribed the interviews before I started the analysis process.

The interviews were all semi-structured. I had a set of core questions that I wanted all the students to answer, (Appendix) but I was also interested in the students' personal experiences. The interviews therefore differ from one student to the other, concerning length and theme.

#### **6.4.5 Analysis step 1: Meaning condensation**

The analysis was conducted stepwise during spring and summer 2004. After a close reading of all the interviews I made a meaning condensation and a meaning categorization. I will describe these two steps and give a short comment on validity.

I started the analysis by trying to get an overall impression of the students' opinions through meaning condensation (Kvale, 1996). First I reduced the interviewees' statements into fewer sentences and meaning categories. Through meaning categorization I coded the interviews into categories. First, according to the positive as well as negative experiences mentioned by the students.

#### **6.4.6 Analysis step 2: Meaning categorization**

The next step was to make a meaning categorization (Kvale 1996). Based on the research questions I was looking for the students' experiences. If they regarded any activities to be a support for their productive learning process, I was interested in knowing what these activities were. Furthermore, I was looking for how I could learn to design a better programme next time. What were the most important consequences for teacher educators that I could extract from the material?

In order to answer the research questions, I chose the following categories.

- What the students looked upon as the most important learning activities during teacher education
- How they experienced participation in an innovation project

- If, and eventually how the educational technology had been a support for their learning process

In the following section I will give an account of the findings. They are listed according to the way the questions were asked in the interview.

### **6.4.7 Analysis step 3: Meaning interpretation**

#### *The most important learning activities*

Not unexpectedly, the students commented that practicum represented the most important learning activity to them. They also appreciated being able to participate in small groups like the seminar and basic groups which allowed them to become more confident, and gave them the possibility of reflecting upon theory and practicum together with peers.

#### *Participation in an innovation project*

All the ten students agreed that it was important to know something about educational technology when they entered schools as teachers. Still they had many objections to the way the innovative ICT-supported project was initiated and conducted. It was impossible for them to understand why they had to collaborate online when they met every day. What they experienced was that I, as a teacher educator, did not tell them *why*. There were a lot of different online activities going on at the same time, and they saw no connection to teaching in schools. It was provocative for them to experience that the teacher educators spoke about autonomy for the pupils and the importance of listening to them. When what they experienced as student teachers was that they were not listened to at all. They were just told what to do.

#### *If and eventually how the technology had been a support to them*

The interviews took place at the end of teacher education when the students were able to look back and reflect on their experiences as a whole. I was curious to understand if the educational technology had been a support to them at all or if it was just an extra burden. The analysis showed that some of the students saw that ICT had been a support for their productive learning process. The activities they mention were the compiling of portfolios with feedback from peers, and asynchronous discussions. The reason being that these activities opened for collaboration and deeper reflection in different ways than face-to-face

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collaboration offered, for different reasons. Firstly because they got more time to reflect and think before they responded. Secondly, the transparent abilities of the technology, and the distance, made it possible to “form” the other students, and therefore to understand them better. Thirdly they found it easier for everybody to participate, compared with a face-to-face discussion where a few tend to often dominate. A fourth aspect is that the assignments for the asynchronous discussions given by the teacher should be open without any fixed answers. Finally, the students experience at the end of teacher education before their final exam that the closed space within the LMS which contained the texts they had written together had grown to what one of them called a “property chest”.

#### **6.4.8 Analysis step 4: What did I learn?**

Through my own reflections combined with the information I gained through the interviews with the students, I learned things that I will incorporate the next time I am going to design a course for a community of student teachers on campus. I had, had my belief confirmed that activities in small groups like seminar- and basic groups were suitable for enhancing reflective dialogues concerning practicum and theoretical perspectives. I had also confirmed that it was important to start with an Introduction week where the students were able to get to know each other and develop confidence. What I understood that I had to improve next time was to spend time on sharing the aims of the activities with the students. By this I mean the learning activities we do every day as well as the aims of the whole programme for teacher education. The students did not understand the purpose of all the ICT-supported activities. What I can see when I look back is that when I joined an innovation project that was initiated and had run for a year and a half before I entered, I too was also uncertain of the aims. Certainly the students recognized my uncertainty. Another important aspect is that combined with sharing the aims of the activities, I would need to be aware that the students should share my responsibility for the activities. On one hand I had the full responsibility because I initiated the activities without involving the students. On the other the students missed my participation in the asynchronous discussions. They wanted the teacher to be present. The last aspect I will bring further is the performance of the assignments. The students preferred open questions for these discussions. For me this means assignments that can open for *productive interactions* because they can drive a dialogue.

### 6.4.9 Research position and validity

Since the main method of data collection in this research was through semi-structured interviews I want to pay special attention to the fact that the informants were students at the same institution as I was a teacher. My position in this study was to be a teacher as well as a researcher, and my position as a teacher has influenced the development of the research questions. Entering the same research field from another position would probably have raised other questions. According to Kvale (1996) there are three possible contexts for validity issues in qualitative studies. These are: self-understanding (the interviewee), critical understanding based on common sense (the general public), and theoretical understanding (the research community).

Context of Interpretation	Communities of validation
Self-understanding	The interviewee
Critical common-sense understanding	The general public
Theoretical understanding	The research community

Table 12: Context for validity issues in qualitative studies (Kvale, 1996)

All the three validation communities are used in the article. The informants' positions have been discussed. The draft of paper 3 is read by one of the students who has acknowledged the content of it. The second step in the internal validation community deals with the general public. Study 3 is described in an article in a journal meant for teachers (Helleve, 2004). Concerning study 3 the data-collection has been discussed with colleagues throughout the three studies. The draft of the paper has been discussed by fellow researchers. Study 3 has been presented at two international peer-review conferences (Helleve, 2007b, Helleve, 2007c).



## **7. General discussion of the thesis**

### **7.1 Ethics, validity and reliability**

The main purpose for all kinds of research should be to produce ethically valid and reliable knowledge. Being able to trust the researcher's results is essential. Undertaking research within education means to intervene in other people's lives, something which underlines the claim to ethics and reliable research. Educational contexts are complex, complicated and value-laden. Conducting research and setting up reliable criteria in a learning community is very different from testing hypothesis in isolated, experimental studies. Qualitative research is based on different philosophical assumptions than quantitative (Hatch, 2002). Consequently it should be based on different criteria for validity and reliability (Merriam, 1998). In this section, I will discuss the questions concerning ethics, validity and reliability that are connected to my thesis.

#### **7.1.1 Ethical formalities**

Concerning study 1, the formal contact was conducted through the principal of the school. Actually, she was enthusiastic to my project and willing to help me with contacting the parents. The teacher also reacted positively to having a researcher in the classroom. Since the students were younger than 18 years old, I needed to have the parents' permission before I could enter the classroom. They were contacted through a letter (Appendix). All of them allowed me to be a part of their child's learning environment. On behalf of this, NDS gave their permission for the research (Appendix).

In study 2 and 3, the participants were older than 18 years old. In both studies the students were interviewed after the education programme was finished. They all consented to the fact that I might use the information I received from them as part of my thesis. In article 2, parts of written texts were published and I got the participants' consensus for that as well. I also contacted the NDS and gave a description of my thesis. Permission was given (Appendix). I also have an agreement with the students saying that I am free to use all their written texts in my studies. In all three studies I am the only one who has listened to the tape recordings.

There are no name lists connected to the recordings, and in all three studies I have made anonymous all quotations from the participants and translated the quotations into English.

### 7.1.2 Ethical considerations

According to Brinkmann & Kvale (2005) there is an implicit idea of qualitative research as ethically good in itself, or at least ethically superior to quantitative research. In qualitative research the art of the human relationship is decisive for the outcome of study. This means that the ethical conduct of the researcher is perhaps the most important question at stake when ethical standards of a qualitative study should be judged. Referring to Aristoteles' concept *phronetic skills* Brinkmann & Kvale claim that a skilled researcher understands the specific features of the context and is able to see what kind of ethical issues this context generates. The task of ethics is not to provide an abstract theory of the good, but rather to make us good. It is about learning to see and judge rather than to make something universal or to calculate (Brinkmann & Kvale, 2005). Consequently, a main ethical concern in qualitative studies is the researcher- participant relationship (Merriam, 1998).

Conversations and interviews as part of qualitative research are often referred to as dialogue. Kvale (2005, 2006) argues that within education, dialogue is looked upon as a humanistic and progressive alternative. The concept *dialogue* gives an illusion of this kind of method as supporting conversations carried out in close and caring relations. Based on three arguments, Kvale warns against dangerous manipulation in an interview situation. First of all the researcher is the dominant partner. He or she decides all the rules concerning the interview situation. The fact that the researcher has the privilege of raising the questions makes an interview a one-way dialogue rather than a conversation between equal partners. Further Kvale argues for the interview as an instrument for the researcher. The conversation is a means in itself. Whatever the agenda of the researcher might be; the interview situation opens for the possibility of manipulation. The closed space with only two people present characterized by an asymmetrical power relation might enhance manipulation in order to get the "right" answers. The last argument given by Kvale is that the researcher also has the monopoly of interpretation. Based on the strong arguments raised in this article, I find it relevant to discuss two ethical dilemmas concerning interviews from my own research. In the first study I interviewed children. In the second and third study the informants were student teachers who knew me as a teacher educator.

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Concerning the first dilemma a common assumption is that conducting research on children is something significantly different from conducting research amongst adults. Approaching children as informants should be done in a special manner. This assumption is partly based on the fact that the relationship between the researcher and the interviewee is even more asymmetric than with grown-ups, and partly concerning the age-specific personal qualities of the child. The answer to this might be that of course we should be aware of age differences. However, knowledge of such differences should not influence our ways of approaching children in research (Solberg, 1996). Solberg has completed different studies among children herself. Her advice is to meet children in the same way we do grown-up informants; with an open approach. In my study the focus of the interviews was the experiences stemming from my observations of what the students were doing. We therefore had a common experience to reflect upon. My experience was that the children acted the same way as grown-up interviewees. I made it a habit to ask every pupil after the interview about their reflections on the situation. All of them seemed to be eager to be interviewed and listened to.

The second dilemma is connected to the student-teacher relationship in study 2 and 3. The student teachers were students at the same teacher education institution where I worked as a teacher educator. This meant that in the interview situation they met one of their teachers and they were asked questions about our common educational purpose. As Kvale mentions it is easy for the teacher in ordinary education, or for researchers in the interview situation, to forget the difference in power, and this is something which is often experienced quite differently by interviewer and interviewees. Even though the theme of my research questions concerned students' experiences with ICT and is not directly connected to their personal inner life it is important to be aware of the close personal interaction I had to the students. According to (Skjervheim, 2003) there are different ways of participating in a conversation. To take the other person seriously means to be willing to take a closer look at his opinions. Looking at the other person like an object is a way of taking control. Skjervheim makes a distinction between participation and engagement, as opposed to declaration and objectivation. Participation implies engagement and influence. Without engagement there is a danger of becoming a stranger even to ourselves. Engagement is a basic structure in human life. Throughout the three studies Skjervheim's warnings against objectivation have been my guidance.

I think both my experiences, and the arguments from Brinkmann and Kvale (2006) show how vulnerable and open for conscious or unconscious manipulation a qualitative research process actually is. This fact might support arguments for not depending on one single method, but on the contrary to be open to using different methods in order to answer a research question. Inter-subjectivity includes empathy, the power of understanding and the ability to imagine another person's feelings. This is essential for participation in social life and the understanding of it (Ziman, 2000).

### **7.1.3 Dealing with validity and reliability**

In action research the aim is to improve practice. Within the field of action research validation is not the summative point in a programme that has led to closure, but a formative engagement in an experience which contains the emergent property for the realisation of new potentialities (McNiff, 2002). Validation is to do with people agreeing that what you say is agreeable. For people who believe in objective reality it might be impossible to understand how to validate action research. According to McNiff the validation process has to be a systematic investigation, a report of how to improve practice and produce evidence for critical scrutiny by others to show how practice can be improved. Through the step-wise analysis in the chapter concerning methodology I have tried to share my own learning process with the readers in a systematic way.

A distinction is often made between internal and external validity. The internal validity of a research project deals with how the findings match reality. External validity is concerned with the extent to which the findings can be applied to other situations (Merriam, 1998). I will first discuss the relevance of internal and then external validity in this thesis.

The internal validity asks if the research is measuring what it is supposed to measure, and if the findings capture what is really there. In qualitative case-studies, human beings are the primary instruments for data collection and analysis. It is important to understand the phenomenon under study as perceived by those involved. It is also important to uncover the complexity of human behaviour, and try to present a holistic interpretation of what is going on. One advantage of this kind of research is that the researcher is close to the participants, and has the possibility of checking immediately any kind of doubt. Interpretations are assessed immediately through the researcher's observations and interviews. A central issue concerning internal validity is if the construction of reality corresponds with the participants' own experiences. In ethnographic studies the researcher usually stays in the field for a long

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time. The observations are conducted in the natural setting through continuous reflections. Conversations and interviews can be directly related to situations experienced by interviewee as well as by the researcher. Finally, the researcher is constantly reflecting on his or her own position. Merriam (1998) enumerates different strategies for enhancing internal validity in ethnographic studies. I will discuss the internal validity of case-studies in my thesis, concerning *triangulation*, *member check*, *long-term observations*, *peer examination*, and *research biases*.

*Triangulation* is defined as using multiple investigators, multiple sources of data, or multiple methods to confirm the emerging findings. Studies 1 and 2 are based on long-term observations. Both studies are based on different methodological approaches, and are conducted by means of different methodological tools. According to Mathison (1988) triangulation as a strategy provides evidence for the researcher to make sense of some social phenomenon, not the triangulation strategy in itself. The value of triangulation lies in providing evidence so that the researcher can construct good explanations of the social phenomena from which they arise. *Member check* means to bring data and tentative interpretations back to the respondents to see if their experience corresponds with the researcher's interpretations. The *long-term observations*, made it possible for me to communicate regularly with the informants. When I was conducting study 1 I had regular meetings with the teacher where I discussed my impressions with her. She also read the interview after it was transcribed. Staying in the classroom for a long period made it possible for me to talk to the pupils and ask them directly about anything I was uncertain about. Studies 2 and 3 were also conducted over an extended period. This made it possible for me to speak to the students and discuss my immediate interpretations. One of the students read the proposal for the article before it was submitted, and throughout the three studies I have discussed my findings with colleagues within my own research community. The final criteria mentioned by Merriam (1998) is openness and clarification concerning theoretical orientation at the outset of the study. This was done before I entered the field and made my first research questions.

External validity is concerned with questioning if the findings can be applied to other situations than the current study. Is it possible to draw conclusions that are valid for cases other than the one described? Normally, this is not a question that occupies qualitative researchers because they select a case that they want to investigate in depth, not in order to find out what is generally true for many people. Still there are at least two possibilities for

further investigation of case studies. One is to do a quantitative follow-up research. The other is to do further case studies of the same phenomenon. “Case-to-case transfer occurs when a person in one setting considers adopting a program or an idea from another one” (Firestone, 1993, p. 17). This is what I experienced with studies 1 and 2. The fact that I should find a connection between my two first case-studies was unintended. What happened was that I discovered that the same patterns developed in the second study as I had seen in the first one. When I focused on the phenomenon, I found that the categories I had developed in the first case-study were transferable to the second study. This again made me curious to investigate some of the same aspects in study three. Case-to-case transfer requires an in-depth description where a broad range of background features must be described (Firestone, 1993). According to Merriam (1998) *multi-site designs* might be a way of enhancing the possibilities for generalization in qualitative research. The point is to use several sites and situations to focus the phenomenon, especially those that maximize the diversity of the phenomenon that “will allow the results to be applied by readers to a greater range of other situations” (Merriam, 1998, p. 212).

The objective of a reliability-test is that a later investigator, following exactly the same procedures as described by an earlier investigator, and conducted the same way, should arrive at the same conclusions (Yin, 1994). The question of reliability is difficult in all kinds of sciences. It relies on a belief in repetition as the establishment for truth, claiming that if repeated observations show the same result, it is more valid. My studies are conducted in educational contexts. The research is based on situated knowledge. Data is a product of the information given to me by the respondents, and the way that I interpreted the context and the information. My position was to be an innovative teacher as well as a researcher. The fact that the study is situated means that it would be impossible for anybody else to conduct the same research. According to Lincoln & Guba (1985), a replication cannot give the same result. The question is meaningless. Instead of demanding that an outsider should gain the same results they argue for what they call dependability, or consistency, the right question to ask is whether the results are consistent with the data collected. This is best done through the researcher’s reflections upon his or her position, triangulation, and a detailed description of how data was collected, categories were developed and decisions were made throughout the inquiry (Merriam, 1998).

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### 7.1.4 My position – researcher and teacher

The thesis is built on my own background, as well as my personal and scientific interests. I will first describe this background before I take a closer look at the pitfalls that interpreting these interests might uncover. First of all I have a profession as a teacher. I have worked for many years as both a teacher and a principle in various schools before I started my career as a teacher educator. This means that I have personal experience with the challenges teachers face when designing education programmes for students. My current profession as a teacher educator means that I am personally engaged both in how to improve teaching in schools, as well as in teacher education. ICT as a pedagogical tool is a relatively new challenge for teachers and teacher educators. My interest in investigating communities of learners supported by ICT is therefore based in my professional background and engagement. According to Ziman (2000), people who commit themselves to science often have a strong interest in emancipation. Not as an alternative epistemology, but as a way of producing knowledge to which people can turn with confidence when dealing with the problems of everyday life (Ziman 2000). No doubt, the interest in teaching has been a driving force in my research. A main focus has been to understand what consequences the students' experiences have for me as a teacher, as well as for other teachers when structuring learning communities supported by ICT. There might be different challenges connected to undertaking research within well-known contexts (Hammersley & Atkinson, 1996). One problem is that you find what you are searching for. To use yourself and your own professional knowledge is a strength, but it is not without problems (Hoel, 1994). As it can be based on prejudice, it might be difficult to understand and notice things that are obvious for outsiders.

Throughout the three studies I have had a combined position as teacher and researcher. In the first study I came from an outside position as a researcher. In the second study my initial position was to be a teacher; a position that gradually evolved to become a combination of teacher and researcher, and in the third study my position was also a combination. Although this time I was appointed to both positions from the onset. According to Flick (2006), researchers' reflections on their actions and observations in the field become data in their own right, forming part of the interpretation. The empirical starting point is the subjective meaning the individuals attribute to their activities and environments. Meaning arises from the social interaction with fellows. Meanings are handled in, and modified through an interpretive process used by the person in dealing with what he encounters. The reconstruction of such subjective viewpoints becomes the instrument for analyzing social

worlds. Researchers have to see the world from the position of the subjects they study (Flick 2006). Through the chapter concerning methodological approach I have discussed my own position and the way I think I may have influenced the research.

Based on McNiff's (2002) definition I define this study as an action research within the category she calls *living theory approach*. Entering the field from an inside position has generated different kinds of data than an outsider would have gained. When students are collaborating face-to-face in discussion-groups, or colloquium, trying to respond to assignments the teacher normally has no admittance. For teachers and teacher educators the educational technology has opened up a new possibility for understanding how students collaborate. Admittance to the communication within the closed space in the LMS gave me an insight as a teacher and researcher that I could not otherwise have gained.

According to the theory of a community of learners the teacher as well as the student is a learner. Learning is a constantly moving target. The educator is responsible for designing and guiding the learning process. This means not just to guide the students through their learning process, but also to learn more about how to design these new communities of learners. Teaching is a goal-directed activity of designing guidance. According to Matusov (2001) the notion of "teaching design" also involves a teacher's orientation towards his or her actions in order to learn for future designs of new communities. Mistakes are inevitable in learning. Learning from mistakes makes the theory of communities of learners a constantly moving target. Consequently, reflection is supposed to be a key element in teacher education and in teachers' professional development. Based on this way of understanding learning, teachers and teacher educators should constantly undertake research on their own practice. The ability to reflect is said to be of essential importance for teachers if they are to learn from their experiences (Schön, 1987; Calderhead, 1989; LaBosky, 1994; Korthagen, 2001; Korthagen & Vasalos, 2005; Loughran, 2006). Critique has been raised against the occasional use of the concept reflection, asking for a distinction between thinking and reflecting. In a socio-cultural approach to learning reflection is embedded in social activities. The mode of reflection, that is, the direction it takes emerges in action depending on the purpose of the activity (Vygotsky, 1986). Personal reflection means to attribute meanings to your own actions during the search process. Reflection in a personal sense means to take a grip of personal development (Wardekker, 1998). My learning process as a researcher has been reported in the thesis. My action has been to design and guide pupils and students in learning communities supported by ICT. According to Somekh (2008) teachers'



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beliefs and attitudes and their confidence and competence with ICT remains centrally important in the pedagogical adaptation of educational technology. I think all kinds of innovation in education should involve teachers using action research.

## 7.2 Discussion of findings

The main aim of the thesis is to investigate what characterises productive interactions in ICT supported learning communities. Through this investigation I wanted to focus on the students' experiences. The aim through the three studies has been to look at the implications of the students' experiences for designing new communities of learners supported by ICT. The research has been a learning process based on a combination of empirical studies highlighted by theoretical insights. The research has been my own learning process not just as a researcher, but also as a teacher. The theory of a community of learners is used as an analytical tool throughout the three studies. This perspective where students and teachers are learners with different kinds of responsibility is fundamental for the analysis of this thesis, and for my way of understanding teaching and learning. Through the analysis process I came across Matusov's (2001) three definitions as *inter-subjectivity* as a reflective tool for analysis of pedagogical designs and processes going on in *communities of learners*. I discovered that these three notions of inter-subjectivity as *having something in common*, as a *space for respectful disagreement* and as *human agency* correspond to the way I was analysing my material. The relation between these concepts and my findings will be discussed later in this chapter.

I will first discuss the computer as a tool for collaborative learning based on the findings in the three communities. Throughout the studies I have developed new typologies concerning collaborative learning and the connection between the teacher's way of designing for learning activities and the students' development of learning strategies. The development of these concepts is discussed in a separate paragraph.

### 7.2.1 Productive interactions

The main research question of this thesis is: What characterises productive interactions in ICT-supported learning communities? I have earlier claimed that when learning is understood as meaning created in the tension between different voices, learning is not only accomplished through interaction; it consists of these interactions. Thus the term *productive*

embraces the process as well as the product of learning (Lillejord & Dysthe, 2008). So what does the term *productive interactions* mean in my thesis? The common background for all the three case studies was that students were supposed to collaborate on text-writing. In study 1 through composing collaborative texts and in studies 2 and 3 through composing portfolios, giving feedback to each other and online discussions. The underlying expectations were that through collaboration the students should learn to argue and reflect. Both studies 1 and 2 show that whether the interactions are going to be productive or not, is partially dependant on the way that the assignments are performed. Productive interactions in study 1 are visualised through the *creative story* that enhance *explorative talk*. These assignments encourage the students into a dialogue characterised through disagreement, argumentation and imagination. They are sharing understanding through a co-construction of knowledge. The students are also interacting when they are composing the *experience stories*. Still the interaction expressed through *cumulative talk* is limited because the students are only asked to collect information about what they have done. They are simply sharing the information about their common experience. There is no challenge or encouragement to argumentation and creativity. *Cumulative* as well as *explorative* talk are characterised by interaction. However, cumulative talk is limited because the students have to repeat and reproduce information. Explorative talk, on the other hand, enhance *productive interactions*; the possibility for argumentation and creativity. Another question is what characterises the opposite situation when there is no interaction between the members? When the communication between the members broke down as described through the *discussional talk*, I chose to call this *counteraction*. In study 2 the students gave feedback to each other on texts written for their portfolio. Of fundamental importance to the “magic group” success is their *interaction*. However, the difference in the way the assignments are constructed decides if the students are going to collect common information or if they are challenged to engage in productive interactions. When the students are challenged on their values and attitudes as professional teachers they meet in the inter-subjective space that Rommetveit (1979) calls a *temporarily shared social world*. What makes the interaction productive is that they are challenged to a reflective dialogue with people they trust, but with whom they still disagree. Sara in study 2 said that she thought of the other members’ different opinions as guests. And then she thought: “What do the guests want from me? Will they be staying in my head for ever or will they disappear”? And from that point of view she gave feedback to the other members’ texts, like guests. Study 3 is only based on interviews with the student

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teachers, not on observations of the collaborative activities. What the students claim is that the productive learning or productive interactions that are important for them as future teachers are asynchronous discussion and feedback from peers. One student says:

“It is another process. You get more time for reflection when you participate in the asynchronous discussions. It is something else to write. You have to think more.” (9).

The concept *reflective dialogue* expressed through *explorative talk* and *explorative feedback* is used as an equivalent to what I have described as *productive interaction*. Thus the performance of the assignments is one element that characterizes productive interactions. In the following paragraphs I will give an account for other distinctive elements that seem to be important; the way the educational technology is used, the initial meeting between students and teacher, and the further expectations of the teacher.

### 7.2.2 Educational technology as a space for reflective dialogues

Educational technology as part of a learning community changes nothing in itself. In fact the opposite can be true, the technology has qualities that can re-vitalise the most rigid learning activities from pedagogy of the past. Larsen (1998) is concerned with the same problem. He argues that if educational technology is adjusted to the traditional way of teaching or what he calls to “put electric power” on traditional methods this is going to conserve old ways of teaching and stop necessary pedagogical development. Common for all the three communities constituting this thesis is that educational technology is used as a tool for collaborative writing. The qualities that educational technology possesses makes this new way of collaboration possible. One of the hallmarks of a community of learners is that it promotes different learning activities with emphasis on collaboration. Students should be encouraged to share ideas, knowledge, experience and interdependent learning. Collaborative activities where students are working on different parts of a common exercise should be promoted (Boud, 2001; Keppel *et al.*, 2006).

Experiences from the three different communities show how the computer can be used as a tool for collaborative writing activities for students of different age groups; for students who meet every day as well as students who are distance learners. The fact that the groups and the activities in this study are so different makes the findings more general (Wegerif, 2007). The study shows that educational technology offers a new kind of room or an inter-subjective space for collaboration. The space might be compared to what (Engeström, 1998)

calls a *zone of possibilities* that can help learners to renew existing knowledge and where both the individual's personal zone and the group's common zone develop according to the process of interaction (Wasser & Bresler, 1996; Hoel 2001). The fact that the texts become a common and not an individual property is discussed by Wegerif (2007). Referring to societies where oral, rather than written communication has been the norm, he claims that these cultures possess a kind of common wisdom that is absent in cultures where individual writing is more common. Educational technology by its nature offers a common space for sharing texts that makes common reflection possible. The computer has the ability of storing collaborative texts, in what one of the informants in study 3 called a "treasure chest". Another fact is that these collaborative texts might be there for ever. As a consequence there is then the possibility for the continuously re-working of these texts. Independent of time students and teachers can visit these texts and respond to them. Again this illustrates how, in on-line collaboration, students have more time for reflection before they respond to other students' utterances than in oral collaboration. Accordingly the notion time and space differ from face to face meetings. Wegerif claims that on-line discussions and collaborative activities might be more egalitarian than face-to-face collaboration. The same fact is stated by students in study 3 who claim that it is easier to respond to other students' utterances in a virtual discussion.

What the study also shows is that confidence is fundamental for collaborative writing activities supported by educational technology. Whether the students are placed in front of a stand-alone computer in a class-room, or are collaborating through their computer at home, trust and faith in peers seems to be essential. This finding corresponds to other researchers results (Hoel, 2003; Sjøhelle, 2007; Wegerif, 2007). The study shows that willingness to be honest and open up, which again is a precondition for productive interactions, should be based in confidence. Other research shows that on-line collaboration often is characterized by anxiety, mainly because online collaborators lack the possibility of "reading" body-language (Burbules & Callister, 2000). Consequently the willingness to share and invest their inner thoughts is more limited than in face-to-face collaboration. An important precondition for on-line collaboration seems to be that the space within the LMS is closed for everyone other than the included members and the teacher. The most important issue for students in this study seems to be to get know each other and to have established a sense of common faith and obligation that makes collaborative text-writing worth-while. The fact that the collaborative activities should be limited to the selected group seems to be a common

feature throughout the studies. The way the educational technology is used as a collaborative artefact in study 1 ensures that no-one other than the teacher and the students are participating. Students' experiences in studies 2 and 3, show that an important pre-requisite for the willingness to participate in productive dialogues and argumentations, is that the collaborative activities are taking place within a limited space within the LMS. Students and the teacher, who share the basic notions of inter-subjectivity, should be the only participants. Research shows that in many situations students want to avoid difficulties and conflicts and choose not to be involved in dialogues (Taylor, 1991; Burbules & Callister, 2000; Andriessen *et al.*, 2003; Koschmann, 2004).

This study shows that when the students start the ICT-supported collaborative activities they enter a world of their own. In study 1 I used the metaphor "a helmet made of glass" to illustrate that the students went into a world of their own. The teacher in study 1 says in the interview: "When the students are collaborating by means of the computer, my job is done". For her this meant that her main way of influencing them was through her design of the teaching programme, and through the learning activities prior to the ICT supported collaborative writing. The most important finding from the SLANT-project also revealed that the communication taking place in front of the computer-screen was the result of a long process consisting of teachers' designing the programme, then communicating and sharing plans and ideas with the students (Wegerif & Mercer, 1997; Wegerif, 2007). In traditional face-to-face education in a classroom the teacher has the possibility of intervening and stopping the activities. When students are collaborating by means of educational technology their orientation is towards the computer-screen either they are in the same class-room or they are at home with their own computer.

Summing up, this study shows that educational technology is suited for collaborative text-writing; composing texts, giving feedback to other students' texts, as well as discussions. Due to its interactive abilities the computer offers an arena for collaborative reflection. The texts become independent of time and space because they are always available, something which might make it easier for students to contribute. Still the findings underline the importance of fundamental confidence and responsibility between students in ICT supported collaboration. Finally the study shows that designing for communities of learners supported by ICT, raises challenges for teachers that are common across all areas whether these represent the stand-alone computers in the classroom, or on-line collaboration as well as

across different age groups. In the following paragraph, I will discuss the importance of a good start for members within a learning community supported by ICT.

### 7.2.3 Creating a community of learners

In all the three studies the students had the opportunity to meet face-to-face before they were expected to collaborate by means of the computer. This meeting seems to function as a melting-pot where they got to know each other and gained confidence. When the three different studies are compared some general findings concerning the teachers' design of communities of learners supported by ICT seem to emerge. The findings show themselves in different ways throughout the three studies. However, there are some general principles. Before the teacher meets the students he or she has normally made a plan or a design for the activities. The crucial moment for creating a learning community is what I have called the *initial meeting*. The teacher may either take the full responsibility for the activities or abdicate. The alternative is to create a learning community with shared responsibility between students and teacher. If the students are to learn through respectful disagreement and common creativity the collaborative writing seems to be depending on a chain of activities. The preconditions are grounded on a stepwise development. When designing the teacher should be aware of the fact that the establishment of the community is fundamental for how the learning process is going to turn out. I have decided to call this the *initial meeting*. The initial meeting might be the start of the "writing-day" as in study 1, or the initial meeting for student teachers as in study 2. In study 3 the students also stressed the importance of confidence: "...you have to know each other because you cannot read body language when you are online" (7). Two main concerns seem to be important in the initial part of group establishment. The first is to establish confidence between the members of the society. The second is to share a concern for development of common activities and aims. These basic concerns are rooted in the initial meeting and appear to influence the collaborative activities the students are participating in later.

During these meetings the students across the studies had to show some of their personal attitudes. They were either playing together or they were talking about their experiences from their leisure time or family life. What happened during these first meetings was that students and teachers had to open up and learn to know each other as human beings. The foundation for the development of common agency (Matusov, 2001) seems to lie in the initial meeting. Students and teacher come to share a personal concern for each other.

According to the experiences of the students in this study, basic trust and confidence seem to be decisive for the further collaboration. The concepts *interaction* and *counteraction* are used to illustrate the difference concerning human relations. This moment is crucial for faith and confidence and the establishment of inter-subjectivity (Rommetveit, 1985, 2008).

The second concern is the development of common aims and for sharing responsibility for the learning activities or the subject. In study 3 the students missed having the opportunity of sharing the aims and responsibility for the ICT supported activities. One student says:

“What I reacted to most was that we heard a lot from the teacher educators about pupil’s autonomy and pupils’ interests and how important it was to speak to them, take them seriously and listen to them. But as students we experienced quite the opposite. So I felt no kind of motivation” (2).

The teacher left the students without telling them why they had to do all the different ICT supported activities. They were left on their own. In study 1 and 2 the initial meeting is used as a meeting arena where the students and the teacher are sharing goals. This does not mean that the teacher meets without any plans for the activities. What it means is that the teacher through the design has made a plan. Through the initial meeting, the teacher shares his or her plans with the students permitting the students access and potential ownership to the aims. They get a shared focus for the activities (Matusov, 2001). The students in study 3 missed having the opportunity to share the aims of the activity, and this turned out to be an significant problem for many of them. They simply did not understand why they had to do all the ICT-supported activities.

According to the findings in this thesis the initial meeting between teacher and students is decisive for the development of the further collaborative process. The term initial is here understood as the moment when the teacher initiates the activities for the group. This might be every day or over a longer period of time. The initial meeting is critical for establishing a common basis or platform for further collaboration. The initial meeting has a double purpose for the studies in this thesis. It serves as a foundation for development of common human agency as well as a basis for development of common aims for the learning activities. The shared responsibility and mutual obligation seems to be important. Tom in study 2 says:

“Knowing that the other members spent a lot of time on my text I just had to do the same. Otherwise I would never have done it”.

The concepts of analysis I found relevant for my thesis were based on three different notions of inter-subjectivity; as having in common, as an arena for respectful disagreement and as human agency (Matusov 2001). Through the process of analysis, I found the notions of inter-subjectivity as *having in common* and as *human agency* to be relevant for

understanding the importance of the activities in an educational context understood as a community of learners in all three studies.

The third analytical concept is *respectful disagreement* as a reflective tool for understanding a community of learners. Referring to Bakhtin (1981) I have earlier argued that there seems to be an agreement underpinning the fact that different perspectives drive dialogues (Mercer, 1995; Engle & Conant, 2002; Hattie & Timperley, 2007). Based on an article of Lillejord & Dysthe (2008) I also raised the question on whether a conflict or a dispute is productive or unproductive. A common finding for all the three studies is that it seems to be important to have a confident basis for collaboration. Otherwise *counteraction* and no collaboration is the result. If this sense of trust is present the students seem to develop productive interactions from disagreement as well as agreement. In study 2 the students explicitly claim that they appreciate difference and different opinions. In study 1 they might well disagree, but what seems to be just as important is the possibility of using creativity and imagination. In study 3 I have no data that can inform me of their thoughts on disagreement. My conclusion to these questions is that students in my study develop *productive interactions* from arguing with peers they disagree with but still have confidence to engage with in these discussions. Still creativity and imagination is also important when students are challenged beyond the limits of what they could possibly have managed on their own. Another important finding in my thesis is that the assignments the students are going to answer or the tasks they are going to solve are performed in a way that enhance the possibility for creativity and different opinions. In study 3 the students asked for assignments without any correct answers. They had discovered the productivity of being creative together.

#### **7.2.4 The teacher should be present**

Another assumption that seems to be characteristic for *productive interactions* is the position of the teacher. Designing and conducting group-activities has always been a challenge for teachers. When should she leave the students to work on their own, and when should she intervene or just be available? The challenge of designing for collaborative activities supported by ICT is no less complicated. According to Webb & Cox (2004) teachers in ICT supported education should be able to plan activities that enable students to exercise control over their learning and to provide appropriate support or scaffolding when students need it. When the students are collaborating in these three case studies, it is the result of a long



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process. Still in the design of the programme the teacher should be aware and conscious of how the performance of the assignments should facilitate or block the aim of the teaching and learning programme. If the aim is to support creativity and argumentation then this has to be built into the activities and the expected outcome in terms of the way the assignments are performed as in the *creative story* and the *creative assignment*. This is important in all kinds of group activities, but still more in ICT supported activities where students are left alone with the computer.

Throughout the three studies, findings show that the students want the teacher to be an active part of the collaborative process. In the first study, the students clearly stated that they wanted the teacher to read and comment their texts and to be available when they needed her. In the second study the students express that they want the teacher to read their texts, to make comments and to be there. The teacher should be the only person outside the group with admittance to the closed space within the LMS. Study three shows that the students missed the teacher who was absent.

“I missed the teacher who could conduct the process. We were fumbling. We thought maybe we had misunderstood the articles, and when we gave feedback it was perhaps not so fruitful as it might have been (9).

They missed the teacher’s participation. The students claim that even though the teacher has another position when students are collaborating online, he or she should still be watching the learning activity and the process going on, and be a “visible” participant in the groups. The theory of a community of learners is based on the fact that the teacher should have a double responsibility. As well as carrying responsibility for the design, the teacher should be oriented towards the students’ activities (Matusov & Rogoff, 1995; Rogoff & Gardener, 1999). This means that the teacher should not take control of all the activities taking place. Nor should the teacher abdicate and leave the responsibility to the pupils alone. In a community of learners teacher and students have a shared responsibility for learning. The findings in this study confirm the theory.

### **7.2.5 Generating concepts and typologies**

In this section I want to discuss the main categories developed through this thesis. I will show how they emerged and developed through the first study and how concepts in study 2 generated from the first study. An important approach to analysing qualitative empirical data is to find concepts to explain what is going on in the different situations. The aim is not merely to explain what is going on, but to do this in an analytical way that can give new

perspectives to the phenomenon that is studied or to highlight and give knowledge to other related phenomenon (Hammersley & Atkinson 1996).

The terms *discussional*, *cumulative* and *exploratory talk* are described in the SLANT-project (Mercer & Wegerif, 1997; Wegerif, 2007). Exploratory talk is looked upon as an ideal and a way of enhancing higher order thinking based on reasoning. Higher order thinking here understood as a tool for mediating knowledge through argumentation based on Vygotsky's notion of mediation from inter- to intra personal level (Vygotsky, 1978). The aim of the project was to investigate how cognition is represented in language and to make a survey of the most important influencing factors when children of different age groups collaboratively are solving problems by means of computer-based software. The term *exploratory talk* was used to inform the students of an ideal way of communicating when they were supposed to solve computer supported problems through collaboration. The assignments were initiated through different kinds of software and computer games (Wegerif & Schrimshaw 1997; Wegerif, 2007).

Findings from the SLANT-project show that *exploratory talk* was well suited for enhancing higher order thinking. It also shows that the total design of the educational activities including the information the students received about how to behave in exploratory talk was important. As one of the researchers from the SLANT-project, Wegerif revisits the project in 2007 with a new set of glasses. His acknowledgement is that the notion of knowledge that was the basis for the project was limited. Based on Bakhtin's notion that meaning is created through interaction and confrontation between different voices he argues that instead of looking at the dialogue as an end in itself it should be viewed as an ongoing dialogue. Re-reading the findings in the SLANT-project tells him that the students also expressed notions of creativity and care, but this was not what the researchers were looking for then. This data was overlooked and not used in the final analysis of the data. Based on these reflections Wegerif wants to change the term *exploratory talk* into *reflective dialogue* (Wegerif, 2007).

When I analysed the data from my first study I was influenced and inspired by the SLANT-project, and I found the three concepts meaningful for the analysis of my own data. Still there are some fundamental differences between my study and the SLANT-project. SLANT was a large, quantitative research with an experimental design and comparative analysis. The students were informed and trained in how to communicate in front of the computer. In my study the collaborative activities are based on texts made by the students

themselves. I listened to the pupils' conversations when they were composing texts and used the three concepts to classify the different ways of communicating. The presupposition for *explorative talk* is that the students should be creative, reflect and argue. In my thesis the concepts *productive dialogues* and *productive interactions* are used as equivalents to *explorative talk* and *feedback*. The assignments are made by the teacher and closely connected to the activities taking place within the community. This means that the findings from my studies clarify the teacher's position in the community in quite a different way than the SLANT-project. In my interpretation *cumulative* and *explorative talk* is implicit in the performance of the assignments through the educational design made by the teacher. This is also the case in study 2 where the concepts are called *cumulative* and *explorative feedback*.

The question of how the assignments should be performed will differ according to subject and age group. The point is that the assignments should open for *productive interactions* in a way that challenge the students beyond their own imitations. How the assignments should be performed in order to achieve this, is what the teacher must take into consideration when he or she is designing for a new community of learners. The report from the Research Council (2003) asked for more research concerning what they called *productive interactions* based on results from the SLANT project. I think this study has been a contribution to this call as I have gone into the questions of what it is that makes learning processes productive for learners.

## 8. Implications

The aim of my thesis is not to identify findings that can be generalized to a broad population. Still it is possible to discuss some of the implications. In the following chapter I will initiate some aspects that I look upon as relevant for teachers and teacher educators, for policy-makers and for future research.

### 8.1.1 Implications for teachers and teacher educators

This study shows that computer-supported technologies can be powerful pedagogical tools supporting productive learning for student teachers as well as pupils. Perhaps the most important finding of the thesis is how important the position of the teacher and teacher educator actually is in designing and guiding ICT-supported learning communities. The study combines research on primary school pupils and student teachers and contributes to insight in both fields. I agree with Wegerif (2007) when he argues that many of the same pedagogic design principles for opening, deepening and widening dialogic spaces developed in primary school still apply in virtual learning environments with adult learners (ibid. p. 241). The study underlines that educational technology is a great challenge for teachers and that it requires them to undertake more complex pedagogical reasoning than planning face-to-face education. The study addresses teachers as well as teacher educators. According to Loughran (2006) student teachers come to teacher education with the prospect of receiving a recipe for teaching. This study shows that educating teachers is much more complex than just telling the students what to do. Implication for teacher education is to give students educational experiences they can use in their own teaching practice. In addition to focusing the content it is important to have a meta-cognitive view on the way teacher education and school practice is conducted as well as on the students' own learning process if student teachers should be able to benefit from their experiences. They have to understand *why* they are doing different activities. The complexity of designing for ICT-supported learning activities underlines this need for meta-cognitive discussions between teacher educators and student teachers.

What the study also shows is that being a teacher or a teacher educator is closely connected to personal values and attitudes. This means that how teachers are supposed to use

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mediating tools like i.e. computers is difficult to predict by others. Adoption of ICT in education depends on what teachers and teacher educators believe about the importance of ICT for learning. Consequently there is a need for teachers to make explicit the underlying theories influencing their work. This study shows how action research can help teachers to visualise their own learning process and become aware of attitudes and values influencing their professional development. This again means that action research is important for teacher educators as well as teachers and can function as a bridge between schools and teacher education institutions (Smith & Sela, 2005).

### 8.1.2 Implications for policy-makers

According to Castells (2002) education is the social activity that is most challenged by the network society. Internet has challenged our notion of what counts as knowledge. There is a gap between policy-makers ambitions in the field of educational technology and teachers' lack of competence and in-depth reflection on how to use the technology. Information and communication technologies do not themselves determine innovation. They are totally dependent on human agents exploring their use. But this medium has an impact on teaching and learning that is stronger than any other artefacts, Säljö (2000) claims that the computer is the most important threat against the traditional classroom as we have known it for hundreds of years. Kompf (2005) argues that the technology's self-organising capacity may lead to control over education passing out the hands of educators into the hands of administrators. The important purpose of education is no longer to collect information, but to produce knowledge. This study shows that the educational technology offers a new kind of room or inter-subjective space for collaboration; a space for productive interactions that enhance students' abilities to argue and reflect. Through explorative assignments and explorative feedback the students are given the opportunity to learn through argumentation and imagination. What is shown through this thesis is my own learning process through the three case stories. The study shows the importance of teachers' participation through action research in innovative processes. According to Somekh (2007) the aim of policy-makers and teachers is the same. They both want to make improvements to process and outcome so that more students can reach higher level of achievement. Given this fact I think teachers as well as politicians have to take part in the debate and raise some important questions: Why do we want our children to go to school? What purposes do we want the technology to serve? What

are the implications for knowledge? Where does ICT fit into an ethical framework? What the three studies also show is the importance of a teacher who has a consciousness of *why* and *how* the educational technology should be used. I think this is decisively important if *we* are to control the technology and not the other way round.

### 8.1.3 Implications for future research

The fact that there is a discrepancy between visionary policy initiatives and change in classroom practice concerning educational technology means that there is a strong need for further research within the field of ICT and learning within Norwegian education contexts on different levels. Further research as classroom observations, observations of conversations in front of stand-alone-computers and online learning conversations is necessary.

This study shows that designing for productive interactions in ICT supported learning communities, means that teachers have to undertake more complex pedagogical reasoning than in face-to-face contexts. In my studies the teacher is designing and guiding learning communities where the aim of the activity is collaborative writing. Obviously there is a need for further research on the teacher's position in other kinds of ICT-supported learning activities and subjects. Another finding concerning the position of the teacher is that when students collaborate by means of educational technology the teacher has a more peripheral position than in ordinary classrooms. Still the students want the teacher to be present. A question for further research should be what this presence means in different situations. When should the teacher leave the students to work on their own and when should she intervene or be available?

The study also shows that as a parallel to teachers' change in teachers' position the position of the students change as well. The focus of this study is on what characterises productive interactions. The concepts *counteraction* and *discussional* talk are defined and illustrated in study 1. Other research shows that students often avoid conflicts and discussions and choose not to be involved in online dialogues (Taylor, 1991; Burbules & Callister, 2000; Andriessen *et al.*, 2003; Koschmann, 2004). Given the extensive and increasing use of online communication in education I think there is a strong need for further research in why intended collaboration often ends in *counteraction* or *discussional talk*.

## 9. Concluding comments

In the Introduction I drew attention to the importance of teachers' participation as action researchers. The focus of the thesis has been to understand more of how learning communities supported by ICT are established and develop. The aim was to answer the question: What characterises productive interactions in ICT-supported communities of learners? The thesis shows that the educational technology offers a space for productive interactions and productive learning given some suppositions. *Productive interactions* or *productive dialogues* are characterised by creativity and respectful disagreement. If the interaction turns out to be productive or not, is depending on the performance of the assignments. *Cumulative talk* and *cumulative feedback* ask the students to accumulate information. *Explorative talk* and *feedback* on the other hand has the characteristics of *productive interactions*. Basic for interaction or the inter-subjective space is a community of learners. Designing, establishing and guiding this community is the responsibility of the teacher. Basic for the development of interaction is confidence. Other important aspects seem to be that students and teacher share the aims of the activity and that they share a sense of common agency. This means that the teacher has to have a holistic view of the learning activities that are going to take place. Through the three case studies my aim was to investigate what I as a teacher and teacher educator could possibly learn from my own and the students' experiences. This learning process has utterly confirmed my belief in the teacher as a researcher.

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