

# The School from the Teacher's Perspective

Matti Lattu

## The School from the Teacher's Perspective

The Teaching Space of Eleven  
Change-Oriented Teachers

*Academic Dissertation to be publicly discussed, by due permission of the Faculty of Education in the University of Helsinki, in Auditorium XIV of the Main Building, on October 3rd, 2003, at 12 o'clock.*

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ISBN 952-10-1277-3 (paperback)

ISBN 952-10-1278-1 (PDF)

ISSN 0359-4203

Yliopistopaino

2003

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Abstract

This report describes an in-service training project, in which eleven voluntary primary school teachers co-operated intensively with a researcher for one academic year. The researcher met each teacher every second week. The most important forms of co-operation were planning, reflecting on past events, and joint teaching. The goal of the development was to support teachers in opening the learning environments. Thus, the scientific interest of the process deals with teachers' professional development.

The concept of an open learning environment is defined through child-centredness. The learning environment is understood as factors that define the context of a learner's studying and learning. The learning environment can be closed or open depending on how much control the learner has over the learning process.

The research is a teaching experiment, aiming to develop new ideas. It is typical in such research that the research questions change during the process. This research also explored the determinants of the teaching space of a primary school teacher. The teaching space is the working context of a teacher. The model is built of different components: society, school, teacher's thinking, pupils, parents, supporting networks, premises, and materials.

The data consist of teachers' interviews and researcher's notes on classroom and planning activities. The data was analysed using the grounded theory procedure.

The data analysis resulted a data-based teaching space model built of 48 concepts. The analysis continued by searching for links between these concepts. The emerging links were studied from the perspective of teaching,

teacher's work and change in thinking. The key concepts in the teaching were planning, learning material and time. The teacher's work was wrapped around the teacher's confidence and uncertainty.

The results suggest that the opening of learning environment could be best supported by actions targeted to the use of time and learning material. The use of time especially can be restructured on the level of school. One of the eleven teachers changed his/her teaching radically during the experiment. The rest of the teachers got positive experiences of the open learning experiments. According to the data, teachers shape their insight into learning process through their own experiences. Thus, it appears that the change in teachers' thinking cannot be accelerated by intensive support, which was attempted in this project.

There are several directions for further research. We should obtain more knowledge of phenomena behind the key concepts, as well as their interplay. New ways to produce desired experiences for practising teachers should be innovated and experimented with. Also, the model can be used as such in forming a shared framework for teacher development projects.

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Keywords: teaching space, school change, teacher's professional development, learning environment, child-centredness, teaching, teacher's work, grounded theory, teaching experiment

Helsingin yliopisto, Kasvatustieteellinen tiedekunta  
Opettajankoulutuslaitos  
Tutkimuksia 246

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Matti Lattu

Koulu opettajan näkökulmasta: Yhdentoista muutosorientoituneen opettajan toimintatila

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### Tiivistelmä

Tämä tutkimusraportti kuvailee täydennyskoulutusprojektin, jossa yksitoista vapaaehtoista ala-asteen luokanopettajaa tekivät intensiivistä yhteistyötä tutkijan kanssa yhden lukuvuoden ajan. Tutkija tapasi kutakin opettajaa joka toinen viikko. Tärkeimmät yhteistyön muodot olivat suunnittelu, aiempien tapahtumien reflektointi ja yhteisopetus. Projektin tavoitteena oli tukea opettajien tarjoaman oppimisympäristön avaamista. Tutkimustavoite liittyy opettajien ammatilliseen kehittymiseen.

Avoimen oppimisympäristön käsite määritellään lapsikeskeisyyden kautta. Oppimisympäristö käsitetään oppijan opiskelun ja oppimisen kontekstin tekijöiksi. Oppimisympäristö voi olla suljettu tai avoin riippuen siitä kuinka paljon oppija itse voi ohjata omaa oppimisprosessiaan.

Tutkimusta voi parhaiten kutsua opetuskokeeksi, joka pyritään kehittämään uusia ajatuksia. Tällaiselle tutkimukselle on tyypillistä tutkimusongelmien muuttuminen tutkimushankkeen aikana. Uusien ideoiden kehittämisen lisäksi tutkimus hahmottelee ala-asteen luokanopettajan toimintatilan tekijöitä. Toimintatilalla tarkoitetaan opettajan työn ympäristöä. Malli rakentuu useiden eri komponenttien varaan, joita ovat yhteiskunta, koulu, opettajan ajattelu, oppilaat, vanhemmat, muut tukitahot, tilat ja oppimateriaali.

Tutkimuksen aineisto koostuu opettajien haastattelusta ja tutkijan opetustapahtumista ja suunnittelutuokioista tekemistä muistiinpanoista. Aineiston analyysissä hyödynnettiin aineistolähtöisen analyysin (grounded theory) käytänteitä.

Aineiston analyysi tuotti 48 käsitteestä rakentuvan mallin opettajan toimintaympäristöstä. Analyysiä jatkettiin etsimällä näiden käsitteiden välisiä yhteyksiä, joita tarkasteltiin opetuksen, opettajan työn ja ajattelun muutoksen näkökulmista. Opetuksen avainkäsitteitä olivat suunnittelu, oppimateriaali ja aika. Opettajan työ rakentui varmuuden ja epävarmuuden ympärille.

Tutkimustulosten mukaan oppimisympäristön avaamista voitaisiin parhaiten tukea ajan ja oppimateriaalin kautta. Erityisesti ajankäyttöä voidaan koulun tasolla. Yksi tutkimukseen osallistuneista opettajista muutti opetustaan radikaalisti opetusjakson aikana. Muut opettajat saivat oppimisympäristön avaamiseen liittyvistä kokeiluista positiivisia kokemuksia. Aineiston perusteella opettajat muuttavat omia oppimisprosessia koskevia käsityksiään omien kokemustensa perusteella. Vaikuttaa siltä, että opettajien ajattelun muutosta ei voida nopeuttaa tekemällä tukea intensiivisemmäksi, mikä oli tämän projektin leimallinen ominaisuus.

Toimintatilaa määrittävän mallin jatkotutkimuksissa tulisi selvittää havaittujen avainkäsitteiden takana olevia ilmiöitä ja niiden välisiä suhteita. Lisäksi tulisi kehittää ja tutkia uusia tapoja luoda opettajille niitä positiivisia kokemuksia, jotka voivat johtaa haluttuihin muutoksiin heidän toimintatilassaan. Kehitettyä mallia voidaan jatkotutkimusten lisäksi hyödyntää vastaavien kehitysprojektien viitekehystenä.

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Avainsanat: opettajan toimintatila, koulun muutos, opettajan ammatillinen kehitys, oppimisympäristö, lapsikeskeisyys, opetus, opettajan työ, grounded theory, opetuskokeilu,

## ACKNOWLEDGEMENTS

Although the researchers would like to think that their achievements are due to their own excellency, this is unfortunately seldom the whole truth. First I would like to thank professor Veijo Meisalo, who has devoted his time for guiding me with my work. He and professor Jari Lavonen are the ones to blame that I gave up the safe career as a teacher and continued my studies in education. During the last few years we have worked together with a number of articles and I have gained a lot from these discussions. Along with these two, M.Sc Kalle Juuti helped me to improve my manuscript by his troubling questions during the last weeks of my work. My pre-examiners, PhD Jouni Viiri (University of Joensuu) and professor Varpu Eloranta (University of Turku) spent their valuable summertime to give me new ideas for the final straight.

The researchers of natural and engineering sciences often joke that the humanistic research is cheap for the society. All you need to buy is a pencil and a notebook and there it goes. However, these comics do not realise that you need a room and food as well. The room has been arranged by the Department of Teacher Education at the University of Helsinki and the food has been provided by three foundations: Emil Aaltonen Foundation, Research Foundation of University of Helsinki, and Finnish Cultural Foundation. I do not know what professors Veijo Meisalo and Juhani Hytönen wrote to my references, but they seemed to be very effective in getting economic support for my work. During the last months I have been employed by the Faculty of Education, which agreed for a part-time work for the time needed to finish the manuscript. During the time I have had the privilege to be supported by Dogman Media Oy, which has provided me a peaceful yet inspiring space to work.

While doing the empirical phase of this study I spent one academic year among 11 class teachers. Although I hope the teachers gained something from our co-operation, I still believe that it is me who remained as the debtor in these relationships. Without the help of the teachers there would not be data and without data there is no science. My thanks go also to the teachers' colleagues and principals who were always helpful. MA Marjatta Näättänen from the Education Department of City of Helsinki played an important role in getting the moral support of her organisation. This endorsement was essential for the recruitment of the teachers.



Finally, I would like to thank my closest supporters. My family has always been supportive, and my friends have reminded that there is life outside the schools and the university. My fiancée Mira has been interested about my work when needed and discretely neglected it when appropriate. My last thanks go to my son Otso, whose birth and intense being finally made to finish this project.

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## 1 OUTLINE AND RESEARCH PROBLEMS

*This study started as a holistic research and development project, which aimed to design and implement a technology-rich learning environment. During the journey, the destination changed a number of times, and the study ended up delineating a completely new concept, the teaching space, that is the central concept in the framework of teacher change. This chapter describes and justifies decisions that steered the study and also gives an account of the execution of the study.*

The starting point of the study was the author's licentiate thesis (Lattu 1999), which touched on the theme of an open learning environment (see Chapter 4). The purpose of the thesis was to find out how Empirica Control, a tool designed for technology education, would suit primary-aged pupils. The tool allowed pupils to utilise simple electric components like motors, lights, switches and electric eyes with an icon-based programming platform. The goal was to allow pupils to build and program everyday automatic devices in order to understand the basic principles of their technological environment, "technosphere". The tool was designed to be easily learned and connected to existing related instruments. At least theoretically speaking, such equipment would allow pupils to test their ideas without the teacher's direct presence.

These ideas led the author to books and articles concerning learning environments, constructivism and child-centred pedagogy. While carrying out the teaching experiments, it quickly turned out that adopting an open learning environment, whatever that meant in those days, required a change in the way of being a teacher. Although the role of a facilitator was not completely unfamiliar, the new roles were interesting. Therefore, the concept "role" was taken along to be used in further projects.

The initial idea of this study was to first describe pedagogic principles for a class working in a classroom provided with modern tools designed for an open learning environment, like Empirica Control, and then test-drive those principles in a few classrooms. In January 1998, the research questions were:

- 1) What is a functional modern open learning environment like?
- 2) What changes occur when shifting from teacher-centred teaching towards more open teaching?



It quickly turned out that research question number one would not offer the support expected in the empirical stage. It seemed hard to write down a set of definitive principles because of the nature of an open learning environment. Therefore, the empirical phase was started with no clear-cut theory-based agenda about the open learning environment. Later on, the answer to the repeated question about the subject of the research was something like “I’m working with a few teachers, who want to make their teaching more child-centred. I’m supporting them by planning, teaching and evaluating with them.” Instead of mentioning “learning environment” the term “child-centred” was used, as the latter seemed to arouse more positive associations than the former.

The other rock on which this research was founded, the use of modern tools like Empirica Control, was abandoned quite quickly. There were two main reasons for this. Firstly, managing with the existing resources seemed to be essential so as to point out that an open learning environment is not as resource-dependent as generally claimed. Secondly, no financial resources could be found to supply several classrooms with the appropriate technology. At first, the plan was to work with one or two teachers, but later this seemed too risky. If our co-operation were to become a problem for, for example, personal reasons, much time would have been wasted. Therefore, the number of participating teachers was increased to around ten.

Instead of linking the research with the modern tools, it was decided to connect the research to science teaching. There were several reasons for this. Firstly, in science, there is a strong tradition of conducting experiments, so that seemed to be a natural domain to enhance the teachers’ child-centred practices. Secondly, during the 1990s, the Finnish National Board of Education had propagated the need to develop science teaching in schools and organised in-service training for teachers. Later, Physics and Chemistry were introduced into primary schools as new subjects as they earlier had been part of Environmental and Natural Studies (NBE 2003, 111-114). With this in mind, the decision to link the project to science teaching was very good timing. It was thought that it might be socially more acceptable for teachers to accept help in science than in some other subject or in no subject at all. Last, but not least, the researcher’s personal interest in natural sciences was also an important factor in the decision.

The possible teachers were approached in co-ordination with the Education Department of the City of Helsinki. The Department sent a letter to all Finnish-speaking primary schools in February 2000 and the message

was re-sent to the principals by email. 14 teachers asked for more information and expressed their interest in the programme. In April 2000, the researcher met all the teachers personally and discussed expectations and possible ways of co-operation. After the sessions, the teachers were asked to think it over and contact the researcher if they still wanted to co-operate. 12 teachers wanted to begin the project, and in May 2000, the researcher met the participating teachers once again. The motive for these meetings was to find out the teachers' concrete plans for the autumn term, so the researcher could prepare by doing some reading before the beginning of the term. In the beginning of autumn, one of the teachers wanted to back out because of other duties in his/her school, so the actual number of participating teachers was 11. Once the group was formed, the principals concerned were informed about the goals of the project by letter.

In short, the researcher met one teacher each day during the school year 2000-2001. This means that each teacher was visited every second week. Naturally, adjustments to this timetable were continually made because of the teachers' absences, special occasions (theme days, visits) etc. The researcher sometimes spent the morning with the scheduled teacher and moved to another school to have, for example, a planning session. The number of documented encounters with each teacher varies from 14 to 21. There were two two-hour get-togethers for all teachers in September 2000 and January 2001. In the first, the researcher explained his framework and some organisational matters were discussed. In the second meeting, the teachers summarised their activities with the researcher for the other participants. The teachers were afterwards interviewed before the summer holiday in May 2001.

As explained above, the purpose of the study has evolved a great deal during its history. Naturally this has been reflected in the research questions. During the empirical phase, on January 2001, the research problems were slightly more specific than three years earlier, but still very open:

- 1) What is a functional modern open learning environment like?
  - 1.1) What should a modern open learning environment be like according to the theoretical knowledge and practical experience?
  - 1.2) What needs for change does the use of the designed learning environment raise?

- 2) What changes take place when the teaching is steered from teacher-centred teaching towards more open teaching?
  - 2.1) What experiences does the teacher get?
  - 2.2) How does the teacher's concept of work change?
  - 2.3) What experiences do the pupils get?
  - 2.4) How does the pupils' concept of work change?

The empirical phase and the following grounded theory analysis (see Chapter 7.2) raised three main areas of interest:

- A) Teaching environment (cf. Learning environment) – there are factors that which make it difficult for teachers to adopt changes
- B) New ideas and what happened to them
- C) What does it look like when the pupil-centred approach is functioning successfully?

In April 2002, all teachers were contacted to hear what had happened since May 2001, when the empirical phase ended. To avoid conflicts with the teachers' timetables, several meetings were arranged at schools and the university. 7 of the 11 teachers participated. In the meetings, the teachers were told the guidelines of the analysis and the three areas of interest, and asked which of these three they found the most interesting. At this point, one of the teachers commented that ideas A and B were linked: the fate of the new ideas reflects the teachers' area of action. Therefore, the two first interests could be merged. Later, interest C was dropped from this report to increase its coherence.

At the time of the final analysis, the research question was:

What are the determinants of the teaching space of a primary school teacher?

This remained the only research question throughout the analysis and it is the question that this report will answer (see Chapter 7.6).

## 2 SUPPORTING SCHOOL CHANGE

*This study is about improving teaching and studying practices by supporting teachers' change processes and professional development. This chapter discusses why the school has to change and reviews related theory and research & development projects on school improvement. Finally, the study is defined using the concepts of the area.*

### 2.1 Changes in Society

Why are we discontented with the current education? Hargreaves (1994, 5) quips: "People are always wanting teachers to change. Rarely has this been more true than in recent years." He explains the increased need for change by using postmodernity, which is a social concept while postmodernism is an aesthetic, cultural and intellectual phenomenon (Hargreaves 1994, 38). He also lists four ways in which postmodernity affects education (Hargreaves 1994, 5):

- 1) Teacher's role expands to new problems and mandates.
- 2) Accelerated change makes innovations multiply causing overload among teachers and principals.
- 3) Old moral certainties change and new missions and purposes are needed.
- 4) Scientific certainties lose their credibility, which sets the teacher's methods and knowledge as a target for criticism.

Similar notions have been formulated by other observers (e.g. Dalin & Rust 1996; Helakorpi, Juuti & Niemi 1996; Jokinen & Saaristo 2002, 228). In their recent book about Finnish society, Jokinen and Saaristo (2002, 222-225) add that there seems to be an ongoing negotiation process in the school, as the old authority structure has disappeared. They also add that in Finland neo-liberalism wants to re-direct the welfare state, and can change the school's status as well (Jokinen & Saaristo 2002, 321-325). These are properties of the post-modern society, which is made up of doubts about certainties, mosaic-like organisations, empowered and boundless individuals, high dependency of problem-solving skills and increased anxiety because of the quickening pulse of the centrally-administered society (Hargreaves 1994, 47-83).

Obviously, the changes in society have increased the pressures for the school to change. As these needs are part of the teacher's working environment, they are discussed further in the proper chapter (see 5.1). Fullan (1993, 135-138) turns the idea of society changing the school upside down. He claims, that society needs education to change society itself – to build “The Learning Society” – as it seems evident that learning is no longer taking place just in the school system but in business and industry as well. The idea of using the school to change society is not a new one. Some examples of it are presented in the review of the child-centred literature (see Chapter 3.1).

Surely the society has not been the only source of pressure for the school change as the concept of learning did change radically during the 20<sup>th</sup> century. According to the constructivist theory learning is not any more seen as transmission and replication of knowledge from the teacher to the pupil, but the learner has an active role in it. This sets schools, teachers and pupils to a new situation which is discussed further in Chapter 4.

## **2.2 Making Changes in Schools**

If the school has to be developed to better suit the needs of tomorrow's society and current knowledge of learning, what then should school look like? According to Louis and Marks (1998), the so-called school effectiveness research tradition has approached the school from either the viewpoint of an individual classroom or an individual school. The writers argue that there is little common ground between the two camps. Several decades of school effectiveness research has contributed valuable knowledge of those properties that make schools effective – and those that are indifferent (Reynolds & Packer 1992).

After the school effectiveness research was able to describe effective schools, the inevitable question “how do we get there” was raised. A new research wave swept the scholar community. The emerging research tried to portray the change that was needed to implement all the good things pledged by the school effectiveness researchers. What would be the best way to support teachers' professional development? The different phases of the trend are described by Richardson and Placier (2001, 907). Today, this research builds on two cornerstones: organisational theory and the increased knowledge of change. Both of these areas offer a rich variety for

researchers and developers to choose from. Dalin (1998) gives an excellent review of the current theories of organisation and how these frameworks can be applied to schools.

Most of the recent development projects that deal with entire organisations use “organisational learning” as a frame of reference. The fundamental basis of organisational learning was built by Senge (1990, 6-10), and was quickly adopted by the school developers (Dalin 1993; Fullan 1995). Although there have been prophecies about its demise (Gold & Watson 2001), the concept seems to do well at least in the educational context (Cardano 2002; Southworth 2002; Duckett 2002; Jack & Punch 2001; Imants, Slegers & Witziers 2001; Claudet 2001). Since the present study is not focused on organisations but individuals, the organisational theories are not discussed here further.

The knowledge of change has been growing through the joint research and development projects run by the schools, universities and local school authorities. The word “joint” maybe reflects the most important lesson learned from the successful teacher development projects. The change cannot be followed through just with administrative decisions. Hargreaves (1994) summarises the following results from a number of studies:

- Change is a process and not an event
- The practice changes before beliefs
- It is better to think big but start small
- The evolutionary planning works better than linear planning
- Policy cannot mandate what matters
- Implementation strategies which integrate bottom-up strategies with top-down strategies are more effective than top-down or bottom-up ones alone
- Conflict is a necessary part of change

Local implementation, capacity and will dominate outcome, and local variability is the rule while uniformity is the exception (McLaughlin 1990). Fullan (1999, 14) argues, that although there is some knowledge of the properties of successful organisations and change (e.g. Fullan 1993, 21-22; Fullan 1999, 18; Dalin 1993, 26-37), no cookbooks or silver bullets can be given as each situation is unique and reforms might be successful because of the conditions, not because of the reforms themselves (Fullan 1999, 14,

64). What works somewhere does not necessarily work elsewhere, as the school development can not be cloned (Sarason 2002, 137-140). At the end, the developing practitioners are on their own.

Typically, the related research (like this report) focuses on the adults of the school, but the pupils also have to change. Dalin (1993, 21) suggests “students need to master a number of critical skills, such as thinking skills, problem-solving skills, human relations skills, group dynamic skills, as well as more specific subject matter skills, to become successful students”. Change does not only touch the adults working at the school, but also the pupils and parents. Thus, in school development the school should be understood as a work community of principal, teachers, school helpers and other professional staff, pupils and their parents. The constant change of pupils and parents might mean that the school has to undergo certain change-related procedures over and over again, as the new participants step in to the community. In other words, although the pupils change more often than the adults, this rotation does not necessarily initiate change – on the contrary, it can inhibit it.

## 2.3 Some Development Projects

As can be seen from the review of theories on changing the school, the research in this field has been active during the last few decades. The motive of this chapter is to present a concise summary of related Finnish projects, while some foreign reports are referenced as well, when appropriate. It hopefully serves as a brief introduction to the Finnish environment for a non-Finnish reader<sup>\*</sup>. The time span is about a decade, since the current framework curriculum (NBE 1994) was promulgated in 1994. Also, Linnan-saari (1998, 5-11) has already built up an excellent review of the main Finnish development projects in the 1980s. The level of the Finnish framework curriculum is very general and is specified by the schools (teachers) in their own curriculum processes. While it is unclear whether the 1994 framework curriculum has changed the practice of teachers, it might have had an effect on the educational discourse that nowadays stresses co-operation, shared leadership and dynamics. There is no doubt that the learning organisation is

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<sup>\*</sup>) For a general view of Finnish educational system the please refer to www-pages of the National Board of Education (<http://www.oph.fi/english/>), the statistics-weighted description of the Finnish educational situation (NBE 2001), or PISA 2000 report from the Finnish perspective (Väljörvi, Linnakylä, Kupari, Reinikainen & Arffman 2002).

perceived as a model of a good school, and the curriculum-making process might have been an important factor in spreading the idea of organisational learning. The 1994 framework curriculum and the development during the last decade are discussed in more detail in Chapter 5.1.

There are a number of projects that have focused on changing the teachers' practice. Kuitunen (1996) followed a life cycle of the Finiste-network that aimed at enriching the teachers' palette of working methods. The network was originally science-related, but gradually the project spread to other areas as well. The report covers five years of co-operation, and at the end the number of participating teachers had increased to 196. The teachers were voluntary and had been organised into different sub-projects. Kuitunen approaches the process from the framework of the diffusion of innovation. The activities were closely tied to the classroom where the operations were tried to change through individual teachers, as in the present study. In the meetings, the teachers discussed a new idea, tried it in their own classrooms and reported their experiences in the next meeting. The teachers' direct networking was also supported. The researcher himself thought the project successful, but the evaluation presented is quite superficial. (Kuitunen 1996) An example of a sub-project of Finiste is reported by Kuitunen and Meisalo (1995), who studied the diffusion of the creative problems solving methods. According to these studies, change takes time and success is related to the effectiveness perceived by the teachers.

The development project reported by Kaikkonen and Kohonen (1997) was similar to Finiste. The participants had meetings and conducted teaching experiments between the joint sessions. However, in this project the developers tried to impact the whole school instead of individual teachers. There were six participating schools and the planned duration of the project was four years. As the project was executed while the schools worked with the first own curricula of their own, the curriculum development stamped the activities. (Kaikkonen & Kohonen 1997) It appears that the results of the project are hard to summarise. Kohonen (1997) has found the following themes in his data: teacher's biography and growth, individual learner, expanding the subject-teacher's identity, facing change, individuality and collegiality, communication in the work community and resources for renewal.

The guidelines of another curriculum-related project are described by Syrjälä, Annala and Willman (1997). The planned duration of the project was three years and 22 schools participated. Typically 4-5 teachers from



each school were involved. The schools were divided into six networks, which worked autonomously and had an informal nature. The indicated problems have been finding common time and spreading knowledge in the schools, and the importance of the principal is once again stressed. (Syrjälä, Annala & Willman 1997)

The importance of the principal was also identified by Syrjäläinen (1992), who followed three teachers and their principal in an information technology related change process. In this project the teachers resisted the project. Syrjäläinen explains this by being tired of consecutive changes, neglecting the teachers' opinions and teacher culture, i.e. the teachers are weighing up school reforms on grounds different from those of the developers. (Syrjäläinen 1992)

Wallace (1998) has studied a project that tried to support teachers' co-operation through peer coaching. According to the study, the project failed to arouse the intended collegial interaction. Gitlin (1999) seemed to be more pleased with his results, although his goals were not so formal as Wallace's, being just to support collaborative school culture with informal discussion that was driven less strictly by the researcher and more by the teachers themselves. Sahlberg (1996) used peer coaching in his two-year development project, which aimed to diversify the teachers' set of teaching methods. A similar method was used by Taipale (2000), who studied the use of peer-assisted leadership among principals. Lack of time was indicated, yet the participants found the co-operation useful. Limited time resources were also experienced by Sahlberg (1996, 153-154), who also lists other problems: the teachers' reflection and the nature of collegial co-operation was not focused enough, and there was a lack of Finnish material about the teaching methods. The peer coaching did not work (Sahlberg 1996, 186).

There are a number of examples where the researcher develops and tests a pedagogical idea in one or a few settings and then reports it (e.g. Näsäkkälä 1999; Kyyrönen 1999; Kuusela 2000). While the Get Electronics Project also had the development phase, it extended to the diffusion phase as well. The project took three years including the evaluation phase. The project differs a great deal from the other project referred to as it has a clear top-down structure: the material was designed by specialists and financed by industry. However, the features that the authors claim made the project a success were common to network-designed projects: voluntariness and co-

operation with and between teachers, which were usually teaching physics and crafts. According to the researchers, the active phase of the project was too short for the teachers. (Lavonen, Meisalo, Autio & Lindh 1998)

A number of the reviewed studies had been executed for several years. Development takes time and the projects should be long lasting. Rosaen (1995, 364-368) describes several co-operation schemes where teachers and researcher have been in close contact. Typically, these projects have lasted for 2-3 years and their starting point equals the study reported here:

Unlike traditional professional development models that bring a well focused agenda that has been determined by outsiders, researchers and teachers developed their goals and work plans jointly and flexibly adapted their work as it proceeded. (Rosaen 1995, 373)

## 2.4 Key Elements of the Project

One of the key elements of this development project was voluntariness. Hargreaves (1994, 11) points out that the administrative and political plans too often neglect the teachers' own desires for change. In this project, the help was offered to schools and the teachers who felt they needed help in changing their teaching enrolled.

Crockett (2002) describes her in-service training project as "site-based professional development" which also suits the present project. In Crockett's project, the co-operation between the teachers and the researcher was planned to take place at the teachers' workplaces, as this was hoped to be the most effective way for the researcher to understand the teachers' starting points and change the practices. Crockett (2002) had a four-stage agenda that relates to the approach used in this study:

- A) identifying teaching and learning problems
- B) lesson planning
- C) reflecting on the lesson taught
- D) assessing the student work produced in the lessons

The Crockett's approach is very similar to the present research. In this study, the active co-operation between the researcher and the teachers started with joint planning sessions, where the teacher's development goal was made into a plan, where these issues were put into practise. After the lessons,

the teacher and the researcher discussed the events. Usually the teachers were interested in changing the assessment methods, which contributed to the discussions of the evaluation practices.

Richardson and Placier (2001) would call such an approach a “formal program for teacher change” to distinguish it from naturalistic and phase-related change processes. Chin and Benne (1976, 23) would classify such a strategy as “normative-re-educative”, since it tries to change people’s attitudes, values, skills etc. instead of trusting solely on their rationality.

Site-based in-service means usually more work for teachers, as they must carry their routine work as well as concentrate on new things. However, situated in-service training is preferred (Cherubini, Zambelli & Boscolo 2002). In his development project, Gitlin (1999) was able to arrange grants to support hiring replacement teachers. For some teachers, such extra resources are a non-existent luxury and the lack of them is a good reason not commit to any development projects. To encourage such teachers, one of the key elements in this project was to manage without extra resources (learning material, computers, increased time for planning or in-service training etc.). Of course, the fact that there was another adult in the class from time to time to help with the pupils was something that Finnish teachers seldom have. To compensate the teachers for their efforts, the development tried to get very close to their everyday work so that they would feel they were getting a direct benefit from the project.

The review of reported change processes suggested that a typical project takes 3-4 years. In this project, the time span was one academic year, but the co-operation between the teachers and the researcher/developer was more intensive than in the projects referred to. In the reviewed projects, the teachers met the support team 2-9 times in a year, but here the researcher visited a teacher at least every second week. In a study that resembles this report in many ways, Senger (1999) spent one year with three elementary mathematics teachers, but gives no details about the frequency of the co-operation. Will the intensity compensate for the shorter time span in this case?

Another idea that could be gained from the descriptions of the projects referred to was the networking or co-operation of the local teachers (Kuitunen 1996; Kaikkonen & Kohonen 1997; Sahlberg 1996; Taipale 2000; Lavonen, Meisalo, Autio & Lindh 1998). The general idea of having the teachers co-operate is to get both pressure and support for the networked teachers (Fullan 1991, 315-326). However, the results of Sahlberg and Taipale suggest,

that the co-operation is very dependent on the available time. Since there were no extra resources available, peer coaching or other types of co-operation were not actively promoted in this study. Some teachers had existing patterns of co-operation that were running normally during the project, but the project itself did not initiate any new partnerships. For some teachers, co-operation was proposed, but there seemed to be a lack of interest on the teachers' part. Also, the cross-school partnerships should have been supported with at least a symbolic amount of paid planning time, but the no-extra-resources principle was considered more important than the possible benefits of the peer collaboration.

As pointed out by Fullan (1993), the current knowledge about school change suggests avoiding "tinkering", which results only in short-term changes or no changes at all. If changes remain at the classroom level, it makes no difference (Fullan 1993, 11). If this argument holds, how can the single-teacher approach used in this research be justified? Instead of recruiting single teachers from a number of schools, could the researcher have tried to find one voluntary school to work with? Fullan himself continues, that neither the centralised nor decentralised model alone works in change – there must be pressure from both the top and bottom (Fullan 1995, 37-38). Dalin (1993, 21) joins the chorus by arguing that a trademark of a learning organisation is competent staff, as the teacher's "mastery becomes the core of a problem-solving school."

Furthermore, the current trend of conducting only school-wide projects offers very little for the individual teacher who wishes to make a change in his/her classroom. There are many teachers who have noticed the need to renew their practice, but do not quite know what to do. The academics cannot leave these teachers on their own to either wait for a site-wide in-service program or find a position in a more active school. In Dalin's terms, this research is an example of an "individual strategy", where "the object is to change the schools by influencing individuals" (Dalin 1998, 151).

In recent years, there have been serious and widespread attempts to establish a closer congruence between the devices and desires of change. There have been efforts to involve teachers more in the change process, to create more ownership of change among the teaching force, to give teachers more opportunities for leadership and professional learning, and to establish professional cultures of collaboration and continuous improvement. (Hargreaves 1994, 12)

The above quote from Hargreaves is well aligned with Fullan (1991, 91-92; cf. Dalin 1993), who gives four factors that constitute a successful change process. The initiation and participation must be active, there must be both pressure and support, there must be changes in behaviour and beliefs, and the participants must have a sense of ownership. In this professional development project, the teachers had voluntarily applied to the programme, and the researcher visited the teachers every second week according to a pre-planned timetable causing pressure and support. A new emphasis, if not changes, on existing practices was planned and executed. The steering of the project was based on a shared leadership between teacher and researcher, and the project was targeted at the teachers' local situations. Thus, the elements for Fullan's successful change process were there.

### 3 CHILD-CENTRED LEARNING

*The goal of the study was to support teachers in enhancing their learning environments to be more open. The next two chapters present the theoretical framework of the goal. The concept of the open learning environment is based on the idea of a learner as an active and decision-making individual. Because this concept is not a new one, briefly reviewing the trends and schools can be useful to give some historical perspective to the contemporary concept of the learning environment. In the following presentation, the child-centred movements are divided into three categories based on their main justification for child-centredness. The grouping argues that constructivist pedagogies should be seen as one branch of child-centredness.*

Child-centred learning is a broad concept that generally means the opposite of teacher-centred instruction, which stands for uniformity in behaviour, dominating teacher's talk and restricted student movement (Cuban 1984, 30). Chung and Walsh (2000) argue that "child-centred" is a politically useful code word, but the underlying assumptions are complex and contradictory. It is easy to agree on this, even when the scientific literature is concerned. To study the relationship between classroom environment and teachers' pedagogy, Martin (2002) defined teacher-centred pedagogy and child-centred pedagogy by the amount of time spent in "teacher teaching" and "pupils on task". Such a definition can lead to obvious misinterpretations. For example, the teacher can tell pupils to silently memorise a poem or solve a group of arithmetic tasks. This activity would be interpreted as child-centred although the child has no degree of freedom.

On a general level, child-centred is an attribute for anything that claims to use the properties, needs or interests of a child as a primary guideline. A child-centred designer could start sketching a chair by studying children's play and their different uses of a chair. A child-centred shirt would be comfortable to wear and easy to put on and take off. In both cases, the interests of other stakeholders, like adults (suitability to the existing interior, good taste and low cost), salesmen (lure), or society (use of recyclable materials), would be overruled by the child's needs. Similarly, child-centred education gives priority to the child instead of, for example, the teacher, discipline or society. It might be worthwhile remembering that this is a strong simplification, since in everyday education compromises are needed and/or perceived. For example, in this science-oriented teacher development

project, the child-centredness was seen as a way to bring the child closer to nature. Because there is no objective set of child's properties, needs or interests, there can be a number of approaches that may be explained as child-centred. One could also similarly define a set of corresponding concepts: learner-centred, pupil-centred or student-centred. In the framework of the primary school, there is no great difference whether the pedagogy is said to be centred for child, learner, pupil or student.

Typically, the common denominator of child-centred movements and other alternative pedagogies is to get rid of teacher-centredness, which sees the teacher as a disseminator of knowledge and the centre of all activities. Goodman and Kuzmic (1997) argue, that in many cases this has led to very individualistic forms of instruction. According to them, there is a lack of attention given to developing co-operation, altruism and civic responsibility.

Contemporary Finnish public discussion could comment on the spokesmen of child-centred pedagogy. Here, society and work life is increasingly criticised for preventing adults from spending enough time with their children. As a result, many children spend lonely afternoons and evenings at home heating up their meals etc. Critics say, that children are required to grow up too early. There is a danger that child-centred education is understood to mean the autonomy of the child and less responsibility for the adult. Although the adult might not have such a goal in mind, the threat may come true in practice. As this seems to be a common fear especially among the pupils' parents, it should be taken seriously.

As there are a number of excellent historical presentations of the child-centred movement (Chung & Walsh 2000; Darling 1994; Cuban 1984) and the philosophical criticism of it (Darling 1994), these issues are not dealt with here in a great detail. The child as an important phase of life was first suggested by Jean-Jacques Rousseau in 1762 (Rousseau 1989). The actual term "child-centred" was first used by Friedrich Fröbel in 1889, and in the beginning of the 20<sup>th</sup> century, child-centredness had three distinctive meanings (Chung & Walsh 2000):

- 1) Fröbel put the child at the centre of its world. The child has intellectual limitations, which prevents it from gaining abstract knowledge of the world. Adults should make an environment for the child.
- 2) Developmentalists put child at the centre of schooling. Things are owned by child – in contrast to Fröbel, who let the child play and learn in the adult-made environment.

- 3) Progressivists argued that the child should direct its activities. Childhood is not a preparatory step on the way to something real, but a stage with its own rights and characteristics.

In the first quarter of the 20<sup>th</sup> century the child-centred pedagogues were organised under New Education Fellowship (NEF), which in 1921 formulated child-centredness as the need “to respect the child’s individuality” and “to give free play to child’s innate interests” (Darling 1994, 35). In this presentation, the different child-centred movements have been divided into three groups depending on their motive for making the child the centre of the educational process.

### 3.1 Child-Centredness as a Change Agent

The contemporary education discussion has raised the progressivism as the de-facto meaning of the child-centred education. There can be a number of reasons for this. The spokesman of progressivism, John Dewey, was inspired by the European educational philosophy and used his predecessors’ ideas for his own purposes. Dewey’s progressivism is quite well aligned with cognitive psychology and constructivism that are today’s dominating theories. It can also be possible that the post-war hegemony of the Anglo-American educational tradition has diminished the repute of the European theorists. However, the current view where child-centredness and progressivism are seen as synonyms for each other would have been a nightmare for John Dewey, who detested and ridiculed enthusiasts who wanted to put the child in control of learning (Cohen 1998; Prawat 2000).

Progressivism was initiated by Dewey in his book *Democracy and Education*, which was published in 1916. Two years later William Heard Kilpatrick published his more practical essay about the project method. (Chung & Walsh 2000) Dewey was not out there to solve the school’s problems, but he wanted to use the school to correct the problems posed by industrialism, increasing economic inequality, political inequality that resulted from concentrations of wealth and poverty, collapse of organic communities and migration to cities. These themes were common for the intellectuals of the 19<sup>th</sup> century, like Karl Marx. Nor was he the first to use the school in the renewal of society. The centre of Dewey’s school-related ideas was situated learning. Industrialisation had alienated learning from the first-hand experience



and Dewey wanted to correct this. It should be underlined that the reason for the school's failure was not bad teaching, but the changed societal framework. (Cohen 1998)

Dewey did not suggest that instruction should be centred by children's interests, but to organise the work around "occupations" that once had been central to work and learning. The "occupations" would not just be related to basic production, like agriculture, mining, cooking and sewing, but also sciences that had been developed to transform nature, like mathematics, chemistry, astronomy and literature. Reinventing things would make pupils understand the history of mankind and open their minds to scientific questioning. (Cohen 1998) The occupations should by no means be understood as grooming for working life, as Dewey attacked utilitarian pre-vocational training and supported all-around education (Chung & Walsh 2000).

Prawat (2000) has analysed Dewey's concept of learning. Dewey noted that there is a tension between subjectivity and objectivity of the knowledge in the classroom where the learning-by-doing approach is employed. One way or another the learner should be aware not only of the knowledge acquired by one's own experiences but also of the objective knowledge of the discipline. During his career, Dewey's idea of learning changed from the well-structured inductive-deductive model to fuzzier experience, where serendipity plays a great role. In contemporary terminology, the latter view could be understood as social constructivism. (Prawat 2000)

Changing society through school did give the children too much freedom of choice. Dewey wanted no part of experimental pedagogies where pupils had complete control of their curriculum. Cohen (1998) argues, that Dewey's "...curriculum was child centered in the somewhat ironic sense that Dewey was convinced that it would work for all children." Furthermore, Dewey's child-centredness could also be interpreted to mean his view of a child as the centre in solving the great modern problems (Cohen 1998).

The Brazilian pedagogue Paulo Freire is another example of using child-centredness to change society. As was the case with Dewey, Freire's relationship with child-centred movement is also problematic. However, by arguing that social injustice can be reduced by educating all humans by focusing on each of them as individuals he aligned with Dewey's change-oriented child-centredness. (Roberts 2000, 55, 71)

### **3.2 Classic Child-Centredness**

Before and along with the progressivism, several alternative pedagogies evolved. In classic child-centredness, the motive is either humanist or practical. The former refers to the idea of a child having equal rights as adults, and the latter to the practical notion that an enabling pedagogy leads to the desired results. In this group, the motives vary greatly. A. S. Neill, the founder of Summerhill School, sees it as a way to produce a happy childhood and an ensuing happy adulthood (Darling 1992). The Waldorf School, initiated by Rudolf Steiner, could be called child-centred as it tries to develop the child holistically (Easton 1997).

In her article concerning the New Education Fellowship, a organisation launched in 1921 to promote new pedagogic practice, Jenkins (2000) points out that the concept of freedom is a two-edged sword: “Moreover, the general emphasis on freedom in education proved contentious, creating a dilemma for New Education because given conditions of absolute freedom, there was no guarantee that the children would learn anything.” For Neill, this was not a problem since “...academic attainment was not the highest priority: it was certainly not worth the cost of the psychic scars inflicted by an imposed curriculum” (Darling 1992).

### **3.3 Constructivist Child-Centredness**

The constructive learning theory, which emerged as a result of cognitive psychology, stresses that learning new knowledge is tied to the existing knowledge. While the former knowledge base is unique for all learners, individual teaching and learning methods are required to enhance learning. From this perspective, the child-centred approaches are a way to improve the quality of learning.

As a wide concept, the child-centredness can also be understood from the viewpoint of the child’s cognition. If the education is aligned with the pupil’s existing knowledge or his/her meaning-making process, the education is child-centred. Therefore, every constructivist teacher is also a child-centred teacher. However, this interpretation can lead to confusions (see Chapter 4.4).

Constructivism itself is not a uniform theory, but rather an approach or a meta-theory. There are a number of flavours: radical constructivism (von Glasersfeld 1995), social constructivism after Lev Vygotsky and rational

constructivism after Jean Piaget (Moshman 1997). The common denominator is the personal nature of knowledge and learning. Not only does the knowledge between individuals differ, but also the cognitive styles and learning strategies (Riding & Rayner 1998).

By looking at the modern books intended for use in the pre-service teacher training, it looks like there is common view that the constructivist theory is the only possible reason for an individual curriculum. However, practitioners were convinced about the power of individualised instruction long before the results of cognitive psychology had arrived in the field of education. For Maria Montessori, the child's freedom guarantees rapid development (Plekhanov & Jones 1992). In his guide to activity methods, Daniel (1947, 50-51) justifies their use by the curiosity and interest the children show to the environment: "Externally imposed standards of this kind have to have real value... Direct teaching, therefore, has to be avoided."

The reasons of these "ancient constructivists" are unknown, but some of them could be derived from the knowledge that exists today among the pedagogies and laymen. Personalised education makes you feel respected, enhancing intrinsic motivation. Motivational factors are also gained by letting the pupils participate in decision-making and, thereby, perceiving themselves as the locus of causality (Stipek 1996, 96). If the learning tasks are tailored for the pupils, it is easier for the pupils to get excited and learn. Last but not least, many teachers might have been inspired by the ideas of romantic and progressive ideas regardless of the similarities between these movements and constructivist psychology. Yet, when asked, they might justify their enthusiasm by saying that "it works", which the researchers interpret as better learning outcomes.

While the participating teachers had their own reasons to be interested in the child-centred approach, the empirical period emphasised the constructivist child-centredness. The researcher encouraged the teachers to test the pupils' preconceptions as part of the planning process, suggested pupil-planned scientific experiments and projects to support the pupils' inquiring minds, and favoured the use of concept mapping during the lectures and as a method of testing.

### 3.4 Integrating Thoughts

Bruhn (1973, 22) divides the early 20th-century child-centred movement into three groups: activity pedagogy (stressing the pupils' active role), freedom pedagogy (stressing the pupils' self-governing role) and social pedagogy (stressing the social development). The examples of these movements could be Montessori, Neill, and Dewey, respectively. Bruhn's grouping is equal to the one used above, as activity and freedom belong to the classical child-centredness, while the social pedagogy is a synonym for child-centredness as a change agent. Obviously, the constructivist child-centredness was not around in the beginning of the 20<sup>th</sup> century and, therefore, not part of Bruhn's classification. The classification above could be possibly enhanced with Bruhn's. It should be stressed that the different flavours of child-centred pedagogy are by no means exclusionary, which is also pointed out by Bruhn. Instead of drawing borders, the goal of the classification above is to present one view of the range of motives of child-centred pedagogues.

A fine example of the merged goals is the Freinet pedagogy. According to Lee (1983), the Ecole Moderne initiated by Celestin Freinet has strong roots in both classic and change-oriented child-centredness. In normal tax-funded schools, the teachers are seldom able to be very extreme in their work – even if they would like to be. Today, most teachers are familiar with child-centred ideas as these goals are commonly seen as good. Although a teacher would agree that the children are individuals and should enjoy corresponding possibilities to make decisions concerning themselves, the teacher might not let this aim dictate his/her whole pedagogy. There are always other aims to consider: respect adults, adapt to society, face the competition etc. Therefore, the practices of a classroom can be justified with varying – even contradictory – aims. What a challenging area for a researcher!



## 4 OPEN LEARNING ENVIRONMENT

*The reported teacher development project is closely related to the concept of "open learning environment". This chapter clarifies what is meant by a learning environment and how it can be open or closed. As learning is a constructive process, the learning model presented by Niegemann and Treiber (1982) is adapted to the learning environment setting. If the learning environment is seen as a stage, there seems to be a number of screenplays (i.e. sets of pedagogic rules) that can be played in the open learning environment. The closing words of the chapter discuss the common properties of child-centredness and the open learning environment.*

The Finnish framework curriculum 1994 (NBE 1994, 11), that is in effect, describes the teachers' task as follows: "... means a change in the role of the teacher in the direction of his being one who directs the studies and plans learning environments." Although the concept of learning environment seems to be vital for the document, it does not give any clarifying definition of the concept. As with child-centredness, the learning environment has been a buzzword at least during the last decade. It has been used to mean very different things: classroom furniture, school architecture in general, computer programs that are claimed to enhance learning, lists of web sites containing information, science centres etc. It is no wonder that the writers of the Finnish framework curriculum 1994 were keen on using the concept but less interested in defining it.

This obvious drawback has been corrected in the coming framework curriculum, which divides the learning environment into physical and psychic. The physical environment should be aesthetic, changeable, a guide to the use of diverse teaching methods and enable the development of skills needed in computer-rich information society. The psychic environment should support motivation, curiosity, activity, self-direction, creativity, interaction between teachers and pupils and pupils' self-evaluation. (NBE 2003, 12) For a closer discussion on the two curriculum documents see Chapter 5.1.

The term "learning environment" is normally linked to computer networks and the WWW. Typically, such a learning environment is a WWW site with embedded document storage, discussion forum and some way to make co-operative authoring. The openness of this kind of learning environment refers to its accessibility regardless of time and place. In this

study, the open learning environment is seen as something that is not necessarily linked to computers, although the environment can contain computer-based resources as well.

Before plunging into the open learning environment, it should be stressed that the open learning environment is just one metaphor that aims to support educators in providing learner-centred education. Maybe the most well known parallel approaches are problem-based learning, cognitive apprenticeship and project-based learning (Land & Hannafin 2000, 2). Land and Hannafin call these schools as epistemologies, but that seems a rather elevated expression. In the following chapter, the problem-based learning is listed as one model of a working method that can be utilised in the open learning environment. This example points out that the organisation of the different approaches is unclear and the ideas can be combined in several ways.

## **4.1 Learning Environment**

Literally, the concept “learning environment” suggests that there is a certain environment that is designed to support learning. Learning can take place without the learning environment, which is just there to support the actual phenomenon. An analogy can be drawn between the learning environment and any other environment. A peaceful view in the countryside can be quite static, but regardless it can inspire a hiker wandering in the hills. In the city, the environment is usually more actively in contact with the individual within it. However, it is always the individual making decisions about the use of the offered possibilities and not the environment. Of course, the environment can attract or drive people to certain actions, and when designing the learning environment this is exactly what we want to do.

One way of defining a concept is to use a metaphor. Let us imagine a flat, peaceful rural landscape. There are fields and a river runs through it all. Suddenly, an army of excavators begins to dig a gigantic pit by the river. The form of the emerging excavation is far from simple. There are larger parts, which are connected to smaller ones by the narrow channels. Finally, the biggest excavator connects the river to the system by a small ditch. The water instantly begins to run into the excavation. Where the connecting channels are too narrow, the running water erodes them, making them wider

so it can flow on its way. In the context of a learning environment the excavator is the teacher, who designs the learning environment by allowing and screening the space that is available for the pupils.

This metaphor raises two fundamental requirements for the teacher. He/she must believe that the pupils take advantage of the offered possibilities (like the water does) and do not always choose the easiest way (like the water does). Secondly, the teacher has to control the flow of activities by reshaping the environment and not through forcing. Furthermore, a lake is a lake regardless of its simple or complex shape. Similarly, every environment that supports learning is a learning environment.

Learning environment has become a buzzword for describing almost everything concerning a school, but so far no generally agreed definition has emerged. Vosniadou, Ioannides, Dimitrakopoulou and Papademetriou (2001) track the origins of the learning environments to basic and applied cognitive science research and define it as follows:

- Learning environments should support active learning and guide the students towards the acquisition of self-regulated processes.
- In the design of learning environments, we must take into consideration the relevance and meaningfulness of educational tasks.
- Since learning is not an individual but a social affair, schools should encourage children to work with other children and learn from them in ways that take into consideration their individual differences.

Reeves & Reeves (1997) offer a model of 10 dimensions, which are to cover extensively all possible learning environments. Although their framework is Web-based instruction, the basic idea seems attractive. However, their own set of dimensions suggest that selecting these dimensions is a very demanding task. Obviously, there is interplay between dimensions like “pedagogical philosophy” and “learning theory”, which makes their co-existence as separate dimensions dubious.

Kallonen-Rönkkö (1995, 12-13) presents a model of structural factors of learning environment. The heart of the learning environment is made by pupils’ learning processes and teachers’ teaching processes, which are supported by methods for learning and teaching. The model reminds us that learning and teaching are essential to the learning environment, and are supported by the other factors (activities, tools, materials). However, the

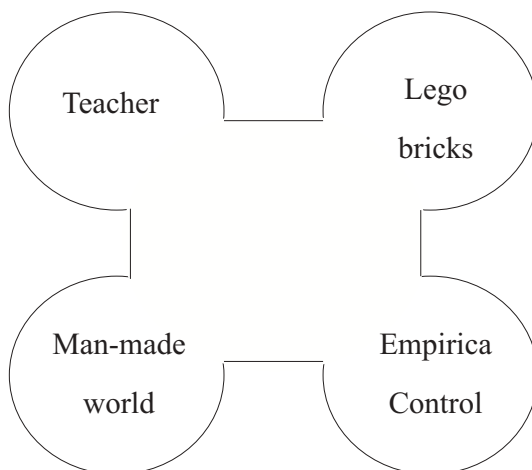


model shows teachers and pupils as symmetric participants of the learning environment. This is hardly the case, as the learning environments in schools are designed by teachers in order to provide certain learning experiences.

Mononen-Aaltonen (1998) divides different definitions into three categories: ecosystems, place metaphors and virtual environments. The first group represents the traditional system theory, where a process leads from a starting point to an end. In this approach, the problem is that definition of the starting point is hard because of the high number of variables. The other group, place metaphors, tries to understand learning environments using a generally known example. The water metaphor above and the Open Market metaphor (see Fig 1) belong to this group. The third group contains definitions that highlight the virtual nature of the learning environment. (Mononen-Aaltonen 1998, 170-185) Mononen-Aaltonen (1998, 185) suggests a fourth category that understands the learning environment as a dialogue (see also Tella & Mononen-Aaltonen 1998). Obviously, dialogue is an important factor in learning and certainly part of the learning context, but this seems to be more like another defining metaphor than a distinctive category.

In this study, the learning environment is understood as factors that define the context of the learner's studying and learning. As can be easily seen, the number of factors is enormous covering the learner's personal characteristics, social environment and physical setting – to name just a few. It should be underlined that while the term “learning environment” refers to something that is external to the learner, it is not always easy to draw the line between the environment's externals and the learner's internals. The values and goals are part of the learning environment, but they are there to be absorbed by the learner.

The physical requirements for learning environments were first sketched by the alternative school movement in the beginning of the 20<sup>th</sup> century (e.g. Dewey 1956, 79-90). Daniel (1947, 70-73) describes a school with various classes: general purpose rooms for classes to meet, special rooms for different subjects, and spare rooms for co-operative activities and quiet work. These ideas have been reincarnated in the digital age, as Meisalo and Lavonen (2000) have adopted a similar metaphor for making open learning environment more concrete. Their Open Market metaphor sees the learning environment as a market square where the consumer uses the booths available to satisfy his/her needs. The metaphor could also have practical value because of its graphical form, which could be used when describing a beginning project and resources for the pupils (see Fig 1).



**Figure 1.** Technology education project (Lattu 1999, 121) depicted using the Open Market metaphor.

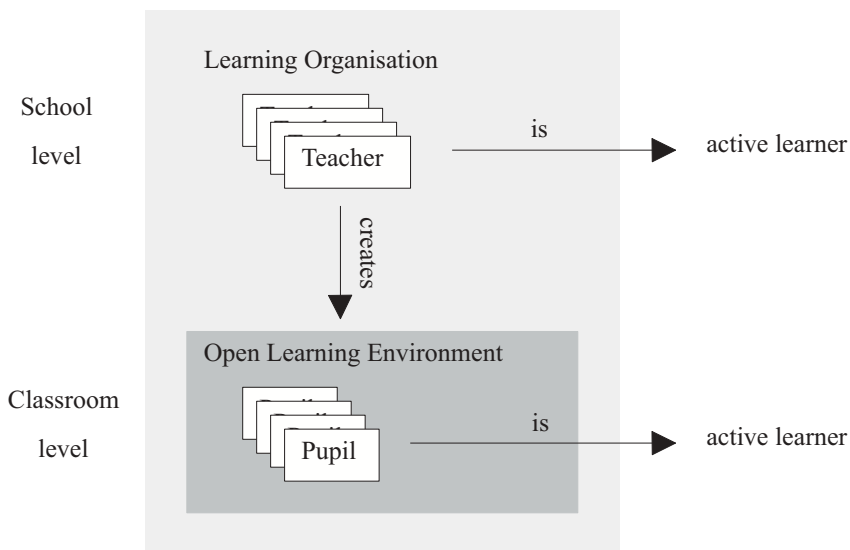
“Openness” is often linked to learning environments. Openness can be understood as a continuum with two ends: “closed” and “open”. In the closed learning environment, the learner has no degrees of freedom while in the open learning environment the learner has total control over his/her learning process. Using the water metaphor, a canal with steel gates and concrete banks controls the flow of water very efficiently, while Amazon-like wetlands offer a great variety of possibilities for the water to run.

The process of empowering the learners can be called “opening the learning environment”. Opening means that the learner makes the decisions about different aspects of learning instead of the administrator, planner or teacher. Below is an exemplification list of more or less distinguishable areas that can be used in planning a learning environment and its level of openness:

- Goal and Content: What will be learned and why?
- Method: What will be done to enhance learning?
- Social Organisation: Who will take part in the learning process?
- Tools: What materials or equipment are used to support learning?
- Place: Where do the activities related to learning take place?
- Time: When do these activities take place?
- Duration: How long do the individual sessions and the whole project last?
- Assessment: How is the process and/or the outcomes assessed?

The more open the learning environment, the more the learner is able to control his/her personal learning. In a very open learning environment, the learners can make very different decisions so that their personal learning environments differ. On the conceptual level, it is useful to make a distinction between the learning environment, meaning the possibilities that are common to all learners, and the personal learning environment, which refers to the choices resulting from the individual's decision-making.

The open learning environment is similar to organisational learning (see Chapter 2.2) in many ways (see Fig 2). They both see the individual as active and omnipotent – yet co-operative. Setting up an open learning environment means transforming the classroom into a learning organisation.



**Figure 2.** The learning organisation and the open learning environment have many similarities. One could say that open learning environment is classroom-level variant of organisational learning.

## 4.2 Constructivist Learning in a Learning Environment

The constructivist learning process can be easily described using the concepts structure of the subject matter (Lehrstoffstrukturen), cognitive structure (kognitive Strukturen, see also Ausubel & Robinson 1969, 51) and pedagogic structure (didaktische Strukturen) as defined by Niegemann and Treiber (1982):

- The structure of the subject matter means the conceptual network of a subject or scientific field that the teacher usually gets structured in the learning material. The teacher can make some adjustments to the structure for teaching: selection, conceptualisation, emphasise some connections and ignore others.
- The cognitive structure stands for the individual's concepts and workings.
- The concept linking the teacher's and pupil's cognitive structures, the pedagogic structure, represents the teaching-learning process, which has taken account of factors related to the psychology of learning. The information is usually arranged in chronological order, and the learning situations chained to form a whole.

Using these three concepts, a typical teacher-led teaching-learning situation can be described in the following way:

- 1) The teacher begins by shaping his/her cognitive structure using the structure of the subject matter available.
- 2) According to the constructivist learning theory, it is not possible to impart the teacher's cognitive structure directly to the learners. Therefore, the teacher has to create a pedagogic structure in a way that meets the pupils' cognitive structures.
- 3) The pupils' cognitive structures are engaged activities with the pedagogic structure. From the teacher's point of view, this activity is called teaching, whereas from the pupil's perspective it is studying (Uljens 1997). If this encounter is successful, the pupils change their own cognitive structures accordingly. (Niegemann & Treiber 1982; Olkinuora, Salonen & Lehtinen 1984; Lehtinen 1988) If there are any changes in the cognitive structures, the studying has led to learning (Uljens 1997).

Because Niegemann and Treiber obviously have defined the concepts for the teacher-led teaching-learning situation, some extensions could be considered. In science, nature and its concrete expressions are an integral part of the pedagogic structure. When learning co-operative or social skills, the social environment with other individuals can be part of the pedagogic structure, as the teacher has assigned roles for the group members, for example.

This model of the constructivist teaching-learning process simplifies a natural setting, but it is useful for the analysis of the process and designing teaching-learning situations. The model emphasises the importance of the pedagogic structure. While the teacher cannot impart his/her own cognitive structure to the pupils, he/she must design situations where the pupil changes his/her cognitive structure towards the structure of the subject matter. A key question for a high-quality learning is how to get the pupils engaged with the pedagogic structure.

Open learning environments are one answer to the question. In the framework of constructivist learning, the open learning environment offers an inspiring stage, where the learner is willing to use his/her knowledge in order to learn new things, and the pupils have more control over their activities than in the teacher-led setting (closed learning environment). The pupil's increased degree of self-direction is needed to fulfil the idea of constructivism: learners set questions and learn knowledge that make sense to their existing cognitive structures. Using the term "meaningful learning" (Ausubel & Robinson 1969; Ausubel, Novak & Hanesian 1978), the questions asked by the pupil assure the psychological meaningfulness (the new information can be linked to existing structures), but not the logical meaningfulness (the new information has an inner logic and meaning). The decreased direct guidance must affect the pedagogic structure, as the teacher is not always in close contact with the pupil. In the framework of constructivist learning, the pedagogic structure and the pupil's cognitive structure can interact in three different ways: as a one-way connection, dialogic connection, and reactive connection (Lattu 1999, 51-55). In its most developed form, the learner is in a reactive connection with the pedagogic structure. Here, the pedagogic structure reacts to the learner's actions and the learner is able to adjust his/her cognitive structure based on the feedback. Of course, the other types of connections can be more or less efficient when it comes to the support of the pupils' conceptual re-structuring process (Roth, Anderson & Smith 1987).

While the discussion above has focused on the interaction between the teacher and pupil, it is definitely not the whole picture. A good example of forgetting the essential is the following argument by Hedberg, Brown and Arrighi (1997, 47):

The multitude of ways the teacher and learner can communicate and the time and feedback quality of those communications largely determine the success of the teacher/learner relationship and the learning outcomes.

According to this statement, the learning emerges from the communication, but this communication should not be understood to happen only between pupil and teacher, as the authors tend to suggest. The communication must be perceived in a wider sense, as between two or more learners, or learner and the equipment or ideas in the environment. If the teacher wants to promote pupils' science skills, he/she brings loads of material (tins, sticks, wire, nails etc.), building blocks and books for the pupils. There are different long-term experiments going on in the classroom that the pupils are observing formally (making notes every day) and informally. The equipment and experiments are there to initiate informal testing and conversation, which increase the amount of communication related to the pedagogic structure.

Naturally, also the quality of connections is vital. Enhancing the level of these discussions to support the pupil's re-structuring processes should be the key task of a teacher. Kletzien and Baloché (1994) recommend that pupils' discussion skills should be developed using structured co-operative methods. Most of the current web-based learning platforms are based on a similar assumption that structuring the pupils' conversation increases the contentual level of the discussion.

However, there is a limit to structuring the learning environment. A certain level of casual atmosphere is needed as the environment should combine the spontaneity of learning outside the school and the effectiveness and methodicalness of the inter-school activities. If the open learning environment is heavily structured, it will become closed again. Essentially, a well-built open learning environment realises some sort of child-centred approach.

The presentation above focuses on the conscious attempt to learn, also called studying (Uljens 1997, 36). Uljens notes that there can be learning without studying. In some cases, these "side effects" can be important

goals for opening the learning environment. In their guidebook for physics and chemistry teachers, Meisalo and Lavonen (1994, 9-11) give a following list of aims that should be taken account in subject-level curricula:

- thinking and reasoning skills
- laboratory and fieldwork skills
- social skills
- developing the individual's personality

While all these can be developed and practised using conscious programmes, an open learning environment offers a natural setting for cultivating such skills.

Although the idea of an open learning environment seems to be mouth-watering, there are several inherent problems. The whole concept is based on a view of an active individual, which is quite a romantic view of a child. Are the decisions made by a child always more preferable to those made by an educated adult? Not all pupils are vital and energetic and evoking this side of their personality might take time. Making fruitful environments is a very demanding task for the teacher and requires familiarity with both pedagogical issues and subject matter. The latter puts a great strain on classroom teachers, who are working on a number of subjects. Also, if the pupils are engaged in very different tasks the evaluation becomes a laborious and time-consuming job.

### **4.3 Screenplays for the Open Learning Environment**

The learning environment itself is not a pedagogy, but the level of openness reflects the pedagogy pursued in the classroom. In the closed learning environment, the teaching is teacher-centred and the teacher controls all activities. Opening the learning environment does not lead to successful teaching and learning if the openness is not supported by proper pedagogy. There are a number of methods that can be used to organise the learning in an open learning environment. Some of them are presented below.

**Problem-based learning** was initially developed in medical education in 1950s and 1960s, so its roots are in adult education and professional training (Boud & Feletti, 1991). Even today the research and discussion concerning the approach is centred on the medical education journals. In problem-based learning, the learning activities and subject matter are organised

around one or more key questions, while traditionally the subject matter is first presented as such and later tied to the reality by examples or exercises. The openness in problem-based learning lies in the learners' possibility to steer the process by asking further questions – and answering them. Therefore the problem-based learning is considered to develop several generalisable competencies, like “adapting to and participating change” and “dealing with problems, making reasoned decisions under unfamiliar situations” (Engel 1991). For a summary of the advantages and disadvantages of problem-based learning see McGraith (2001).

**The discovery learning** tries to bring a scientific inquiry process to the classroom. Bruner (1961, 20) spurs us to see pupils as researchers that are excited about discovery and making relations and similarities between the phenomena and ideas found by them. Discovery learning has especially affected the pedagogy of natural science, as the discovery learning process (asking questions, predicting outcomes, making experiments and analysing results) resembles the discipline's inherent process of inquiry. In Britain and America, the enthusiasm around discovery learning reached its peak in the 1960s, when large development projects, Nuffield and PSSC, were launched in Great Britain and the United States (Lijnse 1997). However, the criticism against discovery learning addresses its fundamental idea. Hodson (1996) argues that discovery learning has gone too far in placing imagination and theory far behind the analysis of observational data.

**Co-operative learning, collaborative learning and communal learning** stress the interaction between the learners. As can be expected from the terms, they approach the theme from different angles (Passi & Vahtivuori 1998, 266). Co-operative learning highlights the classroom management, the framework of collaborative learning is Vygotskian cognitive psychology and communal learning emphasises the social skills and wellbeing.

In co-operative learning, the teacher is trying to get the learners to increase the level of co-operation by using certain well-defined procedures. There are a number of different designs (Sharan 1994, 3-133; Johnson, Johnson & Johnson Holubec 1994, 18-21) but their common denominator is that the teacher-initiated procedures force participants to co-operate. Very little importance is placed on the individual's need for togetherness or intrinsic motivation. Rather, the approach builds on extrinsic encouragement. According to Johnson and his colleagues (1994, 9), the positive interdependence is created by “so that the students know they sink or swim together.”



Salomon (1993) describes collaborative learning as “distributed cognition”. An apt profile for communal learning has been given by O’Donnell (1999): “Learning is viewed here as an inherently motivational, cognitive, affective-emotional and social process.” However, O’Donnell himself calls this concept as “selves-directed learning”.

Opening the learning environment is also possible in pre-school education. In the **pedagogy developed by Maria Montessori**, the physical learning environment is very important. The requirements are diverse: the design should allow individuals’ freedom of activity and stimulate the interest of children. The learning material developed by Montessori aims to challenge children’s intelligence by offering sorting and organising tasks. (Montessori 1977, 20-22) For the observer, the Montessori movement seems somewhat stagnated. In her recent book *Montessori Today* Lillard (1996) clings to Montessori’s slogans and articles. The Great Lessons and Key Lessons, originally developed by Montessori herself, are an inherent part of the Montessori education – not just as examples but also materials which practitioners are expected to use as such (Lillard 1996, 58-76). The reluctance to make any changes in the pedagogy becomes concrete, when Lillard (1996, 182-183) promises great financial savings as Montessori teachers do not need any in-service training, as there is nothing to be unlearned from the initial training. However, the Montessori pedagogy suggests that even the kindergarten-aged children’s learning environment can be open.

Naturally, the teacher is not bound to any of these approaches. With a holistic view of education and the pupils a well-educated and experienced teacher is able to write a screenplay for his/her learning environment. Such a teacher may even find the tightly defined recipes limiting, whereas more general lines may be fruitful (e.g. De Corte 2000). However, this requires that the teacher is thoroughly familiar with the teaching-learning process and basics of the curriculum planning. In Finland, the government has opted for autonomous and critical primary teachers, as their education was redesigned as a university-level Master’s programme in the 1970s. With such training, the teachers should be able to weigh different approaches and merge their best features for their own pedagogy.

All pedagogic methods like the few presented above can be valued using their openness, i.e. how many degrees of freedom do they give to the pupils and how much power is kept by the teacher. When opening the learning environment, the teacher lends his/her power to the pupils. Naturally, this changes the roles of the teacher and pupils and sets new requirements

for them. The teacher has to trust to the pupils' capacities to use the power in a useful way. This is closely related to the teacher's basic view of man. In the example of the pit and water (see Chapter 4.1), the question was whether the water fills the whole pit including the areas that are not easily reached. Is the man good and active who wants to do his/her best, or is the man bad and lazy who does things only under pressure? If the teacher's beliefs fall in the latter category, the opening of the learning environment can fail because of the lack of supportive foundations.

The second lesson in the water metaphor was that the actions cannot be controlled by force, but by restructuring the environment. In the open learning environment, the teacher has to offer support instead of direct orders. Pupils need support in learning new tasks: planning the use of time, problem-solving, using available resources in a meaningful way, solving conflicts etc. Obviously, the teachers of the open learning environment utilise their social and problem-solving skills more than their colleagues in more closed learning environments.

#### **4.4 Child-Centred Pedagogy vs. Constructivism**

The child-centred pedagogy (see Chapter 3) and constructivist learning (see Chapter 4.2) are usually perceived as being congruent with each other, if not synonyms. The common denominator for these approaches is the importance of the individual. Child-centred pedagogy sees upbringing and education as a support for the child's natural development, while the constructivist view of learning stresses the importance of existing cognitive structures for learning. These two basic themes seem to produce quite uniform forms: stressing the importance of self-direction and reflection, and seeing the teacher as a mentor and supporter.

Chapter 3.3 argues that every constructivist teaching method is also a child-centred method. However, it is quite possible to support constructivist learning in teacher-led learning situations. The teacher can chase up pupils' preconceptions by questions, or the subject matter can be approached from a number of angles to support conceptual learning. The teacher could think aloud in problem-solving situations to give examples of using theoretical models, or the pupils are expected to give reasons and consider the validity of arguments given by others. On the other hand, the child-centred teaching is not necessarily constructivist. Neill (1960, 80) quotes the report by Her

Majesty's Inspectors arguing that "some surprisingly old-fashioned and formal methods are in use", referring to his own well-known child-centred school.

Typically, pupil's freedom to choose is seen as an instance of constructivism. When the pupil is able to choose the subject matter or learning methods, the teaching-learning process is automatically constructivist and the new information is seamlessly linked to existing knowledge. However, this is hardly the case. The pupil might make decisions based on other reasons than his/her intrinsic interests, like what he/she thinks is expected from him/her, friend's decisions etc. A common view "a free child makes better decisions than an educated adult", is quite romantic. The child-centredness, if understood as a child's freedom, does not always lead to a constructivist learning process.

If one defines child-centredness in general terms as in Chapter 3, minding the child's existing cognitive structures is enough to call the approach child-centred. As this can be done using teacher-led methods, this seems to lead to obvious conflict, where "teacher-centred" is a synonym for "child-centred". A useful solution is to distinguish between the teacher-centred teaching that is uniform, restrictive and teacher-oriented (Cuban 1984, 30) and teacher-led teaching where the teacher is leading and pacing the social situation that aims to support pupils' individual construction processes (cf. Kansanen 1991). Lee and Kazlauskas (1995) describe a Freinet classroom as being "child centred but teacher led", which illustrates the possibility of this surprising combination.

## 4.5 Roles in the Open Learning Environment

In the sociological framework, role means the set of expected behaviour patterns, obligations and privileges. Roles are tied to status, a position in a society. A position can occupy a number of roles depending on the task or environment, while the most dominating is called the master role. For example, a teacher has a different role performance (actual role behaviour) when working with pupils than when communicating with parents or colleagues. (Robertson 1981, 80-81) Glaser (1978, 80) adds that the statuses are often used when meaning rank.

Taking the concept to the classroom, there can be a number of master roles: know-all, bully, timid, underachiever, athletic, etc. The teacher behaves differently towards the pupils. Some pupils might require the teacher to

increase his/her role of authority, while others benefit from a different role. While the role performances are dependent on the roles in the environment, opening the learning environment is bound to make changes to the teacher and pupils' roles. It is not enough that the pupils are empowered and their role is adjusted to be more active and self-directed. The teacher also has to change his/her role. If the roles stay the same, no change can take place.



## 5 TEACHING SPACE MODEL: LITERATURE REVIEW

*As presented above, the learning environment is a concept that is used both in research discourse and administrative documents. While this study sees the teacher as a key in changing the classroom practices, it is meaningful to define the concept "teaching space" to describe the teacher's working context which is made up of the school's physical and social ethos and the teacher's own thinking. This chapter presents the researcher's idea of the teaching space model before the final analysis, which procured a data-driven version of the model (see Chapter 7).*

Learning environment has been a useful concept for both researchers and teachers. It forces us to look at the school from the pupil's perspective, which helps us in understanding and developing the school. Learning takes place not only by listening to the teacher talk or doing exercises, but also by chatting with peers or playing during the break. The shift in the viewpoint is important, as one should not show contempt for informal ways to cultivate grounds for learning (e.g. curiosity, appreciation of knowledge and skills) or even foster learning itself (e.g. books, construction sets, maps).

In a similar way, the researcher could benefit from using an alternate viewpoint in studying teachers committed to changing their teaching. While the learning environment can be seen as space for water, the teaching space is a corresponding matter for teachers. If the environment continuously inhibits the teacher from making certain changes, it is most probable that the change will not take place. From this angle, the current trend of developing a whole school as a community makes sense, as making changes to the whole organisation makes it possible to develop the individuals' environment in the desired direction (see Chapter 2.2).

The teachers' environment has been defined in various ways, while the viewpoint is, typical of ethnography, the researcher's. In her thorough study of an English primary school, Acker (1999) describes the school from her own perspective:

This is the day before the children arrive, now officially a day teachers are supposed to be in school having meetings. The staff had meetings and lunch together. I arrived around 2.00, at the point teachers were moving into their classrooms to sort things out. Sheila, Debbie and Kristin were there; Rosalind came later. They seemed glad I was there, as the main activity was moving chairs and tables and help was appreciated. (Acker 1999, 76)

Some scholars take the organisational viewpoint, like Southworth (2000) who excellently analyses the organisational learning in schools – without even the slightest snapshot from the individual teacher’s viewpoint.

The limits of the teachers’ context are often called “boundaries” (Goodlad 1990, 4; Kärkkäinen 2000). Some elements of the environment are stable, like physical environment, but some can be more dynamic, periodic (weekdays, seasons) or random (weather, classroom atmosphere after the break). Cuban (1982) uses the word “margin” referring to the difference between teacher’s current practices and the boundaries set by the school. According to him, the margin is small: the time is sliced, high school teachers are in contact with more than a hundred pupils a day, and there are the requirements for grading, credits and exams.

Goodlad (1990, 4-5) has noticed that these limits are layered. Some of them are tied to the classroom, like its size or the pupils’ age or social background. Some constraints are set or negotiated in the school level, while others are set by other stakeholders: school administrators, results of the budget negotiation, parents or society in general.

In his massive research project on Swedish teachers and schools, Arfwedson (1985, 30-33) uses the concept of school code, which is related to teaching space. Arfwedson defines school code as a theoretical construct, which is the common denominator of individual teachers’ “guiding principles for interpretation and action, embracing whatever is important with reference to work, work environment and general problems” in the school. The school code has different contexts: the system context is set by state or municipality, external context is formed by the neighbourhood of the school and internal context is shaped by the history and institutionalised rules of the school itself. Arfwedson notes that each individual of the school forms his/her own picture of the school code, and although their environment is equal these pictures might have similarities and differences. From the constructivist viewpoint this is quite understandable.

When defining the school context Arfwedson does not clearly tell us what is the role of the individual teacher or principal in refining the school code. There are the “central bearers” who try to keep things as they are, and the “code breakers” trying to change the code, but generally Arfwedson communicates that these processes are not conscious. The principal does not seem have to any special status in shaping school code, although the importance of the principal has been stressed by a number of studies (see Chapter 2.3). Could it be that the development in the 1980s and 90s after

Arfwedson's study has made the leadership and the formation processes of school code more visible? However, Arfwedson (1985, 91) links the school code closely to change as he uses the concept to divide the schools into three categories based on the level of establishment of the school code.

A somewhat similar construct (with teaching space) has been suggested by Robbins, Crino and Fredendall (2002). The framework of their meta-analysis is organisational management. To put it briefly, the paper links a local work environment and a broader organisational context to empowered behaviour, by which Robbins *et al.* mean "an opportunity to exercise one's full range of authority and power".

Maybe the most aligned concept with the teaching space is "teachers' professional knowledge landscape", which was suggested by Clandin and Connelly (1995). The professional knowledge landscape contains relationships among people, places and things. There is both an intellectual and a moral landscape. The landscape in the classroom is a practical place where knowledge has taken the form of a story. Whereas the landscape outside the classroom, covering teachers' personal practical knowledge and ideas, is abstract in two senses. Its talk is abstract and torn out of the historical context, which makes it hard for teachers to understand and merge it with their in-class landscapes. Crossing the boundary between these two landscapes causes problems for teachers, as their language differs. (Clandin & Connelly 1995, 4-15)

In this study, the teachers are seen to be supported and restricted by boundaries originating in the outside world (e.g. school's physical or social ethos) and the teacher's thinking (e.g. need to be effective). It must be stressed that the limits are not only restricting (cf. "boundary", "margin"), but they can also be supportive and even open up new views (cf. "landscape"). On looking back, the first time the idea of teaching space sprang to researcher's mind was a discussion with a teacher about whether he/she should continue to co-operate with me. The teacher felt that the researcher wanted to drive the activities in the class a direction where he/she could not go.

[Teacher] says that he/she feels oppressed: "Like I am between a rock and a hard place." On one side there are parents and on the other me [the researcher]. During Open House, one of the parents asked "is it always like this in here" referring to pupils chatting with each other. [1, appears also as 106] <sup>e</sup>

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<sup>e</sup>) The quotations are numbered in order of appearance.

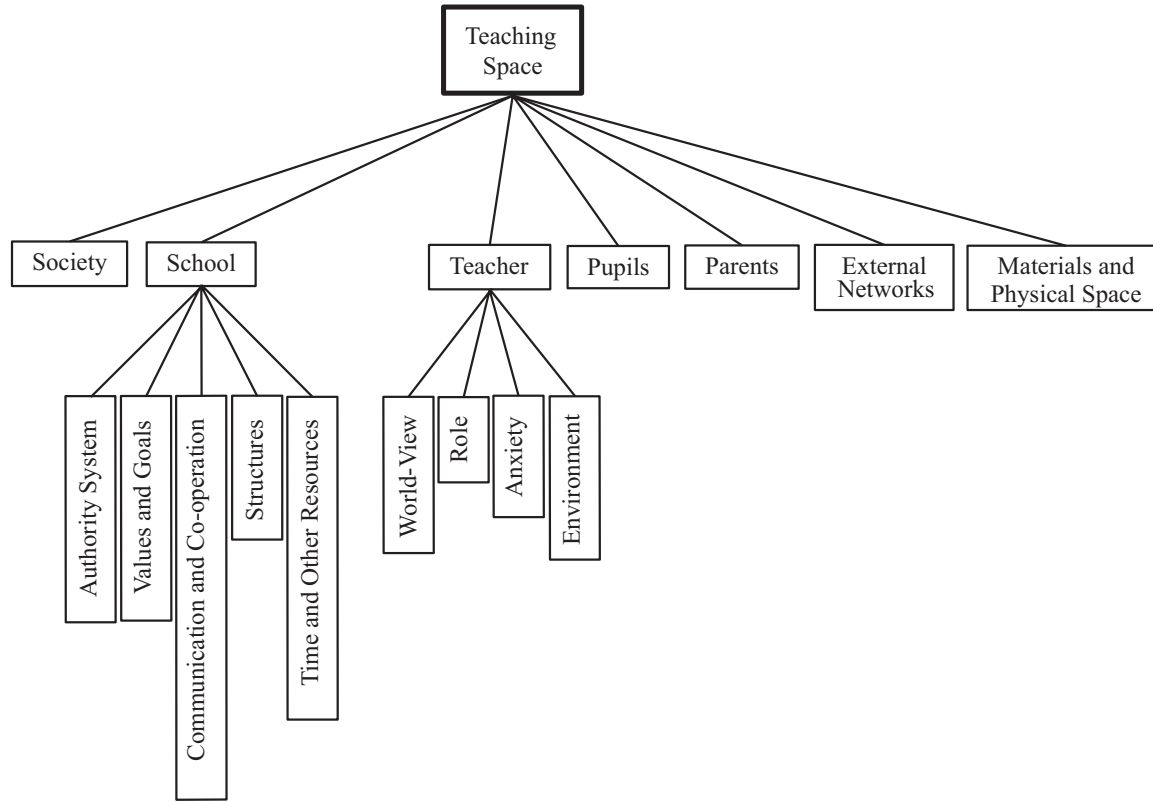


Clearly, the teacher quoted felt limited in his/her work and the limitations were not only physical or time-related, as I had expected beforehand. It was as if the teachers were in a room with limiting walls, while some of them were visible and some not. As the learning environment was the theme of the study, it was easy to start calling the room the teaching environment.

However, calling the space “teaching environment” or “teaching context” would weight the external boundaries, while the internal factors could hardly be seen as part of the “environment”. A similar problem seems to disturb the concept of “socially shared cognition”, as one can ask what is a cognition that lies between individuals (Resnick 1991, 1). For similar reasons, Clandin and Connelly’s “professional landscape” was inappropriate.

In this study, the area in which a teacher is allowed to work without conflicts is called the “teaching space”. The teaching space is intended to support the teacher and his/her pupils in their everyday work. Curricula, principal, classrooms, learning materials and the teacher’s educational knowledge are there to make the teaching more helpful for the students’ learning. However, the brief literature review illustrates that calling them “boundaries” or “code” usually compromises these structures. Surprisingly, the very same factors that were originally intended to be supportive can be seen as limiting, especially during a purposeful change process. The outline of the literature-based teaching space is presented in Fig 3.

The model of the teaching space was built using a number of studies concerning teachers’ work. The goal was to create a rough map of the teaching space, which could be improved with the empirical phase of the study. The structure of the theory is straightforward: the teacher is seen in the middle surrounded by a number of other factors in the educational scene. Some are close, like the teacher’s pedagogical thinking and the workplace, and some are more remote, like top-level educational bureaucrats. Based on the references, the classification scheme used here felt natural, and no other methods were considered. The list of references used in describing the concept of teaching space does not tend to be exhaustive but more like an example. The presentation is weighted to the themes that were present in the empirical study.



**Figure 3.** Outline of the literature-based teaching space.

## 5.1 Society

During the 20<sup>th</sup> century Western society has undergone major changes. Hargreaves (1997, 105-106) argues that the main challenge for today's teacher is the paradoxes of society. Every force or goal seems to have a counter-force or counter-goal, and the parallel existence of these forces seems to continue. In his definition of school code, Arfwedson (1985, 31) uses the term 'external context' to describe the demands from the state and municipality. He continues: "Within each school strategies are developed, capable of promoting/neutralising/opposing these demands." The neighbours set boundaries, "within which each school can shape its work and its school code." This point of view is quite simplifying, as the neighbouring organisations are seen only as limiting and not as supporting factors.

Generally, society seems to be remote from the teachers' everyday life. The teachers are linked to the outside world via pupils, parents and their own personal contacts. Professionally, the top-level school administration plays the part of society. The changes initiated by the top-level administration do have an impact on the teachers' environment and the changes can be quick. Churchill and Williamson (1997) conducted a survey of Australian teachers. When asked for educational changes that have changed their working lives, the teachers mentioned only state-level changes: systemic cuts to funding, introduction of national curricula, increased accountability requirements etc. No school-level phenomena were reported by the authors. Acker (1999, 169-170) noticed the top-down changes as well. Hargreaves (1994, 67) argues that the teacher unions are against the changes for a more flexible school, a "moving mosaic" as he calls it, because the changes would threatened existing career routes. Evidently the trade unions are reluctant to let the decisions be made at the local level as it would make the supervision of their interests more laborious.

In Finland, the last major top-down change took place in 1994, when the current framework curriculum (NBE 1994) was enforced. Instead of a specific national curriculum, the new document was very general. To get a rough idea of it, the publication consists of 120 pages where 74 pages define 29 subjects. For example, the nature, main goals and central contents of comprehensive school (grades 1-9) mathematics are presented in four pages. The high number of subjects arises from different combinations of mother tongues and religions. The idea was to let the schools write their

own curricula and use this to support the everyday work by giving all levels of planning to the school, which eventually will take care of evaluation as well. Also, the learning material approval procedure was discontinued.

The new cycle of administrative actions began shortly after 1994. The recommended criteria to assess the pupils finishing their basic education were delivered in 1999. From the perspective of this study, it is worth mentioning that the document clearly defines not only the knowledge, but also the skills to acquire in physics and chemistry (NBE 1999). The new law of basic education that integrated a number of separate laws and put an end to the administrative difference between the primary (grades 1-6) and lower secondary (7-9) schools was put into effect in 1999. The working group of basic education reform delivered its final report in 2001, which suggested some changes to the distribution of the number of lessons and diminished the number of selective hours (MINEDU 2001).

The new framework curriculum will be put into effect gradually. The new framework curriculum for the first two grades was put into effect in 2002 and the framework curriculum for the other grades of basic education is in the testing phase (NBE 2003). The new framework curriculum does not change the key role of the schools in the curriculum-writing process, but it is more defining than the previous one. The number of pages has been increased 50%, the subjects are defined using 2-3 years time spans and criteria for pupil's assessment at the end of every period have been added. Based on her study among Finnish primary and secondary teachers, Syrjäläinen (2002, 61) argues that the top-down "mass changes" are more likely to decrease the level of learning outcomes, as the teachers have less time to plan their teaching.

In the PISA 2000 survey, the high rank of Finnish students in reading, mathematical and scientific literacy provoked unparalleled interest in the Finnish educational system. The Finnish PISA researchers explain the results in a number of ways. Finns are readers and in the data the students displayed an interest and engagement in reading and read a wide variety of material. The success in mathematics and science is explained by a felicitous test: the problem-solving-centred PISA test was particularly suited to the Finnish curriculum, but some credit is given to the national development project that was launched at the end of the 1990s. Perhaps the most pleasing result of the PISA study was the high equality of the performances of the Finnish

students, as society has invested heavily in equal opportunities for learning during the last four decades. (Väljjarvi, Linnakylä, Kupari, Reinikainen & Arffman 2002)

A persistent lack of time (intensification) might lead to reductions in quality (Hargreaves 1994, 118-119). Churchill and Williamson (1997) reported intensification as one of the main afflictions of the Australian teachers' working life. Teachers tend to mention increased assessment practices as a factor causing a lot more work than earlier (Acker 1999, 170; Churchill & Williamson 1997). Campbell and Neill (1994, 163-164) use the term "role inflation" describing the trend of giving new tasks to teachers while the hours and salary remain the same. Of course, the problem is not only present in education. Räsänen, Notkola and Husman (1997) interviewed 1750 Finns for their study related to occupational health care. When asked, 67% of the respondents named the work pace as the most harmful factor in their working environment.

On the other hand, Wallace (1998) reports how "being busy seemed to bring out the best in Amanda", who was a teacher studied in a four-teacher case study, as "being busy" seemed to be linked to the general excitement of the teacher. The view is supported by Campbell and Neill (1994, 213-214), who disagree strongly with claims of the deskilling effect of intensification (Apple 1982, 146-147; Hargreaves 1994).

Apple's (1982) deskilling thesis is one of the most cited threats to teachers' professionalism. He suggests that education is going to go through the very same development that took place when craftsmen changed to labour in factories. Earlier, one craftsman had handled the whole process of making a product, but in factories each worker is required to master only part of the complete process. The deskilling raises new requirements, reskilling. Apple (1982, 146-147) suggests that in the teacher's profession, the deskilling means the end of planning and designing teaching and curricular strategies for specific groups and individuals based on the knowledge that the teacher has. In the teacher's case, the reskilling would be an increased need for classroom management. Between the lines, Apple seems to suggest that the pupils' interest decreases as they are studying only standardised materials instead of tailored instruction, and the lack of motivation is expressed as restlessness requiring more effective classroom management skills. Apple (1982, 143-148) gives an example of pre-packaged, modular material and how the teachers are tied to the selected set of material. He

points out, that not only the teachers are deskilled, but also the pupils, as their responses are standardised in the modules. Only the pace can be varied. (Apple 1982, 152-155)

At first sight Apple's thesis seems to be logical, as the examples in industry seem to be relevant for education as well. However, since the beginning of 1980s much has happened in industry as well. Today, the factories are more and more organised into small teams where workers are required to understand the whole production process in order to develop their working methods as expected by their superiors. To support the new innovations and an understanding of the entirety, the teams from time-to-time change their duties. Apple's (1982, 142) other example about how women are deskilled because of the word-processing technology seems outdated as well. Never has the work of office employee been as versatile as now, as the new office technology expects its users to be simultaneously graphic designers, communications professionals, printing specialists, bookkeepers, mathematicians and even programmers. In education, a similar trend has taken place in Finland. Instead of promoting pre-packaged materials, the top administrators are expecting schools to write their own curricula. It seems evident that the intensification has not led to de-professionalisation but in the opposite development: there is an increased need for a jack-of-all-trades in the today's labour market. However, the greatly praised teachers' professionalism can be a veil of smoke. This interesting viewpoint is that of Syrjäläinen (2002, 38) who suggests that the teachers are simply manipulated by praising them for running the top-down reforms that are not inherently motivating for the teachers.

In Western society there seems to be a wave of decentralisation (with some counter examples, like England and Wales), which increases the tension between the local autonomy and the accountability (Dalin 1998, 5-6). For a more specific review of the decentralisation process in Scandinavia, some Anglo-American countries and Germany see Dalin (1998, 7-22). This trend seems to apply not only in the framework of education but also in other areas of public services and business. The top management focuses on following the indicators of efficiency and leaves the troublesome decision-making to the local level.

While parents are free to choose a school for their children, the schools have to keep up a good public image (Acker 1999, 143-149). The schools are rivals competing for pupils and resources. In Finland, the school-level curriculum process has enabled schools to specialise in some sciences

meaning an increased number of lessons or special courses in these subjects. The former lower secondary schools (grades 7-9) are allowed to use admission tests in their selection of pupils. By these means, the schools try to acquire motivated and capable pupils resulting a high level of academic attainment. In some countries, like England and Wales, the assessment results are public information and, therefore, freely available. However, this is not the case in Finland. The publicity of the assessment results can encourage parents to take their children to “good schools” with high ranks, while the non-measured elements of learning would be neglected. However, the reputation of a school is not based just on official information but also on stories heard through the grapevine. This development can lead to a situation, where the role of parents is changed from partners to customers, which reduces the school component of the teaching space by minimising the openness. The co-operation between the school staff and parents is replaced by the customer service.

Where schools of the same level compete for pupils, the scarcity of resources has also made the different school levels rivals. Acker (1999, 128) mentions how the unequal distribution of contact time and preparation time troubled primary teachers, whose preparation time was less than secondary teachers’.

At this point it should be said that the teachers’ general status in Finnish society differs from their European colleagues. In rural Finland, the teachers were local notables along with the priest and the police. Although the connection between the school and the church has been close and still exists, the teacher represented the academic body of knowledge, which was generally considered as perceived. The teachers still rank high in surveys that measure the importance of the different professions. Although the teachers’ wages in Finland are not very high, the class teacher education programmes at the universities can afford to turn down roughly 90 percent of the applications (Väljjarvi, Linnakylä, Kupari, Reinikainen & Arffman 2002, 42).

Normally the organisational charts contain some kind of “a broader organisational context” between the local level (here: the school-level pedagogical environment) and the meta-level (the society). However, in this presentation such a level does not exist, as the analysis of references did not show any significant difference between the environment set by the top-level school organisation and society in general. From the teachers’ viewpoint, both of them seem to be equally distant.

Along with the organisational representative of society, usually some government office, there are numerous stakeholders that want to influence teachers. While some of these agents spend a great deal of resources to promote their interests, others are less organised and official. Gill and Schlossman (1996) describe a one-man fight against homework in the U.S. in the beginning of the last century. Even today, articles in the newspapers and TV talk shows have a surprisingly large effect on the staff room discussions (see Dalin & Rust 1996, 19-20).

## 5.2 School

Southworth (2000) calls the school component of the teaching space as staff culture and felicitously describes it as “the way we do things around here” (see also Dalin 1993, 20, 97). According to Southworth (2000), the staff culture is the social reality which people have built for themselves: “This social reality is both the product of and results in the acceptance of tacit, deeply internalized mutually binding procedures, customs and traditions which forge a rule-bound existence for group members.” Maybe the most well known attributes for school cultures are “moving schools” and “stuck schools” used by Rosenholtz (1989). Her massive work linked these attributes to a number of school-related phenomena, like teacher collaboration, teacher learning and teacher commitment.

However, there are plenty of concepts for a school’s spirit to choose from. In his concept of school code, Arfwedson (1985, 31) has named the “earlier life” and traditions of a school as the internal context of the school code. Hargreaves (1994, 166) uses the term “teacher culture” separating content (attitudes, values, beliefs, habits, assumptions of doing things) and form (relations between teachers and their colleagues). Hodgkinson (1983) presents an interesting idea of three levels of school culture. The following nutshell definitions are from Dalin (1993, 97):

- 1) The transrational level: where values are conceived as metaphysical, based on beliefs, ethical code and moral insights.
- 2) The rational level: where values are seen and grounded within a social context of norms, customs, expectations and standards and depend on collective justification.
- 3) The subrational level: where values are experienced as personal preferences and feelings; they are rooted in emotion, are basic, direct affective and behaviourist in character. They are basically asocial and amoral.



Dalin argues that the schools generally have an outspoken culture on the rational level through their stated objectives, norms, rules, regulations etc. The subrational level is very important in a school, and only a few schools (e.g. Waldorf and Montessori schools) are clear about their values in the transitional level. (Dalin 1993, 97) In Finland, the framework curricula (NBE 1994; NBE 2003) tries to make the schools aware of their own values, as the curriculum processes start by value-related discussions and the finished curriculum has to define the values of the school. The framework curricula define a set of basic values: human rights, equality, democracy, environment and multiculturalism (NBE 2003, 10).

Kruse and Louis (1997) approach the matter in a more specific way. In their study of teacher teaming, they have defined a “school wide professional community” to be founded on six factors. The concept itself describes a warm, discussing and supportive school environment, but in a stripped-down form the factors can also be presented in a more general form as follows:

- A) The Authority System – Who is making the decisions?
- B) The Decision-Making Process – If the decisions are made jointly, what is the process like?
- C) The Personal Reward System – What kind of reward systems are used in the community?
- D) The Communication System – What kind of structures there are to support communication of the community?
- E) Personal Efficacy – Are the teachers affiliated with the school and committed to their colleagues and students?
- F) Responsibility for Student Learning – Who is or are accountable for student learning?

All these questions are important elements for school culture, but structuring the related findings from the literature under these six factors turned out to be impossible. Too many references fell in to “miscellaneous” category. Clearly, the school in the teaching space model is a wider concept than the Kruse’s and Louis’ “professional community”, which neglects the practical level of running the school – the way things are done. The grouping used below combines groups A and B to “Authority System”, takes groups C and D as-is, and adds new groups for goals and values, structures and time and other resources.

The added groups might be considered lower-level concepts compared to the level of groups by Kruse and Louis. Also, there is at least some degree of causality between both sets of groups. The authority system defines the space of possible answers for the rest of the questions. The goals and values are the framework for all activities. The groups – or questions, sub-spaces, domain areas, depending how one wishes to call them – are evidently also overlapping.

In Finland, the school-level curriculum process is distinctive for the teaching space of the school. Even before the 1994 curriculum reform, a great many teachers had been participated in the curriculum process in their own municipality (Kosunen 1994, 166). Jauhiainen's (1995, 165) results suggest that the curriculum process in schools changed the teachers' focus from classroom to the school level.

### 5.2.1 Authority System

In this framework, authority system means the distribution of power and relations between the empowered subjects in the school organisation. Principal is an important factor in forming the school component of the teaching space (Rosenholtz 1989, 128-134). Also Southworth (2000) sees the principal as an important person for creating a school level pedagogic environment and he/she should have sound knowledge of teaching and learning, recognise teachers' strengths, and be aware of what goes on in the classrooms. However, Acker found no systematic observation conducted by the principal, so the principal's views of teachers are based on factors other than their actual classroom performance; extra responsibilities taken on, personal life (Acker 1999, 158-161). The principal might pop in to classes from time to time (Wallace 1998), but even a 45-minute visit is not enough to write an evaluation that would be valid from the teacher's point of view (Gitlin 1999).

A chance to affect school-level decisions should be considered an essential for teachers in order to be able to redefine his/her own teaching space. Acker (1999, 109-110) describes a school where the teachers truly took part in school-level decisions.

Along with the principal and teachers, the pupils can also be empowered in the teaching space. In Neill's Summerhill, the pioneer school in pupils' self-government, the principal had set certain boundaries for pupils' power, but inside these boundaries the adults had no official power over the pupils since in the General School Meeting all participants had just one vote (Darling

1992). Darling (1992) argues that in reality the adults and especially Neill himself must have had an indirect influence on their pupils because of his fame and skills in presenting convincing arguments. This must be kept in mind when studying the power relations between the adults of the school, too. Not all power is official.

It appears that the localised decision-making processes, including the curriculum process, have contributed to the fact that the Finnish teachers' chances of affecting decisions concerning teaching, guidelines of the school, and distribution of resources were significantly better than in other OECD countries (Väljjarvi 2002, 189). Obviously the distribution of the decision-making process also means an increased workload for the teachers.

### 5.2.2 Values and Goals

In every school component of the teaching space there are some level of shared values and accordingly set goals. The level of sharing can be understood as continuum, where at one end there is no mismatch between the individual teachers' and the school's shared values, and at the other there are no common values just the individual's ones.

Arfwedson (1985, 65-66) has found that the school code is important for the teachers. If the teachers feel that they are representatives of a minority in their school – meaning that their own school code is not compatible with the corresponding conception of the majority of the teachers – they are ready to find a new position in some other school. Acker (1999, 47) mentions that non-typical school code (like extremely demanding alternative pedagogy) can be a problem for a school, as it might be hard to hire substitute teachers.

However, there are different types of goals in the schools. Churchill and Williamson (1997) noticed that teachers generally welcomed initiatives concerning the classroom practice, but responded negatively to procedures seen as serving the needs of educational bureaucracy. The former was interpreted as “professional goal” and the latter as “organisational goal”. In the school component of the teaching space, the terms could be defined in another way as well. In this framework, the term “goal” is often used to stand for desired learning outcomes, and these could be called “professional goals”. The “organisational goals” could be seen as the aims that the top-level administration has set for an individual school as an organisation; like empowered individuals, learning teams, self-evaluation – just to name a few. While these two sets have a common aim – enhancing student learning –

they are still quite distinguishable. Problems might occur, if the school administration tries to set organisational goals using the professional goals, as in the national curriculum document. A separate document of organisational goals would be a clearer decision.

In schools, comparing “our” values to “theirs” can serve as a way to discuss the shared values, which otherwise might be too theoretical or uncomfortable for the everyday staff-room chat (Acker 1999, 125-126). Acker’s (1999, 128) other example of primary teachers accusing secondary school teachers of treating the pupils like babies could be interpreted as underlining the pupil-centred goals of the school that was studied.

### **5.2.3 Communication and Co-operation**

The current idea of a functional school contains a conception of a learning community. As communication is an essential factor for learning, linking communication with school can be interpreted as a suggestion seeing the school as a learning organisation and/or co-operative community. In the concrete level, the communication can be a way to enhance organisational learning and/or co-operation. Little (2002) calls such environments professional community and refers to several reports finding the positive effect of such a discourse. The school size seems to effect the co-operation, as teachers in the small schools are more satisfied with it (Räty, Snellman, Kontio, Kähkönen & Saari, 1997).

There is growing evidence that the non-classroom matters effect what happens in the classroom, while the affect can be either positive or negative (Hargreaves 1994, 14). Louis and Marks (1998) found that organising “teachers’ work in ways that promote professional community has a positive relationship with the organization of classrooms for learning and the academic performance of students.” Little (1986) argues that collegial talk consists of four categories: talk about teaching, shared planning and preparation, classroom observation and training together or one another. Related to a project where teachers and research were in close contact, Rosaen (1995, 359-360) adds that ongoing research and sharing the results with a wider audience helps teachers’ professional development.

Naturally, co-operation itself is not the key to a successful school component, as the collaboration can be formal (contrived) or informal (self-initiated) (Churchill & Williamson 1997). In Wallace’s (1998) study the teacher co-operation, although agreed upon formally, followed a set of behavioural

conventions: visit only if invited, present your best effort, do not criticise, be non-specific when commenting and make just short visits. However, Rosenholtz (1989, 209) found schools where “norms of self-reliance appeared to be selfish infractions against the school community.”

It is hard to describe a typical way of co-operation. The teachers studied by Campbell and Neill (1994, 205) spent four hours a week in meetings, non-pupil days, inter-school liaison and in-service training. This suggests that there is a quite a lot of formal co-operation, which takes place at an agreed place and time. However, other reports describe informal co-operation. Talk on big issues goes on with interruptions, a few words now, some words in another few days (Acker 1999, 178). McDaniel-Hine and Willower (2001) clocked an average planning session to last 3.4 minutes. Wallace (1998) suspects that this is because of the lack of common time for formal meetings, which is exactly the opposite compared to the observations of Campbell and Neill. It looks like the last decades of patronising communicative cultures has been successful, as in the survey of Churchill and Williamson (1997) the Australian teachers reported increased co-operation between colleagues and clearer assessment practices. Wallace (1998) argues that the teachers seem to be more receptive to the general idea of helping than to formal ways of co-operation, like coaching or supervision. In everyday scholarly discussion, the teachers are often blamed for a lack of reflective thinking. Southworth (2000) stresses that the teachers do reflect upon their thinking when evaluating the learning outcomes, but making this inner talk explicit at the school-level is another skill.

#### 5.2.4 Structures

The school component of the teaching space contains rules that are used to fragment the whole into smaller and more controllable pieces and/or link these elements to larger systems. These rules and boundaries are usually man-made and artificial, but once put into effect, they can be very hard to change. For example, the boundaries of academic disciplines can help learning by making it easier to keep track of the different domains of knowledge. However, it can also inhibit the concept-formation when the studied area is cross-disciplinary. In recent decades, a several cross-disciplinary subjects have emerged, like environmental education and technology education. Implementing these cross-disciplinary domains to the schools' everyday

work has been a rocky road. Acker (1999, 173) gives an example of an opposite situation, where the subject model used in the national curriculum puzzled child-centred classroom teachers.

In primary schools, the teachers tend to be class teachers, who basically teach all subjects to their classes. According to Acker's notes, the class teacher system has both positive and negative effects. Teachers can use their special talents by specialising in some subjects while still having a better picture of an individual pupil's progress than subject teachers. However, the teachers might be tempted to cling to their own pupils and withdraw from other adults in the school. (Acker 1999, 58-60)

Schools also set a structure for time. Each school has its own structure of a normal school day paced by assembly, lunch and breaks. There is also a structure for the term: it might begin with a visit to church and end with a collective celebration or a concert. These structures help the teachers plan their work and pupils to perceive the passage of time. On the other hand, the structure might limit the work of individuals in case there would be need to follow an alternative timetable, like longer or shorter lessons. Teachers themselves create structures for time, classroom furnishing, assessment etc. that can be hard to abandon, as structures and habits tend to make life and work feel easier and more secure.

### **5.2.5 Time and Other Resources**

Time is money at school, where the teachers' time is the most important resource. The teachers' time is often divided into two categories: the time with direct contact with pupils (contact time) and other time (non-contact time). Contrary to popular opinion, the teachers' non-contact time exceeds the contact time (Campbell & Neill 1994, 51-52; Churchill & Williamson 1997). While the non-contact time contains administration, in-service training, staff meetings etc., the preparation of contact time takes up an important part of the non-contact time. Increasing the amount of non-contact time, especially to be used for preparation, has been a major theme in the Anglo-American schooling debate. Interestingly, the praise for an increased percentage of preparation time has not been uniform. Some teachers may feel that the preparation time is somehow taken from the pupils. (Hargreaves 1994, 128-135) In the study by Campbell and Neill (1994, 138), the working

hours were found to be stable throughout the year. If teachers spend some extra time on specific purposes, like evaluation, they cut back in some other areas.

Teacher time can also be seen from the systemic framework as a “staffing level”, a ratio between teachers and classes (Campbell & Neill 1994, 167-168). Taking the pupil’s perspective could produce a fresh view of the discussion, as the staffing level is not affected by whether the teacher is focusing on a single pupil or a group. Furthermore, the superficial numbers do not tell about the quality of the communication, which is essential for learning. In their study on four primary teachers, McDaniel-Hine and Willower (2001) noticed the short duration of most activities. Generally, the teachers started a new activity every 77 seconds. While in the classroom, it was as low as 37 seconds. One can wonder, whether a quality teacher-pupil interaction can take place in such a short time.

As the economical constraints are becoming more and more limiting for increasing the staffing level, the schools have been tempted to hire adults with lower academic requirements. Campbell and Neill (1994, 171) report that teachers do 5-7 hours a week of work that could be conducted by para-professionals. However, they add that these tasks are by no means unimportant, as, for example, helping pupils put clothes on can be an important opportunity to enhance teacher-pupil relationships.

### **5.3 Teacher**

The teacher component of the teaching space refers to the boundaries that are in the teacher’s own thinking. It is necessary to stress that the teacher’s thinking is the driving force in the teaching space. In the end, it is the teachers who build up the school component of the teaching space. The teaching space is a supporting and limiting force, but the actor in this scene is the teacher. The teacher is driven by his/her own ideals, both known and silent knowledge and practical operations models. The school component of the teaching space both supports and screens the teacher’s actions, as do the other parts of the teaching space.

The structure of the teacher component of the teaching space could be described using the model of teacher’s pedagogical thinking suggested by Kansanen, Tirri, Meri, Krokfors, Husu and Jyrhämä (2000, 23-31). In a nutshell, the teacher’s pedagogical thinking can be sliced into three levels. The lowest level is called the action level, where “...the instructional process

proceeds in successive cycles consisting of preinteraction, interaction and postinteraction” (Kansanen *et al.* 2000, 25). The middle level is called the object level and contains object theories that are studying the action level. The highest level could be called the metatheoretical level with a corresponding meaning. A teacher who is able to combine all three levels could be called a “professionally thinking teacher” (Meisalo & Lavonen 2000).

It could be argued that the teacher component of the teaching space, or teacher’s pedagogical thinking, should be the top-level concept with sub-concepts similar to the other parts of the teaching space model (society, school community, pupils etc.). Calderhead (1988, 59) presents an example of such a model. The different sources of information, like self, children and curriculum, are organised under the metacognitive processes (planning). In the framework of the teaching space, these sources of information are different defining factors of the space. These two frameworks provide different views of the same phenomenon. The teaching space model could be useful in understanding the change of the teacher, as developed for such a purpose, while the pedagogical-thinking-centred models could be more appropriate, that is, in understanding the planning process (see Kosunen 1994).

In a simplified form, the content of the teacher’s professionalism has been based on knowledge of the subject matter (what to teach) and pedagogy (how to teach). However, this schema does not seem to work any more since the constructivist view of learning stresses the individuality of learning. It is not enough that the teacher masters teaching, but he/she must understand learning as well. The growing amount of information has raised the need for new skills: seeking, selection, synthesising. On the one hand, the teaching profession is today more fragmentary than earlier, since there seems to be more expertise required of the teacher. On the other, the open learning environment and notion of learning as a constructive process could move the focus of the teacher’s skills from pedagogical tricks to something fundamentally human. For example, Fullan (1993, 14) argues that a personal moral goal is essential in change: “...paradoxically, personal purpose is the route to organisational change. When personal purpose is diminished we see in its place groupthink and a continual stream of fragmented surface, ephemeral innovations.”



Teachers, like any other people, try to get their own schemata aligned with the environment either by adapting their own thinking or by trying to change the environment – in this case the other factors of the teaching space. In her study of schools and teachers in the United States, Rosenholtz (1989, 2-3) adopts a social organisational perspective:

Teachers, like members of most organizations, shape their beliefs and actions largely in conformance with the structures, policies, and traditions of the workday world around them.

Later in her study, Rosenholtz succeeded in finding support for her theoretical assumption. Teacher talk was linked with the social organisation of their schools, and the teachers' "reality" is at least partly socially constructed (Rosenholtz 1989, 39). Not just the professional environment, but also personal histories, knowledge, skills, and interests shape teachers' thinking (Rosaen 1995, 369; Campbell & Neill 1994, 157).

While the construction process is mostly sub-conscious, the teacher component of the teaching space can be fuzzy and contradictory. For example, some teachers might feel that the learning is deeper when the pupils are talking and there is noise in the classroom. This type of teaching space supports the use of co-operative methods while more silent methods, like process writing, would be diminished. Also, the teachers might feel that if they do not actively teach, but silently observe the pupils' work, they are lazy and not doing their jobs properly. In her teacher development project, Crockett (2002) tried to get a group of teachers to discuss a certain lesson that they had followed. However, no real discussion took place, which Crockett interpreted as the teachers not being able to see any alternative way for a mathematics lesson. Their views about the structure of a mathematics lesson were normative. Furthermore, Crockett's teachers saw manipulatives automatically as a part of mathematics lesson. One could say, that the teachers linked manipulatives with good learning.

The preceding notions are examples of beliefs that are sometimes also called subjective knowledge, views, conceptions or attitudes (Lavonen, Jauhiainen, Koponen & Kurki-Suonio *to be published*). In defining the concept belief, the key question is how it differs from knowledge. Pajares (1992) suggests that knowledge is typically semantically stored, while beliefs are episodic in their nature. Also, the relation between attitude and belief can be seen in a number of different ways (Meri 1998, 48-51). The research on teachers' beliefs has been active. Teachers or student teachers' beliefs on

language arts (Pajares & Graham 1998; Graham, Harris, MacArthur & Fink 2002), mathematics (Philipp, Thanheiser & Clement 2002; Soro 2002), child development (Daniels & Shumow 2003), the relation of pedagogical rules and teachers' beliefs (Meri 1998) and being a good teacher (Virta 2002) have been studied recently – just to name a few examples. Lavonen *et al.* (to be published) noticed that these beliefs do not change easily, as their 40 ECTS in-service training programme divided into 1.5 years did not have any significant effect on teachers' beliefs about the role of experiments in physics.

While the model of Kansanen *et al.* (2000) suggests a structure to the teacher component of the teaching space, the literature review suggested certain areas of content for it (cf. Carter 1990). Of course, a wider meta-study and further research would certainly result in subsuming more areas to the model.

### 5.3.1 World-View

An individual's ideas are usually based on his/her world-view and this also applies to teachers. One's basic view of man, in particular, is the basis for teacher component of teaching space. Briefly, if the teacher sees man as good, he/she trusts that the individuals want to do their best when given a chance. In contrast to the trusting teacher, a sceptical teacher sees that there will be no efforts without pressure and control. It is evident that these teachers try to motivate their students in a very different way and their willingness to use pupil-centred methods is very different.

The basic view of man has a wide variety of results. In her study, Crockett (2002) asked teachers to estimate possible difficulties when solving a certain task in mathematics. In her example, the teacher assumes that if the task is difficult for him, it is difficult for his pupils as well. In a way, the teacher thinks that the pupils are like himself. Further, when discussing mathematics tasks with multiple correct answers, the teachers in Crockett's (2002) study protested: "kids want a pat answer for everything".

### 5.3.2 Role

The teacher's role is hard to define, as several factors seem to affect it. Teachers, like any individuals, have a self-image that includes a conception of one's role (see Chapter 4.5). Although the role evidently affects one's behaviour, it can also have an influence on one's thinking. An individual

might be tempted to complete the expectations of the role or vice versa actively try to change the role by acting in a contradictory way. The teacher's image of his/her role is an important issue in changing existing practices. If the teacher feels that the current practices are aligned with the existing role, he/she might be prone to cling to the existing customs. Therefore, renewing the individual's praxis should go hand in hand with the renewal of the role.

Acker (1999, 108-109) seems to define the teacher's role as things that teachers do: "moving furniture, scouting for cheap supplies while on holiday, placing domestic or other skills at the service of the school". The teacher quoted by Acker (1999, 69-70) mentions only the time spent with the pupils suggesting that the teacher's job is to be in contact with the pupils and not do anything else. However, this "paperwork" has increased (Hargreaves 1994, 125) and in Finland, the school-level curriculum process is one source of work that is not directly related to pupils. All school developers should keep in mind that a class teacher has many priorities, so he/she just cannot focus on developing one thing (Wallace 1998). Lawrence and Veronica (1999) studied the teachers' learning style preferences, which could also be a relevant factor when explaining the role adopted by a teacher.

Generally, the teachers' roles seem to change very slowly. In his U.S. centred article, Cuban (1982) argues that the high school teachers' portrait did not change too much during the 20<sup>th</sup> century. The writer finds this striking, since the teacher training in the 1970s is generally considered to have been of a higher quality than in the beginning of the century. When studying secondary teachers van Veen, Slegers, Bergen and Klasen (2001) noticed that subject matter had a significant association with teachers' orientations. The math and science teachers were more oriented to transmission of knowledge than social studies teachers, while the latter group considered moral education more important than the math and science teachers did. Age seems to have some interplay with teachers' orientations, as teachers who are 41-50 years old were less oriented towards active learning than their younger and older colleagues. Also, when the researchers split the teachers in to groups, the oldest teachers were present more in the groups that were described as traditional and restricted. The "life cycle research" or "career research" suggests that there are some sequential stages for the majority of the teachers (Huberman 1989). Huberman's sequences are well aligned with the results of van Veen *et al.* (2001), and the interplay between experience and classroom practices has also been noted by Kosunen (1994, 286).

### 5.3.3 Anxiety

Anxiety seems to be part of the teacher's thinking and thus, the corresponding part of the teaching space. One would expect that the teachers would avoid themes causing anxiety. The basic problem seems to be that the teachers' job is open-ended and ill defined. There is always something to do and someone to give attention to. Many teachers are hard on themselves and they set high expectations for themselves. (Hargreaves 1994, 126, 145-157; Campbell & Neill 1994, 166) The teachers are often afraid of losing face if their pupils do not have skills required by the pupils' next teacher. A class teacher should be an expert in every subject (Acker 1999, 173). Acker reports that the introduction of the national curriculum in Great Britain caused anxiety for some teachers. These teachers felt bad because they did not meet the expectations set by the national framework (Acker 1999, 174). Hargreaves (1994, 124) suggests that increased accountability to parents and administrators can also cause anxiety.

### 5.3.4 Environment

Today's views of school development stress the importance of teachers' collaboration. Thus, the teachers' attitude towards the environment and colleagues is a critical property of teacher component. Some authors seem to think that teaching requires great individuality and there is an ongoing battle between the shared and the private. A teacher might actively look for isolation, when he/she is scared of external criticism. Such a teacher might agree with Rosaen (1995, 374) that several adults (teacher, co-teacher, researchers) in a single classroom "added complexity to the teachers' and students' worlds". Another teacher would perceive this as stimulating.

Isolation and individualism, as some rather call it, is not necessarily located in workplace conditions, but the teachers' personalities (Hargreaves 1994, 167-169). In the terms of Clandin and Connelly (1995, 13), there is a lot of ownership in the classroom, so visits from outside are daring. Individualism, says Hargreaves (1994, 172-173), can be originally for three distinguishable reasons:

- Constrained individualism is caused by administrative or other situational constraints
- Strategic individualism, where the teacher cling to their own pupils to fulfil the impossibly high standards and tight work schedules set either by themselves or others
- Elective individualism refers to the choice to work alone

As argued above, the teachers look for stability between their personal teaching space and the other parts of the teaching space. If the non-teacher-dependent part of the teaching space changes, a possible ideological clash between the teacher's ideas and external ideas might occur. Van Veen *et al.* (2001) point out that the current emphasis on constructivist theories and the methods derived from these theories might be in conflict with a long serving teachers' basic training and their daily practices. Teacher might think whether the proposed change is practical, if it works, or is it aligned with my desires of change (Hargreaves 1994, 12-13). Or more practically, does the change offer value for time spent (Wallace 1998). Syrjäläinen (2002, 11) argues that some teachers confront the complex and changing environment as depressing and exhausting, while others see it as tempting and inspiring.

## 5.4 Pupils

In their extensive theoretical framework on teachers' beliefs concerning child development, Daniels and Shumow (2003) divide the area into two: the child's mind and the social child. Pupils define the teaching space in a number of ways: age, language, and health of pupils, as well as the size of the group, number of absentees, socio-economic and racial makeup of the class, whether the class is multigraded (Goodlad 1990, 4; Hargreaves 1994, 124). However, the size of the class might have a smaller impact on the environment than one would expect. Campbell and Neill (1994, 92) had no statistically significant interplay between the teacher's preparation time and class size or number of age groups in a single class.

The pupil's age is still the most important grouping factor, although there might be differences corresponding to several years' development in a single class (Campbell & Neill 1994, 81). Understandably, the age has an effect on the subject matter defined by the curriculum, but it affects teaching space through the teacher. Acker (1999, 66) reports that teachers expect

older pupils to be more self-directed and self-pacing than the younger ones, and the teachers of young pupils leave more room for changes of plan. For a teacher who opens the learning environment, the expectation of older pupils' skills can be an unpleasant surprise, since these skills are not learned automatically but through learning and practising.

The teachers tend to link pupils to a certain group. Age and ability levels are suitable criteria for pupils' grouping (Acker 1999, 67-68), but other factors can be used as well. In one lower secondary school, a group of three boys were labelled "the Smithwood mob" as they all came from Smithwood Primary. A short observation of the teachers' discussion did not give any reason for the nickname "mob" except the boys were very reluctant to be in contact with their classmates. Classes tend to have a certain reputation: "'J2 is terrible', Rosalind said a few days later; 'I'm worried about taking them out to games, and Sheila's at the end of her tether.'" (Acker 1999, 111). In teacher's thinking, some individuals give characteristics to the whole group and this view of the groups' properties – not just the age – defines the teaching space. The implications can be surprisingly significant and concrete. Acker (1999, 47) describes how teachers of "difficult children" felt unable to be absent, as the substitute teachers would not manage with them. Obviously, not all children of the group addressed were difficult, but enough were.

As with teachers, the concept of role is essential with pupils. Verkasalo, Tuomivaara and Lindeman (1996) approached the pupil's role from the perspective of values. In their study among high-school pupils and teachers, they noticed that these two groups had distinguishable pictures of the ideal pupil. Horn, Collier, Oxford, Bond and Danserau (1998) were interested to know whether the role of the learner had an influence on the learning outcomes. In their study, the learner could have either a "learner role" that "involved processing, elaborating upon and ultimately remembering information" while a "learner facilitator role" may involve "teaching the material, serving as a 'sounding board' for ideas and providing a supportive emotional environment" (Horn *et al.* 1998).

The teacher-pupil relationship does not affect solely the pupil's learning, but also the teachers occupational health. Schonfeld (2000) studied the symptoms of depression and job satisfaction of fresh women teachers. In this study he found that the so-called episodic stressor scale, which measured things like threat of personal injury, confrontation initiated by an insolent student, or students engaged in fighting, was the best predictor for

self-image, job satisfaction and motivation. The fact that primary teachers tend to have close quasi-mother-like (or quasi-father-like) relations with their pupils (Acker 1999, 106) might be stressful in the long run. However, the pupils can feel the difference between being a person or just an ID (Louis & Marks 1998).

While the teachers' beliefs had been studied, the corresponding matters have been researched with pupils. As with the teachers, there are studies that focus on some (subject-specific) area and other that have more general meaning for the teaching space. Berry and Sahlberg (1996) found that the 14 and 15-year-old pupils did not see learning as a social or self-regulated activity, but rather as transmission of knowledge. Devlin (2002) studied a similar matter with tertiary students, who saw learning "as a quantitative exercise in accumulating facts and knowledge to be remembered in 'practice'" (see also Morris 2001; McLean 2001). Furthermore, Richardson and Placier (2001, 923) argue that pupils are the most important agent of teacher socialisation. It appears that the pupils are a very important defining factor of the teaching space. The pupils' expectations and characteristics might have a stronger effect on teacher behaviour than is normally expected.

## 5.5 Parents

Dalin and Rust (1996, 11) remind us that the "family as an institution has changed in character during the past century, with the extended family and broad household replaced by the nuclear family." The nuclear family as a typical household is gradually changing because of the high divorce rates that lead to so-called new families with children from different marriages. During the 1990s the yearly number of divorces was quite steady at about 50% of the number of marriages (Statistics Finland 2002).

Although pupils' parents rarely physically attend the school, they are very much present in other ways. Officially, the parents are involved through the school boards and parents' associations, which are administratively outside the school. Unofficially, the teachers feel they are in everyday contact with parents through the pupils. Parents are blamed for pupils' bad behaviour (Acker 1999, 106, 139). Hungry children and broken families pose new welfare and support roles for teachers (Churchill & Williamson 1997). In a way, teachers see pupils as ambassadors of their parents. The parents' attitude toward school is in association with their social background (e.g. Rätty, Snellman, Mäntysaari-Hetekorpi & Vornanen 1995; Gorman 1998).

Acker describes the relationship between the teachers and parents as two-fold. Teachers feel unappreciated by parents who come to meet them whenever they want and do not show up to appointments. At the same time, parental praise means a lot to the teachers. (Acker 1999, 140-143)

The communication between the teacher and parents could be divided into direct and non-direct communication. The ends can communicate directly by phone, letters and when parents visit the school, which typically happens at collective celebrations, parent's evenings or face-to-face meetings arranged in some schools as part of the pupil evaluation. The non-direct communication is mediated by the pupil. This communication is informal and its volume outnumbers the direct contact. The pupil might tell a parent what happened in school today. On the other hand, the pupils usually tell teachers about their holidays etc., which the teacher uses to form a picture of the pupils' backgrounds. The danger lies in trusting the objectivity of the small child. In the long run, especially if there is no close relationship between the adults, the parent and teacher might be affected by the non-direct communication and in the case of imbalance with the two contacts, distrust might grow. According to a story, a parent in a parent's meeting started to criticise some occasion that had taken place in the classroom. The teacher interrupted the critic by saying: "Let's make a deal. If you promise not to believe everything what your kid tells about the school, I'll promise not to believe everything I'm hearing about your home."

From the teachers' perspective, the parents do not understand the high number of goals and issues in school, which can lead to a clash of priorities with active parents (Acker 1999, 141-143). Epstein (1995) talks about parents' and teacher's spheres that may be overlapping or separate. The latter might lead to a situation where the teachers envisage parents as enemies instead of partners as suggested by Epstein (1995), Vincent and Tomlinson (1997) and Webb and Vulliamy (1996, 122).

## 5.6 External Networks

Basically, the teacher's relationships can be divided into two groups: "professionally supportive relationships among teachers within schools" and "external networks" (Louis & Marks, 1998). If this dichotomy holds, also the parents should be seen as external assistants who would completely ignore their role as stakeholders. Therefore, in this presentation parents are not combined with the other supportive resources.



The school itself offers a number of resource personnel to collaborate with the class teacher's work: kitchen ladies (serving food, washing dishes), dinner ladies (supervise the eating and playtime), caretaker, cleaning, general assistants (school secretary and others with younger pupils), nurse students, supply teachers, youth training scheme, volunteers, parental help, peripatetic teachers (guitar, violin), nurse and educational psychologist (Acker 1999, 122-123). Some elements are located outside the school: public swimming pool, sports field, church (Acker 1999, 41, 73). Acker (1999, 73-74) summarises that passing through the school's gate causes insecurity for the teachers: increased amount of planning, keeping discipline is more difficult and organisational matters could go wrong, like busses do not arrive on time and asking help from other adults can be tiring.

## 5.7 Materials and Physical Space

It is a common belief that the teachers are prisoners of the school's physical environment:

The ease or difficulty of a teacher's task is largely determined by the accommodation and equipment available. The requirements for a class spending half its time in experiment and activity are very different from those needed for a class spending all its time sitting at desks, and old standards of accommodation are quite inadequate and old types of furniture quite unsuitable. Changes in the school buildings necessarily lag behind changes in teaching method. (Daniel 1947, 68)

Interestingly, the environment does not stand out in the descriptions of the teacher's work. Also its effect on the learning outcomes does not seem to be very important. According to the PISA 2000 survey, the index of schools' physical infrastructure explained only one percent of the variation in the student performance on the combined reading literacy scale (OECD 2001, 173, 182). The school studied by Acker (1999) was located in an oldish building with its advantages and disadvantages. However, although the teachers complained that the lack of space limited activities (Acker 1999, 35), the researcher describes various co-operative and activating working methods taking place. The coins seemed to have two sides: while there was no place for teachers' quiet work (Acker 1999, 35-36), the location of the rooms made it easy to have a teacher-to-teacher talk (Acker 1999, 75).

Acker (1999, 27) points out that the relationship between teachers and their work setting is bi-directional. Teachers can change their surroundings, although “the power to alter their work context is seriously limited” (Acker 1999, 27). While the lack of pencils and exercise books does not seem to be very important when talking about re-designing education, it has a demotivating effect for teachers and the physical limitations are seen as an obstacle for pedagogical development (Acker 1999, 38-40). Although the teaching usually takes place in the school, this is not the only working environment for the teachers. Campbell and Neill (1994, 57-58) noticed that teachers spent 20-25% of their working time off the school premises. In a significantly smaller study among primary teachers in United States, the out-of-school work was 15% (McDaniel-Hine & Willower, 2001). It looks like the teachers’ teaching space extends to their homes as well.

The school size does not necessarily have an important part in the teaching space. Campbell and Neill (1994, 93) observed that in small schools with less than 100 pupils teachers tend to spend more time on organisation (moving pupils from place to another etc.) and on lesson planning. However, Rosenholtz (1989) was not able to link school size to any of her “school realities” which were explained by statistical and qualitative analysis.

The study of Martin (2002) addresses the question about the relationship between the teacher’s pedagogy and the physical teaching space. According to her results the classroom with more space is associated with more pupils-on-task activities. Also, certain ways to organise pupils’ desks are associated with working methods. In the classrooms where desks are organised in circles or in a horseshoe, the lessons were less pupils-on-task oriented compared to the classrooms where the desks were organised as groups. Martin also followed the pupils’ and teacher’s movement during the lessons. On mere supposition it would be easy to say that the more space the pupils have to move in, the more movement is required by the teacher. However, Martin’s results show that in such a situation the teachers tend to move less. When the teachers were interviewed, 54% of the teachers said that the classroom environment has an impact on the planning of their lessons. Based on the correlations found in the study, it seems evident that there is a relationship between the physical environment and the pedagogy, but the direction of a possible causal relationship is unclear.

Happonen (1997) studied the “physical learning environments” in Finland. He focused on special education, which makes it harder to apply the results to the world of a classroom teacher. According to the results, the

teachers were unsatisfied with the versatility and adaptability of the special education classrooms, although the respondents rated these elements very high in their rank of perceived factors. (Happonen 1997) This could be explained by the classroom size that is typically smaller in special education than in mainstream. This is uniform with Martin's thesis: The larger the classroom, the greater the variety of the activities.

According to the review of educational databases, it looks like the traditional learning material, namely textbooks and worksheets, are not considered as an attractive area of research. It appears that computer-based material receives a lot of attention at the cost of traditional yet still widely used printed matters. However, it is a common belief that the learning material directs the teachers' decisions. Some results suggest that such interplay exists (Mehtäläinen 1994), and another studies downplay the connection (Kosunen 1994, 167). It appears that the materials are important tools for a teacher, if not dictating, since sharing or developing materials are often part of development projects (e.g. Bruce & Bruce 2000; Riquarts & Hansen 1998; Lavonen, Meisalo, Autio & Lindh 1998).

## **5.8 Reshaping the Teaching Space**

School development means the change of existing practices and in recent decades the change has been studied closely (see Chapter 2.2) and the theme has encouraged Finnish educational researchers to sum up their thoughts, as well as the leading theories and results of the area (Helakorpi, Juuti & Niemi 1996; Sahlberg 1997; Vanhalakka-Ruoho 2000). Because the principal and the teachers are the ones with most power at the grass roots level, reshaping the teaching space is essential when changing the school. As argued above, the teaching space is constructed of a number of factors that are both external and internal to the teachers. Some parts of the teaching space are invisible and hard to study, but nevertheless they are important factors in the change process.

Using the term "teaching space", the development of the school is an endless negotiation process, where individuals' teaching spaces clash and change each other. Tobin, Tippins and Gallard (1994, 55) write about the change of beliefs in a similar manner:

... we redefined belief as a form of knowledge that is personally viable in the sense that it enables a person to meet his or her goals. Viability is a significant part of the definition because it implies a test of the belief against experience. This can be undertaken only in a social milieu.

In Rosenholtz's (1989) terms, the moving schools are full of fruitful conflicts between the individuals' teaching spaces that make them aware of their space and feel that it is possible to reshape it. In a stuck school, the teaching spaces of the staff room are aligned or there are unresolved conflicts between the individuals' teaching spaces that make the negotiation process unnecessary or impossible. No matter how fruitful the conflicts are, a high number of potential collisions might demoralise potential reformers causing a stuck situation. Jauhiainen's (1995) results suggest that the school-level curriculum process may contribute to the reshaping of teaching space by encouraging the negotiation process. The change should take place at least on two levels: helping the individual teacher to reshape his or her teaching space and making changes in the group and inter-group level in order to enable individuals to function together (Dalin 1993, 96). In their two-year study, Peterson, McCarthy and Elmore (1996) followed the restructuring process in three elementary schools. Their main result was that the teachers' practice is primarily a problem of learning and not one of organisation. This would suggest that the most fundamental determinators of the teaching space are in the level of the teacher.



## 6 DEFINING THE FRAMEWORK OF THE RESEARCH

*One of the original key ideas of the study was to combine the quantitative and qualitative research approaches, although the quantitative component was finally reported elsewhere (see Chapter 7.2). It appeared that the multi-approach interests of the study were aligned with pragmatism, which is referred as the paradigmatic framework of the research. The research is defined as teaching experiment and teacher thinking research.*

### 6.1 Paradigmatic Background

In 1994 the education theorist Wolfgang Klafki visited the University of Helsinki. In his lecture he argued, that combining positivist and hermeneutic paradigms could be a way to understand better teaching and learning. To the researcher, then an undergraduate student, this idea sounded wild and revolutionary. However, this was the time when the pragmatists, the pacifists of the paradigm wars, as Tashakkori and Teddlie (1998, 5) called them, began to get general acceptance.

In the 1980s, the two paradigms, positivist and hermeneutic or quantitative and qualitative, were seen to be ultimately incompatible. Guba and Lincoln (1988) manifested that combining these two approaches and methods is not just a big task, but inherently impossible because of the opposite assumptions of the axioms. A compact summary of the differences between the two approaches is presented by Creswell (1994, 5).

The paradigm wars, as the debate between the warriors of the positivist/quantitative and hermeneutic/qualitative scholar armies is often called, are closely analysed elsewhere (Gage 1989; Tashakkori & Teddlie 1998, 1-11). The warfare tired a number of researchers, who tried to combine the good ideas and methods from both cultures. Using multiple measurements was not a new idea, as Campbell and Fiske (1959) were able to refer to papers published as early as the 1930s where intercorrelations among tests had been used to control validity. Lazarsfeld and Thielens (1958) used a questionnaire that had both multi-choice and open-ended questions to study the tolerance towards communism among U.S. academics. In the 1980s, combining the different paradigms or at least their methods was a subject of more thorough discussion. Jick (1985) and Mathison (1988) saw this methodological triangulation as an instrument for increasing validity and reliability, and getting a holistic view of the phenomena. Patton (1988) asked

why we should neglect the good results gained by combining approaches, although the paradigms seem to be contradictory. Ten years later, Strauss and Corbin (1998, 33) were ready to argue that the use of both approaches should be more than just triangulation, but a true interplay between the methods in different stages of the study.

While the incompatibility thesis states that the positivist and hermeneutic paradigms cannot be combined, the pragmatic paradigm is based on opposite rationale: the methods, logic (deductive or/and inductive) and epistemology (objective or/and subjective) derived from all paradigms can be mixed. The driving force of the research should be research questions, not paradigm or methodology. A single study can stretch from inductive to deductive reasoning, and these can be used simultaneously. The researcher can be both objective and subjective during the course of the study, so there is no need to choose either-or. The researcher's values affect both conducting the research and drawing conclusions, but there is no need to be concerned about. (Tashakkori & Teddlie 1998, 20-30) When it comes to the ontology, the pragmatists see that there is an external world independent of one's mind, but the researcher can never be sure whether the explanation is "real" – and how one could ever know what is "real" (Cherryholmes 1992, 14-15). Tashakkori and Teddlie (1998, 28) summarise that pragmatists "believe that there may be causal relationships but that we will never be able to pin them down." Indeed, as the pragmatism and social constructivism had developed in a shared environment resulting in a concept of pragmatic social constructivism, it would be inviting to link pragmatism and constructivism via Dewey, one of the theorists of pragmatism (Garrison, 1998). However, the Dewey analysis presented by McCarthy and Sears (2000) tends to prove these suggestions false.

If pragmatism gives the researcher such great freedom to follow the research problems, why it is so rarely mentioned? Tashakkori and Teddlie (1998, 22) have noticed that the theorists seem to drop pragmatism when comparing paradigms. Dillon, O'Brien and Heilman (2000) suggest that pragmatism as a paradigm has been misunderstood and ill defined. Perhaps one answer to this neglected status is that, in a way, the pragmatists slope off from the discourse, which has been the core of the theorists' academic self. However, this does not seem to be the case, since the decision to adopt pragmatism has usually come from epistemological arguments (Dillon, O'Brien & Heilman 2000).

When talking about pragmatism, the importance of the paradigmatic discussion to the development of science must be stressed. One should not forget that the evolution of the paradigms has resulted not only in lively academic debate, but also in a wide variety of “concrete” approaches and methods. It would be equally wrong to reject new ideas and think that the current choice is all there is and will ever be.

The above discussion of pragmatism might be distant from the perspective of the current report. However, combining the paradigms was one of the original ideas of the study. Using Habermas’ (1978) concepts the initial cognitive interests of this study were empirical-analytic, because the objective was to document a change process and confirm the change using the quantitative data collected from the pupils (see Chapter 7.2). However, in the final analysis the significance of the hermeneutic interests has become dominant, since the interest is to explore the teaching space of the teachers being studied. One should be careful not to link the change automatically to Habermas’ emancipatory cognitive interest, since it aims at the pursuit of reflection. (Habermas 1978)

## **6.2 Defining the Research**

### **6.2.1 Teaching Experiment**

Teaching experiment is a broad concept that covers a wide range of different approaches. In the teaching experiments based on the qualitative research approach, the researcher tries to describe a variety of interesting observations, while the quantitative teaching experiments try to realise an experimental set-up with clear measuring instruments to verify some argument. This is the typical set-up, but, naturally, the approaches are not necessarily tied to inductive (qualitative) or deductive (quantitative) combinations. The teaching experiment is defined below as a case study that is dynamic and aims to change teaching practices.

Lesh and Kelly (2000, 228-229) present a list of problems of pretest-posttest design when studying innovative instruction programmes: the project’s desired outcomes are not known in the beginning of the study which makes it impossible to develop adequate tests, which might influence on the goals and methods to attain these goals, and finally, it is often hard to reliably compare experimental and control groups. A typical feature of the teaching experiment is that hypotheses are created and tested “on the fly”



(Steffe & Thompson 2000, 277-278). In this case “hypotheses” are not the same as they are understood in deductive research, well-formulated statements that are tested in the experimental setting, but rather those ideas that are polished during the experiment.

According to Lesh and Kelly (2000, 200), the aim of the teaching experiment is not to produce generalisations, but to develop ideas “regardless of whether the relevant development occurs in individuals or in groups.” Lincoln and Guba (1985, 360-364) try to define the case study as “a slice of life” or a “depth of examination of an instance”. From this viewpoint, the study could well have been reported as a case study. When considering this research project as a case study, one should decide whether the cases are individual teachers or the project as a whole. Lincoln and Guba (1985, 362) have given a list of eight content areas that should be included in a case study report. The areas are:

- Substantive considerations
- Explanation of problem, evaluation or policy option
- Description of the context or setting
- Description of the transactions or processes observed
- Discussion of the saliencies that are identified
- Outcomes, “lessons to be learned”
- Methodological considerations
- Description of the credentials of the investigator(s)
- Description of the methods
- Trustworthiness steps taken

The list seems reasonable but challenging from the perspective of teachers’ privacy. In a long-term study like this, the researcher sees and talks with teachers about several things, which often are confidential. If the number of subjects were very low or totally isolated from the readers of the research report, this would not be a problem. However, the key goal and challenge in writing this report has been that the individual subjects could not be identified even by other subjects working in the same school, not to mention their superiors or colleagues. Therefore, although the research was conducted as a case study it was decided not to report it as such.

Researchers generally use some kind of member-check or approval procedure to make sure that the subjects look through the quotations and/or analysis before they are published. However, in the long-term research project,

the researcher and the subjects form a bond, and it is not evident that the teachers are willing to deny publication of some observations that impinge on their privacy but are important arguments in building a certain theory. In this study, the researcher did not want to put teachers in such a position. Nevertheless, most of the quotations were approved by the teachers (all the quotations in Chapter 7), but, because of the tight schedule in finishing the manuscript, several quotations were not put through the approval process (the quotations in Chapter 8). This was not considered to be a problem, since no teachers commented on the part that they had seen and accepted.

For the reader, the decision to carefully hide the profiles of individual teachers can be irritating. It would have been easier to be in touch with the subjects if they would have been described clearly as individuals. In fact, the original idea of the research report was to tell the teachers' stories that could be useful to read for practising teachers. However, it turned out that although there was some development towards more open learning environment in several classes, no significant trajectories could be identified under the phase being studied as initially expected. This substantially influenced the research problems. The following set of research problems kills two birds with one stone. The teachers' privacy could be protected and data could be used efficiently to answer a research question that was still closely related to the area of the research.

When a researcher is engaged to developmental activities with subjects in their own environment, the project is usually described as action research. The approach utilised in this research project is similar to the action research tradition, but it can not be seen as action research. There are differences in both the framework and empirical study. The most fundamental distinction between the action research tradition and this study is the aim of the scientific activity. The research problems of this study require an "interpretive view of education practices", which Carr and Kemmis (1986, 180-181) cannot accept in action research. According to the authors, the interpretive researcher tries to study practice using the ideas of the practitioners and neglecting the external factors. However, the final research question of this study is set to explore both the subjects' intellectual and physical constraints, which is inherently interpretive. Also, most of this information was extracted from the data after the developmental phase, not during it as intended in the consecutive spirals of planning, acting, observing and reflecting (Carr & Kemmis 1986, 165; Lewin 1946).

Furthermore, Carr and Kemmis argue that the subjects' personal knowledge can be developed through praxis, an informed and committed action, which must be distinguished from an habitual or customary one. As only the practitioner can study his own praxis, action research can only be conducted by the practitioner. The task for the researcher is to arrange things so that the practitioners can examine their praxes. (Carr & Kemmis 1986, 190-192) In this study, the researcher did not encourage or require teachers to do anything that could be seen as examining their praxes. However, in the post-interview it turned out that the co-operation had activated the reflection process of some teachers.

The other important way to develop subjects' personal knowledge is "through rational discourse between action researchers and other people with whom they interact" (Carr & Kemmis 1986, 190). In this particular way, the study meets the ideas of the action research tradition.

For some readers, the approach used in the data collection might look like ethnography. Since the idea of teacher development and change was constantly present in the empirical phase, the researcher cannot be seen as a bystander, but an active catalyst. Therefore, the teaching experiment was chosen as a more appropriate framework. Yet, there are good reasons to call this study an ethnography, as all the versions of research questions were descriptive (Shimahara 1995, 84), the final research question deals at least partly with culture (Eisenhart 2001), and the data collection followed the principles of participant observation (Shimahara 1995, 86; Syrjäläinen 1995).

## **6.2.2 Teacher Thinking Research**

The teacher thinking research started from the need to build a bridge between education theory and practice. In the beginning, the area was approached from the theoretical, that is prescriptive, angle, but later the interest in the teachers' cognitive functioning made descriptive methods more fruitful (Lowyck 1990, 88-92). The descriptive approach seems to be dominant in the current research (Udvari-Solner 1996; Artiles & McClafferty 1998; Davies 2000; Butler 2001). Research on teaching tries not only to describe phenomena, but also to optimise the structures and processes of teaching and learning. As this is a very broad goal-setting scholars can invent a great number of research topics. Therefore, slightly more specific goal setting could be useful. (Lowyck 1990, 99-100)

Carter (1990) suggests that there are three types of research on teachers' knowledge:

- 1) Teachers' information processing, including decision making and expert-novice studies
- 2) Teachers' practical knowledge, including personal knowledge and classroom knowledge
- 3) Pedagogical content knowledge, that is, the ways teachers understand and represent subject matter to their students

Although this research also deals with teachers' decision-making, the concept "teachers' practical knowledge" is the most suitable term to describe this study. Yet, the scope in this report is wider than the teacher's thinking, covering other elements of teaching space as well.

Although not originally intended, this research moved towards teaching thinking research, as the development of the teaching space model became the main focus of the report. If the researcher could have predicted the ultimate interest, other data collection methods might have been used (e.g. stimulated recall, think-aloud planning). Yet what once felt like failure turned to success, since the data collected for describing the change appear to serve just as well in their new use. In this research, the teachers' thinking is studied through their everyday practice and discussion instead of artificial interviews.

Elbaz (1990, 15) raises the teachers' voice as an essential concept in teacher thinking research. By voice she does not mean direct quotations from qualitative data, but presenting the phenomena as seen by teachers. According to Elbaz (1990, 16-26) the teachers' voice is:

- non-linear
- integrative
- arranging complexity into patterns, routines or cycles
- personal and linked to context

In this study, the concept of teaching space has the central role and the teacher is in the centre of the model. Most of the classifications used in the analysis are based on factors that make sense to the practising teachers. Therefore, it can be argued that this research fulfils Elbaz's requirements.



## 7 DATA ANALYSIS AND RESULTS

*This chapter presents the data, their analysis using the grounded theory method and the results of the study. The central concept of the study is the teaching space, which was presented using existing literature in Chapter 5. The following section presents the teaching space model built upon the collected data. Summarising chapters are added for those readers who are interested only in the main results.*

### 7.1 Description of the Teachers

As the recruitment of the voluntary teachers is explained above (see Chapter 1), this chapter tries to describe the participating teachers as closely as needed to give the reader enough information about the subjects to enable transferability (Lincoln & Guba 1985). However, since the data analysis is not based on picturing the development of individual teachers, a very thorough description of individuals would not serve any purpose. It would also jeopardise the intimacy of the subjects that has been closely preserved throughout the study. For example, even the researcher's fiancée did not hear the names of the schools during the whole empirical period – or after it was finished.

The number of participating teachers was 11. When asked about their experience as a teacher, the researcher has usually answered by saying that there are teachers who count the elapsed years and teachers who do easier by counting the years to come. Although the teachers' background variables were not used in analysis in any way, they are presented in Table 1 to give the reader overview of the subjects. Beyond the table it should be added that since the 1970s, all Finnish teacher education programmes lead to a Master's degree. The classroom teachers do their research-oriented Master's thesis in education.

The teachers were asked about their motives for participating in the project in the first meeting with the researcher and the matter was discussed from time to time during the project. In the first meeting with the teachers, the researcher explained to each of them that he was interested in the open learning environment, but science can be used as a starting point. Science was the common denominator for all the participants, but six of them wanted

to talk about other matters as well. In two cases, the teachers mentioned that their school has set science as a focus area, and this was why they were participating.

In Finnish primary schools, the classroom teachers often “switch groups” meaning that a teacher who has specialised in a certain subject teaches it to other classes as well. This is typical in music, arts, physical education, foreign languages and crafts. All teachers worked in self-contained classrooms teaching mainly their own class. The teachers in school III are an exception, while their classes formed a “large classroom” that was sized and equipped just like two regular classrooms except without a wall between them. Naturally, these teachers did a lot of joint planning. Teachers 2 and 3 formed another long-term partnership and at least teachers 1 and 4 had more or less long-term partners outside the research group. Teams were evidently an integral part of the professional organisation of school I.

The schools also varied. Schools III and V had been operating for just a few years and the oldest schools (I and IV) were founded in the 1950s. All schools were medium-sized with roughly 15-20 classes for a

**Table 1.** Summary of the teachers’ characteristics.

subject	years in profession (*)	school	sex	grade (1-6)
1	3	I	F	6
2	10	I	F	4
3	10	I	M	4
4	10	I	M	3
5	2	II	M	3
6	30	II	F	3
7	5	III	F	5
8	25	III	M	5
9	1	IV	F	4
10	2	V	F	3
11	3	VI	F	3

\*) Number of academic years as a teacher before the year being studied.

total of 300-400 pupils. However, these figures are very rough estimates. All schools were located in the suburbs of Helsinki, where the population is distinctly middle-class. In school VI, roughly 5-10 percent of the pupils represent ethnic minorities, which is an exceptionally high proportion in Finland.

As the support from the principal has been reported to be crucial in development projects, the principals' role is briefly described. The invitation that was sent to schools to find the interested teachers was processed in different ways in different schools. In one school, the principal contacted the researcher and had actively recruited the teachers to participate. In another school, the letter was presented in the staff meeting. In the third school, the principal had delegated matters to different teachers, so the science representative got the letter and became involved. During the year under study, the researcher introduced himself several times to the latter principal, who always thought he was a substitute teacher – despite the letter that was sent in the beginning of the academic year under study to all principals about the project (cf. Sahlberg 1996, 216). During the year, some principals casually asked about the progress when met in the staff room. However, the researcher could not give any detailed answers, as there was no agreement on giving information about teachers to the principals.

## **7.2 Description of the Data**

The main data of the study are the researcher's notes and transcribed interviews. In addition, some teacher-made worksheets were collected. As explained in the outline of the study (see Chapter 1), the teachers were interviewed before and after the empirical phase. The themes of the pre-interview were motives for participating in the project, expectations concerning the co-operation, most important aims and planning habits. In the post-interview, the teachers were asked how the expectations had been met, what had changed during the year and what helped in the change process, thoughts about the open learning environment and motives for being a teacher. The researcher's notes tried to document the observations: what the teachers, pupils or researcher did and said, how they did it, what the atmosphere was like etc. The notes were written in chronological order, and an effort was made to keep the observations separate from the researcher's thoughts.



The teacher's post-interviews were recorded and transcribed, while the rest of the qualitative data were either written during the lessons or as soon as possible afterwards. The direct note taking was usually possible only when the researcher was following lessons without participating in teaching or advising pupils. In these situations, the researcher was able to write his observations and thoughts directly onto a computer. When the researcher was taking part in activities needing his full attention, like planning with the teacher, the notes were first made in a notebook. If the researcher was engaged in teaching, no note taking was possible. Later on, in most cases in the afternoon after school hours, the researcher transcribed the hand-written notes onto computer while supplementing them with what he recalled. Ironically, these procedures resulted in very detailed notes of classroom events, whereas the planning sessions that reflect the teachers' teaching space were documented in less detailed fashion. However, recording and transcribing these sessions would have been an enormous task and far beyond the available resources. Recording the sessions might also have had an effect on the teacher's responses and made the interaction more formal. This was also why notes were taken manually in the pre-interviews. In the post-interview, audio recording was used as it was considered that the teachers and researcher already had a close and trusting relationship.

The qualitative data consist of 186.748 words in 208 documents. With an average of 500 words a page this makes about 370 pages. All data were written onto computer in order to be able to utilise programs designed for qualitative data analysis. In this case, the program was Atlas.ti.

In addition to the qualitative data, a relative large quantitative data was also collected. The goal was to study a change in the pupils' views of roles using a quasi-experimental setting. The experimental group contained the classes of the 11 teachers and the control group was 6 classes, one class from each school. Three sources of ideas were used in developing the questionnaire: primary and secondary control (Rothbaum, Weisz & Snyder 1982), the teacher's roles in an open learning environment (Lattu 1999) and role-related recipes (Meri 1998). The form contained 41 statements and the answers were given on the 5-step Likert scale (strongly agree ... strongly disagree). Because of possible problems with reading skills, the items were read aloud to all the pupils by the researcher, who conducted the collection of the data. The data were collected twice, in December and May, using the same items, which were in a different order in the pre- and post-test.

Unfortunately, the quantitative data turned out to be hard to interpret. The sensitivity of the instrument was poor causing distributions to differ too much from the normal curve, so no parametric methods could be used. The analysis was continued using non-parametric methods, but since the distributions were heaped there was nothing to be done. The data were analysed with a tailored non-parametric methods and cluster analysis, but since it produced no information that would have helped in answering the research problem of this report, it was decided to completely exclude the data from this report. A summary of the analysis has been presented elsewhere (Lattu 2001).

### 7.3 Grounded Theory and Its Use

Grounded theory has evolved from the ideas of Glaser and Strauss (1971), who presented the framework and method (constant comparative method) for qualitative theory-generation. Since the original book, the authors continued to develop the approach independently to better suit their personal interests. Because of this there are at least two types of grounded theory: Strauss' (Strauss & Corbin, 1998) and Glaser's (1992). However, these two flavours still share the most fundamental ideas: a two-way reading of data and deriving a new theory from that (Silvonen & Keso 1999). At first sight, the approach and the rigorously defined procedures derived from it seem very restrictive. However, this is not the intention. Strauss and Corbin (1998, 12-14) define grounded theory in the following way:

What do Strauss and Corbin mean when they use the term "grounded theory"? They mean theory that was derived from data, systematically gathered and analyzed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another. A researcher does not begin a project with a preconceived theory in mind (unless his or her purpose is to elaborate and extend existing theory). (Strauss & Corbin 1998, 12)

In short, grounded theory is not just the procedures. The main thing is the reason behind the procedures: meaning comparisons, questions and sampling based on evolving theoretical conceptions – not the procedures themselves (Strauss & Corbin 1998, 13-14, 46). No matter how liberal the former sounds, in practice the researcher may feel more comfortable if he/she is able to select one of the two flavours to apply. However, for a pragmatically orientated research project, there is no need to make any clear decision as

the imperative of the process is the research questions and all other factors must follow. To make the reader aware of the analysis procedure of the qualitative data, the phases are described below. The decision regarding the analyst's colours in the Strauss-Glaser battle is left to the reader.

Although Strauss and Corbin were very permissive in defining their method, this study cannot be labelled as "grounded theory research" but rather as a "research using grounded theory analysis". The ideas of grounded theory were not used during the empirical stage. Glaser (1992, 19-20) stresses that data collection and data processing should alternate to gain maximal economy by helping the research to collect and process only the data that are essential for the emerging theory. In this study, there was no formal interplay with the stages of data collection and data analysis. The empirical phase was driven by the needs of the teachers, not by the needs of the researcher. It was not possible to step aside to make an analysis while development was taking place in the classrooms. To fulfil the requirements that grounded theory presents, the empirical phase should have been structured in a completely different way. However, arranging a more longitudinal-oriented study was not possible for economic reasons.

### **7.3.1 Open Coding**

Before beginning to analyse the complete set of material, Strauss and Corbin suggest conducting a microscopic examination of the data. The reason for the close-up analysis is to find relevant categories before moving to the other coding phases, so the research can focus on the significant parts of the data. (Strauss & Corbin 1998, 57-71)

Categories are the building bricks of the grounded theory. The data are split into items and coded in several coding phases. They will result in categories, where one category covers a single concept. Usually the categories emerge from the data, but existing categories can also be used, if they fit the data (Glaser & Strauss 1971, 4). Of course, a category can contain subcategories, which Glaser (1992, 38) calls properties. Once finished, the theory will describe the relations of the concepts. Glaser (1992, 40-45) warns the researcher against creating unnecessary low-level categories and forcing categories into a preconceived framework, as Glaser has interpreted the suggestions of Strauss and Corbin. Writing memos about emerging ideas is an important part of the analysis at this stage, as it is also during other phases (Glaser & Strauss 1971, 107-108; Glaser 1978, 83).

In this study, the researcher open coded all pre-interviews and 32 other documents (out of 194), that is, one fifth of the whole data. The phase was something between microscopic examination and open coding and resulted in 136 different categories. The three focus areas, which are used as a framework for presenting the results of the qualitative data analysis, were selected at this point and phrased as following:

- A) Teaching environment (cf. Learning environment) – there are factors that which make it difficult for teachers to adopt changes
- B) New ideas and what happened to them
- C) What does it look like when a pupil-centred approach is functioning successfully?

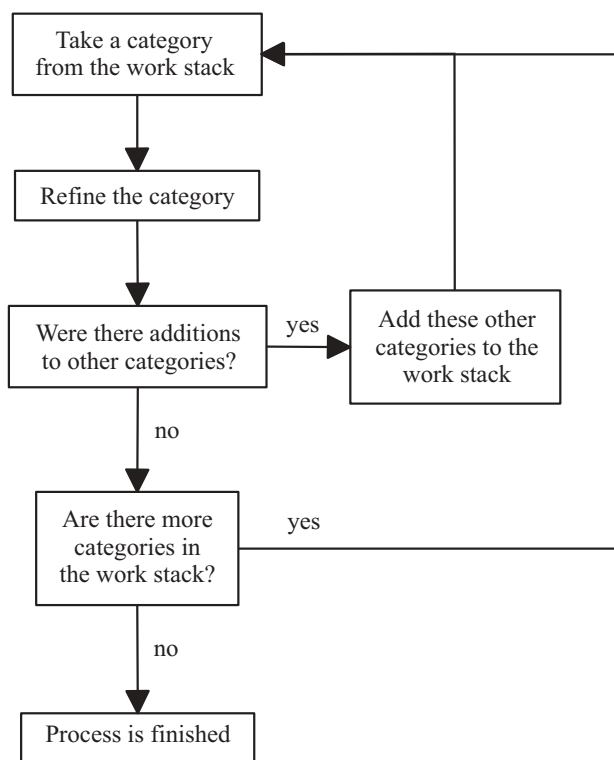
Going through the code list with these focus areas lead to a significantly more targeted code set. For a detailed description of the evolution of the research interests please refer to Chapter 1. Before the analysis continued with the axial coding phase, a brief literature review was made resulting in the skeleton of Chapter 5, which describes the relevant research.

### 7.3.2 Axial Coding

During axial coding, the analyst reassembles data that were fractured during open coding. The data are structured into categories (phenomenon) and subcategories (explaining phenomenon). (Strauss & Corbin 1998, 124-125) Glaser (1992, 61-63) stresses the importance of relying only on the data at this stage. This criticism is targeted at the idea of asking questions of the data, as suggested by Strauss and Corbin. From Glaser's perspective, the analyst's preconceptions could affect the theory-formation through the questions. Normally, analysts tend to verify their coding procedures, for example, by using a second analyst and counting an agreement coefficient. According to Glaser (1992, 67), no verification of the coding process is needed, because "Grounded Theory looks for what is, not what might be, and therefore needs no test."

The final research question was formulated before diving into the axial coding phase. In this research, axial coding meant going through all the categories to make sure that the definition and content were aligned (see Fig 4). This procedure was repeated each time a new category or a sub-category was formed. Later on, the refining process continued by making

adjustments to the coding of the text segments. While some category pairs were by definition mutually exclusive, most categories were overlapping. When a text segment was added to a new category, this category was added or moved to the work stack containing categories to be refined. Refining meant going through all segments in the category and aligning its content with the definition. Discrepancies led either to adjusting the definition or re-coding the segment. If the segment was added or moved to a new category, this new category was added to the work stack, thus leading to refining the new category later on. Adding a category to the work stack after changing its definition was considered unnecessary, as the categories were relatively small containing no more than 50-60 segments. Therefore, it was expected that the analyst could adjust the category definition without necessarily going through the category immediately after the change. Of



**Figure 4.** Iterative refining process that was followed to finish the categories.

course, most of the categories were constantly re-browsed since making additions to them added them to the work stack. This iterative refining process ended when the work stack was empty indicating that no further changes were needed. After this the coding was not modified.

Although not suggested by Glaser, the axial coding phase was ended by a peer review. A PhD, specialised in education, read through the category definitions with the following questions in mind:

- 1) Are the category definitions clear?
- 2) Are the categories mutually independent?
- 3) Are there categories that are (in the reviewer's experience) missing?

The reviewer did not find any major weaknesses in the categorising scheme. Most of the questions and suggestions concerned definitions, which because they were brief did not open up to the reviewer. It was agreed that this was not a problem, since the final report would contain clarifying examples to aid the reader. The reviewing process resulted in only minor adjustments to the definitions and suggested that there is no major overlapping in the categories.

### **7.3.3 Selective Coding**

The selective coding phase aims to integrate and refine the set of categories with the theory. To find a central category, the analyst can use different techniques: writing a storyline, using diagrams and reviewing and sorting memos. (Strauss & Corbin 1998, 146-156) The goal is to reduce the number of elements in the emerging theory to what is essential (Glaser & Strauss 1971, 110-111).

Strauss and Corbin suggest that an analyst ask questions during the analysis. The questions can be sensitising, theoretical, practical or structural and guiding. (Strauss & Corbin 1998, 74-78) Glaser (1992, 76-77) sees these questions as preconceived forcing. In this study, the existing theory was not consciously used before the third coding cycle, as the researcher wanted to see whether there were any submerged themes in the data. However, there was one exception. During the empirical phase, the teachers often referred to factors delimiting their environment. The concept of "teacher's teaching space" seemed a fresh idea, as contemporary academic and professional educational discussion talks a lot about "learner's learning

environment” or “studying environment”. Most of the related literature presented in Chapter 5 was read in between the open and the axial coding phases. Therefore, this was one interest before the selective coding phase, which could have made it, using Glaser’s term, “preconceived”.

A procedure called “Category Networking” was developed to find possible connections between categories. The procedure is related to the Conditional/Consequential Matrix presented by Strauss and Corbin (1998, 181-199) as Category Networking realises some of the purposes of the Conditional/Consequential Matrix. However, originally the Category Networking procedure was not derived from the matrix of Strauss and Corbin but developed individually. The Category Networking procedure processes all categories one-on-one to find overlapping quotations. The number of overlapping quotations is used to calculate two percentages, namely the proportion of the overlapping quotations of the total number of quotations of categories. Counting two “overlapping percentages” instead of using the raw number is meaningful when there was a great difference in the size of the categories compared. For example, the categories *Family as Explanation* ( $N_1=4$ ) and *Pupil’s Mind* ( $N_2=44$ ) have 3 overlapping quotations so the overlapping percentages are 75 and 6, respectively (see also Appendix 1). It can be said even without the qualitative analysis of the overlapping quotations that the relationship between these two categories is asymmetric. The numbers suggest that *Family as Explanation* could be a subconcept of *Pupil’s Mind*. However, such statement cannot be made without a careful qualitative analysis of the overlapping quotations. In this study, the procedure was utilised to focus the analysis on pairs of categories with a high number of shared quotations. One might picture tasks when other criteria would be more appropriate (i.e. low number of connections, very unequal overlapping percentages etc.). A tailor-made program in Perl programming language was written by the researcher to realise the analysis using the Atlas.ti data files.

Writing the theory is part of the method itself. If the analyst has written memos as suggested earlier, the theory can be easily described using these documents, as they are about categories and their relations. (Glaser & Strauss 1971, 7, 113) In this study, the researcher wrote memos concerning the categories, and these memos were the basis of the category definitions.

## 7.4 Teaching Space Model: Categories

This chapter contains descriptions of all the categories. The categories are overlapping by default, whereas exceptions are indicated. The excluding categories were defined where the analyst wanted to clarify the category definition in relation to other categories.

Although the research reports on studies utilising qualitative methods tend to mix the presentation of data, data analysis and even the conclusions, this report tries to keep these levels separated. This section aims to present the categories as-is, while their connections are dealt with later (see Chapter 7.5). However, ideas linked exclusively to the category are discussed in the respective chapter.

The categories are structured to the sub-groups that were used in presenting the theory-based definition of the teaching space (see Chapter 5). Although the most orthodox users of grounded theory would probably see this as “preconceived”, it was used to help those readers who are interested in comparing the literature-based and data-driven teaching space models (for comparison see Chapter 8.1.1). The data-driven structure of the categories is presented in Chapter 7.5.

The quotations were translated from Finnish to English avoiding any significant changes in the original data. For example, the quotation marks appear as they are in the original notes. In quotations, the square brackets [...] suggest that the text inside them is either added, changed or removed to/from the original data to maintain the intimacy of the subjects or to add clarifications for the reader. The brackets (...) appeared also in the original notes. As explained above, the data consist of teachers’ interviews, and researcher’s notes from the lessons and planning sessions. The different types of data are presented mixed, as the contexts become clear from the quotes themselves.

### 7.4.1 Society

Interestingly, the data analysis raised no society-level categories from the material. This finding is addressed below in Chapter 8.1.1.



## 7.4.2 School

### 7.4.2.1 Time

Time screens the teaching space in one way or another. Time has to be taken into account in arrangements or decisions.

[Teacher A]: We should start a project for the able pupils, which they can do while they have spare time. Here [Teacher A] began to talk about working with computers.

[Teacher B]: Acquiring skills in using new computer tools takes time. [Teacher B] said that it is not a problem with the group of able pupils. [2]

They discussed how much time there is for the communications education. [3]

[Teacher A]: Let's have a look at the timetable. They started to browse their diaries. In May, they have a few days field trip and before going there they have to discuss the ecology of the Baltic Sea. [4]

Time is used for some purpose.

The special education group is leaving. The special education teacher is absent today and [the teacher] spends a lot of time with the group. [5]

Furthermore, it would be good to make these experimental phases to clear periods. So that they would be fairly short, these experiments with plants and water. Somewhat... it is kind of, when suddenly it takes six weeks and... It feels like if you could make it tighter and give it a certain shape, then I think it would be good for the morale. [6, appears also as 91]

One of the pupils does nothing, does not get started. With him/her I spend a lot of time. We get the book from the shelf, look for the word "piano" and read what the book says about it. We have to think what does it mean and what to write down. [7]

Busyness.

They went out for the break. I asked [teacher] if he/she has time to discuss the events now. [Teacher] said he/she has not, because there is the next lesson to begin. I said that we should talk about this later. [8]

A had a brief chat with [a teacher], who was busy. The person from ICT support was at school and he/she discussed with him/her. [9]

[Teacher]: Science is a virgin territory for me and I have left it because of the busyness. [10]

### Timetables in general.

We have problems with the timetable and we tried to figure out the best time for me to be at school. Finally [the teacher] said that he/she changes the order of the lessons, as my schedule is harder to change. [11]

However, quotations about lesson-break cycle, school year or other time-related structures are coded to *Time Structures*. If the teacher says that he/she does not have time to plan because of a lesson is starting, the dominant meaning is busyness.

Excludes: *Time Structures*

#### 7.4.2.2 Time Structures

Time-related structures like school-wide schedules, lesson-break cycle or school year. The structures can prevent action or it is used as a framework. In the former the structures are limiting, in the latter they are supporting.

Related to this, I remember another sequence-related matter mentioned by the [teacher]. He/she had a principle about going through two chapters in a week. As there were three lessons in a week you had to go through two lessons during them. [12]

Then you have this problem of timetables, what you can sometimes try to stretch yourself, but in reality it's a bit hard, when you have this three-quarters-lesson-break-continuum, it is a bit hard sometimes.

- You mean the rhythm?

Yeah, the rhythm. And when the kids have the rhythm it is sometimes hard to break. [13]

[The teacher] began by telling how [the school] is a very traditional school. "We are the only primary in Helsinki with 45-minute lessons". Has had some theme days, where his/her own class has worked on one theme. [14]

[The teacher] told that they had planned a half-hour break for the whole school to allow teachers to meet each other. [15]

[The teacher] had asked the pupils whether they prefer getting their work all at once [i.e. getting all exercises at the beginning of week on Monday] or a lesson-by-lesson approach. Pupils had said they that they like to get it all at once.

[Teacher]: For me the lesson-by-lesson approach is handier, as otherwise the pupils do completely different things and the same pupils have problems all the time, anyway. [16]

[The teacher] had had a mathematics lesson on Wednesday afternoon from 2 to 3 o'clock, and the pupils had been very tired. [The teacher] thought that the hour should be spent on something that the pupils felt like doing. [17]

Referring structures does not automatically result in the quotation being included in this category. If the reference to time is neutral and contains no screening, it is coded as *Time*.

Excludes: *Time*

### 7.4.2.3 Principal

Quotations referring to the principal. He/she acts or the teacher is referring to him/her.

[The teacher] thinks that there is bad atmosphere in the staff room because the current principal lets a group of women boss people around. "When you don't have to pull together, you pull in different directions." [18]

[The teacher] pops in to say that he/she would have called the parents but the principal had wanted to wait. [Teacher]: I think that in a case like this it would be best to contact the parents as soon as possible. [19]

[The teacher] mentioned that the principal had given my letter [to the principals about applying for financial support] to him/her and asked him/her to take care of it. [The teacher] said that the principal is waiting to retire: "There is only one start left for me." [Here the principal, quoted by the teacher, refers to the last academic year in his/her career] [20]

There was very little data about pedagogic discussions between teachers and principals. Typically, the instances are very technical.

The principal came to us [me and the pupils] in the corridor and asked if they had paid attention in the assembly. (Obviously I had not, because I did not know what he/she was talking about. It turned out that the principal had demanded that pupils pay attention to their behaviour.) The pupils quieten down. [The teacher] continued at the lunchroom door: "It is unheard of that the principal has to remind our class about a matter like this. How many of us think that the principal was talking to me?" Few hands were raised. [21]

The relationships between teachers and principals were remote even in the schools where the principal spent a lot of time in the staff room. It is evident that a great deal of this documented remoteness is caused by the data collection procedure. The researcher did not participate in the staff meetings or other occasions where the principal would have a clear role.

#### 7.4.2.4 Work Community

A teacher refers to or values staff members as a community. Common guidelines. Also contains references to small-scale co-operation if the segment is of value.

We went to the staff room. There was a sign on the door: "Pupil! Do not forget to address teachers correctly." [Teacher]: This is a demarcation in the culture of the school. Some teachers want pupils ask 'Is teacher so-and-so present'. [22] [In Finnish schools, it is typical that pupils call the teachers by their forename.]

How it could succeed, it is, that you would train and commit the whole school to it. But if it is just you doing something, finally... The school is no longer that you teach your lessons and go home to plan, but a great many bits and pieces, groups, planning, meetings and insane things are part of it. Yeah... So if you could just concentrate on that one thing you could succeed, but it is full of other things as well. [23, appears also as 271]

Sure and maybe I had a bit of a bad conscience or felt that way when I joined [the research project] like... We had such a general spirit here in our staff room that we're given a paper and we do as it says. [24]

If the reference does not contain any value or pedagogical thinking, the proper categories can be *Other Teachers* or *Teachers' Co-operation*.

#### 7.4.2.5 Other Teachers

A teacher mentions another teacher.

There were many references to instances of informal and short-term co-operation.

We proceeded to mother tongue. They decided to consult the lower secondary teacher about whether to teach sentence constituents or not. [25]

We met another teacher on our way downstairs. I introduced myself. [Teacher]: Will you have any spare machines in the computer lab? If I send some pupils that need computers to your class you can do the same to me. [26]

Long-term systematic co-operation (e.g. joint planning) is coded as *Teachers' Co-operation*, but short-term discussions (e.g. suggesting material or approach) belong to this category. Obviously, the distinction between short-term and long-term co-operation is not clear-cut. Long-term co-operation may appear like a casual chat in the staff room, as teachers do not often have scheduled time for meetings. Teachers also get feedback directly from their colleagues and by benchmarking:

[Teacher A]: [Teacher B] (colleague [of Teacher A]) said one day that he/she saw that you have made the classroom look nice. [27]

I come to the classroom and the pupils are gradually going home. They have presented a shadow theatre for other classes in their own class today. There is an upbeat mood in the classroom. [The teacher] tells that pupils have got a lot of thank-yous from other teachers. [28]

[The teacher] commented on [the meeting of the teachers of the research project] by saying that it was a relief to hear that the others haven't done too much either. You get easily the feeling that your own things are minor and think that others achieve much more. ([The teacher] repeated this a few times during the day) [29]

In one case, the feedback was from the teachers of another school:

The principal began. He/she emphasised the multiculturalism of the school as a richness. Told that they had got good unofficial feedback about the pupils' multicultural skills (my own term). The principal thought this was important capital in the global world of tomorrow. [30]

There were also examples where other teachers cause pressure:

Others have done it for a couple of weeks but I haven't even started yet. I haven't mentioned it to other teachers. When there are too many of these things they set off a red light and everything goes over here (moves his/her hand over his/her head). [31]

Quotations referring to the principal are coded to *Principal*. Special education teachers, school psychologists and other professional resources come under *Supporting Network*.

Excludes: *Teachers' Co-operation*, *Supporting Network*

### 7.4.2.6 Teachers' Co-operation

Formal and/or long-term co-operation between the teachers.

During the break before the lesson [the teacher] tells that they have started a project on the geography of Finland in Environmental and Natural Studies. The project is done as group work. The teacher of the parallel class and the special education teacher are participating. The latter is working with a certain group of pupils. [32]

[The teacher] says that he/she will go to plan the mother tongue test with the teacher of the parallel class, but he/she will be around if needed. [33]

I asked [the teacher] why the doors [of the classrooms] are kept [open] so often. [The teacher] says that he/she does not know. Instantly [the teacher] says the classroom will become very hot otherwise. Continues by telling, that it might be part of this general change, that you can go into classrooms just like that. In the old days, the staff rooms were very different; you did not say anything about your own work. Now there is co-operation, teams and organised peer support. [34]

[The teacher] started to talk about how co-operation is difficult and how they haven't been able to start the co-working. [The teacher] believed that the reason was their differences as teachers. [35]

The other thing that was discussed [at the staff room] during the break was whether there was a staff meeting today. Some teachers some teachers affected an air of boredom. [Teacher A]: "Couldn't care less, in fact this club sandwich interests me much more." [Teacher B]: "I could go home at 12 o'clock, I really don't want to hang around school." [36]

Short-term co-operation or contact belongs to *Other Teachers*. References to short-time consultations come under *Teachers' Co-operation* if they seem to be part of a long-term process.

[Teacher]: "Have a nice weekend. You have the music lesson." The pupils are pushing to the neighbouring classroom. Suddenly the music teacher rushes in and says: "[Teacher A], there was a quarrel in my class and I need to sort it out." [Teacher A to the pupils]: "Wait a minute." [37] [Same teachers elsewhere:] [Teacher A] asks [Teacher B] how he/she taught photosynthesis. [Teacher B]: I drew a primitive picture and... (explained) [38]

[The teacher] pops in and says that he/she will go and ask [the music teacher] how to proceed in the matter. [39]

Co-operation with professionals other than the teachers is marked as *Supporting Network*, *Parent-Teacher Co-operation*, or *Teacher-Researcher Co-operation*.

Excludes: *Other Teachers*, *Supporting Network*

#### 7.4.2.7 Curriculum

Quotations referring to either the framework curriculum or the school's own curriculum. Evaluating, describing or using the curriculum document. Ideas for developing the school's curriculum. Using the learning material as a curriculum. The curriculum is mentioned as a factor of the teaching space. A teacher uses the school's curriculum to familiarise himself or herself with the school.

While planning lessons:

They have Northern Europe in the curriculum. He/she would also like to teach some science. There is "friction" in the textbook. [40]

We stayed in the classroom [after the pupils had left for the break]. [The teacher] began to talk about the curriculum, how it should [be rewritten] to include matters that could be easily dealt with in an experimental way. [41]

[The teacher] looked at the curriculum and told that he/she will do it in four units. In the autumn there would be water combining the physical characteristics and the life forms (adapting to water), the Nordic Countries (including the climate and the climatic zones). In the spring term there would be air and organisms adapting to air. (I wonder what the FOURTH unit was as I have not written it down...) [42]

In some references, the curriculum was seen as restricting, while opposite views were also present.

[Teacher:] But those degrees of freedom have been very rare during the year. But I don't know how it would be possible, after all. [Researcher:] Why isn't it possible? [Teacher:] You what? [Researcher:] Why isn't it possible? [Teacher:] Well if you think that we have a certain curriculum which we are implementing and I have a certain structure about the subject-matter of a subject, how the knowledge is built... like what kind of bricks they should have available. But of course, within the limits of those it would be possible. [43]

[The teacher] wanted to teach water and air along with the things in the curriculum, because they could be easily dealt with in an exploratory way. [44]

By following the teachers' work, it was easy to get the impression that the school-level curriculum work had contributed to their awareness of a curriculum. However, in the planning situations the curriculum was not the main source of support (see Chapter 7.5.2).

#### 7.4.2.8 School Routines

School routines, like assembly, lunch etc.

Two pupils were drinking water from the tap in the back of the classroom. [The teacher] hurried them because there would be assembly in church in a minute. [45]

We are waiting for pupils to wander in from the lunch. [The teacher] says aloud: No point in starting before everyone gets here. [46]

Time was spent clearing up pupils' absences in the beginning of the lesson. [47]

The break ends. [The teacher] goes to fetch the pupils from the yard. [48]

Time-related structures and routines likely come under *Time Structures*.

Excludes: *School Premises*

#### 7.4.2.9 Exceptions

Exceptions to customary routines or schedules.

The pupils enumerate their times reserved with the dentist. Oppressive situation. The pupils somehow hope that the teacher would take care of their appointments. There will be someone from the Finnish Nature League to observe the signs of spring tomorrow with the pupils. We are going to go to outdoors. Some pupils have appointments with the dentist even during this lesson. [The teacher]: Oh my, this is difficult. [49]

I think it was [Teacher A] who said that they have one hour of some fuzzy bumbling around since we're waiting for the girls to come from the swimming pool. [50]

Tomorrow's special day (workshops of the culture week) causes problems with the schedule, because [the teacher] is teaching classes 1-2 [who don't participate in the week like his/her own class]. [51]



One of the weeks is an evaluation week, where the teachers have lessons just for their own pupils. [Teacher]: You could do a project that week. On the other hand, there is a lot of work already, but you could manage if you'd plan it well. [52]

[The teacher] started by talking about the past day. [Teacher]: In such situations the pupils can be at their best and everyone can take his/her own place. This was an ideal. Even those who weren't acting have been useful. Some made syrup for the actors and another worked as a doorman advising visitors where to put their coats etc. [53]

[The teacher] also told that there have been four pupils attending special education, weak boys ([the teacher] mentioned their sex). Because of this you had to be careful not to advance with the whole group, if the four are away. [54]

As can be seen from the examples, the exceptions are seen mostly in a negative light or causing problems.

#### 7.4.2.10 Summary of the Sub-Group "School"

The school component of the teaching space has two major components: time and community. The time is referred as a consumable resource or busyness, which makes you to do things in an easy way that is familiar to you. This model distinguishes the general references to time (category *Time*) from the concept of *Time Structures*, which refers to organisation-level schedules. The *Time Structures*, especially, had a supporting nature. Although the exceptions to the normal procedures were generally perceived as welcome, they seemed to always cause trouble for the teachers.

The community is described using the concepts *Principal*, *Work Community*, *Other Teachers*, *Teachers' Co-operation*, *Curriculum* and *School Routines*. In this data, the principal seemed remote, but this can be the result of the data-collection process that focused on classroom activities. In most cases the teachers felt collegial support was a resource, but there were exceptions where the teachers thought it caused pressures. Following the teachers' co-operation is a challenging task, because for an observer it is not always obvious whether the brief chats are part of a long-term co-operation or just what they seem to be, since finding common time for meetings is hard. The curriculum was seen as an active document that could and should be renewed.

### 7.4.3 Teacher

#### 7.4.3.1 Aims

A teacher describes, formulates or discusses general aims or values. Subject-specific objectives fall into *Objectives*.

[Researcher]: As you are with them so much anyway why don't you do it more systematically? Collect these pupils as a group of their own? [Teacher]: I wanted to give them the same opportunity I gave to the others. I didn't want to take it away right in the beginning. [55]

We had a long discussion about the rules. [The teacher] was irritated because the special education class had privileges. They had a set place for smoking, right by the school. He/she did not like the idea of a group in the school that is above the rules. [56]

[About homework] [Teacher]: The pupils show it themselves and sometimes I look. I check the exercises but I think that it is more useful to use the time to support the weak rather than checking them. [57]

Yeah, well before I have concentrated on the inquiry methods. I wouldn't say that it's not important anymore, like understanding the learning process, evaluating and developing mental models. But it is important that they really can do some things. [58]

[The class is discussing how to form the kitchen helper pairs.] Dealing with the issue took 10 to 15 minutes. (This is a typical example of how time is allocated to important things. [The teacher] values common decision-making and time was given to it.) [59]

In an interesting reference, the teacher is questioning the unimpugned status of the objective-driven teaching process:

[Teacher while planning]: Could we teach something without requiring it in tests? (An interesting question. This is it, the teaching has become so goal-oriented that one can not imagine teaching anything without checking the pupils' performance.) [60]

### 7.4.3.2 Objectives

A teacher describes, formulates or discusses objectives that are usually directly related to the subject matter. Other planning comes under *Planning* and general aims under *Aims*.

[The teacher] wanted to skip the structures of different materials (fat, carbohydrates) that were in the workbook, since they seemed to be too complex for the pupils. [61]

[The teacher] fetched the curriculum on my request, but it was very superficial. It mentioned Nordic Countries, Baltic and Baltic Sea, environmental factors and a couple of other things. Water was not mentioned at all, but [the teacher] decided to include it anyway. The curriculum did not offer any support for this, although there was “making observations” etc. in the general aims. [62]

[The teacher] is browsing through the formative test (taken from a teacher’s book). [Teacher]: I don’t know whether it would have been a better idea to talk about the decimals and not change them to millimetres, considering this test. [63]

But at the same time there is fear and feeling about the amount of information. The selection of subject matter that took place was pretty furious. When studying like this we have to decide not to learn the names of the rivers, which is a stupid thing as such. But learning to identify species, which might have been instead of this... I feel slightly scared about what we have lost. [64]

### 7.4.3.3 Planning

Justifications for the use of time, selection of subject matter, organisation and methods, as well as other thinking related to planning. Also covers the context-derived thinking, which in some cases can resemble Schön’s (1983) reflection-in-action.

[The teacher] is sitting in the staff room and browsing through the maths book. He/she tells that he/she knows what to do. He/she has decided to teach as suggested in the book (first you count the unit price and the totals). After that he/she will give some problem-solving tasks that can be written on the blackboard. [65]

[Teacher] starts to talk through the mother language lessons and exercises from the books and handouts. Assigns them to the next week’s timetable. [66, appears also as 111]

We discussed how you have to give special activities for both weak and capable pupils in order to avoid the tag of remedial education. [The teacher] told that he/she has a quite permanent group for remedial education and he/she does not want to mix it with this. [67]

I'm sure you notice that I have a number of ideas, but I can't make up my mind. Some ideas are forgotten and some get realised. I think them over and over and change them in the nick of time, if needed. If I don't make any of them my business I forget them and they're thrown away. [68]

To support the formation of the groups [the teacher] had made a sociograph. (He/she collected data for this when I was visiting the class recently. The question was who would the pupils like to see in the same group. You could name three boys and three girls.) [69]

### Examples of context-derived thinking:

I continued by telling how I can recognise certain pupils who likely started the disturbance. I kept circling around them and could keep them working without saying too much. This worked well. [70]

(The discussion [in the class] was not going anywhere. They talked over each other etc.) [Teacher]: "I did that on purpose, they had had to concentrate so much in the forest when we were thinking together. If you twist them all the time they'll go crazy." [71]

Excludes: *Realising Teaching*

#### 7.4.3.4 Subject Mastery

References to the teacher's subject mastery.

[Teacher] was worried about whether he/she knew his/her subject well enough. He/she repeated what he/she said in the pre-interview, that he/she was from an arts home that did not encourage science. The school could not get [teacher] interested in science either. [72]

Quite quickly we found ourselves in the middle of the things that were unfamiliar to us both. One was how the animal actually uses the nutriment it gets from the prey. It is easy to understand how the sugar is used but what about the others... [Teacher] was unsure about photosynthesis, burning and breathing. [73]

[Teacher] said that he/she is nervous about encountering matters that could not be answered by him/her (I think he/she mentioned this in the classroom as well). I replied that you just have to say that you don't know. [Teacher]: Or find out. [Researcher]: The explanation can be too difficult for the pupils to understand. [74]

For some reason we started to chat about the principle of the compass. [Teacher]: Isn't it like in the North Pole there is a lot of iron that pulls it? [Researcher]: I don't buy that, if it would be like that the compass wouldn't work in the southern hemisphere. [Teacher]: Does it work the same way in the south? I thought it shows the opposite direction. [75]

#### 7.4.3.5 Realising Teaching

The teaching is realised, that is, the teacher does some things in order to organise and/or support the pupils' learning. This category can also be understood as implementing the teacher's plan, thus an outcome of *Planning*. It should be noted that the teaching is understood in its narrow meaning, not covering planning and evaluation as usual.

[The teacher] walked from one pupil group to another. He/she says to me that the time flies when walking amongst the pupils. Some of the groups were in the corridor, two were in the library and four in the classroom. [76]

[The teacher] comes to say that teaching the use of computers is hard because there is no data projector. The projector has been brought to the classroom but is not connected to any of the computers. Two pupils uses computers in the corridor, there are six machines with one pupil on each of them. So [the teacher] can advise one pupil at a time. [77]

[The teacher] goes to the classroom and starts to divide the pupils into groups. Grouses about boys and girls not wanting to form mixed groups. In one group, a boy sits far away from the others, as there would be... [78]

The use of school premises is coded to *School Premises*. If the quotation is directed towards teaching in the future it is coded to *Planning*, even when the time span is very short.

Excludes: *School Premises*, *Planning*

### 7.4.3.6 Stuck-On-Action

Teacher is stuck on action without being able to get an overall picture of the activity.

We go through these stages, the stages of research. But it can easily happen that at some point it gets diffused and everyone is at a different stage. Like what succeeded this year which was a picture that we used [to concretise the stages]. Before I have tried to guide the structure and the search for information, guide using the stages. But then the work has fallen apart in the very early phase. Like everyone is at very different stages and I feel like all I can do is just hang on. Like it has just entangled me with the action. [79, appears also as 270]

### 7.4.3.7 Assessment and Evaluation

Pupils' formal assessment or informal evaluation by the pupil himself or herself, the teacher, or parents.

We also discussed who answered [during the previous lesson]. [Teacher] told that one boy talked a lot although he is not normally shining too much. I said that there were a lot of girls who were active as well. [80]

[The teachers] are discussing and using the weak students as indicators whether everyone understands the matters. One of them says this aloud: I'm now using X as an indicator, I think they will master these things. [81]

They should take a test in maths. [Teacher] starts to browse through the ready-made test forms on the last pages of the book [label removed]. A suitable test is found. [82]

Planning and evaluation combined:

Some [pupils] do not feel like making the plan (and obviously the same applies to following the realisation of it). [The teacher] justifies the importance of using a planning form by the pupils' differing pace. He/she wants to see who is moving on and where. It is easiest for him/her to do that using the forms. And of course the larger assignments get chopped into smaller bits because of the form. [Teacher] collects the forms several times a week. He/she has a look at the plan and the realisation part of the form. Marks "significant question marks" to missing parts or if the description of the pupil's activities is not clear enough. [83]

### Pupils and parents as evaluators:

[Teacher] tells pupils to go through their maths homework in small groups. This takes a couple of minutes. [84]

And one thing which was also new, although I have done it another way was the succeeding self-evaluation and the evaluation by parents about the book and the project. [Researcher]: Well, you mentioned that this project has been praised. Would you elaborate on that? [Teacher]: Well yeah... The evaluations written by the parents were such that you could read between the lines that they were excited. The pupils got praise from the others about the work they've done, from each other and the parents. [85]

### Testing and student-centred learning:

Well in a way you think, like... Considering that the traditional tests do not support the idea of pupil-centredness. Like first you work hard on a project with splendid results and then you get a grade based on a test, it's not correct in a way. Like what and how you evaluate, how you estimate the know-how. Finally you have to fill in the report form, like measure your knowledge in some subject. There are skills, but... This is one thing that makes you wonder. [86]

If the evaluation is focused on the teacher by the parents the proper category is *Parents Approach Teacher*. Pupil's initiatives are categorised under *Pupil's Act*.

#### 7.4.3.8 Plan Does Not Get Realised

The pre-planned teaching does not get carried out as planned.

[The teacher] said he/she almost lost his/her nerve when things were not running as they should. But it was all right, after all. [87]

I do not recall the exact thread of our discussion. Perhaps we got back to [the teacher] being disappointed with pupils' progress. It had been so slow. [The teacher] said that the pupils have problems understanding what they were reading. [88]

They had made the concept maps in the groups. Pupils had discussed the matter and made shared maps. This had taken a surprisingly long time, two hours. [The teacher] is going to continue with this tomorrow. [89]

We discussed with [the teacher] almost exclusively about the project concerning the geography of Finland. [The teacher] told that the work had been prolonged because his/her objectives were a bit too ambitious. [90]

Most of the quotations in this category referred to the use of time, that is, more time had been used compared to the initial plans (see Chapter 7.5.2).

#### 7.4.3.9 To Be Improved

The teacher mentions a thing that he/she must improve in his or her work or thinking. This category overlaps with *Teacher's Uncertainty*.

Furthermore, it would be good to get these experimental phases to clear periods. So that they would be fairly short, these experiments with plants and water. Somewhat... it is kind of, when suddenly it takes six weeks and... It feels like if you could make it tighter and give it a certain shape, then I think it would be good for the morale. [91, appears also as 6]

[The teacher] is afraid whether there is enough control for the pupils. During the year he/she has worried because of a lack of it. [92]

[The teacher]: This is my problem, I always try to make things out of nothing. You could get better acquainted with the ready-made materials. [93]

#### 7.4.3.10 Teacher's Confidence

Teacher's feeling of confidence.

Then about assessing maths. Giving marks was an easy way for [the teacher] to follow pupils' progress in his/her own bookkeeping. Last year, the tests were given back to the pupils corrected. The pupils could have seen how they had done, but there were no marks. [94]

We talked further about the feeling of uncertainty that [the teacher] had had. He/she had not had any idea where to go. [Teacher:] You could do it briefly by giving worksheets. [95, appears also as 114]

[A teacher and the researcher are talking about pupil-centredness.] [Teacher]: But for me... I couldn't or wouldn't like to start that. I don't think it... I think it would, it would jeopardise that, like what if I'm not here next year. Like, I feel that for me it is important that I can go through the things that are defined by the curriculum. [96]



It appears that in many references confidence is build up from order and control. The teachers felt confident when there was a clear guideline to follow.

#### 7.4.3.11 Teacher's Uncertainty

The teacher's feeling of uncertainty and inferiority (comparing self to others). This category also covers tiredness, except if caused by physical factors. If so, the proper categories are *Teacher's Fatigue* (work-related) and *Personal Life* (private-life-related). Uncertainty caused by external factors.

Lack of authority:

[The teacher] said that he/she definitely wants to follow the book. If he/she does not do so, he/she will feel uncertain. [97, appears also as 109]

I sit at the teacher's table in the dining room, where [the teacher] and four other teachers sit. They talk about choosing applicants for a permanent post. Somehow we start talk about grading student teachers' teaching skills at the end of their studies. Teachers are astonished on hearing that the grades have not been given for years. Someone asks how they know any more how good a teacher is. [98]

Lack of pedagogic skills:

But when you begin that by the teacher-lead way like hey, there is a thing. But somehow, I don't know, maybe you're still so green that you can't do it in an unnoticed or non-teacher way. You should do it like via a backdoor or something, like oops there is this something, how do you think it works, or something. [99]

After the lesson I had a feeling that this kind of work is really something new for [Teacher A]. And also for [Teacher B]. What is it that makes it so different? It was hard for both to organise pupils to select subjects [for their project work]. Or maybe "hard" is the wrong word. Of course they would have dealt with it [without my help], but they both had to pause to think how to do it. It did not spring to their minds just like that. Also, both kept asking my advice even in the smallest matters. [100]

Learning outcomes:

We went on talking about the textbooks. [Teacher] said that the pupils learn to critically analyse information sources, but whether they learn anything about species is not known to him/her. [101]

Yeah well, I've talked with you dozens of times about what is learning, what is the meaning of doing things and does any real learning occur. Like that has been my problem in these experimental things, like do they really learn anything (laughs). [Teacher refers to pupils doing science experiments.] [102, appears also as 127]

### Professional questions:

[Teacher]: I was every minute bound to special education pupils. I don't know what to do with them. I don't want to leave them alone and on the other hand I don't want to give them any colouring-book assignments. [103]

### Comparing to other teachers:

[Teacher A]: I must say that I'm a pretty lousy teacher. [Teacher A] had visited the classroom of [Teacher B], who had had a list of conjunctives on the notice board. [Teacher A] had started to think that his/her class had studied the same things, but he/she did not have anything on the walls about them. [104]

### External factors:

Three girls come to the classroom door and one of them says [to the teacher]: Could you have a look at her foot because it doesn't move at all. [Teacher] goes to the pupils and closes the door [behind him/her]. [105]

[Teacher] says that he/she feels oppressed: "Like I am between a rock and a hard place." On one side there are parents and on the other me [the researcher]. During Open House, one of the parents asked "is it always like this in here" referring to pupils chatting with each other. [106, appears also as 1]

In some quotations, the inferiority was intertwined with improvements. Teachers are not sure whether some task was carried out properly. These quotations are coded as *To Be Improved*, as the key concept is considered to be improvement, while one is uncertain whether the need to improve really exists. These two concepts are obviously overlapping.

When measuring the uncertainty we should once again be careful not to forget the context of the study. The teachers had applied to the teacher development program concerning science teaching and considered the researcher an expert in the field. With the assistance of the researcher, they taught domains which they normally might have completely skipped or at least paid less attention to. The context seems to favour the teachers' uncertainty.

### 7.4.3.12 Sources of Support

Where to get support. Can refer to both human and other sources of support. In this category, four distinctive subcategories were found.

#### Materials:

There was a general agreement to start with the science, because it is more concrete and there is material for that ([The teacher] had the books with him/her). [107]

[The teacher] said that otherwise the pupils won't get anything. [Teacher]: Or is this again an attempt to play safe, like when it is in the notebooks it is in there somewhere and dealt with. [108]

[The teacher] said that he/she definitely wants to follow the book. If he/she does not do so, he/she will feel uncertain. He/she is not so much disturbed when leaping over five or ten chapters, but he/she wants to do things in order. In the beginning of autumn we dealt with the mushrooms [before they appeared in the book] and now when they are approaching the mushrooms he/she is noticeably disturbed by the fact that they are already dealt with and must be skipped. [109, appears also as 97]

#### Time structures:

They talked about what to do in next week's lessons. The discussion was supported by the timetable. Thus, they planned the coming week. [110]

[The teacher] starts to talk through the mother language lessons and exercises from the books and handouts. Assigns them to next week's timetable. [111, appears also as 66]

#### Making clearer definitions:

Like there was the definition and the structure like... what I learned from it, like it is possible to keep it in check. Like it easily begins to spread around. That felt good to have it defined. [112]

(thinking) The idea of wholeness is linked to this. There could be a short period of time, where I "precisely and safely" ([the teacher] used these words) define the subjects and goals. I could "safely" think about giving personal assignments to different pupils beforehand. [113]

**Role:**

We talked further about the feeling of uncertainty that [the teacher] had had. He/she had not had any idea where to go. [Teacher:] You could do it briefly by giving worksheets. [114, appears also as 95]

[Teacher]: There is no energy or time to think about a new approach. Then you do like you've done before. [115]

**7.4.3.13 Teacher's Experiences**

Experiences from previous teaching and learning situations, which in one way or another come up in the discussions. The quotations falling into this category always contain a real incident that is addressed.

**Success:**

And the success... It has been a positive feeling noticing that you can succeed in science like I did. [116]

[Teacher]: This is brilliant! I felt like being a science teacher! [117, appears also as 266]

Well I think the best part of it was the discussions with the children. Like combining their thoughts into a whole. Like we are doing a shared mind map on the blackboard about water and its behaviour. And the pupils tell things, with a slight help from the adults who place it into its true context and we get a pretty complete picture of the forms of water. [118]

[Researcher]: I was thinking about what you just said... Oh yes, why has it been more motivating to you? [Teacher]: Because, taking it on a practical level: I see that pupils enjoy and they want to do things. I don't have to strangle them and say that you just have to do this. Well of course there are always ones who won't get anywhere, but the general picture is that pupils feel better themselves and they want to do things. Then if I have to interrupt after few hours work they ask whether they can finish this at home or look for information on this and that at home. If so, you're doing all right, aren't you? [119]

**Lack of success:**

... with the six-graders I didn't succeed too well. I had a bad conscience when failing to get them to think, while they had other things in mind. [120]

### Own teacher:

[Teacher] thought back to what his/her own teacher had said about chatting when he/she had been in the 6<sup>th</sup> grade: You talk all the time, but you still get your things done. So if he/she thought this way, then [the teacher] can let pupils talk. (Interesting how [teacher] openly tells that his/her own teacher affects his/her thinking.) [121]

#### 7.4.3.14 Insight into Teaching-Studying-Learning

Teacher's insight into the teaching-studying-learning process. The category is named after Uljens' (1997, 36-38) concept.

Learning was often approached from the framework of academic skills:

They are, like... In a way it is interesting that they are useful for both good and bad pupils, or so-called good and bad. But for a certain kind of pupil, which has an ability to perceive things and look for information. For pupils that have certain skills. The reading skills have to be good enough to find the main points. Surely, it gives a lot more than just reading a book. But then I've started to feel more and more that for those pupils who have lost their basic skills it is even a waste of time. Although they learn those skills, the content doesn't take any form, which would be important, like at least something should stick in their minds. But I have comforted myself that they've learned to look for information from various sources and that way learned to perceive the knowledge and this world. But less attention has been paid to some matters. [122]

A few times teachers justified their decisions with short statements that could be called recipes. The researcher was not able to ask about the reasons behind the recipes. Without deeper discussion the recipes seem biased and simplified, which is not necessarily the case.

Pupils can work either alone or in pairs. [Teacher]: A group of three starts to be a bit ineffectual. [123]

Some references suggest that there are matters that can be taught using a student-centred approach and matters that must be gone through with teacher-lead methods. Student-centredness is considered to be easier for pupils and teachers must continuously justify the use of these methods at

least for themselves. It might be that the teachers feel uncomfortable with the student-centredness as it seems to be less effective than the teacher-lead approach.

[Researcher]: How about after these, are you going to do some pair work? [Teacher]: Yes, after we have gone through the basic stuff. [124]

Surely we intend to continue a lot like this, like increasing the amount of it. We start with history next year and it is a good subject for planning something, too. [125]

We should continue with biology. We have been on a bird expedition with my own class and things have been casual. [126]

Yeah well, I've talked with you dozens of times about what is learning, what is the meaning of doing things, and does any real learning occur. Like that has been my problem in these experimental things, like do they really learn anything (laughs). [Teacher refers to pupils doing science experiments.] [127, appears also as 102]

It takes a lot of time to do it a different way. [128]

The following references suggest that learning should be a clear-cut period with separable phases and simple conclusions.

According to what [the teacher] said I believed that he/she was surprised at how confusing it was and how hard it was to reach a conclusion. [The teacher] had wanted to reach a clear conclusion that would not have left a fuzzy impression. [129]

[Researcher:] What was it, what was the good of it? [Teacher:] I suppose there was some kind of a structure after all. It had a beginning and there was a sort of a motivation, then there was a working phase, then we looked at what we have achieved and the de-briefing. [130, appears also as 268]

Excludes: *Personal Preferences*

#### 7.4.3.15 Teacher Education

Teacher education is mentioned. Includes both pre-service education and in-service training.

I have graduated from the University of [City]. And well, I don't want to advertise and praise my university, but I have already heard about these things during my basic education. And some, who have studied in [another university] have said

that they had not heard a thing. And there are concepts and terms that are not familiar to them. But they were discussed in [City]. And the feeling was already in those days, that this is something to pursue. [131]

There you see, although you're a young teacher, if you haven't got it as a regular tool via your education or via another way. Although we have talked a lot about it, we have just talked about our regular evaluation. [132]

[Teacher] started to think aloud what the pupils actually learned in the previous exercises. Is the main goal that they can work in a group or that 1 litre takes 10 decilitres? [Teacher]: I often think the latter. When I got my pre-service education teamwork and such were no goals. It was important to use correct expressions and build knowledge in a correct way. [133]

We talked about the type of teacher that is promoted in the pre-service education. [The two teachers] who had finished their pre-service education recently said that now the training encourages pupil-centred methods. [134]

Whenever the education had seemed to have had an effect on teachers' thinking, it was the pre-service education that was meant. References to in-service training were technical:

... has been ill and in training and according to his/her own words he/she came to fix and have a look at what the substitute has brought about. [135]

The fact that the in-service training did not come out in discussions suggests that it had not had a great effect on teachers' thinking.

#### **7.4.3.16 Personal Preferences**

The teacher describes his or her personal preferences or customs. Preferences in this category are justified more by personal taste than rational justification, which makes it different from other similar categories.

[Researcher]: Have you that, what's... why doesn't it [change in general] take place? [Teacher]: Well I have been thinking, yeah, it troubles me knowing that I could do things in a better or different way. But then, I dunno. Actually, finally, is it a matter of character or it just doesn't like... Like I don't in real life consider it important although you might think that this is something you should. [136]

[Teacher] mentioned [a local alternative school], they've contacted him/her and asked for a substitute. I asked is [the teacher] attracted to [that particular alternative pedagogy]. [The teacher] said yes, but there are things that he/she dislikes. He/she also likes the "normal teaching" and cannot stand the chaos that is inherent in this pedagogy. [137]

... and the other thing is that the experimental working methods produce a lot of noise and discussion and I am very bad at standing noise. Of course it makes less noise when you have pupils write and draw in their notebooks. It is so heavenly peaceful but it is by no means creative or useful for the kids. [138]

[The teacher] regretted that he/she is a lazy person who doesn't want to go to great pains. [139]

Excludes: *Insight into Teaching-Studying-Learning, Teacher's Role*

#### 7.4.3.17 Teacher's Role

What and/or how a teacher should act or is accustomed to do.

Defining the role in the level of action:

[The teacher] says that his/her work ethic does not allow making photocopies in the staff room in the middle of a lesson. You cannot leave the pupils in a classroom on their own. (I'm not sure how he/she exactly put this.) [140]

[Researcher]: Have you thought about letting them to check the homework themselves in groups? [Teacher]: You mean that they would go through the exercises themselves? [Researcher]: Yeah. [Teacher]: That has never crossed my mind. [141]

[The teacher] tells about an in-service training day at their school. They had had group work and all teachers had felt that the trainer had tried to make short work of it. (Somehow this describes the atmosphere in the school. They wanted someone to tell them things and they would have listened.) [142] [Elsewhere in the same document:] [The teacher] continued by saying that the teacher's book contains ready-made instructions about co-operative learning, but he/she feels that the teacher won't do his/her work when doing something like this. [Researcher]: Often after teaching by the teacher-lead approach you feel that you've been working hard. [Teacher]: ... earned your living. [143] [Yet another quotation from the same teacher:] I continued by saying that when the pupils are doing their group work, I'm there stimulating and asking questions. [The teacher] commented that in everyday life you use this time to do your own work. [144]



... so I liked it when there was an outsider, who brings intensity to certain situations. Because you're never a prophet in your own land, you know. And I think it really works well. Like if I would go for a bird trip it would result in chaos although I know birds. So it's good when an outsider comes, who makes them listen and be quiet. [145]

Let's say, in a way it has been there before I began my studies or got acquainted with the school. Like a certain ideal that there is this open learning environment and the pupils are very independent and they can do different things at different times... And the role of the teacher is advising and steering... defining somewhat, creating structure and so on. Like it isn't necessary to be a disseminator of knowledge. [146]

The teacher's role is defined in a quite concrete way in the data. Again, this is likely to be a result of the nature of the discussions between the researcher and the teachers.

Excludes: *Personal Preferences*

#### 7.4.3.18 Change in Thinking

Change in teacher's pedagogical thinking. Describes the process of change or compares two situations (before ... now). The teacher can look back at previous changes in his or her thinking.

(sigh) Well I think I have changed totally opposite from (begins to laugh) the change you'd perceived. Like I've been very open and, somewhat... or I wouldn't say I'm not like that now, but I have moved to a more traditional direction. Now I've realised that they really have to learn some knowledge. And I've become much more exact about let's say requiring them to do their homework and know the things. And we have been nasty and even had some spot checks. [147]

[Teacher]: I feel like a learner, I look for experiences on running projects like this. How much time they take etc. They have to have a base and I'm now building that base. [148] [Same teacher elsewhere]: Yeah, well in a way your daring builds, you find your limits, weaknesses and strengths. So that's what this is also about. [149]

So I have been thinking a lot, well, as I have been working as a teacher for a long time it is terribly hard to change my own habits. But I have slightly begun to think, think that well... this... that I can change my customs and I can use the experimental methods. But it requires a lot of work from me. It is by no means a

matter of course for me. [150] [Same teacher elsewhere]: They can work by themselves and I have tried not to step in all the time. I don't step in all the time, which is typical of me, the stepping in. [151]

Naturally the resource is very limited, which you can invest yourself. So I dunno if I could have been able to reach any more than I did. If you've had, if there would have been just five of us, it would have brought... doubled that time. We could have... But I dunno if that would have been a solution, because these aren't such matters, which can be improved with quantity. [152]

I think that was a screamingly good wholeness which I would like them all to be like. Of course there could be a little adjustment here and there and some phases took a bit too much time, or... But that was exactly something which slowly becomes a habit when you do it a lot. [153]

According to the quotations above, the teachers themselves see the change as a long-term development that is closely tied to their work. All these quotations are from the post-interviews suggesting that the change is not present in the discourse of a regular workday. Thus, the change should take place on-site but it does not happen without support and attention.

#### 7.4.3.19 Employment

Positive and negative factors of the teacher's work. References to pay, employment or an assignment. Motives to work as a teacher. Direct references to working hours comes under *Working Hours*.

The kids are something. Working with them is somehow very rewarding. This is the main reason to have doubts about other professions, in them you couldn't work with kids any more. At least not as much as now. I enjoy being with kids. [154]

I thought that in this work you have to be up-to-date, you have to develop yourself and learn new things. Perhaps that has been it. But I have also experienced being with children as meaningful. Although it was not that, that wasn't my reason to apply to [the teacher education programme] because the kids are so sweet (laughs). [155]

Well, the regularity of it. You have regular working hours, you have regular pay, and... of course the short days and long holidays, they're nothing to despise. [156]

While the positive factors were dealing with people and the dynamic nature of the work, the very same elements had their flip sides:

Yeah, then I think that I'll get bored at some point. I know myself well enough. There should be always new challenges and new things around. [157]

On the other hand the breadth, although it is a burden. I do feel truly enthusiastic about the things I teach and try to pass on. It is... there is always challenges as much as you want to take. Maybe that's it, there won't be a feeling of doing the same from day to day and never get finished. Okay, you won't necessarily never be finished, but the feelings of success depend also on yourself. [158]

Excludes: *Working Hours*

#### 7.4.3.20 Working Hours

References to working hours, work done out of hours and the amount of work. Other references to work are coded as *Employment*.

Like these projects... First of all, a project with not much ready-made material can be carried out like... err... within the time and energy I have. [159]

[Teacher]: I will be able to do just one test. (Meant that the test should be aligned with the exercises and if there were to be a great variance within the exercises there should be a greater variance in the test.) You have to make things easy for yourself, there are so many things to do. [160]

[The teacher] repeated his/her principle that he/she works during the lessons and will not be at school in the afternoons. [161]

Excludes: *Employment*

#### 7.4.3.21 Other Tasks

Tasks which the teacher considers "other tasks" or are classified as such by the researcher. Here, "other tasks" mean tasks that are not directly related to teaching. However, most of these tasks can be seen as part of the teacher's job.

Some teachers participated in the school administration as deputy principals or members of committees. In many schools, the principals have delegated tasks for teachers to take care of.

Like this year more than usually... I've been compelled to be, do the work of a deputy principal. Like somehow in this work the two things get balanced. Sometimes I feel that I have a bad conscience about the teacher part. It is just this situation and we have to live with it. [162]

And then, there is this work at the executive board which is in a way a large part of my week. Like the organisation of it like... somehow developed my own view about managing a school. And what is it like to work in a leading position and present things to teachers. [163]

At the level of the school [the teacher] receives all papers concerning in-service training. He/she also deals with recycling and other environmental issues of the school. Now he/she has arranged a visiting counsellor and an exhibition about recycling from the Helsinki Metropolitan Area Council. Additionally, he/she takes care of the staff room by collecting money [for the coffee] and by washing the coffee cups. [The teacher] is also a member of the IT-related information team, but he/she has tried to withdraw from that. [164]

Although the cleaners and caretakers do the maintenance of the school, there are other maintenance duties that are taken care of by the teachers.

Another teacher came to say that there is a stuck username. [The teacher] had to go to release the ID. [Teacher]: I have to go to release a username. It takes two minutes to do that. You have to wait quietly here. I'll ask [the researcher] whether you've been quiet. [165]

During the break, we go to fix cables of an electric bass guitar in the crafts workshop. [166]

Several different organisations are competing for the teachers' attention. Usually these organisations supply material for short-term projects, which sometimes are even supported by a national campaign in the media. During the period under study, the teachers participated in projects concerning osteoporosis, democratic decision-making process, recycling and supporting pupils' off-school physical exercise.

[The teacher] mentioned that he/she has participated in the campaign of the Finnish Sports Federation and regretted the decision. It requires a lot of work from the teacher. The teacher should keep a record of the pupils' sport activities and update them to some network server. [167]

After all, there are numerous other tasks that the teachers perform daily. This should not come as a surprise, as the teachers are the main human resource in the school. If extra help is needed, it is likely to be provided by the teachers.

[The teacher] explained the business to the substitute, [sentence removed]. The secretary comes and asks if 15 Koreans can visit the school tomorrow. [168]

Numerous things can happen on your way from the staff room to the class and while getting there you've already forgotten a thing or two. And then you have to completely change the plan like you can't run the lesson as you've planned, whatever. It is chopping and changing all the time. [169]

Parent-teacher co-operation, co-operation with staff members and working pupil's conflicts fall into their respective groups (e.g. *Parent-Teacher Co-operation*, *Teachers' Co-operation*, pupil-related categories) if the teacher does not consider these "other tasks".

Labelling this category as "other tasks" may be a conversation piece for someone, as these are tasks that have generally been considered an inherent part of the teacher's work. In this set of categories, the core task of a teacher is teaching and all other duties are seen as secondary, although it is agreed that they are part of the job of the teacher and usually essential to the development of a successful teacher-learner relationship.

### 7.4.3.22 Teacher's Absence

Teachers are absent or talk about being absent, although the absence is possibly never realised. Being absent means a long-term absence lasting at least a few hours. Short visits outside the classroom are not included in any of the categories.

[Teacher A] and [Teacher B] began to discuss where to find substitutes for them. One problem day was Thursday. The problem was that [Teacher A] has just a few lessons on Thursday which makes it a less lucrative day for a substitute. This conversation lasted about 20 minutes. [Teacher A]: G-ddamit, we're running out of days! [The end of the term was approaching.] When you have a chance to go to training the time is wrong! [170]

While talking to the electric project for the third and fourth grade pupils [the teacher] said that he/she does not know anything about the plan, as he/she has been absent. [171]

[Teacher]: I'm so busy. I have to supervise pupils on three breaks today. Last week I was absent for a day, on another day we were at the [Firm] candy factory, and on a third day we watched a play at the school. [172]

### 7.4.3.23 Teacher's Fatigue

Occasions where teachers indicate fatigue and possible causes for it.

[Teacher in the morning]: I've been working on the [school] budget till 8 o'clock and now I'm *tabula rasa*. [173]

[Teacher]: "It almost feels like when you've overcome the Monday you have overcome the whole week." I asked how Monday differs from other days. [The teacher] told that he/she sleeps badly the previous night because the work springs to mind. [174]

Well yeah, in a way the pupil-centredness requires controlling and foreseeing situations. Then you have to be very... very aware of the situations in order to lead them somewhere. And during the moments you're tired, it is pretty hard. You'd like to sit down and, hey, write some story in your red notebook (laughs). [175]

If fatigue is caused by the teacher's private life the correct category is *Personal Life*.

### 7.4.3.24 Personal Life

Quotations related to teacher's personal life.

These quotations were quite rare presumably because of the moderately formal relationship between the researcher and the teachers. As there was no spare time in the meetings, the discussions dealt with professional topics. However, there were exceptions:

Well I have this situation at home, a small child at home. Yeah, well it will be there in the future as well, small or little. At least I feel that my mental capacities are not endless in that respect, as sometimes I feel really exhausted. [176]

[Teacher in parent's meeting]: I have no other general things except this autumnal fatigue. I think that in most cases the reason is staying up too late. I don't have kids of my own so I don't know what to do with this. [177]

There is a category *Teacher's Fatigue* that is used for fatigue caused by work.

#### 7.4.3.25 Summary of the Sub-Group "Teacher"

The teacher component has the highest number of categories in the teaching space model. This could suggest that the teacher's level has the central role in the teaching space instead of organisational or physical factors, as often argued. However, it can also be a result of the classroom-focused data-collection process.

It appears that the teachers' *Insight into Teaching-Studying-Learning* is mainly based on the pre-service education and previous experiences with pupils. Generally, if teachers referred to professional education they meant pre-service education, as the in-service education was present only when discussing *Teacher's Absence*. The teachers saw that a good learning process is a clear-cut and well-structured period. Actually, clarifying the definitions of the assignments was one of the *Sources of Support*, while others were *Materials*, *Time Structures* and *Teacher's Role*. Also the *Personal Preference* affected the decisions. Teachers are open to new evaluation practices involving pupils and parents to the evaluation process.

According to this analysis, the *Teacher's Uncertainty* was caused by lack of authority, lack of pedagogic skills, doubtfulness about the learning outcomes, doubt about professional questions and comparing self to colleagues. There were also examples of pupils and parents causing perceived uncertainty. There were much less references to *Teacher's Confidence*, which seems to grow from order, control and clarity.

The *Change in Thinking* was perceived as hard and time-consuming. However, at least the teachers referred to saw change as a process and had reflective thoughts about themselves in the process. When reflecting on their teaching, the focus was quite one-dimensional, as time was the main criterion for success. Yet, this observation can be caused by teachers prolonging the period if the desired learning did not take place. In this case, the learning process or outcome was the criteria and not only the time.

## 7.4.4 Pupils

### 7.4.4.1 Pupil's Skills

The teacher refers to pupil's academic skills, learning skills or developmental stage, or how these factors affect the teaching space in other ways.

Three subcategories can be distinguished based on the context of the references.

While planning lessons:

[The teacher] told that the parallel classes are very uneven. He/she said that the classes have been divided by putting all the smart pupils to one and dumb ones to another ([the teacher] did not use these words). [The teacher] teaches the same subjects to both classes and different methods have to be used for the two. [178]

Like at least I have some pupils, one should really think how to make their school going a bit more challenging. For example, my [pupil] in maths, he/she has taken a giant leap in the development of his/her own thinking and so on... so he/she is interested in maths and how you fuel that. Again, the other group is much weaker. Like there is this bit more advanced, how to help him/her. [179]

In-action:

At the end of a lesson [the teacher] gives personal homework to everyone depending on the page they are at in the workbook. [180]

Evaluation:

[The teacher] was pleased with the advance last week. I tried to ask what had made him/her feel this way. [The teacher] answered that on average the pupils had worked and found things from the encyclopaedias. Of course there are weak ones who had not succeeded as well as that. [181]

[After a self-evaluation of a project:] [The teacher] had been very convinced that everyone would feel like they had learned and succeeded well. However, this was not the case. [The teacher] speculated what should be done. [The teacher:] Pupils had been very stressed by the self-evaluation. Some had asked if they could renew the evaluation. It was very hard for them to check what they had been doing and what they had not learned. Pupils considered this a test although [the teacher] had tried to explain that the pupils are making the evaluation for themselves. [182]

[The teacher:] Because of the immigrants (it was their turn to perform) I didn't want to get into details, because they had problems with the language. [183]



Of course, there were also several references that did not fit any of these categories.

Pupil: “Teacher, what did we get for homework in maths? I was with the special education teacher at the time.” [The teacher]: “Go and ask [Pupil B].” [184]

I told that in another school the teachers would have liked to get an adult to teach kids to play. [The teacher] said that this is understandable. Some children cannot play and unload their energy on something nice, on nasty things instead. [185]

Excludes: *Pupil’s Attribute*

#### 7.4.4.2 Pupil’s Act

The pupil’s opinion, act or initiative affects or tries to affect the teaching space. The act can be presumed by the teacher, for example, while planning.

In most cases the pupils’ act is initiated by the teacher, who opens the learning environment:

[The teacher] had told beforehand about the plan, as he/she had let pupils arrange the seating in a similar manner. It had proven to be functional. [186]

[The teacher explains to the researcher why pupils should be able to choose working methods and subjects of their projects:] And somehow, somehow err... they would gradually become apparent that they are interested in different things than I am and sometimes they could work in the area they’re self interested in. [187]

[The teacher] to all pupils: “This was the first time that you got more exercises for the whole week at once, wasn’t it? Please tell how you felt about it?” Pupil A: “Why can’t we always do like that?” Pupils start to discuss whether it was good or not. Pupil A: “You’ll get less work in this system.” [188]

However, there were cases where the pupils attempt to reshape their learning environment themselves:

I heard [the teacher] saying that he/she will not back down in some objective. Apparently [the pupil] has complained a goal is too hard. [189]

When [the teacher] comes back he/she asks what is the scheduled activity for this lesson. Pupil A reads aloud: “[The teacher].” Pupil B: Shucks... [The teacher]: But you’ve known this for a couple of days. [190]

[The researcher]: What's new with the stars-and-snowman thing? [The teacher]: I've tried to ask the pupils how they feel about it. We're also evaluating the class as an entity. That the control would become conscious. But after all, I am the policeman who decides. I've got a clear message from the pupils that there is too much noise and they're suffering from it. A message for me that to keep them in their place. [191]

Different from the other two, the third subcategory is composed of references describing how the teachers anticipated pupil behaviour:

Pupils anyway expect us to put the stickers (laughs) and maybe change the seating. [192]

[The teacher] agreed that we can let the pupils to do the work in groups. But naturally the weak pupils work with each other. [193]

While leaving the staff room [the teacher] says that there will be a great mess. But then you just have to try the same working method over and over again. [194]

[Teacher]: Sure I know there are these group work things but I'm very cynical about them. I believe that those who are normally quiet are also quiet in a group. [195]

[The teacher] is planning a worksheet, as the pupils should have something concrete. They consider it important. [196]

The latter group indicates that the teachers foresee pupils' expectations as very traditional, thus a relatively closed learning environment would best fulfil the expectations. In order to change teacher behaviour, the teacher's pupil expectation schema should be modified.

#### 7.4.4.3 Pupil's Attribute

The pupil's capacity other than skill (*Pupil's Skills*), mind (*Pupil's Mind*), or problem behaviour (*Pupil's Problem Behaviour*) affects the teaching space.

I asked about [the teacher's] system in forming the groups. First, he/she had assigned all groups with an even number of girls and boys. Then a strong girl and a strong boy were chosen for each group. Weak pupils were distributed among the groups. After that [the teacher] made sure that there was no best friends or conflicts in any of the groups. [197]

I sat in front of the classroom on the edge of the cathedra. [The teacher] sat in front of the class behind the teacher's desk. We were listening to the assembly [from the loudspeaker] which was assisted by a member of the local church. When the music stopped [the teacher] said the name of a pupil and showed him/her out. Pupil A moved to the corridor. When the assembly was over he/she returned. Somebody asked why the pupil had been outside. Pupil B said: "He/she has his/her own religion." [The teacher] repeated the same: "He/she has his/her own religion." [198]

[The teacher] has taught a special need pupil with a disease that prevents him/her from being anywhere with a lot of other people. [199]

The subgroups of this category could have been selected to follow the other pupil-related categories, for example, *Pupil's Skills* and *Pupil's Problem Behaviour*. However, the attribute-based subcategories seemed more meaningful than the context-based division.

Excludes: *Pupil's Skills*, *Pupil's Mind*, *Pupil's Problem Behaviour*

#### 7.4.4.4 Pupil's Problem Behaviour

The pupil's problem behaviour affects the teaching space. Here the perspective is either the teacher or researcher's.

While planning lessons:

The small-group lesson followed the division of the [foreign] language groups. Each pupil had English as the foreign language. I asked [the teacher] for the basis for forming the groups. He/she said that they were divided as equal as possible. [The teacher]: I'll try to ease the work of the English teacher by not putting all the troublemakers into same group. [200]

Like you could go into a classroom where the band works eagerly and not strictly this and this, but the band swap opinions and are busy with things and so on. That would be neat, that I would like to achieve. But I dunno if it ever happens, because there are breaks, there are lunch hours, and there are 27 pupils or 25, and there are weak pupils who make noise in there. It is such balancing and compromising all the time. [201]

In-action (some of these could also be categorised under *Other Tasks*):

We had hard luck right from the beginning. One pupil of [the teacher] had locked himself/herself in the toilet and [the teacher] had to leave to sort things out. He/she was away for almost the whole lesson. [202]

When I come to the classroom after the break somebody tells me that Pupil A has thrown a chair at someone. I see right away how Pupil A hits the back of Pupil B, who is leaned over a desk and turned his/her back on Pupil A. [203]

[Teacher]: Now I can't concentrate on this any more, I have the next issue in my mind (bullying meeting [with some pupils and parents]). [204, appears also as 231]

#### Other:

After some lesson I noticed a sign with different rules by the door. I remember just one of them: "Do not burp." I asked [the teacher] for the history of the sign. He/she did not say anything and I understood that it was because there were still pupils in the classroom. When they had left the teacher told that in the beginning the class was terrible. There was a never-ending chain of meetings with parents, pupils, school psychologist etc. [The teacher] had been thinking whether to apply for early retirement. The pupils had been running senselessly in the corridor, there had been burping contests in the classroom etc. Bit by bit things had become better. The sign had been made when they wanted (I have a picture that it was the pupils who had wanted but I'm not sure – besides this is the information got from [the teacher] and not an absolute truth) a list where to check behaviour-related things. [205]

Some of the in-action references would also suit *Other Tasks*, but the primary category is *Pupil's Problem Behaviour* when applicable. Likewise, the references in the planning context are very similar to *Pupil's Attribute*, with the attribute being problem behaviour. Here the *Pupil's Problem Behaviour* category is considered a dictating one.

Excludes: *Pupil's Attribute*

#### 7.4.4.5 Pupil's Mind

The pupil's mind, morale or motivation is referred to.

While planning lessons:

[The teacher A and B] are talking about the timetable. They use pupil and teacher's tiredness as an argument when discussing the small-group lessons. (These lessons were evidently seen to be valuable and which should be placed well and effectively to make the work "effective", which was the word used.) [206]

Yeah, I don't know about these permanent groups. It can be pretty rough for pupils to be forced to be with a difficult pupil all the time. [207]

[The teacher] added that two lessons in a row is a long time and pupils can't work through it at one sitting. You have to do something different for the last 30 minutes. [208]

#### In-action:

The lesson began and the pupils rushed to the computers. All pupils seemed to work with project-related activities. Only two pupils had chosen map exercises that were for those who had already finished the project. Other pupils wrote texts, some were still looking for information from the Net. No unnecessary activity could be observed except one pupil. He/she was a group leader and waited for the teaching [about composing www-pages] to begin. [209]

#### Reflective phase:

[The teacher] told that one of pupils [...] was depressed. [The teacher] had found the pupil crying in the corridor. Also the mother had noticed that the pupil was unresponsive at home. [The teacher] had scheduled a meeting with the mother. [210]

[Teacher]: These pupils have a high work ethic, "no side-step responsibilities here". It is pleasing as well, they can say that I've done that. [211]

[Teacher]: The pupils could find the information from the Net quite well. The group work phase failed. The group sizes and group chemistry changed. [...] Some pupils couldn't cope with each other. [212]

The pupil-centredness appeared in this category as a factor that increases the pupil's motivation.

Excludes: *Pupil's Attribute*

#### 7.4.4.6 Pupil's Insight into Role

The pupil has an insight into the role concerning him or her, other pupils or the teacher. This insight affects the teaching space.

[The teacher] begins to return maths tests. Take these and have look at them. Pupil: "Should we ask for a signature [from the parents]?" "No." "Well, why are you giving these to us?" "For you to have a look at them." [213]

That's what I thought right in the beginning when I started with the class. They've been taught in a very traditional way and I had a situation where I didn't want to change their expectations. [214]

When the pupils go out to wait for the teacher to come and perform an independent warm-up: they play football, like 15 or 20 blokes playing the same game, no problems, they give their best shot and all goes really well. Then the game is interrupted and gathered in a group, I'll count them and we discuss what to do during the games. We'll say that those who want to play football go there, arrange a game, and it will never work. It takes five minutes and there's a fight: shabby teams. Like when it is allowed or the thing to do, for some reason it doesn't work. [215]

Considering the nature of the data, this category is based on mainly teachers' ideas (c.f. *Pupil's Act*) and the researcher's observation notes. Naturally, to meaningfully study this subject different data should be collected.

#### **7.4.4.7 Summary of the Sub-Group "Pupils"**

*Pupil's Skills* is maybe the most significant pupil-origin factor of the teaching space. Although the teachers usually mention problem behaviour as the main challenge in a modern school, the *Pupil's Problem Behaviour* does not have a similar pervasive effect throughout the teacher's actions as the *Pupil's Skills*. If pupils actively affect the teacher's teaching space by their own actions (*Pupil's Act*), it is likely planned by the teacher. The teachers try to foresee the pupil's acts and take this into account in their own behaviour. The perceived *Pupil's Insight into Role* seems to cause similar proactive operations. However, whether these anticipations are based on observations of this particular pupil group or teachers' teaching space (e.g. *Insight into Teaching-Studying-Learning, Personal Preferences*) cannot be determined from the data.

### **7.4.5 Parents**

#### **7.4.5.1 Teacher's Comments on Parents**

Teacher's comments on parents to the researcher or colleagues. The teacher says something directly to parents.

[The teacher] said that there are a number of pupils who stay the weekends in the other parent, thus "travelling". In the beginning [the teacher] did not recognise the broken families because both parents showed up in the parents' meetings, but during the year the truth came out. He/she added that it is great that parents are able to show interest in their children even in such a situation. [216]

[Teacher]: Then the school has changed and become more effective and when the parents are thinking about their own school the picture isn't valid any more. [217]

[The teacher] had been talking with [a parent]. They had discussed the situation at home, the other parent felt enervated and ill. [The teachers] were worried and [the teacher] had said this to [the parent]. [218]

If the comment explains pupil behaviour it is coded as *Family as Explanation*.

Excludes: *Parent-Teacher Co-operation*, *Family as Explanation*, *Parents Approach Teacher*, *Parents as Resource* (all other parent-teacher related categories)

### 7.4.5.2 Family as Explanation

The teacher uses the pupil's family relations as an explanation or to provide background information for the pupil's behaviour or his or own decisions concerning the pupil. This category can be seen as a special case of *Teacher's Comments on Parents*.

[Teacher] says that there are a lot of pupils with problems. The parent of [the pupil] is single and in another home the child is setting the pace for the whole family. [219]

After coming [the teacher] said that [Pupil A] goes on bullying other pupils. The teacher had hoped that things would have got better during the summer holiday, but it was not the case. [A's] parent was strict. [A] had said that he/she will get beaten if [the teacher] calls his/her parent. [220]

Excludes: *Parent-Teacher Co-operation*, *Teacher's Comments on Parents*, *Parents Approach Teacher*, *Parents as Resource* (all other parent-teacher related categories)

### 7.4.5.3 Parents Approach Teacher

Parents comment on the teacher or school, or ask questions or express desires. The teacher thinks back on incidents where teachers have approached the school.

[The teacher] had experienced homework as being a problem. Parents expect teacher to give it, but [the teacher] had had problems in integrating it into the school work. [221]

[The parent] asks about the teaching of geography. His/her older child had entered the secondary school and did not know where Ireland is. [The teacher] answers that school tries to teach entireties instead of single pieces of information. [222]

The scandal of the morning was that one parent had sent an email and protested a voting result of the pupil body. [The teacher] commented that the parent was always interfering in things and he/she will have kids in the school for years. [223]

Although all teachers seemed to have relatively good relations with the parents of their pupils, the contacts with parents were still troublesome. The teachers seemed to feel that contact with the parents involved a high risk of getting unjustified criticism or other trouble, though not all contacts were negative.

[Researcher]: Yeah, that's the first reaction of a teacher, I blame myself. [Teacher A]: No you don't have to, because the parents take care of that. (He/she repeated this later on). (This is a similar pattern that was told by [Teacher B] yesterday. Parents are blaming the teacher if the pupils aren't learning as they should.) [224]

[The teacher] replies that during the last parents' meeting one parent had been participating in the meeting of the wrong class. The following day his/her [significant other] had sent an abusive email to [the teacher], who had apologised for the unfortunate event. [225]

Excludes: *Parent-Teacher Co-operation, Teacher's Comments on Parents, Family as Explanation, Parents as Resource* (all other parent-teacher related categories)

#### 7.4.5.4 Parents as Resource

Parents or homes are used as a resource and/or part of the pupil's learning environment. Also contains quotations referring to other kinds of direct support from home (e.g. financing pupils' trips).

[Discussing homework.] [Teacher]: I have questioned it for years. There is one good reason for it, meaning the use of time. If it is just simple routine exercises it is ok. But it is not ok that you need a whole family to help you to manage. [226]

I go to the back of the classroom. A computer has turned up since my last visit. The computer is running and on the screen there is a message to parents about the need for recorders. [Teacher] takes care of the purchase. [227]



[Teacher] says that taking the class on a field trip is a drag because of the pupils. [Researcher]: Take some parents with you. [Teacher]: Certainly not, that would double the work! You'd have to listen them waffling on about the kids' piano lessons etc. I'd rather take another teacher and his/her class with me. [Researcher]: If you would clearly state the parents' duties and the teacher's duties and responsibilities? [Teacher] replied that he/she is prejudiced against parents mostly because he/she does not have any children on his/her own. [228]

[A discussion in the parents' meeting about financing the school trip.] There are two main options: to work or to pay. A survey to map the parents' interests is proposed. [The teacher] says in a low voice, "you could do that". Parents talk in a low voice, too. Parents suggest that [the teacher] could send a letter about this to the parents. [The teacher] replies that he/she wants to make it clear that he/she will participate the organisation, but is not going to lead it. [Parent A]: Writing the letter is a good idea, who is going to do it? (Silence) [Parent B]: Okay, I'll do it. [Teacher]: I'll copy it and collect the replies. Discussion about the content of the letter. [229]

Excludes: *Parent-Teacher Co-operation*, *Teacher's Comments on Parents*, *Family as Explanation*, *Parents Approach Teacher* (all other parent-teacher related categories)

#### **7.4.5.5 Parent-Teacher Co-operation**

Co-operation between parents and teachers (homes and school). This category covers quotations that do not fit in any of the specific categories in this subgroup.

[While planning history period.] Greece or Egypt? Here the arguments were practical. They wanted to arrange a happening for the parents. This discussion took a really long time, at least half an hour. [Teacher A] left midstream to find out if their classes are to present something in the Christmas party. [Teacher A] made a deal with the organising teacher that they do not have any active role this year. [230]

[Teacher]: Now I can't concentrate on this any more, I have the next issue on my mind (bullying meeting [with some pupils and parents]). [231, appears also as 204]

The Swedish language teacher said [to the parents] that there will be word tests and the results will be sent to them to have a look. [232]

We went to a small classroom with [the teacher] to have a word. He/she told about the discussion with [a pupil's] parent last night. They had made a deal about a diary which [the teacher] keeps about [the pupil]. [Teacher]: "The problems are too big for me to solve, but there is always something that I can do." [233]

For some reason this year has been a staging post. Each year I've arranged a number of evenings [for parents and pupils] where we have played games and the children have presented something. We've had a parents' committee and things like that, been on a picnic. This year: nothing. [234]

[Teacher discusses the pupils' self-evaluation.] I should get parents involved in order to make them understand what goes on in the school. [235]

### Negative:

[In parents' meeting:] [Teacher] mentioned that he/she will arrange the parents' quarters [a 15-minute private meeting with parents]. He/she mentioned that it is in the school's curriculum and is therefore "statutory". [236]

[Teacher] told about an active parent, who has had his/her child examined. A kind of [defect] has been found. [...] Now the parent explains all problems using this diagnosis and requires special treatment for the child. The parent has hired a private therapist, who has been once to the school and will come again. [237]

It may be worthwhile to note that parent-teacher categories are asymmetric when it comes to the initiator. The quotations where the parents contact school are coded as *Parents Approach Teacher*, but in the opposite case the proper code is *Parent-Teacher Co-operation* instead of *Teacher's Comments on Parents*.

Excludes: *Teacher's Comments on Parents*, *Family as Explanation*, *Parents Approach Teacher*, *Parents as Resource* (all other parent-teacher related categories)

### 7.4.5.6 Summary of the Sub-Group "Parents"

The teachers perceived the relations with the parents as important but somewhat awkward. Meeting the parents independently was mostly seen as rewarding but also time-consuming. Contacts with the parents involved a high risk of getting criticism or other trouble. Parents were used as a

resource, but this did not happen very often. The teachers seemed to respect their professional discretion when talking about the parents with the researcher. This obviously narrows the data collected on this field of teaching space.

## 7.4.6 External Networks

### 7.4.6.1 Supporting Network

The supporting network utilised by the teacher. People, professionals (special teachers, substitute teachers, helpers), organisations and premises other than the school. The category also contains references to special time resources, like temporary extra teaching hours.

[Researcher]: When are the pupils doing these larger projects? [Teacher]: I have one lesson in a week that is not tied to any subject, we are using that. [238]

[Teacher]: Well yeah, we don't have any problems in finding money for substitute teachers. [239]

[Teacher] tells that these “computer-age children” cannot use encyclopaedias. They had visited the library on their own and got back saying that they could not find anything. [The teacher] could not quite believe that. [Teacher]: I suppose we have to visit the library. [Researcher]: Where's your nearest one? [Teacher]: In [place]. It is easy to get there by bus number [x]. [240]

The class was going to visit the house of the city's Youth Department [...] next Thursday (in two days). [241]

[The teacher] could not tell whether the problems were related to the language problems or the lack of understanding. I got an impression that the pupil had been tested, but evidently it did not help [the teacher]. [242]

The connections between homes and school, staff co-operation, references to other teachers and school premises come under *Parent-Teacher Co-operation*, *Teachers' Co-operation*, *Other Teachers*, and *School Premises*, respectively. Occurrences of remedial instruction can be coded to several categories depending on emphasis: *Planning*, *Exceptions*, or *Pupil's Skills*.

Excludes: *Other Teachers*, *School Premises*, *Teachers' Co-operation*

### 7.4.6.2 Teacher-Researcher Co-operation

References concerning the co-operation between the researcher and the teachers.

Two things crossed my mind right away but there is no time to talk about them now. The assembly begins and we go to the class to listen it. I sit by the table of a group and write my memos. Then we leave to have lunch where there is time to talk more. [243]

... [the teacher] said that he/she is nervous every day when I'm coming. [Researcher]: Have you seen what I write down in my notes? Would you like to see? [Teacher]: No, it is not about that. I just feel that everything should be brilliant. [Researcher]: But that is not the case. [Teacher]: Yes, I know that, but this is not a matter of reason but of feeling. [244]

[The teacher] had called my mobile the preceding day and asked how I felt about a test taking the form of a mind map. [The teacher] was calling from his/her mobile in the middle of a woodwork lesson. A sputter could be heard from the background. I said that it is a good idea. I suggested including some traditional questions to make it more familiar and less hard because of the mind map thing. The phone call was a short one. [In the end the teacher]: I called to boost my soul. [Researcher]: Did it? [Teacher]: Yes it did. [245]

As you are like an outsider, you see this from a different angle. You make me, I see this work in a different light. When someone passes a thing what you yourself, yea... Like yeah, sure. Then you start thinking why not. Like in this way it has been useful. That you're not alone just by yourself. [246]

Although the co-operation between the teachers and the researcher is not in the focus of the analysis, a category describing it was still included in the code tree in order to apply it in the analysis of category relations.

### 7.4.6.3 Summary of the Sub-Group "External Networks"

The categories that result from the data-driven analysis are arranged using the areas found in the theory-driven review (see Chapter 5). However, in the case of supporting networks, the grounded theory analysis resulted in a category *Supporting Network* that cannot be unambiguously placed in any of the theory-driven categories. The *Supporting Network* consisted mainly of in-school professionals (special teachers, substitutes, helpers) while external organisations and premises were also mentioned. When the teachers

saw that the co-operation between the researcher was fruitful, they reasoned it by describing the researcher as an outsider who is familiar with the school. The ideas suggested by the researcher were novel, but they meant something to the teachers.

## 7.4.7 Materials and Physical Space

### 7.4.7.1 School Premises

Quotations concerning school premises, furniture, their use or administrative practices related to them.

The library door is closed. There is a laminated note on the door asking teachers to supervise pupils working in the library [247]

The library was located two floors below the classroom. It was a long way and walking between these two rooms consumed a lot of time. [248]

One pupil comes for a key to the library. [Teacher] gives it to him/her. [Instead of lending the key some teachers saw their pupils to the other premises, which required extra time.] [249]

[Teacher] says that he/she has a computer classroom booked for the class in case we thought of any use for it. [250]

[The teacher] had a computer class available just by his/her own classroom. The computers were for the use of all the classes, but [the teacher] had arranged the reservations to match the timetable of his/her class. When the pupils worked independently the computers could be used. Typically, the pupils looked for information for their projects on the Internet. [251]

I arranged a group of table and chairs in the corridor. That didn't take long, as there was spare tables and chairs around. [252]

[The teacher] is going to give a maths test to the pupils. Asks pupils to move desks away from each other. [253]

Now almost all pupils are reading their books. One pupil tells me about upstairs. I asked him to show me the place. It is the top landing of a staircase with just a fire door leading to the attic. Two other pupils are there already. Pupil: We come here often to read. [254]

Teachers running projects run into trouble with the physical teaching space. They utilised different resource rooms: corridor, library, computer classroom etc. In some cases, the rooms were remote and walking between the rooms consumed a significant amount of teachers and pupils' time. Normally the school regulations prohibited pupils from working in libraries and computer rooms without the teacher's presence, but the teachers normally ignored these rules. However, breaking the rules of the community seemed to stress at least some of the teachers.

Premises outside the school are categorised to *Supporting Network*.

Excludes: *School Routines*, *Supporting Network*, *Realising Teaching*

#### 7.4.7.2 Learning Material

The use, quality or availability of learning material is referred to. Learning material affects planning or implementing. Referring to unordinary learning material or teaching aids.

Printed material:

[The teacher] told that they were in Bordeaux. They opened atlases and searched for the place on the map. [The teacher] did not use maps on the wall, since there was no suitable one. [255]

[While planning lessons.] We moved on to browsing through the textbook. [The teacher] had started the autumn term by going through the chapters in the book. The subject was prerequisites for life. [256]

[Planning the grouping] Here the basis of division is the large number of weak pupils in the class of [Teacher A]. (He/she has decided to change the book series of five pupils from [Label A] to [Label B]). [257, appears also as 265]

[The teacher] takes a glance at the textbook to find out where they are. [258]

So parents really compare with other parents, compare the number of pages, like we're on this page, where you are? The parents' value, at least according to my view, they easily value that we have advanced in the book this and this much, like in the traditional way. [259]

Computer-based material:

[The teacher] had noticed that pupils had printed [www-]pages. He/she did not want them to copy information but to read the pages and make notes from them. [260]

**Other:**

We went to look for the cart with the measuring tools for mass. [The teacher] was unsure how the instruments are used. There was [old-fashioned] scales with two cups, digital scales for measuring mail and scales with a spring. There were also weights, sugar, sand etc. All you need. [261]

Capillary had been dealt with the previous year when [Teacher A] and [Teacher B] had jointly run a science club (an optional course). Therefore, there were a number of ready-made experiments and they had put this subject to the top of the list. [262]

The traditional printed material, especially books, has seemingly kept its status. One might surmise that the learning material is associated with the process of setting objects and selecting subject matter and working methods. This matter is approached below (see Chapter 7.5.2).

**7.4.7.3 Summary of the Sub-Group “Materials and Physical Space”**

The *School Premises* posed great challenges for teachers who wanted to do projects . The corridor was the only resource space available, but the necessary equipment was seldom in there. The library and computer class usually had restrictive use policies that did not allow for pupils’ individual work. The computer classes had to be reserved beforehand, which made their use schematic and formal.

**Table 2.** Comparison of some reasonable filtering limits for the Category Networking procedure.

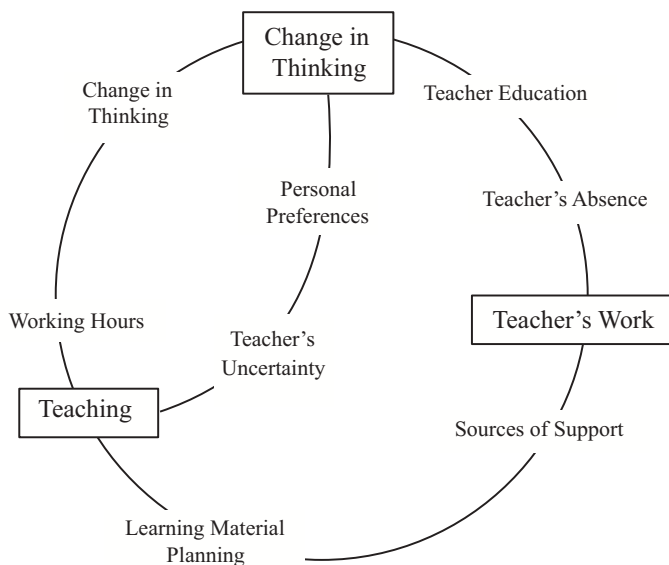
Limit	Number of References Accepted	Percent of References Accepted	Number of Links Accepted	Percent of Links Accepted
10 %	431	53	122	32
20 %	183	22	37	9
30 %	83	10	13	3

The printed *Learning Material* was the main source of information, although the use of the World Wide Web has become important in the schools. The materials, especially textbooks and workbooks, are important in the teacher's planning process (*Planning*).

## 7.5 Teaching Space Model: Category Relations (Networks)

The relations between the categories were first sought using the Category Networking procedure (see Chapter 7.3.3). As suggested above, the quantitative phase was followed by the quantitative analysis of the overlapping references. The idea of presenting several small subsets of the complete networks was acquired from the Atlas.ti analysis program, which was utilised in the quantitative analysis. The program allows its user to connect categories with different relations and import only some of the categories and their relations to a thematic view. This procedure was well suited to the selective coding phase, where the categories are integrated into a theory.

There were two grounds for the selection of the presented views. First of all, the views reflect the relations of the data. To put this another way, there were clear fields of relations among the categories and presenting



**Figure 5.** The links (shared categories) between the three network views.



these fields as entities was tried. The other reason for grouping the concepts was the existing habits of dividing teacher's work. Surprisingly these two grounds resulted in an aligned set of views. There can be a number of possible reasons for this. One might interpret that the existing data supports the common division of teacher's work, but it can also be a result of the analyst's preconceptions. When coding the data, he has only seen the obvious overlapping occurrences of the categories.

When interpreting the attached network graphs the reader should keep two things in mind. There are more references between the categories than were used in the analysis. The selection criterion for the links to be included in the network analysis was that either of them should make at least 20% of the total number of quotations of either of the categories. Naturally, no direct rule about the correct level of acceptance can be given. The criterion should filter enough links to be able to discern the patterns from the noise. The comparison of some reasonable limits is given in Table 2, which shows that the 20%-criterion seems to result in a meaningful number of links to the analysis.

All links that pass the 20-percent-rule are present in the selected network views. No links are presented twice, as there was no real need for overlapping network views. Secondly, one should remember that the total percentage of the references of a quotation can exceed 100. This can happen if category A has a reference with both categories B and C. Here, the reference would be counted twice hence resulting in the total number of percentages exceeding the magic 100.

Each network is structured around one or more key concepts that are highlighted in the presentation. There were no quantitative grounds for the selection of these concepts, but they all are in the central position of the network connecting a number of concepts. The purpose of the key concepts is to emphasise the structure and the nature of the network. The notation used in the network views is presented in Appendix 1.

### 7.5.1 Structure of the Network Views

All three network views are connected to each other (see Fig 5). The Teacher's Work network is linked by the common quotations between the *Teacher's Absence* category and the *Teacher Education* category (see link D in Change in Thinking, Chapter 7.5.4). The *Sources of Support* category in the Teacher's Work view shares quotations with two categories in the

Teaching view, namely *Learning Material* and *Planning* (see links E and F in Teaching, Chapter 7.5.2). Finally, the Teaching and Change in Thinking networks are linked via the shared quotations of the *Working Hours* and the *Change in Thinking* categories (see link B in Change in Thinking, Chapter 7.5.4), and the *Teacher's Uncertainty* and *Personal Preferences* categories (see link E in Change in Thinking, Chapter 7.5.4).

## 7.5.2 Teaching

The Teaching network (see Fig 6) describes a network reflecting teaching. There are three key concepts in the net: *Learning Material*, *Planning*, and *Time & Working Hours*. The *Time* and *Working Hours* categories are dealt with together as they are conceptually related and 40% of the references in *Working Hours* are common with the *Time* category. All key concepts are directly linked, however, the *Time* category is linked to the other two via the *Working Hours* category. The fact that no direct references exist between *Time* and the other two main categories is puzzling.

*Learning Material* and *Planning* are directly linked with each other by common references that make up roughly one fifth of their references.

He/she had got the idea from the films, like what if you would concentrate on the countries and the children in them. The school TV programmes are supplied with ready-made material, but [the teacher] did not have it with him/her. [263]

[The teacher] is thinking about the communications education period. Says that the book is all right and then there is a binder of health education materials for text and pictorial analysis (The teacher must have had in mind the parallel biology period about man, for which he/she had been looking at the material). [264]

Although the dictating role of the material in the planning process seems clear, the data do not allow the analyst to make such an argument without reservations. The teachers might have undergone some selection process that was not documented in this data. However, the direction from material to planning was strong, although there was an example of the opposite:

Here the basis of the division is the large number of weak pupils in the class of [Teacher A]. (He/she has decided to change the book series of five pupils from [Label A] to [Label B]). [265, appears also as 257]

*Working Hours* and *Learning Material* contained two shared references with opposite meanings. In one the teacher has found out that running a project without ready-made material is within his/her resources, while in another the teacher says that sticking to workbooks is preferable so as to save time. *Working Hours* and *Planning* had three shared references. In each of them, the teacher explained certain practices as being timesaving.

### 7.5.2.1 Common with Learning Material

- A) In one school, the curriculum did not offer enough support and, therefore, the teachers are using the book as the curriculum. Planning sessions where the book and the curriculum are used as a reference.
- B) The material steers the goal setting. It is noteworthy that 29% of the references to *Objectives* are common with the *Learning Material* category. The *Learning Material* category seems to have a great impact on the goal setting.
- E) One third of the references in *Sources of Support* is common with the *Learning Material* category. References are typically from planning sessions. *Learning Material* and *Planning* define *Sources of Support* very effectively as the summed percentage of these two links is 72.

### 7.5.2.2 Common with Planning

- F) While planning, the teachers tended to consult the *Learning Material* category and the timetable. Also some level of “clarity” was pursued to get support. The “clarity” stands for existing groupings, clear plan, and clearly defined area of subject matter or project.
- H) The time structures are used as a framework for planning. This is very similar to the relation F, but the *Sources of Support* category is not present (i.e. the supporting nature of *Time Structures* has not been obvious in these references).
- I) This reference is populated mostly by citations where teachers are using sex as a grouping factor when planning co-operative teams.

### 7.5.2.3 Common with Time and Working Hours

*Time* and *Working Hours* were combined by four references (J). Two of them are dealing with evaluation practices. The *Working Hours* category has common references with *Change in Thinking* (see the corresponding network, Chapter 7.5.4).

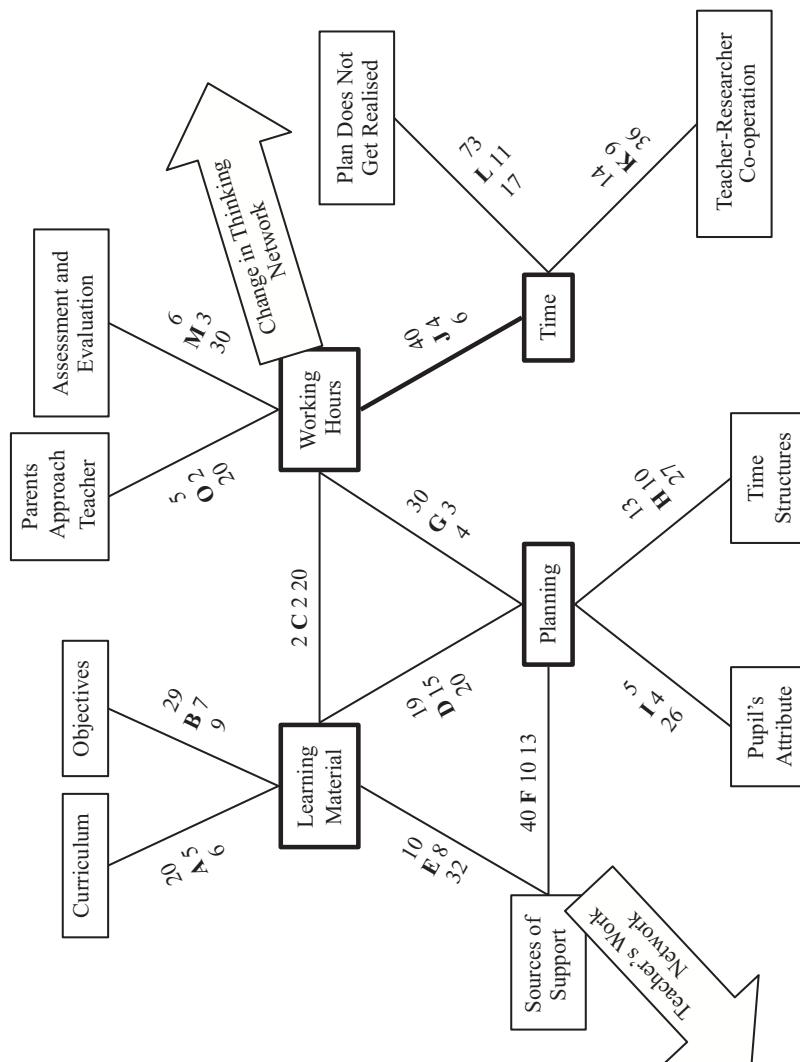


Figure 6. Network view "Teaching".

- K) Clearly, the co-operation with the researcher was stamped by the use of time, as one third of the references in the category *Teacher-Researcher Co-operation* was shared with the *Time* category.
- L) *Time* seems to be the most important player when the teachers look back on their teaching. 73% of the references in the category *Plan Does Not Get Realised* were common with *Time*. In these quotations, teachers were disappointed because some phase took more time than they had estimated. There were different reasons for this. In most cases, the teachers used some kind of pupil-centred methods, which required more time than planned.
- M) The *Assessment and Evaluation* category was linked with the *Working Hours* category by references from two teachers. In both cases, the teachers employed methods beyond marking. The additional consumption of time was referred to as a problem by both teachers.
- O) *Parents Approach Teacher* has two overlapping references with *Working Hours*, which are both from the same teacher as the references in link M. Being in contact with the active parents took time, and the parents' expectations had a limiting impact on the teacher's teaching space.

#### 7.5.2.4 Summary of the Network View “Teaching”

According to the network view Teaching, the most central concepts are *Learning Material*, *Planning* and *Time* (*Working Hours* and time in general). The *Learning Material* and *Planning* categories are closely combined. Although it is not unambiguous whether the material steers the planning, it can be argued that material and planning are closely linked directly and via the *Sources of Support* category. In this network, the time had a limiting nature, as there was always a lack of it.

#### 7.5.3 Teacher's Work

The Teacher's Work network (see Fig 7) presents the teacher's work that is not directly related to teaching (cf. Teaching network above). The key concepts in this view are *Teacher's Uncertainty* and *Teacher's Confidence*. Other key concepts in this area could be *Planning* and *Working Hours*, which are linked to this network via the *Sources of Support* category.

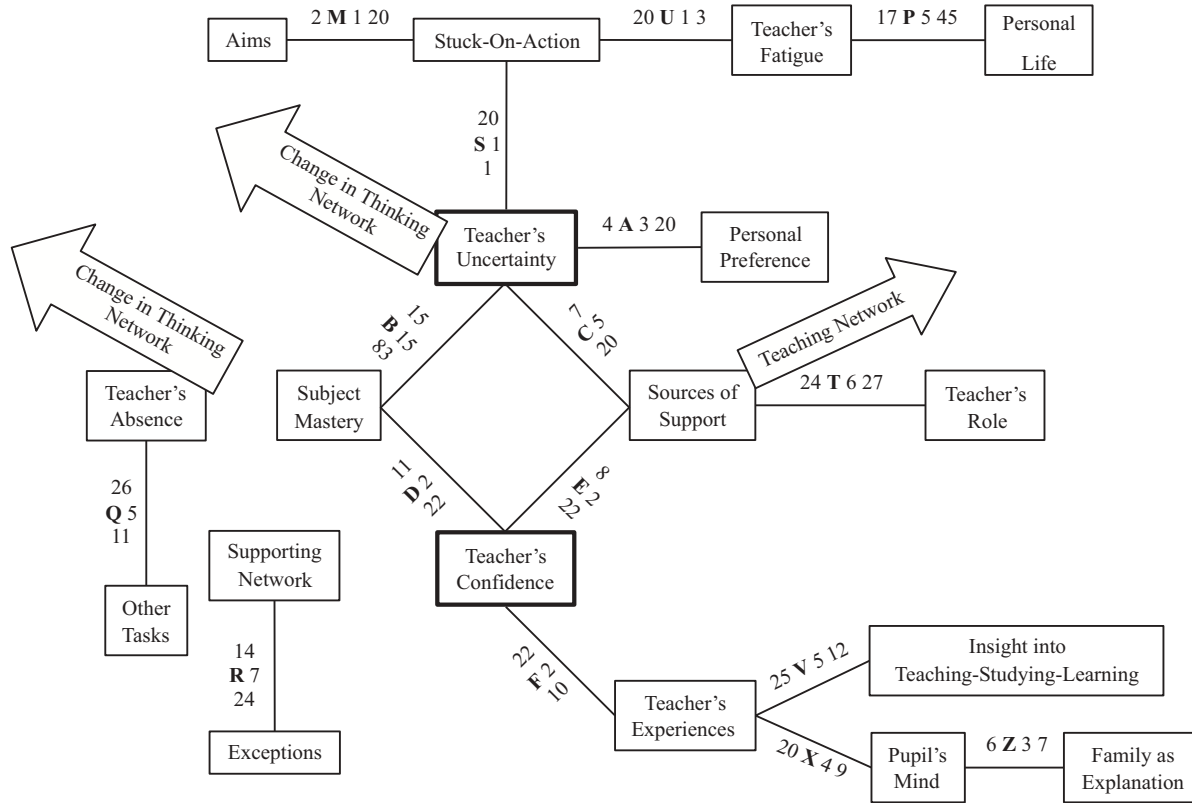


Figure 7. Network view “Teacher’s Work”.

However, since they are already present in network Teaching, they were not included in this view. To put this another way, the teaching is such a dominating part of the teacher's work that it required a view of its own.

### 7.5.3.1 Common with Teacher's Uncertainty

*Teacher's Uncertainty* is one of the largest categories in the whole data. It is connected to the *Teacher's Confidence* category via *Subject Mastery* and *Sources of Support*.

- A) All these quotations are from the same teacher, who explains his/her uncertainty by a lack of interest in science that has caused a lack of *Subject Mastery*.
- B) The *Subject Mastery* category has the highest number of overlapping references with the *Teacher's Uncertainty* category, and the *Subject Mastery* category itself has a very high number of shared quotations. Therefore, one could argue that the *Subject Mastery* category is very closely linked with the feeling of uncertainty. The qualitative review confirms the argument.
- C) When uncertain, the teachers looked for support from *Learning Materials*, clarifying the definition of the subject area and sticking to the teacher-lead role.
- S & U) There is one quote that is shared between three categories, that can be read from the definition of the *Teacher's Fatigue* category ("Well yeah, in a way the pupil-centredness requires...", see Chapter 7.4.3.23). According to the teacher, it takes a lot of energy to guide pupils. When you are tired, two things can happen. Either you cannot accelerate things ("Then you have to very... very aware of the situations in order to lead them somewhere.") or you fall back on your teacher-lead routine ("You'd like to sit down and, hey, write some story in your red notebook (laughs).").

### 7.5.3.2 Common with Teacher's Confidence

By the figures, the *Teacher's Confidence* category is smaller than the *Teacher's Uncertainty* category. A quick reasoning could suggest that the teachers are much more often uncertain than confident. However, such an argument cannot be made, since the orientation of the data collection must

have resulted in the material being skewed. The teachers approached the researcher with their problems, since this was a development project for them.

- D) While the *Subject Mastery* category seems to cause *Teacher's Uncertainty*, it can also improve *Teacher's Confidence*. The other quote is from a teacher who told in the post-interview that his/her subject mastery had improved during the year. The other quote was more related to uncertainty, whereas the teacher joked that the certainty could be strengthened by applying teacher-lead methods.
- E) There are two references from the same teacher in this relation. In one the teacher looks for security by trying to define the area and objectives of a project. Three months later, the same teacher joked that the teacher-lead methods would make him/her more confident. The latter quotation was also included in relation D.
- F) These quotations are from two teachers who reflect on their teaching during the year. The first teacher felt that the last science lesson was fine: "This is brilliant! I felt like being a science teacher!" [266, appears also as 117] The second teacher reflected on the past project, which was aligned with the structure that he/she had been learned during the basic education. He/she knew what was going on and what was going to happen next.

### 7.5.3.3 Other Links

- T) The quotations describe how the teachers fall back on the teacher-lead role for different reasons. It made less work, busyness, tiredness, lack of concentration and lack of planning. See also links S and U, which describe a similar development.
- P) *Teacher's Fatigue* was the only category that has enough common references with *Personal Life* to pass the 20-percent rule. Some excerpts refer to teachers being tired at home, while others were about tiredness caused by non-professional matters (own children, partying).
- V) It is hard to find a common theme among these shared quotations. In some, the teachers told about recent events and took them to a general level:



[Teacher]: Last week I was so desperate with my pupils. One pupil could not do a single exercise without crying in the homework club [where you do your homework if you have not done it at home] yesterday. I feel somehow desperate, you have to go through the same things over and over again... But maybe there are still moments. [267]

In another situation, the teacher felt good about a period that was jointly carried out with the researcher:

I suppose there was some kind of a structure after all. It had a beginning and there was a sort of a motivation, then there was a working phase, then we looked what we had achieved and then the de-briefing. It was finally something that you have been trained to do but which you never reach in real life any more. Maybe it gave me pleasure or something. [268, appears also as 130]

It is quite surprising that the *Insight into Teaching-Studying-Learning* category did not have any other connections where the percentage would exceed the 20-percent-limit. However, it had shared quotations with 20 other categories. It appears that the *Insight into Teaching-Studying-Learning* category does not have a strong influence on any specific concept, but has something in common with a great number of them.

X) In these quotations, the teachers tell about their experiences that are flavoured by the *Pupil's Mind* category. They refer to how the pupils have felt about some activities:

If the pupils have influence [on the activities], of course the adult and the teacher take care of the limits. But err... I think it is far more motivating. And for me, when I get going, it is far more motivating for me, too. [269]

Z) It is hardly a surprise that the *Pupil's Mind* category and the *Family as Explanation* category have common quotations. These are all from the same teacher, who explained the pupil behaviour by their home environment.

M) In this quotation, the teacher describes his/her thinking during a project. The goal has been to understand the structure and phases of a research project, but it has faded during the work:

But then the work has fallen apart in the very early phase. Like everyone is at very different stages and I feel like all I can do is just hang on. Like it has just entangled me with the action. [270, appears also as 79]

There are two pairs of concepts that are not connected to other network structures.

- Q) *Other Tasks* and *Teacher's Absence* have common references, where the teachers describe how they are leaving the school to take care of their other duties.
- R) One fourth of the quotations in the *Exceptions* category are common with the *Supporting Network* category. In most cases, the use of an existing resource (e.g. swimming pool, visiting theatre group) is linked with schedule problems and busyness.

#### 7.5.3.4 Summary of the Network View “Teacher’s Work”

In this network view, the teacher’s work is approached using the concepts of *Teacher’s Confidence* and *Teacher’s Uncertainty*. References to the *Subject Mastery* category were almost always common with the *Teacher’s Uncertainty* category, but there are many other factors causing the uncertainty as well (see Chapter 7.4.3.11). Taking care of the *Other Tasks* category lead to *Teacher’s Absence*, and the use of *Supporting Network* is linked with *Exceptions* to *School Routines*. The references in the *Exceptions* category are typically negative or troubling (see Chapter 7.4.2.9). The use of *School Premises* is linked to *School Routines* suggesting that the use of common premises means adapting restricting rules.

In general, the network looks rather scattered. There are several pairs of concepts that are not connected to other concepts. One could interpret this as evidence of a scattered nature or teacher’s work. The following reference would suit as a punch line to the statement:

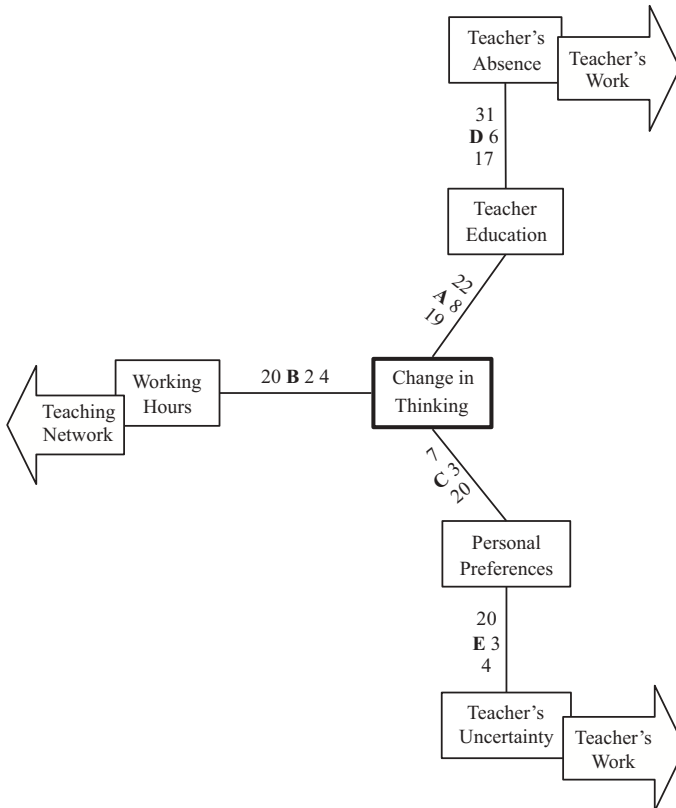
The school is no longer that you give your lessons and go home to plan, but a great many bits and pieces, groups, planning, meetings and insane things are part of it.  
[271, appears also as 23]

However, it is just as likely that the data have produced the view. The related categories are small leading to narrow views. With larger and differently focused data, the picture might be different.

### 7.5.4 Change in Thinking

Although the network Change (see Fig 8) is smaller than the other two, it is included in the analysis as its theme is essential for the study. The key concept of the view is the *Change in Thinking* category. The sum of the category's overlapping percentages is 30, so although the category has a central position in the network it, nevertheless, seems to be quite independent.

A) *Teacher Education* has the highest number of overlapping references with the *Change in Thinking* category. When teachers talk simultaneously about the change and their education, they referred to their pre-service training.



**Figure 8.** Network view "Change in Thinking".

- B) There are two references common with the *Change in Thinking* and *Working Hours* categories. In one the teacher tells how he/she has found out that he/she has the energy to execute a project without ready-made material. The other teacher says that doing things differently from the “ordinary way” takes a lot of time. The *Working Hours* category is one of the key concepts in the Teaching network (see Chapter 7.5.2).
- C) All these three shared quotations are from the same teacher with a career several years long. He/she felt that changing the methods to a more pupil-centred method was hard as he/she is a “dragon-like” teacher and has a habit of leading and interrupting pupils’ activities. A key event was a discussion with his/her colleague who suggested a certain structure for a pupil-centred research project. The suggestion hit the spot and got the teacher inspired.
- D) The *Teacher Education* category is present in one third of the references in the *Teacher’s Absence* category, and these references are mostly about teachers’ in-service training. The shared quotations are mainly negative. Teachers have to do the planning for the substitutes and yet they do not expect any advance to take place while they are absent. Also the *Other Tasks* category contributes to *Teacher’s Absence* (connection Q in the Teacher’s Work network).
- E) All these quotations belong to the same teacher, who was not confident about his/her skills in science and categorised himself/herself as a humanist. In the last reference, he/she told about the new school that he/she was going to next year:

[The teacher] told that the school is committed to a system with no age classes. [The teacher] did not have very precise information what it meant. The school also emphasised the arts subjects. [Teacher]: It was far easier to commit to this as these years have been a [science practising] for me. [272]

Clearly, the teacher was not content in the science-oriented school and instead of facing up to the change he/she decided to change to an environment that was more aligned with his/her own talents.

To summarise the above, the pre-service education seems to be the most important phase of a teachers’ career when it comes to the change. The teachers’ in-service training is referred to when the teachers’ absence is

discussed but they do not refer to it when talking about change or training in general (see the definition of the *Teacher Education* category, Chapter 7.4.3.15).

## 7.6 Brief Answer to the Research Question

To answer the final research question, the researcher has collected and analysed qualitative data and used them to compose a framework called Teaching Space Model. By the selection of the name of the model, the researcher argues that similar constructs may exist in other school levels from kindergarten to adult education. Naturally, one might expect that the education level affects the spectrum of the concepts.

No central category that would fulfil the criteria set by Strauss and Corbin (1998, 147) could be identified. The *Change in Thinking* category would be a lucrative category as it sits closely to all network views, but as a small category it does not appear frequently in the data. It seems to be necessary to call all the three network views (Teaching, Teacher's Work, Change in Thinking) central categories as together they describe the studied area.

First of all, the teacher's teaching space is very complex. There are a great number of concepts and linkages between them. The distribution of the concepts suggests that the level of the teacher is the most important and, at the same time, the most complex section of the teaching space. As suggested by the existing literature, the level of society does not seem to be very important for the teachers. This view could have been different if there had been elections or some other important event external to school during the academic year being studied. Furthermore, the complexity becomes apparent while looking at the connections between the concepts. The linkages in the data are numerous and lack some connections that could be expected. This issue is discussed more closely below (see Chapter 8.1.2).

In the school component of the teaching space, there are two concepts that stick out from the others: time and community. Time is divided into resource and structure, while in the former the time is used to do something and the latter refers to time structures that are set by the school or the teacher. In the network view "Teaching", the time has generally a limiting nature. The talk about time often refers to busyness, which makes you to

do things in a familiar and easy way. Co-operation takes place in brief chats. The community is built up on *Principal, Work Community, Other Teachers, Teachers' Co-operation, Curriculum, and School Routines*.

The teacher has the highest number of categories in the teaching space model. This could suggest that this component is central in the teaching space instead of organisational or physical factors, but it can also be the result of the data collection or analyst's interests. *Insight into Teaching-Studying-Learning* is based on experiences, while the in-service training is not mentioned in this context. The pre-service education appeared together with change. The learning process should be clear-cut and well-defined.

The two key concepts of the related network Teacher's Work are *Teacher's Uncertainty* and *Teacher's Confidence*. According to the data, the uncertainty grows from lack of authority, lack of pedagogic skills and doubt about learning outcomes and professional questions. In the case of uncertainty, the support is sought from learning materials, defining the limits of the subject area and sticking to the teacher-lead role. The confidence appears together with subject mastery and clarifying the area of study.

The *Pupil's Skills* category is the most referred pupils' property that seem to affect the teaching space. Interestingly, the pupils' problem behaviour is not discernible from the data although it is often referred to in everyday pedagogic discourse. The pupils' activity was in most cases arranged by the teacher who has opened the learning environment to allow it. Self-initiated pupils' activity was a rarity. It appears that the critics' concern about the intensifying influence of child-centredness is unnecessary. Clearly, the teachers closely plan each new step of autonomy. If the teacher understands his/her responsibility, there is a great difference between negligence and pupil-centredness.

The teachers see the parents as being important but the relationship to them is awkward: co-operation is time-consuming and there is always the risk of getting unjustified criticism. External networks contain professional personnel at school, external organisations and external premises. In public discussion, the school premises and materials are often referred as an obstacle for opening the learning environment. According to the data, the teachers had problems finding room for the pupil's individual or small-group work. Corridors, libraries and computer labs were utilised but there was a lack of equipment (furniture etc.) or restrictive rules for use (teachers should have

been present at all times). Although the WWW was used, the printed learning material (textbooks and workbooks) was still going strong and was also often used by teachers to support planning.

## 8 DISCUSSION

*The discussion chapter analyses the data-driven teaching space model by comparing it to the literature-based model and ideal networks that are composed on the concepts of the teaching space model. The use of the teaching space model is demonstrated by analysing seven innovations that emerged in the empirical phase. As the study addressed the teaching space of change-oriented teachers, the results allow one to make some suggestions about improving the school component of the teaching space in order to support teachers in opening their learning environments. Finally, the validity and reliability issues of the study are discussed using the concepts of Lincoln and Guba (1985).*

As discussed in Chapter 1, this study started as a technology-related school research and development project that aimed to implement the open learning environment in some classrooms. The research questions evolved during the study. Finally, the research report has answered the question of the determinants of the primary school teachers' teaching space by creating two versions of the teaching space model, first using the literature (see Chapter 5) and then based on the collected empirical data (see Chapter 7). In some sense Cohen (1998, 441) describes this and all other school development studies well when referring to Dewey's comments on the Chicago Lab School: "It would be impossible to count the thousands of innovators who have made just that report to friends and sponsors: The results are mixed, less than we expected, but now we can see the problems more clearly." Yes, the researcher expected more to happen during the year that was studied but no, this research did not end up only pointing out the problems but approached the developing teachers' world in a more holistic way.

It appears that just increasing the support given to the teachers cannot accelerate the change process. The frequent visits of the researcher did put pressure on teachers who noticed it themselves and perceived it as positive. It was like they had made a promise to themselves by participating in the project, and the existence of the researcher reminded them about this. However, most of the teachers approached the themes of open learning environment and child-centredness as working methods that contributed to some aims, but there were other aims to attain, too. Furthermore, the teachers did not want to put all their eggs in one basket as they valued variation and



were not convinced of the power of child-centredness as the main approach. Getting positive experiences takes time, and the data show that these experiences are the main source of conceptions about the teaching-studying-learning process. The external support contributed to the teachers' obligation in experimenting with pupil-centred methods, and with guidance their experiments resulted in more positive results than if they had been on their own. It appears that the process of getting experiences cannot be accelerated, but with close support these experiences are more likely to be positive.

As addressed above by Cohen, the developing projects tend to point out one or more key problems that were encountered during the project. Lack of time is maybe the most referred to problem (Sahlberg 1996; Taipale 2000; Lavonen, Meisalo, Autio & Lindh 1998), while other problems have been indicated as well (see Chapter 2.3). The school developers seem to easily have the wrong idea of the participants' engagement. While working with the teachers, it became evident that although the teachers had committed to this project, their other commitments were just as, or even more, important as the project. The teacher's job is loaded with engagements and pointing out that there was a "lack of time" means only that the particular teachers had other engagements that were more important to them than the developer's mission. The lack of time is not necessarily related to what was tried to be developed or to something that is common for all teachers, but the reasons can vary. If more time were to be allocated, there is no guarantee that the teachers would use it for the purpose expected by the developer.

Therefore, in this study the teacher's working environment and pedagogical thinking is combined with a common framework, teaching space. Seeing the situation as a whole is likely to lead to more effective support for teacher change. As presented in Chapter 2.2 we know more and more about where the schools should to go and what the change process is like. The concept of teaching space contributes to the research on teacher change and professional development by analysing the existing properties of the teachers' reality.

## **8.1 Examining the Model**

The teaching space model can be structured differently depending on the use. In the literature review (see Chapter 5), the teaching space was organised according to different actors of the area. This structure is meaningful when studying the teacher's network of dependencies. In the network views (see

Chapters 7.5 and 8.1.2), the organisation is based on the functions of the teacher's work. From the viewpoint of this research, the central themes in the teacher's teaching space are teaching, teacher's work and change, as described in the network views.

Perhaps the most notable single concepts in the teaching space model are the *Teacher's Confidence* and *Teacher's Uncertainty* categories. The teachers try to avoid uncertainty and gain confidence, and the teaching space model suggests different *Sources of Support*. Apparently there is something very human in this, but are the teachers more careful in avoiding uncertainty than other professionals? If so, what is the reason for this? Obviously, the educational changes would be quicker if the teachers were more ready to handle the uncertainty but, as is often pointed out, some amount of conservatism is useful in order to preserve the good aspects of the existing situation. However, the open learning environment inherently bears some amount of uncertainty for both teachers and pupils, and because of this the ability to take risks is needed for the teachers of the open learning environment.

In this study, the *Teacher's Uncertainty* category was directly linked with *Personal Preferences*, *Stuck-On-Action*, *Subject Mastery*, and *Sources of Support*, while the two last were also directly linked with *Teacher's Confidence*. In her study Rosenholtz (1989) treats these two concepts as counterparts, which they appeared not to be in this study. Rosenholtz's results focus on the differences between moving and stuck schools, but the results also link certainty/uncertainty to teachers' co-operation with each other and parents. None of these links can be supported by the results of this study. However, Rosenholtz's concepts of certainty/uncertainty are more static than what is understood in this research, where the *Teacher's Uncertainty* and *Teacher's Confidence* categories may refer to passing feelings and even appear simultaneously. Also, Rosenholtz's "certainty" refers to certainty about their own instructional practice. In this study, the definitions were wider covering everything that seemed to give the teachers a sense of confidence or uncertainty.

As we are talking about open and closed learning environments, we could talk about open and closed teaching spaces. It would be tempting to call an open teaching space supportive, but this is not necessarily the case. A very closed teaching space can be supportive for an aligned teacher who wants to stick to the existing system, but the same teaching space offers no

support for a change-oriented teacher. Chapter 8.3 discusses what kind of changes to the observed teaching space could be made in order to increase the possibility of teachers opening their teaching environment.

### **8.1.1 Comparing the Data-Driven Model and the Theoretical Model**

The theoretical model of the teaching space (see Chapter 5) was built between the open and axial coding phase while it has become clear that the teaching space is the key concept of this research. The structure, as well as the main references of the current presentation, was found at this point. The theoretical model of the teaching space existed before the data-driven model, and the theoretical model contributed to the organisation of the data-driven concepts in this report. However, the result of the network analysis suggested another organisation of the key concepts.

Both versions of the teaching space model seem to suggest that the teacher has the key role in the teaching space instead of organisational or physical factors, as could be expected. The constructivism is inherently built inside the concept of teaching space, as each teacher has his/her own teaching space. Although the teachers might work in the same school, their perceived teaching space can differ although based on shared properties, like *School Premises* or *Work Community*. The teaching spaces evolve as a result of a dialogue with others. Thus, the existence of multiple realities is admitted, but the model suggests that there are common properties in these realities. This research has tried to find these common properties and, at this point, the teachers' individual teaching spaces were not studied. Making the analysis of individuals' teaching spaces would have benefited the teachers themselves and possibly their development-oriented superiors. However, presenting the cases publicly would serve the interest of concretising the concept of teaching space, which is now done using other examples (see Chapter 8.2).

Although the key role of the teacher in the teaching space model seems to be lucrative, some words of caution should be expressed. In this study, the researcher has applied a teacher-centred professional development model, which suggests that the researchers' interests were wound around the teacher. It is natural that such research results in something where the focus is on the individual teacher. Although the organisationally oriented school developers who were referred to in Chapter 2.2 admitted that it is the individual teacher who eventually makes the difference, the teacher's role

would have been less central in the teaching space defined by such a researcher. The data collection has probably resulted in the data becoming skewed. Since this matter has been addressed many times during the data analysis it will not be discussed here further. However, the central role of the teacher's thinking cannot be explained only by the researcher's orientation or data collection methods. They both suggest that there can be more about the teaching space out there, but they do not mean that the knowledge contributed by this report would be invalid.

There are two key concepts in the theoretical presentation of the teacher component of the teaching space, namely the model of teacher's pedagogical thinking suggested by Kansanen *et al.* (2000, 23-31) and beliefs in general. Using the model of teacher's pedagogical thinking, the teaching space model is emphasised on the action level (see also Kohonen 1997, 285). A few concepts can be counted on the object theory level, like *Insight into Teaching-Studying-Learning*, *Personal Preferences*, and *Change in Thinking*. However, the categories were built on the data that mainly consist of discussions between the teachers and the researcher. The nature of these discussions must be taken account, and these data are not suitable for assessing the teachers' theoretical thinking.

Re-analysing the data from the viewpoint of beliefs could be an interesting task. The concept *Insight into Teaching-Studying-Learning* was linked with *Teacher's Experiences* suggesting that the teachers' learning-related knowledge is crowded with experiences that have changed to beliefs. This would fit in well with Pajares' (1992) suggestion that beliefs are episodic in their nature.

The theoretical model addresses the change of the teaching space in a superficial manner using the terms of constructivism, and in this presentation the change is examined only in the framework of professional development. However, although the experiences have contributed to the *Insight into Teaching-Studying-Learning* category, the data linked the *Change in Thinking* category to pre-service education, while in-service training was not mentioned with the change. No direct references to great changes while being in the field were found, so the professional development taking place at the grassroots has not contributed to the change – at least not in a way which the teachers would have noticed themselves.

The data analysis divided time into two different concepts. The concept *Time* covers busyness, the use of time, and taking time into account while planning etc. (see Chapter 7.4.2.1). The *Time Structures* category stands

for schedules that are used to allocate time (see Chapter 7.4.2.2). These two brands of time are very like Campbell and Neill's (1994, 155-156) "personal time" and "institutional time". In the literature-based teaching space model, time is divided into two categories: the time with direct contact with pupils (contact time) and other time (non-contact time). These two views of time are not contradictory, but it is still surprising that the division between contact time and non-contact time did not come out in the data. Maybe two different notions of time can be explained by the view of the research. This research focused on opening the pupils' learning environments, and here the factors that were not controllable by the teachers' (*Time Structures*) interest. The implications of the time-related findings are discussed further in Chapter 8.3.

The literature-driven model suggests that pupils' concepts of roles affects teaching space. A similar suggestion has been made by Kohonen (1997, 275). In these data, the pupils' role concepts were part of *Pupil's Insight into Role* and *Pupil's Act*, where the first contained references to pupils' self-expressed role conceptions and the latter covered pupils' role expectations perceived by the teacher. However, these concepts did not come out in the data. This might suggest that pupils' conceptions of role are not so dominant with younger students, as Kohonen's data were from the lower secondary school.

Maybe the most fundamental difference between the literature-based and data-driven teaching space models is in the part that society plays in the teacher's environment. According to the theoretical framework, society and top-level administration play a rather invisible but yet significant role in the teaching space. However, the grounded theory procedure resulted in no concepts that would have been inherently related to society.

The lack of society-level concepts could have been avoided by moving some suitable categories to the level of society. *Curriculum* and *Aims* are heavily influenced by society and the researcher could have used them to fill the confusing gap. In fact, if the empirical phase had been executed at the time the manuscript was finished, the curriculum-related discussion would have been more intense and more affected by the society-level matters, since the schools in Helsinki are rewriting their curricula. Now the references to the curriculum were mostly assessing. The teachers criticised the schools' curricula and sketched the needed changes. It appears that giving the curriculum work to the schools has made these teachers see the curriculum as a dynamic document. However, the most probable reason for the lack of

society-level categories was the nature of the data. The changes in society are slow, while these data and the discussions they describe dealt with much shorter time spans.

### 8.1.2 Comparing the Data-Driven Networks and the Ideal Networks

To examine the teaching space model, two additional networks were created. These “ideal networks” sketch rearranged versions of the two largest network views, the Teaching and the Teacher’s Work. The networks contain all the concepts that are included in the network. Some relevant concepts are added and marked with dotted borders. To avoid confusing results all possible connections between the concepts were not included in the Figures.

In the ideal network Teaching (see Fig 9), the real network (see Chapter 7.5.2) is rearranged around the classical planning cycle. Different properties of the teaching space model affect each phase of the cycle. There is no concept related to society, and this was added. Interestingly, the real Teaching network does not have any connections to the *School Premises* or *School Routines* categories, and only *Pupil’s Attribute* is referred to out of all the pupil-related concepts. The network view also lacks the concepts *Supporting Network* and *Parents as Resource*, which were added. Also, no reference to reflective thinking exists, so *To Be Improved* was added to the ideal network. This concept contains the idea of feedback to the beginning of the teaching cycle. The number of added categories (and their relations) was kept low on purpose to maintain the simplicity of the picture. For this reason, the underlying concepts *Personal Life* and *Working Hours* were not directly connected to any of the other concepts, since they have to do with several concepts and the required connectors would have made the diagram confusing.

The comparison of the ideal and data-driven network views suggests that the core concepts of the teaching process are already present in the data-driven network. However, their organisation in the data-based network differs remarkably from the ideal. The data suggest that teaching is not a sequential process but a three-sided decision related to *Planning*, *Learning Material*, and time (*Time* and *Working Hours*). If we want to make a difference in the teachers’ teaching, these three areas seem to be the most powerful properties to manipulate.

The data-driven network provides some surprising linkages. *Assessment and Evaluation* have shared content with *Working Hours* and not with *Curriculum*, *Pupil's Skills*, *Objectives*, or even *Learning Material*. Also the *Parents Approach Teacher* category is linked with *Working Hours*. Based on this we can argue that although these two activities are perceived as important, they are still linked to the *Working Hours* concept that contains references to work done out of hours and the amount of work (see Chapter 7.4.3.20).

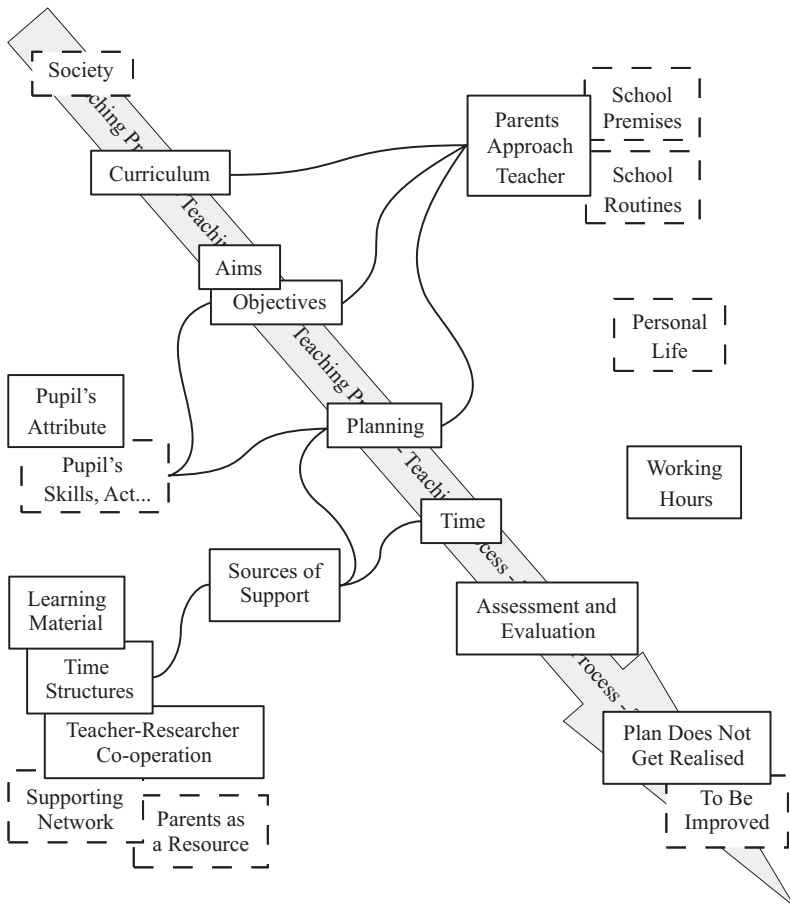


Figure 9. Ideal organisation of Teaching network view.

The notion that the success of the plan seems to be verified only through the use of time is also interesting. It would be easy to argue that the teachers care only about the use of time and not about the pupils' learning etc., but this would be an oversimplified conclusion. The presented quotations of the category *Plan Does Not Get Realised* show, that although time is referred to, the underlying reasons are also mentioned: too high expectations or overestimating pupils' skills or speed of learning (see Chapter 7.4.3.8). The correcting move has been to use more time than planned. Some adjustments of the *Aims* and *Objectives* category might have also taken place, although there is no evidence of it.

Although the ideal organisation of the Teaching network view was based on a sequential process of different phases of teaching (e.g. Lahdes 1997, 14), it should be remembered that the teaching space model is not a pedagogic model (cf. Shulman 1986; Uljens 1997, 65). Although the teaching space model contains concepts that are present in the pedagogic models, the purpose of these two types of models differs. The background of the teaching space model is to present the context of the teacher change, while the pedagogic models focus on the process of teaching-studying-learning. However, both models approach the action from the teacher's perspective. When adopted by the teacher, the pedagogic model becomes part of the teacher component of the teaching space as suggested in Chapter 5.3.

The Teacher's Work ideal network (see Fig 10) is arranged around the central concepts of the data-based network (see Chapter 7.5.3), namely *Teacher's Uncertainty* and *Teacher's Confidence*. The *Sources of Support* category was added as the third key concept, as in ideal situation it changes the uncertainty to confidence. This ideal network turned out to be broad. Since almost any concept of the teaching space model can in some cases create confidence or uncertainty, one could have included almost all of them in the ideal network. For example, the *Curriculum* category can give you a sense of certainty, but it can also be a source of anxiety. The same applies to the *Principal*, *Work Community*, and *Time Structures* categories, to name just a few examples. Therefore, it was decided not to add any additional concepts to this ideal network.

The ideal network resembles a great deal the data-driven network. The ideal network was structured around uncertainty and confidence as suggested by the data analysis and the review of the literature. In the latter, anxiety was one of the sub-concepts of the teacher component of the teaching space. However, in the data-driven network view there was only one link



between *Sources of Support* and the possibly supporting concepts that would pass the 20-percent rule. Although some of the concepts appear in the data-driven view, they are not linked with the *Sources of Support* category.

In the data-driven network view, the *Insight into Teaching-Studying-Learning* category was linked only with the *Teacher's Experiences* category suggesting that it is the only origin of the related knowledge. However, since the *Change in Thinking* category was related to *Teacher Education*, especially the pre-service education (see Chapter 7.4.3.15), the formal teacher training appears to have some effect on teachers.

*Sources of Support* appeared in the both ideal networks, as well as in the data-driven networks. Some related concepts can be identified from the data: *Learning Material*, *Teacher's Role*, and *Planning*. If the teaching space is to be enhanced towards learning organisation, the *Sources of Support* category is the key area to be developed because of its central role in the teaching space.

To summarise, the comparison of the ideal and data-driven networks appears to contain the same key concepts, but there are differences in the organisation of them.

## 8.2 Applying the Teaching Space Model to the Innovations

Several pedagogical innovations were made during the empirical phase. Here, the innovations mean that the emerging ideas were new to the teacher and/or the researcher. Most ideas emerged during the joint planning sessions. Although the ideas were considered valuable by the researcher, their follow-up was not systematic. In some cases, the researcher asked the teacher whether he/she has realised them and, in some cases, there was visible evidence that the innovation was in use.

The following chapters present some of the ideas as examples of the use of the teaching space model in interpreting the classroom reality. The examples were selected mostly based on the availability of the data, but the presented ideas also have a general nature so they are not tied to any specific subject. Furthermore, all the ideas have something to do with the opening of the learning environment, which was the goal of the project.

The ideas could have been used as data and analysed using the critical incidents methodology (e.g. Arthur 2001). However, it was decided to present them in discussion in order to maintain the clear methodological structure of the study. The final decision hopefully helps the reader to understand the concepts better than without these examples.

### 8.2.1 Research Form

The use of research forms was perhaps the most successful pedagogic idea of the empirical phase. In its initial stage the form was made up of stages of a scientific study: describing area of interest, research question, methods

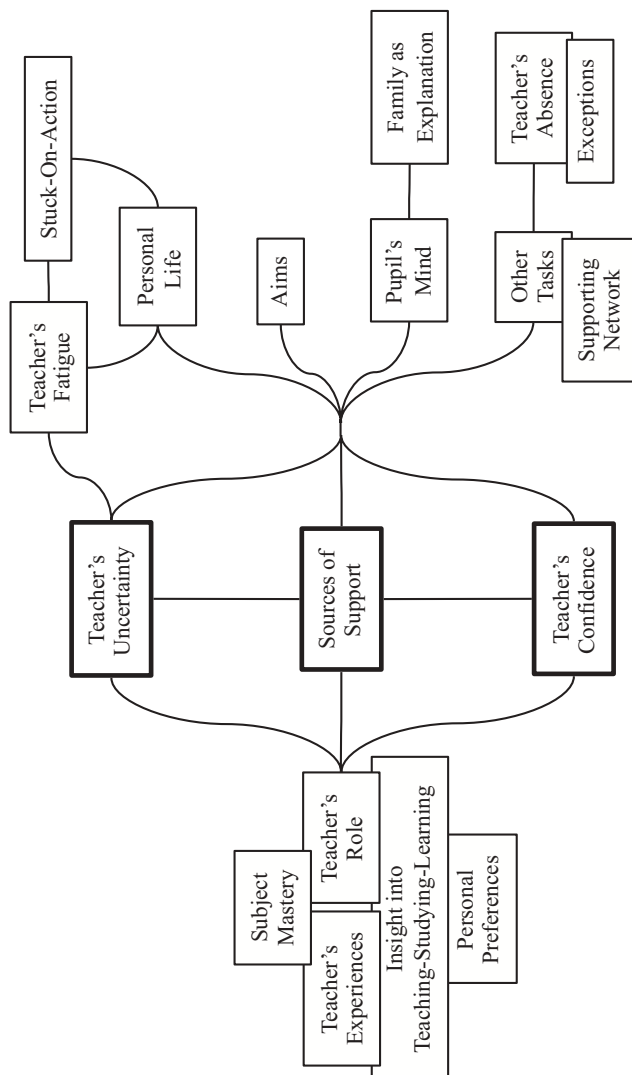


Figure 10. Ideal organisation of Teacher's Work network view.

and tools, results and conclusions. There were several different versions of the same theme. The researcher suggested the original set of phases and the teachers made their own versions. Later on the idea evolved to cover a project that was no longer linked to experimental science. The idea for this came from a teacher who was participating in a study by the Department of Psychology at the University of Helsinki. The research group was observing pupils' activities when engaged in a project. The work was split into specific phases, and to make these more concrete they had designed a poster of the phases. The teacher had found the poster useful because it helped the pupils discuss the process. The idea of outspoken phases was used, but the phases differed from teacher to teacher:

[We are waiting for the pupils to arrive from lunch.] [The teacher] draws five boxes on the blackboard. When the pupils are back except some [the teacher] starts to ask the pupils about the phases. [The teacher] writes names against the phases as soon as they are invented. [273]

Most references about the research forms were positive. The pupils learned how to use it and the teachers liked the idea, because it gave structure to the learning:

We went to the staff room and there I presented an inquiry form that was originally made for [Teacher B]. The form is used by [Teachers B and C], and [Teacher D] uses it in a different form (hand-written). [Teacher A] thought that the form is a good idea. He/she said that the group work had gone back and forth. This could give some shape to it. [274]

However, there was one exception, where the stages were backed up by supportive questions:

[Teacher]: Those supportive questions (that the groups were asked) do not help them at all. [275] [Later in the same document:] [Researcher]: It can be that we're stuck on those questions. (They do not fit all the subjects) [276]

In this example, the teachers had experiences (category *Teacher's Experiences*) about project work. However, the experiences had led to *Teacher's Uncertainty* as they had been unable to support the pupils. The role they were used to (*Teacher's Role*) did not work any more and they looked for *Sources of Support* from the *Learning Material* category. It is no

wonder the support was sought in that direction, since one third of the quotations in the *Sources of Support* category were overlapping with the *Learning Material* references (link E in Teaching network).

The research form offered them order and control, which is an important factor of *Teacher's Confidence* (see Chapter 7.4.3.10). Although an outside observer would not notice the difference in the classroom activities before and after the form, it had contributed to the teachers' sense of order and control. They knew where they were and where they were heading. The teachers who got positive response from the classroom activities (*Teacher's Experiences*) found their certainty increased (*Teacher's Confidence*, link F in Teacher's Work). They could change their role (*Teacher's Role*) without losing their sense of control. However, in a quoted situation where the bad questions caused problems, the *Teacher's Experiences* category probably contributed to the *Teacher's Uncertainty* category.

To put briefly, the teachers had changed their learning space from yielding to supportive by using the research form.

### 8.2.2 Week Plan

One of the teachers being studied was very eager to restructure the timetable. The pupils had been given exercises in larger sets and used to split the work over the week. The teacher designed a planning sheet that looked much like a regular timetable. The lessons that were given by other teachers were hard-coded into it, but the lessons given by himself/herself had no label on them. Each Monday, the working week was started by a planning session, where the teacher explained the tasks of the week and reserved time for common events, e.g. teacher-led sessions, pupils' presentations and tests. The planning sheet had space for pupils to write down what they were going to do during each lesson and how their plan had been fulfilled. The teacher used the forms to follow the pupils' activities by collecting the sheets every now and then for a review:

[The teacher] sums up and begins to hand out the week plans. Stands in front of the class. [Teacher]: If there are any question marks, you have to fill in the missing data. Take a close look at what you have planned to do at home. [The teacher] hands out the papers. The pupils come to him/her to get their sheets. [The teacher] says something personal to each of them. The comments are mostly positive, but some pupils get feedback about inaccuracies or missing data etc. [277]

The teacher and the researcher talked about making the pupils more aware of time. For this, the teacher initiated a “class calendar” that was updated by the pupils and teacher. The teacher used the week plan and the class calendar at least to the end of the year being studied.

This example is very much like the previous example of the research form. The teacher wanted to make changes, but a system to lean on was missing. The planning form offered such a crutch. Supporting desired change by restructuring the use of time is obviously an effective technique, since the *Planning* and the *Time Structures* categories are linked (link H in Teaching network). Here the pupil-centred ideas (*Aims, Insight into Teaching-Studying-Learning*) and his/her own personality (*Personal Preferences*) could have motivated the teacher (for the latter see link E in Change in Thinking). He/she changed the *Time Structures* of the class within the limits of the school component of the teaching space and arranged space outside his/her own class for pupils’ individual or small-group work (*School Premises*). The rules concerning the use of the additional premises required giving the keys to the pupils or staying at the computer lab whenever there were any pupils there (see *School Premises*, Chapter 7.4.7.1). The teacher was ready to spend *Time* moving from one room to another to supervise the pupils, since he/she considered offering different premises important.

To summarise, the teacher began to change his/her practices by redesigning the *Time Structures*. Obviously, this was a good decision since the structure of time is often consulted while *Planning*.

### 8.2.3 On-The-Fly Groups

One of the studied teachers was troubled by his/her heterogenic class. He/she saw that the pupils’ needs were very different and they would benefit from different activities, but could not find a way to provide them with tailored tasks. The idea of on-the-fly groups emerged in an observed Finnish language lesson where the pupils started to write stories. After explaining the task, the teacher asked the pupils who had had problems in inventing a story line to participate in a small workshop. He/she named some pupils, but others joined as well. The next day we had a meeting where the researcher told that the teacher’s idea was fascinating: there are things that go on in the classroom and the pupils are free to participate. The following rules were set by the teacher and the researcher for the use of the groups:

I suggested three rules for the small groups:

1§ Use often, for example, once a day. This is to get used to the idea (Like “get used to it by doing it”).

2§ Would be task-dependent and not subject-dependent. Like in the mother tongue lesson, you can recommend the group for some pupils but try to avoid the groups being for the same pupils every time. (The grounds were to avoid the creation of standard groups that would be a burden for the teacher and pupils.)

3§ Every pupil could participate once a week. This referred to what [the teacher] said in the early autumn that each pupil should at least once a week get a task, which corresponds to his/her own level.

[The teacher] added a fourth paragraph:

4§ Being in a group would be intensive. [The teacher] would be present and not available for the other pupils. [278]

A suitable table was arranged for the group and to remind the teacher about the aim. A reserved table would also minimise the hassle of initiating the on-the-fly group during the lesson and, therefore, remove one excuse for not using the group.

The researcher spread around the idea of the on-the-fly group, like any other ideas. According to the data, three teachers used this idea. Two teachers mentioned this in the post-interview as one of the most exciting ideas of the year.

The teachers were aware of the differences in their pupils (*Pupil's Skills*, *Pupil's Problem Behaviour*, *Pupil's Attribute*) and knew that they should get individual teaching (*Insight into Teaching-Studying-Learning*). However, they had found the realisation of such teaching troublesome maybe because of a lack of time (*Time*), no interest in increasing planning time (*Working Hours*), lack of suitable self-guiding material (*Learning Material*) or to respect the equality of the pupils (*Aims*). The teacher who was quoted above, in particular, thought that he/she does enough work already so there was no time to plan one lesson two or three times for different pupil groups. Therefore, lightweight on-the-fly groups seemed to be a good idea. To remind himself/herself, the teacher arranged a table to enable and remind about the use of the groups (*School Premises*).

It can be argued that the basic idea of the practice was realistic i.e. suited the teachers' existing teaching spaces. The *Insight into Teaching-Studying-Learning* category and the *Teacher's Role* category could remain the same, as the teachers could work as leaders and disseminators of knowledge. Teachers' concept of *Pupil's Mind* suggested that the chance to choose whether to participate or not increases the pupils' motivation and also helps the teachers strive for pupil-centredness (*Aims*). The idea of lightweight planning respects the limits set by *Working Hours* and the short and intensive sessions the constant lack of *Time*.

In a nutshell, the on-the-fly groups succeeded because they required relatively few changes to the teaching space but seemed to fulfil several challenges set by it.

### 8.2.4 Corners

In two cases, the teachers had decided to refurnish the classrooms in the beginning of the empirical phase. When designing the new set-ups, they arranged quiet corners in their classrooms. The idea was to make different spaces in the classroom in order to use them in teacher or pupil initiated small-group activities. The data on the use of these spaces tell that they were used for pupils' individual work and by teacher-initiated sessions. The teacher could collect a group of pupils for a quick teaching session:

[The teacher] takes the pupils who have been absent behind the screen. Some pupils were not at school on Friday and [the teacher] teaches them what was taught to the others on Friday. [279]

The teachers did not always take advantage of the space and the pupils' work was not always perfect. However, such were exceptions in the data.

During the lesson [the teacher] notices that the pupils do not know how to read the pie diagram. [The teacher] interrupts the work and goes through the diagram with all pupils. Even the pupils which I know had completed the [pie-diagram-]exercise interrupt their work. [The teacher] could have collected the pupils with a problem and gone through the issue just with them. [280]

One pupil is "sleeping" on the mattress. [The teacher] goes to him and touches his belly with his/her foot. Apparently asks him to continue his work (I don't hear). [281]

These teachers restructured the *School Premises* category within the limit of the school component of the teaching space, namely in their own classroom. Here the *School Premises* category is an allowing concept, as the teachers are fairly autonomous when it comes to the layout of their own classrooms.

Why had the teachers not changed the layout before being in contact with the researcher? There are different possible reasons for this. Maybe there was no need, as no *Change in Thinking* had occurred, and the teacher's views (e.g. *Insight into Teaching-Studying-Learning*, *Personal Preferences*, *Aims*) and the classroom organisation were aligned. Maybe the teacher had noticed the discrepancy between his/her views and realisation, but was held back by internal (e.g. *Teacher's Role*) or external (e.g. *Principal*, *Work Community*) factors.

When redesigning the *School Premises*, the teachers were not only enabling or supporting some desired pupil behaviour in their classes. It could be argued that the teachers reshaped their teaching space in order to reshape their own behaviour. By adding some concrete reminders to their classrooms, they could remind themselves of pupil-centred activities. The teacher who introduced the On-The-Fly Groups also changed the layout of the classroom (see Chapter 8.2.3). Later on, he/she called the method "the use of the table". The table was no longer just a piece of furniture, but a symbol of a pedagogical practice.

### 8.2.5 Queue

After the break I followed the pupil who I had helped to find pictures of squirrels. We had found none. He/she tried to get [the teacher's] attention, but the teacher was talking with other pupils. [Teacher]: Don't you see that I'm in the middle of something with [Pupil B]. [The pupil] started to chat with others.

I started to think about a system, which the pupils could use to get [the teacher's] attention. A list of names. The pupils would write their name on the blackboard and [the teacher] would look to see whose turn it was. Would it be a good idea to make it compulsory as well? [282]

The previous quote describes pretty well the origin and rationale of the idea. The pupil needed the teacher's help, but was unable to get it as the teacher was constantly surrounded by more active pupils competing for his/her attention. McDaniel-Hine and Willower (2001) call this "flocking". The data on this describe occasions where the idea of a queue is used and the teacher



tells that he/she has been using it. Again, there is a note from a lesson, where the teacher did not mention the queuing rule and the pupils do not spontaneously follow it. Also, the teacher had found that there was no sense in rigorously following the rule when the question could be answered by a single word (i.e. “Can I go to the computer lab?”). The idea of the queue did not spread to other teachers.

This idea tried to align the teacher’s (and the researcher’s) teaching space and reality by changing the practice. There was equality of pupils (*Aims*) and support for the socially less able pupils who had trouble getting the attention of the teacher (*Pupil’s Mind*) and through that it minimised the *Pupil’s Problem Behaviour*. Furthermore, we wanted to make the teacher set the pace. When the teacher did not have time to look around he/she was more likely to get *Stuck-On-Action*.

The data do not give too much material for analysing the reason for its failure. Perhaps the only reason was that the teacher and pupils found it too bureaucratic.

### 8.2.6 Mind Map and Concept Mapping

Before the empirical period, the researcher had read about teaching and learning science. One of the references was Novak and Gowin’s (1984) book about graphical tools for learning, especially concept mapping. This idea seemed suitable for the primary teachers, since it gave structure to the learning-matter and required very little writing. The teachers were familiar with at least the more liberal flavour of Concept Maps, the Mind Maps.

Although several teachers utilised some version of map-making, only one teacher got really excited about it. In the post-interview, he/she explained the excitement by telling how pupils with poor reading and writing skills had been able to produce rich ideas, although normally “locked” by the poor reading-writing skills.

By looking at the few references there is about map-making, it is easy to get a feeling that the method is equally hard for pupils and teachers:

[Teacher]: But those pupils [who have problems in planning], they do not use the mind map fluently at all. No concrete decisions were made on the [mind-map] issue. [283]

I was looking at the [notice board] with the words written by me last time I was here. The old concept map was there, but it had been changed. It was more like a concept network now. There were far fewer links than had been there last time. The new concepts were arranged in a separate group. [...] The network appeared unclear. [284]

Rigorous concept mapping as a technique requires some practice. Thus, in the framework of the model of teaching space, the “hard to learn” could mean that the new method itself caused *Teacher’s Uncertainty*. The original idea of concept mapping was to effectively reveal the fuzzy and/or misleading conceptual structures of its designer. Thus, the teachers whose *Subject Mastery* was causing *Teacher’s Uncertainty* might have kept away from the technique to avoid such development.

Another and far more simple explanation is that the mind maps and the concept maps did not fit into the teachers’ *Personal Preferences*.

### 8.2.7 Maths Group

In one school, the teachers discussed the pupils who were doing well in maths and how they should be given more demanding tasks. In one planning session, the researcher suggested that the able pupils could be given more responsibility for their own work. A group of four pupils was collected from two classes for the researcher, who was offering to take care of providing them with additional mathematics tasks. The group met once a week and talked about the tasks of the previous week and where to proceed. They were asked to monitor themselves whether they could understand the new matters that were taught to the class and if so, they could work on their own tasks instead of the general ones. It was stressed that they had to use the same amount of time that they would normally do, no more or less.

According to the data, the pupils understood the idea of the group, but it did not seem to interest them too much. The teachers did not pay attention to the activities of the group and the whole thing was more or less alienated from what was taking place in the normal teaching. The group dried up after three months when the pupils’ grouping was changed and it was hard to find a time that suited the researcher and the four pupils.

This development could be explained by the link between the *Supporting Network* category and the *Exceptions* category (link R in Teacher's Work), which were mostly negative. Also, the new group of students increased the number of *Pupil's Attributes* in the class, thus, making the planning harder (link I in Teaching).

### 8.2.8 Summary of the Application Examples

The theoretical framework (see Chapter 4.1) suggested a list of eight factors that can be changed to open the pupils' learning environment. The innovations are summarised from the perspective of opening the learning environment using these eight factors (see Table 3).

It appears that each of the methods to open the learning environment is used at least in one of the examples. This suggests two things. First, as the list of eight factors in the theoretical review could capture the essential properties of the examples, the eight factors might be powerful enough to describe any innovation aimed at opening the learning environment. Second, the examples show that a change-oriented teacher can adjust all of these at least one at a time. Furthermore, the two most successful innovations (Research Form and Week Plan) operated in three factors, while others modified only one or two factors. The success of these innovations can also be a result of a printed form, which made them well defined and clear-cut (*Insight into Teaching-Studying-Learning*).

## 8.3 How to Support Opening of Learning Environment

According to the data, the teaching space has a number of features that limit a teacher who tries to open the pupils' learning environment. If the schools would like to increase the support for these teachers, this could be achieved by making some adjustments to the school-level properties of the teaching space. Although the study suggests that the most important parts of the teaching space are within the teachers, the schools can make a difference. A school component of the teaching space that favours an open learning environment might encourage teachers to try and use the pupil-centred methods, and make it easier for them to follow these practices. In all the cases studied, the opening of the learning environment meant that teachers had to make exceptions to what was considered normal. Making these exceptions was possible, but required extra effort from the teachers.

**Table 3.** Summarising the innovations using the factors of opening the learning environment.

Example	Affected Factors
Research Form (8.2.1)	<p>Method: Following a rigorous procedure for the project</p> <p>Goal and Content: Pupils plan an experiment/research of their own</p> <p>Tools: Pupils describe the tools they use in the research form</p>
Week Plan (8.2.2)	<p>Duration and Time: The pupils plan their use of time</p> <p>Place: The pupils plan what they do at school and what at home</p> <p>Assessment: Pupils make a self-assessment on the planning form</p>
On-The-Fly Groups (8.2.3)	<p>Social Organisation: Participating in a group is voluntary</p>
Corners (8.2.4)	<p>Social Organisation: The physical learning environment offers space for different social organisations</p> <p>Place: The pupils can use the space available when doing independent/small-group work</p>
Queue (8.2.5)	<p>Tools: Helps to get teacher's assistance</p>
Mind Map and Concept Mapping (8.2.6)	<p>Was not used to open the learning environment</p>
Maths Group (8.2.7)	<p>Goal and Content: The pupils could choose the assignments</p>

There were three key concepts that appear together in the data: *Planning*, *Time*, and *Learning Material* (see network view Teaching, Chapter 7.5.2). This suggests that these three could be the most important properties of the teaching space to reconsider. Any support that is targeted at these activities has the best chance of changing teaching practices.

Time is money at school. The school transfers the taxes collected by society to resources that should support pupils in their learning. These resources mean premises, learning material, free meal, but the most important and most expensive resource is the time of the individuals in the schools, both adult and children's. Although the last curriculum renewal in 1994 gave the power of making the curricula to the schools, the government wanted to keep the ultimate instrument of control, the distribution of hours to be taught. Although the schools write the curricula, it is the government who controls the time and uses this to promote its interests. This also works at the level of schools and individual teachers. In one example (see Chapter 8.2.2), a teacher devoted one 45-minute lesson each week to planning. This lesson was almost 5% of the weekly contact time, but since the teacher considered the joint planning important there was always enough time for it. As the true values of a government can be read in its budget, the true values of a school or teacher can be seen in the use of time.

Since time is the most important currency of the school, its use should be carefully considered from both the pupil and teacher's perspective. There are a number of studies concerning the matter (Goodlad 1984; Campbell & Neill 1994; Churchill & Williamson 1997; McDaniel-Hine and Willower 2001), but they tell us little about the situation in Finland today. The government controls the pupils' use of time on different subjects, but the schools can plan the use of time from the perspective of the quality of learning. How much time should be devoted to joint planning, acquiring new knowledge, practising its use and evaluation of the process and product? The data show that the teachers link the evaluation with working hours. If the extra time needed leads to better learning, maybe something less essential could be left out?

In order to meet the current need for effectiveness, the schools are trying get the most out of the teachers, which leads to a persistent lack of time (intensification, see Chapter 5.1). The data of this study suggest that the busyness is in the habit of hindering change. When you feel busy, you do not want to try anything new but stick to your routines. The change needs time – not necessarily time as such but merely a feeling of peace

instead of busyness. In one of the visited schools, it was normal that the teachers from time to time sat down and had spontaneous discussions about big questions in life or education during a normal recess. There were days when the teachers of that school had time to massage their shoulders, while the next day they were as busy as bees. The conversation culture in this staff room seemed to give strength to the whole community, whereas in some schools the conversation culture in the staff room prohibited the discussion of all professional matters. The work was in the classrooms and it should not be brought to the staff room.

It is possible that the busyness accumulates in certain active teachers, who want to participate in several different activities at the same time (Kohonen 1997, 283). The school leaders should be careful in selecting the projects in which the school and its staff participate. An active burnt out teacher serves no one. The projects participated in should serve the goals of the school, and not vice versa. As this report is about professional development, it naturally suggests that all projects should serve the teachers' learning, which contributes to the quality of pupil learning. However, the local mileage may vary.

From the perspective of an open learning environment, the time structures are the most important properties of the teaching space at the level of the school. Although most of the visited schools had arranged a variation of the standard cycle of 45-minutes lesson and 15-minutes recess, in practice it has only meant that a new structure has replaced the old one. No matter how long the lessons are, the structures included or whether their length varies from morning to afternoon, they are always based on the idea of pre-planned activity. If the teacher delivers his/her pedagogical power to the pupils, he/she cannot control the pace of the activities and fit them into certain structures.

Obviously, the time structures are helpful in administration of the school. It cheaper to have the teachers overseeing the recesses at designated times instead of providing the supervision in the yard throughout the day. The lunchroom and certain subjects requiring subject teachers or special premises pose a similar problem that is usually solved by making strict timetables for their use. Although this is easy for the administrators, the time structures can be problem for teachers who are trying to open their learning environments.

It should be reminded that the time structures, like all properties of the teaching space, can be both restrictive and supportive. It might be expected that a rigorous time cycle is good for pupils whose family background lacks safe routines. The data show that the teachers used time structures as a framework for planning. One example of the importance of the time structures for the teachers can be found in the use of external resource networks. The use was typically linked to exceptions to the regular schedule, which is generally negative and troubling (see Chapters 7.4.2.9 and 7.5.3). The use of common premises requires shared rules and planning. However, in real life they mean locked doors and tight schedules. It is easy to do as you please as long as you stay in your own classroom. If the school wants to favour teachers' attempts in pupil-centred pedagogies, all time-related practices should be rethought. There must be a way to satisfy the mixed needs.

The data show that learning material has an important status in the planning process. A similar suggestion has also been made by Jauhiainen (1995, 108-111). When looking for ideas on teaching, the teachers seldom have any other sources of inspiration than the pupils' book. Although there are several book series to choose from even the Finnish language area does not make for a large market, the teachers followed in this research seldom had books from different publishers. Neither did they seem to pay too much attention to the teacher's guides that are part of almost every book series. In many cases, the researcher got the impression that the teachers did not even have the teacher's guides or they were shared, meaning that they were not available when needed. At the school level, the investment in teachers' material of good quality could have a stronger impact on teachers' professional development than stressing the pupils' material. Learning material is not only a media for pupils' learning, but teacher development should be considered as well.

Traditionally all learning material had to be officially approved before it could be used as a textbook in schools. The approval was given by the National Board of Education (or its predecessors). The approval procedure for learning material was ended in 1994, and now the publishers are steered only by the interest of the teachers, who select the books to buy. This means that the teachers supposedly choose learning material that suits their existing practices, and the learning material is no longer the tool of a top-down change. Publishers, whose main interest is to make money for their shareholders, produce material that is expected to have the highest sales. A

renewed approval practice that would stress possibility of using the material in the open learning environment could be one way to support top-down pressure for a child-centred approach. As suggested by Hargreaves (1994), both top-down and down-top approaches should be used to support the change process. In the case of learning material, it should be remembered that the teachers also make material of their own, and the government could also invest in collecting this material and making it available to teachers by using the WWW, for example. There have been ideas like this in the website of National Board of Education, but so far these initiatives have suffered from counting too much on teachers' voluntary work. Initiating and giving strong financial support to such a project could be helpful in several ways. It could allow another source of inspiration for the teachers and eventually give the publishers new ideas and innovative designers.

It is a common belief that assessment steers teaching and learning. Pupils learn and teachers teach matters that are likely to appear in the tests that measure learning outcomes. Obviously, if the assessment and evaluation are defined at the level of the school, it must enable the opening of the learning environment. Assessment in an open learning environment is a problem. As noticed during the empirical phase, the teachers were uncertain how to assess projects in a way that respects the goals of the project, but at the same time produces information that can be used when writing the reports. Although a number of the schools studied had practices where the teacher meets parents and pupils as part of the evaluation process, all the teachers were, nevertheless, worried about the reports.

During the empirical phase, it became apparent that the evaluation affects teaching, although the evaluation is planned and conducted by the teachers themselves, as is the case in Finland. Usually the teachers felt that the independent work had taught the pupils less subject matter and more skills, like finding information, planning, co-operation etc. The nature of the concrete products varied greatly: mind maps, oral presentations, written reports etc. Gradually it became apparent that if a significant amount of time is devoted to the learning of skills, these learning outcomes should be assessed in one way or another. However, all assessment methods were time-consuming. Collecting data about pupils' skills would have required systematic observation and note taking, and the project reports required a more thorough process than a simple test. In short, teachers are tempted to



teach matters that are easy to assess and produce concrete evidence. The teachers need evaluation data not only for the pupils and parents, but also for their self-evaluation.

There are several evaluation practices that might solve the problem. Increased self-evaluation, peer evaluation, portfolios, systematic observation or tests that require more skills than memorisation are all well documented methods and some of them were used by the teachers, but they all require more time spent on evaluation than the traditional paper-and-pencil tests that measure memorisation. If the teachers are required to open the learning environment and set more skill-oriented goals, they should be provided with time to make the evaluation properly. So far this matter has not been addressed in the Finnish educational discussion, although addressed by research (Kohonen 1997, 275). The current situation favours the teaching of knowledge instead of skills.

The school premises should be reconsidered to support pupils' individual work. The example of corners (see Chapter 8.2.4) shows what was done in two classrooms. However, the data give numerous examples where the pupils have to work on the floor of the corridor, as the schools lacked facilities for small group work. Some teachers had to violate the school rules by letting the pupils work in the library or computer classroom without adult supervision. The pupils' independent work should be taken account when designing such resource premises.

[The researcher had been talking with the teachers about the noise during lunch.] It came to my mind, that the lunchrooms illustrate well how time has passed certain types of premises. In the old days this would not have been an issue: the problem is caused by the pupils, so let's ban talking and stand by the rule. Today we think that it is a self-evident truth that the pupils can discuss while eating, so the old premises are not working any more. Will the redesigning revolution of the schools start from the lunchrooms? [285]

During this teacher development project, all participating teachers got new experiences about opening the learning environment – at least for a short period of time. With the support from the researcher these experiences were mostly positive. As suggested by the results of this study, these experiences contribute to the teachers' insight into teaching-studying-learning process and gradually affect the teachers' way of working. The key question

in teacher development is how can we provide teachers with desired experiences in their own environments, since the current in-service training does not appear to lead to a change in thinking?

As suggested above, this study points out the factors of the teaching space, which could be modified at the level of the school. Instead of trying to directly affect teachers' pedagogical thinking (the teacher component of the teaching space), the teachers' professional development can be supported by the school component of the teaching space. The low-profile-influencing could better suit Finnish principals than the strong leadership (Isosomppi 1996, 146-147).

It should be noted that the suggestions above differ a great deal from Rosenholtz's (1989, 71-75), who mentions things like goal-setting, involvement in decision-making and shared teaching goals. As can be seen, from the perspective of the teaching space model these suggestions are part of the school component of the teaching space. The difference between the suggestions given by this study and Rosenholtz can be explained by a differing approach. Rosenholtz's suggestions reflect her organisational perspective, while this study approached the school through the individual teacher.

#### **8.4 Whether This Can Be Trusted**

The common denominator of all science is the quest for truth. There are several criteria for truth in the qualitative research (Johnson 1997), and the grounded theory theorists have set some criteria that are specific for their approach (Glaser & Strauss 1971, 228-233; Strauss & Corbin 1998, 269-272). However, the following discussion applies the terms of Lincoln and Guba (1985). The concepts of Lincoln and Guba have become de-facto standards of the qualitative research and it can be expected that most readers are already familiar with them. Furthermore, it appears that the ideas of the grounded theory theorists are not contradictory to Lincoln's and Guba's. Both frameworks stress that it is the reader who weights the truth-value of the report. To be able to do this the reader must be provided with accurate view of the theoretical framework, data and the main decisions of the researcher (Glaser & Strauss 1971, 228-230).

**Credibility** is roughly equal to internal validity in the quantitative framework. The research must be executed in such a way that the data collection process, as well as the conclusions that are made based on it, are credible.

In this research project, the researcher spent an intensive academic year with the subjects in their authentic environment. Considering the eventual research question, the data collection process is long enough to give a credible picture of the teachers' teaching space. The researcher was in a confidential two-way contact with the teachers meaning that not only the researcher asked questions, but also the teachers. Because of the prolonged and communicative nature of the observation, the collected data can be considered credible. Also the research problem has a holistic nature, which increases the credibility of the resulting picture.

However, the credibility is threatened by the focus of the data collection. The researcher followed teachers in the classrooms and joint planning sessions. Naturally, the researcher was able to follow the teachers in the staff rooms, but these observations are not recorded in the data. The researcher was also not present in the staff meetings, while some parents' meetings were visited. Thus, the possible skewing of the data could have resulted in a limited scope to the school component of the teaching space. This obvious problem has been addressed when appropriate.

While the data-collection lasted a significant time, the data processing also took a lot of time, roughly one and a half years. This appears to be part of the grounded theory procedure, where there is no grouping structure to use. As explained in the related chapter (see 7.3.1), it was the second categorisation that produced a useful framework and lead to the final research questions. The prolonged data processing suggests that the analyst spent enough time getting familiar with the data. To increase the credibility of the research process, the data analysis and deduction process has been presented separately. This report presents more than 280 direct quotes from the data in order to allow the reader to get as good a picture of the data as is practical and enable him/her to judge the validity of the conclusions made by the researcher.

Since the methods used in this research are highly dependent on the researcher as a person, it is meaningful to address this matter briefly. The researcher has a primary teacher's formal education, as well as practice working in school. He has also participated in scientific research about open learning environments (e.g. Lavonen, Meisalo & Lattu 2001; Lavonen, Meisalo & Lattu 2002; Lavonen, Meisalo, Lattu & Sutinen 2003). This particular project has been presented in academic forums while in progress (e.g. Lattu 2001). It can be argued that the researcher's familiarity in the researched area increases the credibility of the study.

**Transferability** stands for the external validity of the quantitative approach. In some cases there is a practical need behind the question of generalisation: Can I use these results in my situation? Of course, the situation can be either theoretical or practical. The qualitative research does not try to answer this question through generalising, but by giving enough contextual information to let the reader decide whether the results are applicable in the considered environment. Glaser and Strauss (1971, 232) articulated transferability in following words: “The invalidation or adjustment of theory is only legitimate for those social worlds or structures to which it is applicable.”

In this report, the transferability has been supported by describing the researcher’s theoretical background concerning the domain of the research problem. The science teaching, that was the content of most discussions, played no role in the research question and thus appeared in the data analysis only through the presented quotations, and, therefore, there is no chapter concerning that matter in the theoretical review. The teachers who participated are described as closely as possible without threatening the teachers’ privacy. As the development focused on individual teachers, their communities were described only at a superficial level. While a more detailed description of teachers and their communities could have been possible, the researcher wanted to maintain the confidential nature throughout the study. It is the sincere hope of the researcher, that this would encourage other teachers to participate in scientific research and development projects without the fear of being publicly disclosed by the researchers.

When considering the transferability, the important property of these teachers was the interest in child-centredness and open learning environment. With different subjects, the data-derived model of the teaching space could look different.

Some readers might miss a closer description of what the researcher really did and talked about with the teachers. However, as the researcher did not have any pre-planned procedure to be used with the teachers but tried to offer child-centredness and opening of the learning environment in all encountered discussions, a detailed description could not be given within the reasonable limits of the report.

Glaser and Strauss (1971, 231) encourage grounded theory researchers to use multiple comparison groups to test the emerging theories. Obviously, this would also contribute to the better transferability of these theories.

**Dependability** roughly equals reliability. The concept is a problem in the qualitative paradigm. If one admits that there are as many truths as there are individuals, or the truth can change over time, one cannot talk about consistency in a similar manner as in the quantitative paradigm. Dependability covers both methods and decisions made by the researcher. In this research, the dependability affects both the data collection procedure and the analysis. The data collection was driven by the researcher's interests and there is no guarantee that all relevant observations ended up in the data. As noted in Chapter 7.2, the data collection was dependent on the development. While the researcher had to choose between discussions with the teachers and data collection, the discussions always won. Also, what was said above about the focus of the data is always appropriate in the discussion of dependability.

The grounded theory data analysis is inherently subjective. It is the analyst who begins to see the emerging categories and no matter how hard he/she tries to avoid preconceived categories, he/she is reading the data through his/her own understanding that can be also called preconceptions. In another words, different analysts might see different conceptions emerging from the same data. In this research, the data collection and analysis were conducted by the same person, and strictly speaking the analysis was not conducted only on the written data but also on the memories of those incidents which affected the process. It would be hypocritical to claim that the researcher, while changing his role to analyst, was able to forget the experiences that were not recorded in the data. This has obviously affected the data analysis in one way or another, although no claims are made without direct evidence in the data.

Since it is admitted that the data analysis is subjective, using a verification process in categorisation was not meaningful. The definitions and categories were aligned with each other using a rigorous procedure in the axial coding phase and the peer reviewer read the category definitions (see Chapter 7.3.2). This seemed to be the only meaningful verifying process available.

**Confirmability** corresponds with objectivity that is a problem if one admits the possibility of multiple truths. Confirmability is the characteristic of the data and not the researcher. Much of the above discussion also applies to the confirmability of this research. The data collection and data analysis of the research were subjective, which decreases the confirmability of the study.

To summarise the above discussion, the prolonged data collection and analysis have increased the credibility, while the report explains all the significant steps and decisions of the research. A large number of relevant quotations have been included to allow the reader get a glimpse of the material behind the analysis. It could be expected that a researcher could end up with a relatively similar model of teaching space with similar change-oriented subjects and similar data-collection procedure. However, in a teaching experiment that is highly dependent on local situations and aims to create new innovations, the dependability and confirmability are not the key issues in this study (see Lesh & Kelly 2000 in Chapter 6.2.1).

## **8.5 Closing Thoughts**

This research report has mapped the primary teacher's professional environment that has been called the teaching space. Typical for an inductive study that applies grounded theory methods, the value of the study comes from the ideas it generates and not the generalisable truths it points out. This study suggests that the primary teacher's teaching space can be defined using 48 concepts. The relations network analysis has revealed several links between these concepts. Furthermore, the study argues that the teaching space has a great effect on the teacher – in fact, the teaching space is what the teachers work in. Although some might think that the teachers are given a free hand with their classes, this is not the case. In order to develop a school, it is not enough to work with one teacher or a number of teachers in the school. The whole teaching space must be studied and redesigned to meet the needs. The school developers could find a clear model of the teaching space helpful.

This research dealt with professional development through a long-term co-operation between the teachers and the researcher. As argued above based on the data analysis of this study, the teachers seem to build their insight into the teaching-studying-learning process on their own experiences instead of in-service training, while the pre-service education was also linked with a change in thinking. In this project, all teachers have opened their learning environments at least during a short project and thus, got new experiences about child-centred methods. With the support of the researcher, the experiences were positive, which should contribute to a favourable image of the approach. The use of child-centred methods and an open learning environment are not just techniques to learn. The change from a teacher-

lead approach to a more open direction seems to deal with teachers' deep values that are not changing quickly, as argued by Pajares (1992) and Senger (1999). Pajares adds "change in belief during adulthood is a relatively rare phenomenon..." Obviously, the opening of the learning environment is a challenging task.

Although this report has not approached the data from the perspective of individual teachers (cf. Senger 1999), it should be reasonable to ask how many teachers changed their practices due to the project. A cautious estimation would be that one of the eleven teachers changed dramatically his/her way of organising the school (see Chapter 8.2.2). In the beginning of the project, the teacher was dissatisfied with his/her practice, and in this case the change required the innovation of the planning form and a little support from the researcher: "Yes, it is OK to run a school this way." One of the teachers had been using a child-centred approach so long that the researcher could only offer himself as a peer to test ideas. One teacher was clearly discontent with the co-operation and he/she had no observable interest in changing his/her practices. The rest of the teachers fell into the category that has been described in the previous paragraph. They were interested and got some experiences, which may have changed their view of teaching-studying-learning process. These teachers might have benefited from a longer project.

What could be possible reasons for the lack of great changes among the participating teachers? It looks like the intensive co-operation between the teachers and the researcher did not result in an accelerated change but ensured positive experiences. The teachers form their insights into the teaching-studying-learning process by their own experiences, which takes time. The project also lacked some elements that have been found useful in other teacher development projects, like supported reflection or different levels of collegiality and peer coaching that are suggested by Sahlberg (1997). As explained above in Chapter 2.4, one of the key elements of this project was to avoid the use of extra resources that would not be available for the majority of researchers. Because the teachers had to take care of their everyday duties during the project, the methods used had to benefit directly their everyday work and not generate more work. Since the ideas based on teachers' co-operation suggested by Sahlberg would have required money to hire substitute teachers, and the learning diaries or similar methods would have generated extra work for teachers that could not be compensated for by reducing their work otherwise, these approaches were not used. The

researcher's time was the only extra resource available, and this was used for reflective discussions, feeding research-based ideas and transferring new innovations from one teacher to another.

If the model used in this study was able to ensure positive experiences about opening the learning environment, how could this model be put into the "production use"? Hiring a tutor for ten teachers throughout the schools is not in the foreseeable future as it would require high investments and there would be other equally justifiable purposes to spend this money on. During the empirical phase, some of the researcher's colleagues played with Internet videos that were used in an in-service training project. The use of modern communication technology could offer significant financial savings, as the Internet could be used as a media for passing the teachers' experiences to a wider audience. While the size of the intensive group could be around five, the larger group that would be offered the network material with some get-togethers could be around a hundred. This way the price per teacher could decrease to a more reasonable level compared to the reported project.

There is a saying that nothing is as practical as a good theory. This study has brought some order and visibility to the school reality that is often chaotic and contains hidden phenomena. It is the researcher's sincere wish that the study would help the teachers, principals and other professionals working with the school development in enhancing their understanding of the teacher's frame of reference. The empirical phase of the study took the shape of a development project, and it hopefully contributes to other similar projects for giving new ideas and common concepts for various people working within them. The concepts and their relations can be used to form a shared picture of the situations between the participating individuals. The model of teaching space could also be helpful in formulating the project goals that are both practical and theoretically justified.

The teaching space model offers a number of new courses for research. Maybe the most important message for the researchers in the field is to adopt the teacher's perspective, much like the concept of learning environment suggests looking at the school from the pupil's viewpoint. Since planning, learning material and time were the key concepts of teaching, it would be worthwhile to study them individually and together. What kind of planning habits do the teachers have? According to the experiences of this study, the teachers use the pupils' learning material as such, as well as a source of inspiration. If the teachers do not use the teacher's guidebooks



published with the book series, what kind of learning material would benefit both pupil and teacher and support the latter's professional development? What is the pupil and teacher's time used for and what kind of learning does this use of time support?

Since the teachers seem to form their ideas about teaching, studying and learning based on their experiences rather than the formal in-service training, the research concerning the teachers' biographies should be centred on their professional careers, since the practising teachers are a more focused target group for attempted change. It would be ideal to develop ways to offer practising teachers experiences about the desired practises. This research has presented one way for supplying practising teachers with positive experiences about the open learning environment, and the idea has been developed further above.

There must be numerous ways to develop the suggested model further. Other similar inductive studies that follow the teachers' reality would be appropriate. Kärkkäinen (2000) studied teachers' networks, where the nodes were other people. However, non-human objects of the environment could be treated in a similar way. With measuring instruments that capture the key concepts of the teaching space, one could collect data and try to extract a resembling network that was composed here using the qualitative data. It is my wish to have the privilege of participating in this work.

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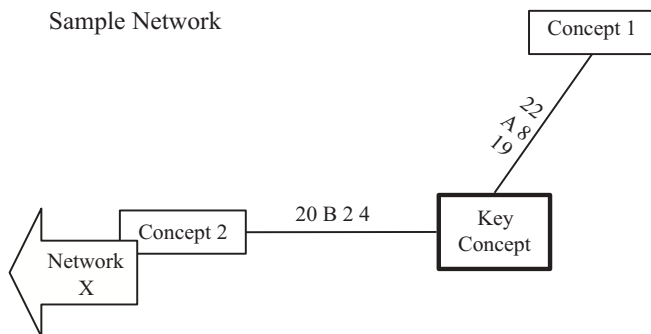
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## APPENDIX

### Appendix 1. The Notation Used in the Network Views.

The network views are in figs 6, 7 and 8.



There are three concepts in the Sample Network: *Key Concept* (thick border), *Concept 1* and *Concept 2*. *Key Concept* is directly connected with both two concepts. The direct connection is marked with line and attached data about the connection. The bold letters (A and B) are used to name the connections, and the following number indicates the number of common references that make the connection. The two other numbers tell the ratio (percentage) of the common references and the number of references in the respective concepts. As there are two concepts in each connection, there are two percentages.

The connection A has 8 common references, which are 22% of the total number of references of *Concept 1* and 19% of *Key Concept*. As 22% exceeds the 20-percentage-limit used in the study (see Chapter 7.5), this connection is included into the analysis. The connection B has 2 common references, which are 20% of the total number of references of *Concept 2* and only 4% of the references of the *Key Concept*.

It is possible that *Concept 1* and *Concept 2* have common references, but since the number of those references is less than 20% of the number of references of either category, the connection is excluded from the analysis.

The large arrow indicates that this network is connected to another network (Network X) through *Concept 2*. This means that there is a concept in Network X that has common references with *Concept 2*.