

Minna Kovalainen

THE SOCIAL CONSTRUCTION
OF LEARNING AND TEACHING
IN A CLASSROOM COMMUNITY
OF INQUIRY

UNIVERSITY OF OULU GRADUATE SCHOOL;
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MINNA KOVALAINEN

**THE SOCIAL CONSTRUCTION OF
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A CLASSROOM COMMUNITY OF
INQUIRY**

Academic dissertation to be presented with the assent of the Doctoral Training Committee of Human Sciences of the University of Oulu for public defence in Kaljusensali (Auditorium KTK112), Linnanmaa, on 20 September 2013, at 12 noon

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Abstract

This thesis concentrates on investigating the social construction of learning and teaching in a classroom that was encultured into working and acting as a community of inquiry across the curriculum. The theoretical and methodological premises of the study draw on sociocultural and sociolinguistic views on learning and instruction. Through this framework, the study aims at investigating the development, implementation and evaluation of the processes and conditions for communal inquiry across different pedagogical situations and across the curriculum in the case study classroom. In addition, the study aims at creating a pedagogical rationale for supporting meaningful, student-centred and problem-based learning in classroom.

The research project was realised as a series of qualitative case studies. The subjects of the study were seventeen third-grade students from a Finnish elementary school and their teacher. The empirical data corpus consists of nine hours of videotaped classroom sessions gathered from the domains of philosophy, science and mathematics. Detailed, micro- and multilevel analyses were completed on the transcribed video recordings of whole classroom interaction.

The results of the research project indicate that social interactions in the case study classroom were quite dominantly characterized by multilateral interactions amongst classroom members. Instead of mere information exchange, the nature of knowledge in this classroom was largely based upon sharing and defining views as well as negotiating evidence. In general, the students in this classroom clearly took charge of the cognitive work whereas the teacher's responsibility was more directed towards managing the interactional practices during the joint discussions. However, there were occasions when the teacher stepped in as an analytic authority. The teacher scaffolding was grounded in the on-going interactions and varied in both quantity and quality whilst engaging in dialogue with individual students demonstrating different participation modes. Overall, the results of the study indicate that teacher scaffolding in this classroom supported communal inquiry from both the cognitive, social and socio-emotional perspectives.

Keywords: classroom interaction, community of inquiry, discourse analysis, elementary education, Philosophy for Children, scaffolding, social interaction and learning, sociocultural pedagogy

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Tiivistelmä

Väitöstutkimus tarkastelee oppimisen ja opetuksen sosiaalista rakentumista luokassa, jonka toimintakulttuuri rakentuu tutkivan yhteisön periaatteille yli oppiainerajojen. Tutkimuksen teoreettinen viitekehys perustuu sosiokulttuurisille ja sosiolingvistisille oppimis- ja opetuskäsitteille. Tästä teoriataustasta käsin tutkimuksen tavoitteena on tarkastella tutkivan yhteisön periaatteille rakentuvan toimintakulttuurin prosesseja ja ehtoja tapaustutkimusluokassa. Lisäksi tutkimuksen pedagogisena tavoitteena on kehittää suuntaviivoja merkitykselliselle, oppilaskeskeiselle ja ongelmalähtöiselle oppimiselle.

Tutkimusprojekti toteutettiin laadullisten tapaustutkimusten sarjana. Tutkimuskohteena ovat seitsemäntoista suomalaisen alakoulun 3. luokan oppilasta ja heidän opettajansa. Tutkimusaineisto koostuu yhdeksästä tunnista videoituja oppituntitilanteita filosofian, luonnontiedon ja matematiikan oppiaineissa. Koko luokan vuorovaikutustilanteita sisältävät litteroidut videotallenteet analysoitiin yksityiskohtaisin, mikro- ja monitasoisin analyysimenetelmin.

Tutkimustulokset osoittavat, että tapaustutkimusluokan sosiaaliset vuorovaikutustilanteet rakentuivat vahvasti jäsenten väliselle, monenkeskiselle vuorovaikutukselle. Pelkän informaation vaihdon sijaan tiedon luonne tutkimuskohteena olleessa luokassa perustui yhteiselle näkökulmien jakamiselle, tarkentamiselle ja perustelemiselle. Luokan oppilaat ottivat vastuuta tiedollisista neuvotteluista, kun taas opettajan vastuu kohdentui enimmänsin vuorovaikutuksen ohjaamiseen yhteisten keskustelujen aikana. Kuitenkin opettaja astui esiin luokan vuorovaikutustilanteissa välillä myös analyttisenä asiantuntijana. Opettajan tuki määrittyi luokan vuorovaikutustilanteiden kautta, ja se vaihteli määrältään ja laadultaan opettajan ollessa vuorovaikutuksessa osallistumiseltaan erilaisten oppilaiden kanssa. Kaiken kaikkiaan tutkimustulokset osoittavat, että opettajan ohjaus luokkayhteisössä tuki tutkivan yhteisön rakentumista niin tiedollisesta, sosiaalisesta kuin sosioemotionaalista näkökulmasta.

Asiasanat: alakoulu, diskurssianalyysi, Filosofiaa lapsille -ohjelma, luokkahuonevuorovaikutus, opetus, sosiaalinen vuorovaikutus ja oppiminen, sosiokulttuurinen pedagogiikka, tutkiva yhteisö

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Oulu, June, 2013

Minna Kovalainen

List of original articles

This thesis is based on the following papers, which are referred to in the text by their Roman numerals (I-IV):

- I Kovalainen, K., Kumpulainen, K. & Vasama, S. (2001). Orchestrating classroom interaction in a community of inquiry: Modes of teacher participation. *Journal of Classroom Interaction*, 36(2), 17-28.
- II Kovalainen, M. & Kumpulainen, K. (2005). The discursive practice of participation in an elementary classroom community. *Instructional Science*, 33(3), 213-250.
- III Kovalainen, M. & Kumpulainen, K. (2007). The social construction of participation in an elementary classroom community. *International Journal of Educational Research*, 46, 141-158.
- IV Kovalainen, M. & Kumpulainen, K. (2009). Discourse-enriched instruction in the mathematics classroom: Analysing collective problem-solving. In K. Kumpulainen, C.E. Hmelo-silver, & M. Cesar (Eds.), *Investigating Classroom Interaction: Methodologies in Action* (pp.43-71). Rotterdam: Sense Publishers.

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1 Introduction

In today's society, social and economic changes have forced educators to rethink their educational aims and to foresee the skills that students are likely to need in their future lives. The conventional pedagogical practices based on recitation and memorization of facts are now considered as inadequate to develop critical and creative thinking and communicative skills that students are likely to need in order to face the complex problem-solving situations of today's society.

Consequently, many contemporary teachers and researchers working within the field of education have been interested in converting the culture of the classroom into communities of inquiry that support active student participation and shared responsibility for learning. In these classroom cultures, students are encouraged to initiate collective discussions as well as negotiate, challenge and provide feedback to the ideas presented by the other members of the learning community. In addition to promoting students' thinking and communication skills, these classroom cultures aim at supporting students' socio-emotional development, commitment and motivation in learning. In summary, contemporary classroom cultures can be regarded as dynamic contexts for multifaceted activity during which social, cognitive and cultural mediation occurs (Rex *et al.*, 2006).

Despite the growing interest in enhancing more participatory classroom cultures over the conventional, recitation-based pedagogy, several recent studies imply that there are various theoretical, methodological and pedagogical challenges to encounter. In recent years, there has been an orientation towards multidisciplinary research work in the field of classroom interaction (Grossen, 2008, 2009; Rostvall & West, 2005). Thus, researchers are faced with a challenge: to be congruent in blending the theoretical concepts and methodological frameworks originating from different disciplinary origins into a logical coherence as the original research objects and goals across various disciplines might be quite different (Grossen, 2008).

The socio-technical developments of today's society have made it easy to document human action and interaction (Pea, 2006; Rostvall & West, 2005). Consequently, video research has gained more and more prevalence amongst researchers investigating classroom interaction. However, analysing the complex, multimodal video data poses various methodological challenges (Pea, 2006; Rostvall & West, 2005). Methodologically, there is a need to develop analytical tools that would enable teachers and researchers to capture the complexity of the dynamic learning situations in interaction-rich classrooms.

In addition, fostering genuine student engagement in productive discussions in participatory classroom culture seems to be quite challenging (Engle & Conant, 2002). Both teachers and students are often puzzled by their new roles and responsibilities in the learning community (Nathan & Knuth, 2003; Rasku-Puttonen *et al.*, 2003; Williams & Baxter, 1996). Pedagogically, there is a need for close, microlevel investigations on how learning and teaching are socially constructed in authentic classroom communities.

This thesis attempts to provide a holistic picture of what it is to learn and teach in a learning community that has been encultured into the principles of dialogic inquiry. By investigating the discourse practices of the case study classroom, the research study aims at illuminating how the pedagogy grounded in the multidisciplinary framework of both sociocultural and sociolinguistic theories is realised concretely in the on-going social interactions of the classroom across various pedagogical situations and across the curriculum. In addition, the thesis introduces a method of classroom interaction analysis developed and applied in analysing the social construction of teaching and learning in the case study classroom community. Pedagogically, the thesis aims at providing valuable information of how to move towards a more learner-sensitive and communicative direction in learning and instruction across different domains. As a whole, it is hoped that the results of the thesis will serve not only the future research in learning and instruction but also the teachers, teacher-educators and student-teachers working in the field of education.

2 Theoretical framework

2.1 Learning and teaching as social construction

The conventional acquisition-oriented perspectives to learning and instruction have been recently challenged by the approaches in which emphasis is placed on collective meaning-making and socially shared classroom practices (Brown & Campione, 1994; Lave & Wenger, 1991; Sfard, 1998; Wenger, 1998). According to these approaches, the joint negotiations of the different views, opinions and interpretations into a shared understanding is seen as giving learners opportunities to extend their level of participation in the socially situated activity in question and, correspondingly, to broaden the learner's ways of knowing and thinking (Wells, 1999).

In this thesis, the theoretical premises and the methodological solutions are influenced by two approaches that view learning and teaching as socially constructed phenomenon, namely the sociocultural and sociolinguistic approaches. These two approaches draw from slightly different disciplinary origins but share the focus in viewing language as mediating learning. By combining elements from the theoretical and methodological premises of the two approaches, this study aims at providing a holistic and transparent description of the interactional dynamics in the case study classroom.

2.1.1 A sociocultural approach

The sociocultural approach has its origins in the developmental theory of Vygotsky (1962, 1978). In this approach, language and other semiotic tools are viewed as significant mediators in the social construction of proximal zones for learning, during which socially shared meaning-making rouses new perspectives yet to be discovered (Moll, 1990; Tharp & Gallimore, 1988; Vygotsky, 1962, 1978; Wells, 1999). According to the sociocultural approach, language has three pivotal and integrated functions. Firstly, language can be regarded as a *cognitive tool* that is used in processing and constructing knowledge. Secondly, language is a significant *social or cultural tool* for sharing knowledge during joint interactions amongst other people. Thirdly, language serves the function of a *pedagogical tool* that may be used in supporting and guiding other people's intellectual development. (Vygotsky, 1962). The use and meaning of language and

other semiotic tools is first learned in social interactions with others at the *intermental level* and, via the process of internalisation, gradually transferred into the individual at the *intramental level* (Vygotsky, 1978). Thus, social experience of language use shapes individual cognition (Mercer, 2004; Mercer *et al.*, 1999; Vygotsky, 1962, 1978).

According to the sociocultural approach, learning entails enculturation into the practices, discourses and norms of the community (Cole, 1996; Sfard, 1998; Vygotsky, 1962, 1978; Wertsch, 1991; Wertsch *et al.*, 1995). Learning about a certain content area means that one learns to use its particular discourses (Lemke, 2000). Thus, learning includes gaining an understanding of the content-specific vocabulary and concepts as well as the meta-discourse; that is, the communal rules, roles and practices that define the valued nature and manner of participation in that specific learning community. Consequently, learning and instruction in the classroom can be regarded as involving a dynamic interplay between the disciplinary discourses as well as the discursive practices of the specific learning community in question with its own rules (Lemke, 2000).

In the sociocultural approach, learning is regarded as a situated process that must be considered in the broader sociocultural and historical context where it occurs (Wertsch, 1991). The notion of context is regarded as a dynamic process that is continuously shaped in the social interactions of the classroom community (Duranti & Goodwin, 1992; Mercer, 2004). Thus, context and talk are viewed in a mutually reflexive relationship with each other, with talk shaping context and vice versa (Duranti & Goodwin, 1992). Describing the multidimensional nature of context, Schubauer-Leoni and Grossen (1993) have identified three different levels, namely the socio/cultural, institutional and interindividual contexts. According to Schubauer-Leoni and Grossen, all these levels should be recognized theoretically and methodologically in the analysis of the complex phenomenon of an individual's participation in socially shared activities.

2.1.2 A sociolinguistic approach

The sociolinguistic approach pays attention to the linguistic interaction that mediates learning (Adger *et al.*, 2004). The sociolinguistic approach draws from the disciplines of linguistics, anthropology and sociology. By investigating the discursive practices and participant structures in classroom communities, sociolinguistic researchers aim at understanding the communicative interactions embedded in particular social contexts (Castanheira *et al.*, 2001; Cazden, 1988).

Learning and teaching are viewed as a socially constructed phenomenon situated in the sociocultural context of an activity and are constantly defined and redefined within and across the different social groups (Castanheira *et al.*, 2001). Thus, classrooms are viewed as cultural sites for meaning in which norms, values, rules, roles and relationships are socially constructed into the on-going social interactions of the community (Bowers *et al.*, 1999; Castanheira *et al.*, 2001; Cole, 1996). The socially established cultural practices of the classroom become evident, are continuously re-constructed in the pedagogical and social life of the classroom and are reflected in legitimate ways of participation and communication (Wells, 1999; Wenger, 1998). Through their actions, participants communicate their membership of a particular group or subgroup within the classroom community (Castanheira *et al.*, 2001). Consequently, the locally constructed interactions signal what counts as learning, participating and communicating in the classroom.

The interactive practices constructed and made available to members of the classroom community constitute participation as a situated process. During joint activities, linguistic interaction at the same time reflects and constructs the situation in which it is used (Gee & Green, 1998). Consequently, the participatory roles of classroom members are both a product of and a tool for the community. The participatory practices of the classroom and the roles individuals take during the practices develop and change while the community itself develops. Thus, participation opportunities and possibilities are viewed as serving both the collective and the individual needs (Lima, 1995). In the learning community, participants are afforded, and sometimes denied, access to particular socially situated interactions. The development of an individual's repertoire of participatory skills is dependent on the kinds of opportunities he or she has access to and which opportunities he or she takes up during socially shared interactions in the classroom (Alton-Lee & Nuthall, 1992, 1993; Castanheira *et al.*, 2001; Floriani, 1993; Heras, 1993).

As the research on learning and teaching as a socially constructed phenomenon has gained more prevalence in the past few decades, qualitative research methods, especially discourse and conversational analysis approaches, have been applied and developed to examine the socially shared meaning-making in classrooms and other educational settings (Gee & Green, 1998). Through detailed, multilevel analysis of the discursive practices of the classroom learning community, these studies aim at illuminating the complex and dynamic relationships between language, socially shared activities and learning.

For example, Judith Green and the Santa Barbara Classroom Discourse Group (see Castanheira *et al.*, 2001) apply a multidisciplinary research approach called Interactional Ethnography that has been influenced by the interactional sociolinguistic work of Gumberz (1982) and Gumberz and Hrasimchuck (1972). In their research, a discourse analysis approach is combined with an ethnographic approach. By investigating the dynamic relationship between an individual's discursive practices and the cultural practices and norms of the social group in question, proponents of Interactional Ethnography attempt to illuminate the social construction of opportunities for learning in and across classroom events. Through detailed, thick descriptions of the joint interactions during socially shared activities, this research approach attempts to illuminate what counts as learning in the social group in question, how it is visible in the actions participants take, what is counted as local knowledge in that group and how the participants interpret and construct knowledge in the learning community (Castanheira *et al.*, 2001).

In addition, Mercer and his co-researchers (Edwards & Mercer, 1987; Mercer, 1995; Mercer *et al.*, 1999) have investigated the linguistic interactions of children during joint meaning-making activities. In their research, they distinguished three kinds of talk amongst children during collaborative reasoning. *Disputational talk* is evident while students work uncooperatively and competitively. If students work cooperatively but co-construct knowledge in an uncritical manner, the linguistic interaction could be described as *cumulative talk*. *Exploratory talk* describes an effective language use for socially shared, explicit, collaborative reasoning. During exploratory talk, participants engage in collaborative interactions in critical but simultaneously constructive ways. Students initiate dialogues and share their thoughts and points of views in the learning community. The presented ideas may be challenged and counter-challenged by the community members. However, challenges need to be justified and alternative ideas brought to discussion. According to Mercer *et al.*, 'in exploratory talk, knowledge is made publicly accountable and reasoning is visible in the talk' (1999, p. 97).

2.2 Guided participation during communal learning

The role of the teacher in guiding the participation processes during collective meaning-making has also been of interest to several researchers. In conventional, recitation-based classrooms, the practice of teaching has mainly consisted of lecturing, explaining and questioning already existing, factual knowledge (cf.

Tharp & Gallimore, 1988). However, in contemporary classrooms based on communal inquiry, the role of the teacher is seen more as a sensitive coach who supports students' active participation in shared meaning-making. In the following sections, some of the most well-known models of instruction that have been developed in order to describe the process by which teachers can guide students' participation during communal learning are presented.

2.2.1 The notion of scaffolding

In the disciplines of psychology and education, one of the most recognized metaphors for the process by which adults (or more knowledgeable peers) guide children's learning and development is the notion of *scaffolding*. The origins of the metaphor can be traced back to the work of Wood *et al.* (1976) who used it as an analytic device in investigating the functional role of the support provided by parents to their young children during joint problem-solving situations. According to Wood *et al.* (1976), scaffolding is a form of temporary adult assistance 'that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts' (p. 90). During the process of scaffolding, the adult's role is important in 'controlling those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence' (p. 90). A prerequisite for successful scaffolding is that a child has some prior understanding of what is to be accomplished during the scaffolding interaction. Via the adult's calibrated assistance, scaffolding interactions are assumed to result in a better understanding on the part of the child. Even though the scaffolding metaphor was initially used in a very pragmatic and atheoretical manner, later on it was linked with Vygotsky's (1962, 1978) developmental theory, especially with the notion of the zone of proximal development.

Cazden (1979) was one of the first researchers who extended the notion of scaffolding from dyadic parent-child interactions to an analysis of teacher-student interactions in classroom contexts. The results of Cazden's (1979) research study indicated that teachers used question-answer sequences during social interaction as scaffolds to support their students' proficiency over the implicit participation structures of classroom discourse. However, it was not until the mid-1980s that research on classroom interaction that applied the scaffolding metaphor began to appear more widely.

One of the most well known applications of the scaffolding metaphor in classroom interaction is the instructional procedure called *reciprocal teaching* that was designed to teach students cognitive strategies that could result in improved reading comprehension (Brown & Palincsar, 1989; Palincsar, 1986; Palincsar & Brown, 1984). During joint small group discussions, teacher and students share the responsibility in conducting a set of concrete strategies related to text comprehension, namely, questioning, clarifying, summarizing and predicting. In the early phases of the joint discussion, the teacher undertakes the primary responsibility for carrying out the strategies via explicit modelling and highly structured feedback. Gradually, however, the students are encouraged to take a greater responsibility in executing the strategies. In the flow of the joint discussion, the teacher guides the negotiation by providing assistance to the varying needs of the students. When students gain more experience in participating and leading the discussion, the repeating sequence structure is gradually faded (Brown & Campione, 1994). Through this process, students can adopt more and more complicated argument structures (Brown & Palincsar, 1989). The potentials of reciprocal teaching have been widely explored in classroom learning and teaching across various classroom contexts (see Rosenshine & Meister, 1994). It is also included in *guided discovery in a community of learners*, which is a pedagogical model designed to enhance socially shared expertise in classroom learning communities (Brown & Campione, 1994).

Another application of the scaffolding metaphor is an instructional approach called *procedural writing* that aims at helping students adopt more sophisticated writing strategies (Scardamalia & Bereiter, 1985). Similar to reciprocal teaching, this approach is designed to improve students' complex problem-solving skills via explicit modelling of expert processes. As students' skills in complex problem-solving improve, scaffolding is gradually reduced. The explicit procedural supports, called *procedural facilitations*, are a set of prompts that are based on a detailed analysis of the activities of expert writers. The prompts are designed to simplify complex information processing and to suggest specific lines of inquiry to follow. Through a specific, think-aloud technique called *co-investigation*, students are also encouraged to reflect on their process of inquiry (Scardamalia & Bereiter, 1983).

As many contemporary research studies on classroom interaction have adopted the idea that all human actions, including learning, have to be understood in the sociocultural context of the situations where they naturally occur, a number of concerns about the notion of scaffolding have begun to emerge. In his short

review, Stone (1998) has listed some criticisms concerning the notion of scaffolding raised by various researchers. One of the criticisms voiced about the scaffolding metaphor has been that it disregards the social and cultural factors shaping the form and quality of interaction (Stone, 1998). In line with this argument, Rogoff claims that scaffolding focuses exclusively on adults as the agents for building up new learning and understandings, even though peers can be valuable sources of enhancing new learning (1990). Secondly, the scaffolding metaphor has been criticised for conceptualising adult-child interactions as too other-driven or biased in nature (Stone, 1998). According to this argument, the teacher is conceptualised as having the main responsibility of guiding the lines of inquiry and the child is seen to merely observe or to react on teacher's actions. Related to this, Rogoff argues that the scaffolding metaphor does not pay attention to the age-related differences in a child's ability to benefit from scaffolding (1990). A third criticism voiced about the notion of scaffolding is that it presumes an idealized adult-child relationship. However, adult-child interactions during scaffolding might not be as affect-neutral as presupposed (Stone, 1998). Fourthly, the scaffolding metaphor has been claimed to encourage researchers to emphasise quantitative rather than qualitative changes in children's knowledge (Stone, 1998). Consequently, there is a need for close, microlevel investigations of the specific mechanisms by which qualitative changes in learning take place during scaffolding interactions. Due to the critical claims presented above, many explicit alternatives or refinements of the notion of scaffolding have been offered in the field of developmental and educational psychology.

2.2.2 Instructional models emphasising learning as participation in contextually embedded activities

One instructional model emphasising the participatory nature of learning and teaching in sociocultural activities of the learning community is called *teaching as assisted performance* (Tharp & Gallimore, 1988). According to this model of instruction, the teacher's role is defined as that of a sensitive coach or expert partner who supports the joint inquiry by providing structural assistance. The students' role is to provide the content of the discussion by developing ideas or presenting their point of views. Tharp & Gallimore (1988) argue that instruction in contemporary classrooms should give space for students' active participation and inventive role in transforming their understandings. The theoretical premises

of teaching as assisted performance are linked with Vygotsky's developmental theory, especially the notion of zone of proximal development. According to Tharp & Gallimore, 'teaching consists in assisting performance through ZPD. Teaching can be said to occur when assistance is offered at points in the ZPD at which performance requires assistance' (1988, p. 31). The assistance provided by the teacher is grounded in on-going interactions and it may vary in both quantity and quality during different phases of the joint inquiry (Tharp & Gallimore, 1988).

Another perspective emphasizing the contextually embedded nature of learning is a model of instruction called *transformation of participation* (Rogoff 1994; Rogoff & Toma, 1997). According to Rogoff (1994, 2003; Rogoff & Toma, 1997), human development, including learning, should be understood as a cultural process. Rogoff argues that 'humans develop through their changing participation in the sociocultural activities of their communities, which also change' (2003, p. 11). In the transformation of participation model of instruction, learning and instruction are viewed as a process of building on ideas with others as a shared endeavour. Through this process, participants transform the roles that they play in the sociocultural activities of the learning community. Students might engage in a variety of participatory roles during the process of inquiry, i.e. leading shared negotiations, developing ideas together or following closely the lines of inquiry during joint discussion (Kovalainen & Kumpulainen, 2005, 2007; Rogoff & Toma, 1997). In comparison to the notion of scaffolding, this instructional model also includes adult assistance in students' learning but places more emphasis on students' active efforts in transforming their understandings. It is not only the teacher who actively develops ideas and guides the lines of inquiry; rather, students and teachers participate actively together in shared cultural activities aiming at mutual understandings. Consequently, students are viewed as resources for each other's inquiries (Rogoff, 2003).

2.2.3 Dialogic teaching and the metaphor of community of inquiry

In recent years, there has been an increasing interest in developing and implementing dialogic approaches to learning and teaching in contemporary classrooms (see Alexander, 2006; Littleton & Howe, 2010; Mercer *et al.*, 2009; Mercer & Littleton, 2007). *Dialogic teaching* has begun to appear as a concept of growing interest and importance in the discussion related to learning and teaching (Lyle, 2008). The concept of dialogic teaching is used by Alexander (2006) to describe how teacher and students work jointly in co-constructing knowledge by

exploring shared ideas and presenting arguments and counter-arguments to test evidence. According to Alexander (2006), dialogic classrooms could be described as collective, reciprocal and supportive in nature. Teachers and students work together as a group or a class. The role of the students is to ask questions, present their own points of view and comment on ideas and thoughts shared in the discussion. The learning environment is safe for presenting ideas freely and without fear of being embarrassed by others. The role of the teacher is to listen carefully to on-going negotiations in order to integrate the presented ideas with the curriculum agenda and domain-specific discourses. Thus, dialogic teacher interactions aim at providing a cumulative, continuing, contextual and purposeful frame for supporting student participation in socially shared meaning-making activities (Alexander, 2006; Lyle, 2008).

The essential features of dialogic classrooms described by Alexander (2006) share similar features with the metaphor of community of inquiry that has been elaborated in a variety of pedagogical programs and models developed to enhance social constructions of learning and teaching in participatory classroom contexts. The theoretical premises of the community of inquiry metaphor are greatly influenced by the work of John Dewey (1902, 1916, 1963). His views on progressive education, discovery learning and democratic classroom practices have been applied and elaborated by a variety of researchers emphasizing the role of social interaction and reflective inquiry in mediating the development of students' thinking and learning. The community of inquiry offers an ideal method for promoting collaborative learning and for motivating students to attentively listen to each other (Fisher, 1998). Learning and teaching in a community of inquiry is based on voluntary communication and shared understandings of meanings. A community of inquiry is achieved when any group of people engage mutually in a cooperative search for shared understanding. Furthermore, each member benefits from the ideas of others and feels valued by the whole community. (Fisher, 1998.)

The community of inquiry metaphor, shaped by the work of Dewey and the traditional Socratic philosophy, has been applied in developing a pedagogical program called *Philosophy for Children* (Lipman, 1991, 1993; Lipman *et al.*, 1980; Sharp & Splitter, 1995). In this pedagogical program, students' learning and thinking is assisted through philosophical discussion by converting the classroom into a community of inquiry (Lipman *et al.*, 1980). Special emphasis is placed on the development of students' critical, creative and caring thinking (Lipman, 1991, 1993). In the community of inquiry, students have an active role in the learning

process by building up their own understandings under the guidance of the teacher (Fisher, 1998). Teacher interactions aim at challenging students to think for themselves and to think more deeply by explaining, analysing and justifying the ideas presented in joint negotiations.

In addition, the theoretical underpinnings of the community of inquiry metaphor have been strongly influenced by the developmental theory of Vygotsky and the sociocultural perspectives on learning. For example, Wenger's theoretical notion of *community of practice* (1998) associates the community metaphor with three dimensions of practice that define the coherence of the community, namely mutual engagement, a joint enterprise and a shared repertoire (Wenger, 1998). Several research studies indicate that mutual engagement is an essential requirement for productive discussions during communal inquiry (Brown & Palincsar, 1989; Rogoff & Toma, 1997). Participants may differ in their views and perspectives but engage in mutual interactions trying to understand each other's points of views as a shared endeavour (Rogoff & Toma, 1997; Wenger, 1998). Over some time, striving towards a shared endeavour creates a repertoire of resources for negotiating meaning in that specific community (Wenger, 1998). According to Wenger, this repertoire might include the 'routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions or concepts that the community has produced or adopted in the course of its existence, and which have become part of its practice' (1998, p. 83).

In this thesis, the community metaphor is used to refer to a broad range of approaches to learning and instruction that are community-oriented. These include the approaches introduced above, such as Lipman's Philosophy for Children, Wenger's community of practice and other community-oriented programs based on sociocultural and sociolinguistic perspectives (e.g. Brown & Campione, 1994; Elbers & Streefland, 2000; Rogoff & Toma, 1997). Although the various approaches have slight differences in their conceptualizations of the metaphor, in this thesis they are treated in a broad sense as being similar and unified in describing the context for communal learning in general.

2.3 Research on the participant structures and processes in inquiry-oriented classrooms

Investigating classroom interaction has been of interest to many scholars since its early beginning in the 1950s and 60s (see Bales, 1950; Barnes & Todd, 1977; Bellack *et al.*, 1966; Flanders, 1970). One of the most well known participant

structures, drawn from many of the earliest studies on classroom interaction, is the triadic exchange structure called *IRE* (Cazden, 1988; Mehan, 1979; Sinclair & Coulthard, 1975). It consists of three moves: an initiation move, a response move and a follow-up move. A prototypical IRE sequence in a classroom consists of a teacher initiating the discussion, usually in the form of a question to students. This is followed by a student answering the presented question and the teacher giving feedback on the student's answer.

The IRE participant structure can be regarded as a cultural tool (Polman & Pea, 2001; Wertsch, 1991) familiar to many teachers from their own school years and to most students after couple of years of schooling (Polman, 2004). Thus, many teachers apply the IRE activity structure in their instruction because they are acquainted with the norms, rules, roles and relationships it creates. However, some claim that the IRE classroom discourse format represents a typical participation structure of the dyadic interactions in recitation-based classrooms (Rogoff & Toma, 1997; Wells, 1993). Even though such a participant structure might be a significant cultural tool in traditional classrooms, it has been criticized for not adjusting well into contemporary, participatory classrooms (Polman, 2004; Polman & Pea, 2001).

Consequently, in recent years several researchers have been interested in examining the new participant structures created in classroom cultures based on project- or inquiry-based learning and teaching. One area of interest in these research studies has been the power relations and shifting patterns of responsibility and control amongst classroom members. For example, Cornelius and Herrenkohl (2004) have investigated how a classroom environment that aimed at enhancing students' meaningful participation during science units transformed the relationships of power in a sixth-grade classroom learning community. In their study, the power relations were investigated from three different angles, namely between students and teachers, among students, and between students and the scientific concepts and materials being studied (Cornelius & Herrenkohl, 2004). Their study specifically aimed at illuminating how student engagement and empowerment in their own learning could be enhanced in the learning community by matching the participant structures with the structure of the discipline.

In addition, Candela (1999) has investigated how power relations are negotiated through the discursive activities in the classroom. However, in contrast to the research study of Cornelius and Herrenkohl (2004), the results of her study demonstrate that students may have access to the discursive resources via which

the teacher exercises power, even within the IRE structure. Thus, according to Candela (1999), the participant structure does not define the distribution of power in classroom interactions. Candela (1999) argues that, regardless of the participant structure of the classroom, students may construct themselves as subjects who are capable of influencing the social interactions of the classroom and, through discursive actions, construct themselves as knowledgeable, legitimate communicators in the learning community.

Another area of interest in research focusing on new participant structures in inquiry-oriented classrooms has been the question of how to nurture a balance between analytic and social scaffolding. Rasku-Puttonen *et al.* (2003) have investigated how the transition from teacher regulation to student regulation took place during a long-term learning project. Specifically, in their study the focus is on the activities of two different classroom learning communities with two teachers who defined their roles in supporting students' learning differently. By analysing the social interactions of the classroom, the study aimed at investigating how the different roles of the teacher were defined and manifested in teacher-student interactions and whether there were shifting relations of responsibility and control during the long-term learning project. As a whole, the study indicated that instructional pedagogy and the teacher's role had an impact on the student groups' self-regulated activities. Even though the *Controller-Teacher* applied more clear instruction and more structured assignments compared to the *Guide-Teacher* his students showed an increase in their self-regulation at the end of the project. On the contrary, the *Guide-Teacher*'s students had difficulties with unstructured task assignments and became uncertain of the goals to be achieved. Thus, the *Guide-Teacher* had to increase his direct regulation towards the end of the project. As a whole, the research results of the study indicated that teachers should be constantly alert to the changing nature of the instructional context and should adjust their scaffolding activities to meet the context-specific demands of different students at different times working on different tasks during long-term project work (Rasku-Puttonen, *et al.*, 2003).

In addition, Nathan and Knuth (2003) have investigated participation structures in relation to teacher scaffolding. Their study focused on one teacher's interpretation of discourse-enriched instruction and its manifestation in the social interactions of a sixth-grade classroom during whole class mathematics instruction. In their study, they applied a multilevel analysis approach in which the classroom interaction was examined through three major forces. Firstly, the study focused on investigating the varying degrees of analytic and social

scaffolding that both teacher and students provided for one another during socially shared interactions. Secondly, the study illuminated the flow of information, whether vertical or horizontal, during the classroom interactions. The last force through which the interactive practices of the classroom were examined was the teacher goals and beliefs, including the ways the teacher defined her role as mathematics instructor and her beliefs about student learning and development. The results of the research study indicated that there was not much change in the teacher's specific goals and beliefs during the two-year period of this longitudinal study. However, as the teacher made substantial changes in how she set out to enact her goals, i.e. removed herself from being the social centre of the discussion and encouraged greater student participation, student-led discussions and horizontal information flow began to increase in the learning community. According to Nathan & Knuth (2003), teachers should learn how to balance their role in providing social and analytic scaffolding; in other words, learn when to step in and out from joint negotiations in order to support productive student engagement.

This thesis adds to the body of research by investigating the participant structures and processes of the case study classroom from various angles; for example, by investigating the participation rights and responsibilities of classroom members and how they shape the location and nature of knowledge constructed during a lesson; the shifting nature of analytic and social scaffolding during socially shared meaning-making activities; and the teacher's and individual students' modes of participation in the social interaction of this classroom.

3 Aims of the study

The main aim of this research study is to investigate the social construction of learning and teaching in a classroom that was encultured into working and acting as a community of inquiry across the curriculum. Theoretically, the study aims at investigating the potential of sociocultural and sociolinguistic perspectives on learning and instruction to support the development, implementation and evaluation of the processes and conditions for communal inquiry across different pedagogical situations and the curriculum. Methodologically, the study aims at contributing to the development of analytical tools to examine the communicative practises of interactive rich classrooms in diverse settings from both social and individual viewpoints. Pedagogically, the study aims at creating a rationale for supporting meaningful, student-centred and problem-based learning across different domains in the classroom.

The broader aims of this research study are also reflected in the specific aims of the four studies reported in Articles I-IV. These aims are presented below (Roman numerals refer to the scientific articles in question):

The first aim of the study is to examine the role of the teacher in scaffolding communal learning from cognitive, social and socio-emotional viewpoints in the learning community (I).

The second aim of the study is to investigate the division of authorities in the classroom community. This includes, for example, examining what kind of participation rights and responsibilities are constructed for both students and the teacher in the on-going classroom interactions (II) and how the teacher balanced the social and analytic authority during socially shared problem-solving situations (IV).

The third aim of the study is to investigate individual students' diverse modes of participation in the joint interactions of the classroom community. Furthermore, the study aims at examining how the teacher interacted with individual students in the classroom community and how those interactions supported particular modes of participation (III).

The fourth aim of the study is to develop a classroom interaction analysis method that could be applied in examining the social construction of learning and teaching in interaction-rich classrooms (II, III, IV).

4 Methods of the study

4.1 Description of the classroom community

The classroom community under empirical investigation in this research study consists of seventeen third-grade students from a Finnish elementary class and their teacher. Of the seventeen students, nine were boys and eight were girls aged from nine to ten years old. In terms of socioeconomic backgrounds, the students were a representative sample of children in Finnish society. However, distinctive to this classroom was the practice of working and acting as a community of dialogic inquirers (Wells, 1999) as evidenced by the pre-study observations of the classroom community across different subject domains and questionnaire data regarding the student's perceptions of their classroom culture and its meaning for their learning and thinking (Pylvänäinen & Rosenqvist, 2000).

The teacher of the classroom community is a devoted teacher who has continuously developed his expertise and professional competence by studying and researching in the field of educational sciences and philosophy. He has also been involved in running in-service courses and developing material on philosophical inquiry and its applications on classroom learning and teaching. The teacher's pedagogical thinking has been greatly influenced by the Philosophy for Children program (see Lipman *et al.*, 1980), which he has actively applied and distributed in the school in order to provide student access to thinking and learning.

The ground rules of the classroom community emphasize shared experience, voluntary communication and joint meaning-making (Fisher, 1998). Students are provided with opportunities to take an active role in exploring issues they find meaningful in relation to their everyday experiences. From the cognitive viewpoint, students have space to engage in reasoning, questioning, discovering and querying assumptions, hypothesising, generalizing, inferring consequences, using and recognising criteria, defining concepts, calling for evidence and judging. From the social viewpoint, students engage in listening to others, respecting different opinions, critically but constructively responding to those opinions and encouraging others to take part in joint inquiry. The role of the teacher is to prompt students' active engagement and to support the atmosphere of openness in which different thoughts and opinions can be freely expressed and negotiated (Fisher, 1998; Lipman *et al.*, 1980). The teacher's role is to facilitate and nurture

students' thinking rather than control or manipulate the lines of inquiry chosen by the students (Lipman *et al.*, 1980).

The ground rules of the learning community are reflected in the way the instructional activities are organised in the classroom. Working on academic tasks in the classroom is usually carried out as collective discussions or small group activities. The collective discussions are often realized in a circle in the front of the classroom, away from the students' desks. A paperboard and markers are available near the circle, so that the questions and lines of inquiry can be written down for joint reflection. In sum, in this classroom learning community a great emphasis is placed upon social interaction and discourse as tools for learning and thinking.

4.2 Data collection

The empirical data base of this research study consists of videotaped classroom sessions gathered from three different domains, namely mathematics, science and philosophy lessons. The whole data corpus contains nine hours of classroom interaction, three hours from each subject domain. In the learning situations during mathematics and science sessions, the group size was 17 students. In philosophy sessions, that class was divided in half, resulting in two groups of eight and nine students. Both half groups were investigated in order to obtain a coherent picture of the nature of classroom interaction during philosophy sessions. Pre-study observations in the classroom, as well as results from the student questionnaires, indicate that the gathered data demonstrates typical learning lessons of the case study classroom following the instructional goals set by national and school-based curricula (Pylvänäinen & Rosenqvist, 2000). Thus, the lessons videotaped for the study were not particularly designed for the purposes of this empirical research but occurred as part of a regular school day. The selected interaction episodes subjected to close micro- and multilevel analyses cover mostly whole class discussions that were of special interest in the four studies reported in articles I-IV. In mathematics, the data corpus covers 236 utterances, in science 612 utterances and in philosophy 827 utterances.

4.3 Learning situations

The learning situations and the topics of communal inquiry varied across the videotaped sessions from the three subject domains. In the philosophy session the

topic of discussion concentrated on love, while in the science session students investigated Finnish animals. In mathematics, the topic for collective discussion was equations.

4.3.1 Collective problem-solving in mathematics

During collective problem-solving in mathematics, students could approach the mathematical problems in multiple ways by posing solutions, asking for evidence, and by explaining and clarifying their strategies. Instead of simply applying and acquiring cognitive structures and procedures, students could elaborate their mathematical understanding through joint discussions. In this learning community, the learning of mathematics was based upon active participation and involvement in collective problem-solving mediated by social interaction.

4.3.2 Group investigation in science

During group investigation in the science session, the topic of investigation was Finnish animals. The group investigation followed a typical format (see Sharan & Sharan, 1992), in that it started with a whole class discussion, during which general instructions and working patterns for the group investigation were negotiated. The collective discussion among the whole classroom community was followed by the group investigation activity and, finally, the processes and outcomes of the small group investigations were reflected upon and elaborated in collective whole class interactions. The investigation activity was realized as a small group poster task on student-selected species. Due to the open nature of the investigation task, the students could direct their inquiry to different topics, such as investigating the environment and nutrition habits of the animal as well as considering the ethical relationship between the human species and the animal. In addition to realizing the actual investigation task, the students and the teacher spent time discussing collectively the procedures of doing research in general. This was followed by a small group activity, in which the students negotiated joint rules for presenting their posters to the rest of the class and for responding to each other's presentations. After the small group activity, the presentation rules were gathered together and discussed as a whole class. Collective discussions were also held at the end of each poster presentation.

4.3.3 Open-ended dialogue in philosophy

Open-ended dialogue in philosophy closely reflects the practices of the Socratic Dialogue (Haynes, 2002). In this session, students sit in a circle and follow jointly established rules for participation. Collective discussion arises from students' questions, usually in response to a particular theme or problem. By first examining all emerging questions that students have generated, the discussion is directed towards open-ended questions. The choosing of the questions, as well as the following interaction, is aimed at being a democratic and innovative process, with no planned goals and endings. In open-ended dialogue during the philosophy session, students are encouraged towards logical, critical and creative thinking, as well as towards reasoning and reflection. Teacher participation includes the introduction of conceptual tools for the learning community that will extend or record joint negotiation processes. The goal in collective discussions is not towards unanimity, but towards different perspectives and views. The emphasis is on the actual processes of negotiation rather than on defining answers.

In the philosophy session, the topic of the open-ended dialogue was love. During this session, the classroom community elaborated upon two questions, namely '*What is true love?*' and '*Why do people get divorced?*' In order to enrich their joint discussions, the students had also been asked to pose these questions to their parents and grandparents.

4.4 Data analysis

The analytical framework applied in this study has been influenced by the sociolinguistic studies of classroom discourse (e.g. Cazden, 1988; Green & Wallat, 1981; Mehan, 1979; Sinclair & Coulthard, 1975) as well as by studies of learning and instruction with a special focus on classroom interaction and discourse (e.g. Kumpulainen & Mutanen, 1999; Rojas-Drummond, 2000; Wells, 1993). It shares some features with methodology called *sociocultural discourse analysis* that focuses in analysing classroom talk as a social mode of thinking (Mercer, 2004, 2010). This methodology is based on sociocultural theory, but it has also been influenced by the work of language researchers across various disciplines. Compared to the purely linguistic use of discourse analysis, it is less concerned with the language itself but rather the content, functions and the ways shared understanding is developed during joint meaning-making activities (Mercer, 2004, 2010). Accordingly, the transcription choices concerning the interaction data (e.g.

non-verbal utterances, length of pauses, etc.) are determined by the aims and the specific research question addressed in the study (Mercer, 2004).

In article I, the interaction analysis of the study was grounded in the data. Selected videotaped sessions were transcribed. Investigator triangulation was applied by closely examining the transcriptions by two researchers. The aim was to identify discourse strategies in the teacher's speech that appeared to support classroom interaction from cognitive, social and socio-emotional viewpoints. All of the identified discourse strategies were then written down with empirical examples. Further examination and comparing of discourse strategies was conducted in order to construct a coherent description for them. As the result of the inductive analysis of the data, the discourse strategies resolved themselves into four modes of teacher discourse.

In articles II–IV, the transcribed video recordings of the classroom interactions were subjected to close microlevel analysis. At the beginning of the data analysis process, two researchers codified 10% of the data. The inter-rater reliability regarding coding was 86.4%. The rest of the data was analysed by two researchers. The specific categories of the analysis framework emerged as a result of theory-data examinations. The main goal in constructing them was to identify meaningful units of classroom meta-discourse that occurred across content areas. Interaction data was analysed in two levels. Firstly, evolving communicative events were examined on a message-by-message basis. The analyses in the message level included the investigation of the source and nature of interaction moves and the communicative functions they served. In article IV, the analysis on the message level included also examining the shifting nature of authorities during socially shared negotiations in the classroom. Secondly, the identified message units formed interactional units when thematically and interactionally connected. At the level of interactional units, attention was drawn to who initiated and participated in the interaction sequence and what implications this had for the thematic and interactional nature of the joint dialogue.

4.5 Ethical considerations

The study follows the principles of good scientific practise set by the National Advisory Board on Research Ethics (2002, 2009). In general, these principles emphasise the importance of conducting scientific research that is based on accuracy and integrity throughout the research work and of respecting other researchers' work and achievements.

In the social and behavioural sciences, ethical questions in research usually focus on the encounter between the researcher and the research subjects concerning the issues of autonomy and privacy. The case study classroom, located in the University Teacher Training School, was used to having teacher trainees teaching, observing, doing research or otherwise participating in their classroom during most of the school year. Guardians of the students were aware of this and had given consent for their children to participate in research projects that had been evaluated by the head of the school and that would provide useful information for the institution. The research study was designed and carried out as a part of the normal schoolwork and daily routines of the case study classroom. The researcher implemented no experiments. As the study focuses in investigating the pedagogical practices of the classroom whilst working as a whole group, the analysis of the social interactions of the individual students was carried out only in relation to classroom interactions in general. The protection of privacy in handling, analysing and publishing the research data was ensured through anonymisation measures. For example, direct identifiers such as names were replaced by pseudonyms when transcribing the data. Extracts of the qualitative data that included the risk of identification were not included in the research publications (articles I-IV).

5 An overview of the empirical studies

This doctoral thesis is composed of four studies that investigate the social construction of learning and teaching in the case study classroom from slightly different angles. Article I illuminates the teacher's modes of participation while orchestrating classroom interaction during whole class discussions. Rather than trying to fit the unfolding interactions into strict coding schemes, this study attempts to convey a holistic and comprehensible perspective on the classroom teacher's situated discourse strategies supporting communal learning from the cognitive, social and socioemotional viewpoint.

Article II provides a more rigorous and detailed description of the processes of participation in the case study classroom through examining the communicative practices and discursive roles of both the teacher and the students during collective meaning-making across three different learning situations.

In article III, the viewpoint shifts to an investigation of individual students' participation in joint classroom discussions. Through thorough analyses of whole classroom interactions, the study attempts to shed light on the forms and patterns of interaction via which particular participation modes were talked into being and maintained over a lesson. In addition, the analyses highlight the ways in which the teacher interacted with individual students and how those interactions supported particular participation modes.

Article IV introduces the method of classroom interaction analysis developed and explained in articles II and III and provides an insight of how it was applied when investigating the division of authority during collaborative interactions in the case study classroom. Specifically, through detailed, multilevel analyses, article IV aims at making visible the ways in which the classroom teacher balanced his stance as a social and analytic authority during collective problem-solving in mathematics in order to encourage active student engagement in meaningful inquiry.

5.1 Article I: Kovalainen, M, Kumpulainen, K., & Vasama, S. (2001). Orchestrating classroom interaction in a community of inquiry: Modes of teacher participation. *Journal of Classroom Interaction*, 36(2), 17-28.

The aim of the study reported in Article I was to investigate the teacher's situational and multidimensional modes of participation when orchestrating whole class interaction in a naturalistic context of the case study classroom comprised of seventeen students. In the close, microlevel analysis of the classroom interaction across philosophy, science and mathematics lessons, special attention is paid to the teacher's discursive strategies and how these strategies scaffolded community building from the cognitive, social and socio-emotional viewpoints.

The interaction analysis revealed four complementary and partially overlapping modes of discourse, namely the evocative, facilitative, collective and appreciative modes. The evocative mode of teacher participation was aimed at eliciting student initiation by asking stimulating questions, calling forth initiations and confirmation as well as arousing students' opinions and perspectives on the topics discussed jointly. The evocative mode of discourse was especially evident in philosophy lessons but was also present in the mathematics and science lessons, as students' ideas and thoughts within the domain specific contents were prompted by the teacher. The teacher's use of the evocative mode of discourse was consistently found to overlap with the appreciative mode, in that by eliciting student initiations and allowing them to instigate the topics for investigation, the teacher indicated that he appreciated and valued their thinking and choices of approaching the phenomena.

Across all the analysed lessons, the teacher was observed to support student participation by re-voicing questions and interpretations, passing on culturally established knowledge and practices, drawing together perspectives and initiations and modelling and monitoring reasoning processes. This facilitative mode of teacher participation regularly overlapped with the collective mode of discourse as the teacher attempted to ensure that the inquiry functioned as a joint meaning-making activity.

In addition to scaffolding community building from the cognitive viewpoint, the teacher was found to support positive social and socio-emotional processes in the classroom. The collective mode of teacher participation included recalling the rules of participating in the community of inquiry, promoting collective responsibility, orchestrating discourse turns and encouraging active participation.

The collective mode was often found to overlap with the appreciative and the facilitative modes of participation; for example, the teacher paced the tempo of interaction according to the needs of different participants.

The teacher also explicitly communicated his genuine interest in and appreciation of students' ideas and thoughts. The appreciative mode of participation was reflected in the teacher's participation as he valued the contributions of participants in communal inquiry, paced the tempo of interaction according to the needs of the participants and supported interaction and expressed interest towards it by using short, conferring expressions. All four modes of participation, particularly the appreciative mode, can be regarded as significant social supports that promote student self-esteem and motivation for learning. In Article I, the data of the teacher's modes of participation in classroom interaction is highlighted by demonstrating their construction in situated classroom practices.

5.2 Article II: Kovalainen, M., & Kumpulainen, K. (2005). The discursive practice of participation in an elementary classroom community. *Instructional Science*, 33(3), 213-250.

The study reported in Article II aimed at investigating and describing the discursive practice of participation in the case study classroom learning community. Through examining the communicative practices and discursive roles of both the students and the teacher, the study aimed at illuminating the participation rights and responsibilities of classroom members. It also aimed at demonstrating how these shape the location and nature of knowledge constructed during a lesson in the context of three different learning situations, namely collective problem-solving in mathematics, group investigation in science and open-ended dialogue in philosophy.

Comprehensive, multilevel analyses were carried out on transcribed video recordings of classroom interactions. As a whole, the results indicated that the cultural rules for communicative participation in the case study classroom provided students with a space to take authority in cognitive work, whereas the teacher's responsibility was more directed towards the management of interactional practices. The students' rights and responsibilities in cognitive work were evidence by their active roles as initiators and elaborators of a joint dialogue. The communicative rights and responsibilities of the teacher in the case study classroom focused largely on orchestrating classroom interaction. The results of the study also show that, instead of merely being an exchange of information, the

nature of knowledge negotiated during classroom interactions was largely based upon sharing and defining views as well as asking for and providing evidence.

In addition, the results of the study demonstrate that the communicative roles and responsibilities of the students and the teacher varied across learning situations. Open-ended dialogue in philosophy was found to reflect multilateral, student-centred interaction, during which experiences were also shared. A characteristic feature of the classroom interaction during the group investigation in science was the high occurrence of bilateral interaction as students, despite their central role in designing and presenting their poster work, invited the teacher to orchestrate their speaking turns. During collective problem-solving in the mathematics classroom, interactions were also found to be mostly bilateral in nature even though the learning situation was built around an open problem-solving task allowing the use of several strategies. Thus, intentions of collective meaning-making did not always result in multilateral interactions that would invite all classroom members into active participation. Furthermore, challenges were identified in the integration and application of the participants' personal histories and experiences as resources for collective discussion.

5.3 Article III: Kovalainen, M., & Kumpulainen, K. (2007). The social construction of participation in an elementary classroom community. *International Journal of Educational Research*, 46, 141-158.

In the study reported in Article III, the aim was to examine the forms and patterns of interaction through which particular modes of participation were talked into being and maintained over lessons among individual students in the case study classroom. In addition, the analyses aimed at highlighting the ways in which the teacher interacted with diverse students in the case study classroom community and how those interactions supported particular participation modes.

Detailed, multi- and microlevel analyses of the interactional and thematic nature of classroom discussions revealed four prevalent modes of student participation in the case study classroom, namely vocal, responsive, bilateral and silent participants. The diverse modes of participation became translucent when comparing individual students' amount of participation, form and function of participation as well as the direction of exchanges in the classroom interaction. The vocal participants were active students who took authority in diverse cognitive and interactional practices in the learning community by initiating

discussions and responding to evidence negotiations. They also provided feedback to the presented arguments through multilateral discussions. Thus, the amount of participation among vocal participants was high. The responsive participants engaged in classroom discussions mostly by responding. They rarely took authority in initiating interactions or providing feedback to the presented arguments. The amount of participation among these students varied from high to low. A characteristic feature of the bilateral participants was that they contributed to classroom interactions by directing their communication to the teacher or one student only through bilateral interactions. They rarely participated in multilateral interactions that were constructed by several members of the learning community. The amount of participation among bilateral participants varied from medium to low. The silent participants seldom contributed to the whole class discussions unless the teacher encouraged them to do so. The amount of participation among silent participants was very low.

The study reported in Article III also indicates that the interactional practices of the teacher varied whilst engaging in dialogue with the students demonstrating different participation modes. When participating in interactions with vocal students, the teacher usually removed himself from the analytic and social authority of the discussion and allowed student-led discussion and horizontal information flow. Occasionally, the teacher offered structural support to the shared discussion of the vocal participants by orchestrating turns of speech or concluding interaction sequences by providing neutral or confirming feedback. At times, the teacher also encouraged vocal students to engage in new lines of inquiry by initiating evidence negotiations or asking for definitions or clarifications.

When engaging in interactions with responsive students, the teacher's analytically-oriented scaffolding appeared to be crucial in order to support and advance their participation in joint discussions. The teacher's scaffolding with responsive students focused on initiating evidence negotiations as well as prompting definitions, clarifications or elaborations.

Although bilateral participants were observed to take epistemic authority in classroom interactions, the teacher's social scaffolding seemed to be important in order to support bilateral students to enter joint inquiry. The teacher's social scaffolding with bilateral students concentrated mostly on orchestrating turns to speak in the flow of classroom interaction.

When interacting with silent participants, the teacher's intensive support aimed at encouraging silent students' participation by asking for their views and

opinions regarding discussed topics. In addition, the teacher prompted their participation by asking for information. However, the teacher rarely continued bilateral discussions with silent students and quickly tried to open the dialogue for multilateral communication. As a whole, the study reported in Article III sheds light on the moment-by-moment construction of diverse participation modes in the social interaction of the learning community and illuminates how these modes mediate individual students' learning opportunities in the case study classroom.

**5.4 Article IV: Kovalainen, M., & Kumpulainen, K. (2009).
Discourse-enriched instruction in the mathematics classroom:
Analysing collective problem-solving. In K. Kumpulainen, C.E.
Hmelo-silver, & M. Cesar (Eds.), *Investigating Classroom
Interaction: Methodologies in Action* (pp.43-71). Rotterdam:
Sense Publishers.**

In article IV, the aim was to introduce the method of classroom interaction analysis developed and applied in articles II and III. This interaction analysis method is grounded in the sociocultural perspective towards learning and instruction. The methodological basis and the concepts used are embedded in the sociolinguistic tradition. The interaction analysis method was developed for the purposes of our research work in order to gain a rich understanding of the processes of participation constructed during collaborative interactions in the case study classroom. Overall, it is intended to provide teachers and researchers with analytic lenses with which to examine the discursive practices of classrooms in diverse settings.

In the article, the application of the analytical method was demonstrated through examining the communicative practices and discursive roles of the students and the teacher during a whole class mathematical problem-solving situation. Particularly, the article uses the analytic method to provide pedagogical insights on the ways in which the classroom teacher balanced his stance as a social and analytic authority during socially shared problem-solving situations in order to prompt active student engagement in meaningful, disciplinary inquiry. As a whole, the results of the analysis showed that the teacher's stance as an analytic authority was important in guiding the broader lines of inquiry. However, as the discussion proceeded there seemed to be a gradual shift in responsibilities as the teacher provided students with more space to engage in cognitive work. If the discussion did not proceed or students got confused, the teacher's analytic

interventions were helpful. The social support provided by the teacher was significant in orchestrating the discussion or pacing the tempo of interaction according to individual students' needs. In addition, social interventions by the teacher included echoing and evoking student initiations. The limitations of the analytical method used in our research, as well as future suggestions in developing interaction analysis methods in general, are discussed at the end of the article.

6 Main findings and general discussion

6.1 From recitation towards socially shared meaning-making: theoretical considerations

According to various recent research studies, learning and instruction shaped by the sociocultural and sociolinguistic theories generates new participation roles, structures and processes in the classroom learning community (e.g. Cornelius & Herrenkohl, 2004; Polman, 2004; Polman & Pea, 2001; Scott *et al.*, 2006; Tabak & Baumgartner, 2004). These participatory practices indicate attempts towards learning and teaching as a socially constructed meaning-making activity (Brown & Renshaw, 2000; Sfard & Kieran, 2001). As the research results of the empirical study reported in this thesis show, the social interactions in the case study classroom were quite dominantly characterized by multilateral interactions amongst classroom members (Article II). In contrast to traditional, recitation-based pedagogies, students in this classroom clearly took charge of the cognitive work, whereas the teacher's responsibility was more directed towards managing interactional practices during the joint discussions (Article II). Instead of consisting merely of an information exchange, the nature of knowledge in this classroom was largely based on sharing and defining views and negotiating evidence (Article II).

With regard to teacher participation, Sawyer (2004, 2006, 2011) compares teaching in contemporary discourse-enriched classrooms to an improvisational theatre performance since the flow of classroom interaction is always unpredictable, cannot be scripted ahead of time and emerges from moment-by-moment interactions during joint discussions. Thus, the discourse patterns in discourse-enriched classrooms may not be linear but may be unbounded and free flowing like the 'ripples of water' described by Vass *et al.* (2008).

In line with Sawyer's (2004, 2006, 2011) view of teaching as an improvised performance, teacher participation in the context of the case study under empirical investigation in this thesis reflected the situated, unpredicted nature of teaching. In this classroom, the assistance provided by the teacher was grounded in on-going interactions and varied in quantity and quality when the teacher was interacting with students on the individual-collective continuum as well as the domain-specific and everyday discourses continua (see Figure 1). On one hand, the teacher interaction aimed at ensuring equal opportunities for participation and

shared meaning-making; on the other hand, it integrated students' voices with the curriculum agenda and domain-specific discourses. Thus, the teacher stepped in and out of joint negotiations in order to nurture balance between the social and analytic scaffolding and to support productive student engagement at the level of individual students and at the level of the whole learning community (Nathan & Knuth, 2003).

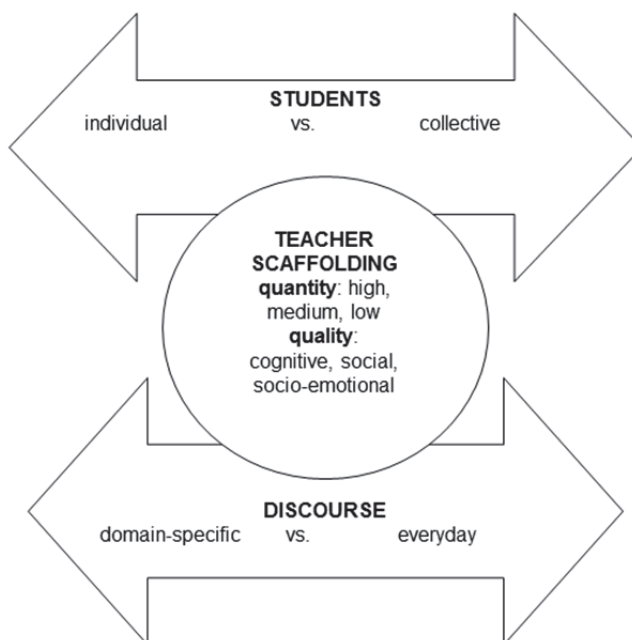


Fig. 1. Teaching as an improvised performance.

However, what counts as productive student engagement may vary across different disciplines (Rojas-Drummond *et al.*, 2006; Vass *et al.*, 2008). Rojas-Drummond *et al.* (2008) argue that the transparent and explicit reasoning standard in exploratory talk, described by Mercer (1995), may not be the only possible discourse feature characterizing productive engagement across different contexts, domains and tasks. Even though engaging in explicit reasoning with arguments and counter-arguments might be a central process during mathematical problem-solving, it might not be so essential in more open ended and creative tasks (Rojas-Drummond *et al.*, 2008; Vass *et al.*, 2008). In these disciplines, the processes central to learning might include emotional and intuitional aspects of cognition as well as rational and intellect-driven thinking (Vass *et al.*, 2008).

Consequently, there is a need to adjust the quality of scaffolding, whether aimed at supporting cognitive, social or socio-emotional aspects of dialogic collaborations, to the processes central to the discipline in question. The microlevel analyses of teacher participation in this classroom revealed four major means of participation, namely the evocative, facilitative, collective and appreciative modes. These means of participation supported communal inquiry from the cognitive, social and socio-emotional perspectives (Article I). Although the teacher scaffolding was mostly social in nature during the whole class interactions of the classroom, there were occasions, especially in the context of mathematics sessions, where the teacher stepped in as an analytic authority (Articles II and IV). This is in line with Emanuelsson and Sahlström's (2008) research study, which found that tighter teacher control of content would be beneficial for student learning in the domain of mathematics. In mathematics, students should be afforded the possibility of checking their understanding along the lines of inquiry and teachers should respond to the checks that students present (Emanuelsson & Sahlström, 2008). However, the analysis of the social interactions during philosophical discussions in this study indicates that teacher interactions were more social in nature reflecting a multilateral, student-centred approach (Article II). Thus, during philosophical discussions, the teacher and the students had equal communicative roles in developing the joint dialogue (Article II).

In addition, the research results of this study indicate that the teacher's interactional practices and quality of scaffolding varied whilst engaging in dialogue with individual students demonstrating different participation modes (Article III). With vocal students who initiated and engaged in enthusiastic multilateral interactions, the teacher could remove himself from the analytic and social centre of the discussion and allow student-led discussions and horizontal information flow. For the responsive students, the analytically-oriented scaffolding was essential in order to support their participation in joint negotiations. With bilateral students, the teacher scaffolding aimed at supporting social aspects of dialogic collaborations. When engaging in interaction with silent students, intensive cognitive, social and socio-emotional teacher scaffolding was needed.

During open-ended discussions, teachers are also challenged by the question of how to integrate everyday discourses with scientific discourses. The metaphor of '*intertwining*' everyday and scientific concepts originates from the work of Vygotsky and has been elaborated on and extended by various researchers.

Renshaw and Brown (2007) identify four formats of classroom talk in contemporary research literature that describe the process of intertwining everyday and scientific discourses. The *replacement format* of talk emphasises bridging the concepts that students bring into the joint negotiations with the precise concepts and ground rules of particular scientific discourse genres. The *interweaving format* of classroom talk describes how scientific perspectives and concepts can be interwoven with the issues of morality and identity that students bring into discussion. The *privileging format* of talk focuses attention on the situational and context-specific foundations for privileging certain discourses over others in particular settings. The *pastiche format* of classroom discourse emphasizes multiple representations of concepts by the classroom members.

In addition, Scott *et al.* (2011) introduced the concept of *pedagogical link-making* to describe the ways in which teachers and students make connections between ideas in the socially shared meaning-making activities of classroom teaching and learning in science. They have identified three main forms of pedagogical link-making. The first form, *supporting knowledge building*, involves making links between different kinds of knowledge in order to support students in developing a deeper understanding of the issues discussed during joint negotiations (Scott *et al.*, 2011). According to Scott *et al.* (2011), links can be made, for example, between every day and scientific ways of explaining, between scientific concepts themselves or between scientific explanations and real world phenomena. Because scientific knowledge is multimodal in nature, links can also be made between different modes of representation and between different scales and levels of explanation. In order to support deeper understanding of scientific knowledge, the teacher might also make analogies with more understandable cases. The second form of pedagogical link-making is called *promoting continuity* and it involves making links between the enacted meaning-making activities of the classroom over time in order to develop a scientific story of the concepts learnt along the way (Scott *et al.*, 2011). The third form of pedagogical link-making, *encouraging emotional engagement*, aims at promoting positive emotional engagement and relevance in the classroom; for example, by linking the ideas and points of view shared in the joint discussion to the name of the student who raised them the first time (Scott *et al.*, 2011). This form of pedagogical link-making also includes more general forms of praise and encouragement (Scott *et al.*, 2011).

As the previously introduced formats of classroom talk indicate, there are various paths and alternatives to designing pedagogical spaces that support the

integration of students' voices with curriculum agendas and scientific discourses (Renshaw & Brown, 2007). In the social interactions in the case study classroom under empirical investigation in this thesis, there can be seen features of the aforementioned formats of classroom talk aimed at intertwining everyday discourses with scientific discourses. In this classroom, teacher interactions aimed at affording students with both time and space to engage in developing multiple representations of concepts as they negotiated evidence and defined and shared views during multilateral interactions (Articles II and IV). Thus, the ground rules of the classroom community supported the bridging of students' everyday experiences and views with the curriculum agenda and the domain-specific discourse of each of the disciplines under empirical investigation in this study. In addition, the teacher interactions in this classroom were similar to the form of pedagogical link-making called encouraging emotional engagement (Scott *et al.*, 2011) in that they aimed at positive emotional engagement from students by supporting the communal inquiry not only from the cognitive perspective but also from the social and socio-emotional perspectives (Article I).

Overall, the research results of the case study reported in this thesis indicate that to build a classroom culture that aims at supporting students' critical and creative thinking as well as communicative skills, teachers have to relinquish strict control over structured routines and engage in improvisation during open discussions (Sawyer, 2006, 2011). However, this does not mean that anything goes and the teacher could remove himself or herself from carefully observing the rules, roles and structures of the improvised dialogue (Sawyer, 2004, 2011). On the contrary, teachers should be continuously alert for the changing nature of social interactions during socially shared meaning-making and adjust their scaffolding accordingly (Rasku-Puttonen *et al.*, 2003).

6.2 Capturing the complexities of classroom interaction: methodological considerations

The investigation of classroom interaction has intrigued many researchers representing various different disciplines, namely psychology, education, sociology, ethnology and linguistics. In contemporary research literature, investigating classroom interaction has been described as an *emergent transdisciplinary field* (Grossen, 2009) that has been more and more looked upon as an autonomous research approach despite its various different disciplinary origins. A shared assumption amongst researchers in this field is that cognition

and discourse are interconnected (Grossen, 2008). However, the contemporary multidisciplinary research approach also raises various methodological concerns, as there is a mixture of different research traditions with different interests and goals blended as a shared set of methods that aim to capture the complexity of classroom interaction (Grossen, 2008, 2009).

The methodological framework of the research study reported in this thesis has been influenced by two approaches that have different disciplinary origins. The method of classroom interaction analysis developed and applied in the context of this research study (Articles II, III and IV) is grounded in the sociocultural perspective towards learning and instruction originating in the discipline of psychology. However, the concepts and methodological solutions are embedded in the sociolinguistic tradition deriving from the disciplines of linguistics and sociology.

In the sociocultural tradition, researchers apply process-oriented methods to investigate the evolving dynamics in the proximal zones for learning (Rex *et al.*, 2006). Through multilayered analysis methods, researchers who embrace this perspective aim at investigating the processes of participation during joint problem-solving that initiates on the social plane and is gradually internalised to an internal plane. Learning and development can be depicted from the changing nature of participation; it is at first legitimately peripheral but gradually becomes more engaging and complex (Lave & Wenger, 1991). The unit of analysis in the sociocultural perspective is individual-in-social-interaction. Consequently, product-oriented methods with pre- and post-test evaluations of individual performances cannot be interpreted in this theoretical framework since, according to it, no activity is purely individual (Rogoff *et al.*, 1995).

Sociolinguistic researchers focus on examining linguistic processes and participation structures in order to gain a deep understanding of communicative interactions during socially shared negotiations (Rex *et al.*, 2006). From this perspective, the unit of analysis is language-in-use and it must be examined within and as a consequence of particular social contexts (Cazden, 1988; Cazden *et al.*, 1972). According to this perspective, classroom practices are created through discursive interactions that influence classroom identities, rules, roles and relationships.

In the research study reported in this thesis, one methodological challenge is to be congruent with the theoretical concepts applied since the methodological framework consists of two perspectives originating from slightly different disciplinary backgrounds (Grossen, 2009). In this study, discourse analysis

methods have influenced the development of the classroom interaction analysis method, but it has been enriched in order to provide dynamic and detailed description of socially shared classroom practices. In analysing the discursive practices of the classroom, the evolving communicative events are described on a message-by-message basis. In addition, interactional units, which are formed by thematically and interactionally connected message units, were of analytical interest in this study. Thus, in this thesis the analysis of the discursive practices of the classroom is based on the assumption that meanings are not individual processes that can be depicted on a message-by-message basis but are socially constructed in on-going interactions between the interlocutors. The research object has not been language or discourse per se but the dynamic interplay between interaction, discourse and learning (Grossen, 2009).

There are also a few methodological concerns that can be raised in the context of this research work due to the limited scope of the case study under empirical investigation and the amount of the observed interaction data. Firstly, the short-term scale investigation of the social construction of teaching and learning in the case study classroom does not allow one to make any conclusions of the long-term processes of learning and development in the case study classroom (Van Deer Aalsvoort *et al.*, 2009). In addition, the method of analysis developed and applied in the context of this study does not explicitly acknowledge the broader sociocultural and historical context of the case study classroom and its participants (Suthers *et al.*, 2009). Furthermore, the specific analytical categories of the method of analysis are obviously very context-sensitive and transforming them from this particular setting to another classroom setting and to other educational contexts might be challenging (Säljö, 1996).

Despite these methodological challenges, the research study reported in this thesis nevertheless serves to illustrate and call attention to a set of questions surrounding socioculturally-oriented classroom practices. These questions deal with classroom interaction processes and dynamics and how they create opportunities for socially shared knowledge creation. This kind of in-depth, microlevel approach has the potential to illuminate the complexity and richness of social interactions in contemporary classrooms and to provide valuable pedagogical information to teacher educators, teachers and student-teachers on how to enhance more learner-sensitive, participatory cultures in the classroom.

6.3 Practical implications and suggestions for future research

According to sociocultural and sociolinguistic perspectives, the nature of classroom interaction is seen as having a critical role in mediating the kind of learning and thinking that is valued in the learning community (Kumpulainen & Wray, 2003). As the results of the study reported in this thesis indicate, nurturing students' critical and creative thinking by engaging them in meaningful and productive discussions entails more than creating a safe environment for open participation (O'Connor & Michaels, 1996). In order to foster productive engagement in learning within contemporary classrooms, students should be afforded opportunities to problematize the issues brought into joint negotiations and share the authority in presenting, defining and solving the problems (Engle & Conant, 2002). In this process, students' everyday experiences and emotions can be intertwined with domain-specific contents. In this way, learning becomes more holistic, deep and meaningful to students. Indeed, in long-term participatory learning communities, the emotional involvement and shared authority in learning can promote students' learning and commitment to the group (Eteläpelto & Lahti, 2008).

However, the nature of social interactions in the classroom is always influenced by a larger contextual system that reflects how education is defined in that particular cultural setting (Rojas-Drummond *et al.*, 2008). Thus, to understand the educational goals and functions of a particular learning community one has to go beyond the discourse itself to look more broadly at how education is conducted in that specific school setting, the aims of the curriculum agenda, the types of educational programs and tasks teachers design, etc. The context of the case study classroom under empirical investigation in this thesis was a university school in which the teachers are encouraged to continually develop their professional competence by participating in in-service courses or post-graduate programs. Teachers in this school are afforded opportunities to apply new innovative pedagogies in their classrooms both time- and space-wise. This might not be the case in many contemporary schools where the recent orientation has reflected a more cost-efficient approach leading to larger schools and classroom sizes. Thus, if teachers plan to implement more learner-sensitive, discourse-enriched pedagogies in their classrooms, the larger contextual systems of the particular cultural settings in which their classrooms are part of should support this kind of development.

In future research on classroom interaction, there is a need for further ecological and developmental orientation (Crook, 2005). Thus, future studies should focus more on the longitudinal changes in participation structures and processes during collective meaning-making in and across different disciplines in diverse contexts. This would include investigating the social interactions in the formal classroom context and in informal learning settings. In addition, there is a need to develop complementary methods of analysis that would focus on establishing connections between microlevel analytical perspectives on analysing the social construction of learning and teaching amongst classroom members to the macrolevel analytical perspective on investigating the broader sociocultural and historical context of the activity in question (see Rojas-Drummond *et al.*, 2008). In addition, new innovative research designs that take affordances of different research paradigms, both qualitative and quantitative, are needed in order to link the processes to the outcomes in educational settings (Mercer, 2004).

Furthermore, future research on classroom interaction should take advantage of the latest sociotechnological developments in video research (e.g. Pea, 2006) that extend the possibilities in analysing the multimodal orchestration (Bourne & Jewitt, 2003) of classroom interactions. Even though verbal interactions are usually foregrounded in social interactions in the classroom, teachers and students also use gestures, gaze, movements and other body language to communicate with each other. By investigating only purely verbal interactions, the meanings carried by the other important modes of participating in classroom interaction might be missed (Bourne & Jewitt, 2003).

To conclude, it is hoped that the research study reported in this thesis serves to open up dialogue and inspire further research on classroom interaction in and across various educational contexts. In addition, it is hoped that it offers lenses through which teachers and student-teachers could examine the social construction of learning and teaching in their classrooms. In this way, it will hopefully pave the way for a more learner-sensitive and reflective pedagogies in contemporary classrooms.

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List of original articles

This thesis is based on the following papers, which are referred to in the text by their Roman numerals (I-IV):

- I Kovalainen, K., Kumpulainen, K. & Vasama, S. (2001). Orchestrating classroom interaction in a community of inquiry: Modes of teacher participation. *Journal of Classroom Interaction*, 36(2), 17-28.
- II Kovalainen, M. & Kumpulainen, K. (2005). The discursive practice of participation in an elementary classroom community. *Instructional Science*, 33(3), 213-250.
- III Kovalainen, M. & Kumpulainen, K. (2007). The social construction of participation in an elementary classroom community. *International Journal of Educational Research*, 46, 141-158.
- IV Kovalainen, M. & Kumpulainen, K. (2009). Discourse-enriched instruction in the mathematics classroom: Analysing collective problem-solving. In K. Kumpulainen, C.E. Hmelo-silver, & M. Cesar (Eds.), *Investigating Classroom Interaction: Methodologies in Action* (pp.43-71). Rotterdam: Sense Publishers.

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Original publications are not included in the electronic version of the dissertation.

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