Biljana Culibrk Fredriksen

Negotiating Grasp

Embodied Experience with Three-dimensional Materials and the Negotiation of Meaning in Early Childhood Education

To Thomas and Brage,
my muses

Abstract

Recent international acknowledgement of young children as competent active individuals raises questions about what their competences are, and what significance embodiment has for their learning. This thesis has two primary objectives: 1) to explore and clarify young children's competences (ages 3-5), and 2) to uncover how children negotiate meaning through embodied experiences with physical and social environments.

Building on the theories of John Dewey, Elliot Eisner and Arthur Efland, this thesis adopts an understanding that cognition is closely related to children's experience with 3D-materials' affordances and resistance. More specifically, this thesis examines what happens during aesthetic learning processes when children experience and explore materials' affordances and resistance through art-based activities in early childhood educational contexts.

This empirical, interactionist study was conducted in one Norwegian early childhood education centre, inspired by arts-based educational research and ART-ography. As such, the researcher gained access to the complex processes of children's experiencing and expressing through interactions with children during visual art activities with 3D-materials. Two children took part in each of the activities and a total of nine educational contexts (cases) were filmed and analyzed. The data were analyzed using cross-case methods, and five selected cases were analyzed contextually. The software NVivo was used, and multiple case study methods were applied throughout the cross-case analysis.

The following four findings emerged from the cross-case analysis:

1. Through their embodied experiences and physical activities the children explored the 3D-materials' qualities, simultaneously as they explored the possibilities of their own bodies.
2. The embodied experiences and verbal language mutually supported each other. The children connected earlier and new experiences through imagination and metaphor development, and negotiated personal meanings.
3. The materials' resistance initiated problem-solving activities and engaged creativity. Unique solutions and new meanings emerged in form of micro-discoveries.
4. What was possible to learn was highly dependent on the quality of inter-subjective relations between the teacher and the children. The researcher's choices of materials and tools structured what was possible to negotiate meanings about, but her attitudes (expressed though body language, tone of voice etc.) were as important.

The close focus on children's actions and expressions lead to an insight that negotiation of meaning is a complex process that interweaves material, individual, and social phenomena, and where imagination, creativity, and metaphor play essential roles. The contextual analysis uncovered materials' resistance as a significant source of motivation to self-initiated problem solving. The thesis discusses young children's imaginative connections between past and present experiences and suggests that their micro-discoveries are the essence of creativity.

The findings in this thesis contribute to understanding children's holistic learning strategies and exemplify how aesthetic experiences can support cognitive activities. The thesis promotes a holistic view on learning, but also problematizes the tensions between the embodied and linguistic nature of learning, which is a significant tension in many educational systems. It further suggests that the present international educational testing race demands extensive discussions about what quality of education *is*, how it is measured, and what quality of early childhood- and school education *should be*.

Acknowledgements

This thesis is dedicated to the young children who let me get close to their experiences. Memories from my son's childhood have been an important source of inspiration. However, I was lucky that another fantastic boy happened to be born in the beginning of this study and never stopped challenging my attention, curiosity and reflection. I am highly grateful to both of them, but many other children have also been invaluable in this study – these are my three, four and five year old 'co-researchers' from a Norwegian early childhood education centre. I cannot thank them enough. I owe their parents gratitude for trusting me. The trust, help and positive attitude from the early childhood personnel is also greatly appreciated. However, the trust implied my responsibility and respect for the children, and in respecting them I found myself also responsible for promoting their voices. Apologies to the reader if my intention to promote children's experiential and embodied approach to the world has been too direct or provoking.

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Biljana Culibrk Fredriksen, Stokke, July 2011

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1. Introduction

1.1 The Topic of the Thesis

Humans do not develop in a vacuum, but together with others. Like each of us, children are unique and competent individuals, who "need to become their own path-finders, speak their own voice, bring their own personal and collective experiences to the world, and negotiate their differences with others" (Ackermann, 2004, p. 16). Through embodied interactions with physical environments, children get to know about the environments' many-folded aspects, and learn about the capacities of their own 'body-minds'[1].

The following example, that inspired my choice of study topic, illustrates the main arguments of this thesis.

> A 14 month old boy, who was not yet talking, was sitting on his mother's lap at a table where adults were gathered. In front of him he had a glass of water, and a bowl with nacho chips was also within his reach. The boy stretched his arm, took a triangular nacho and started to dip it in the glass with water. He was sucking the water from the nacho, observing how the nacho-material gradually became softer and fishing out the pieces that remained in the water.
> When he took another piece of triangular nacho from the bowl, the woman beside him caught his eye, and with a half-open mouth bent towards his hand asking him if she could have some. The boy first stretched his arm towards the woman's mouth, but suddenly changed his mind and started to dip the nacho in the water. Now he held the nacho with both hands, each forefinger pressing against his thumbs, pulling the nacho in opposite directions. His fingers slid along the moist surface. He repeated the dipping and pulling, again and again. The more he dipped, the more slippery the nacho became. After a while he seemed to get annoyed, his fingers "got angry" and, to the boy's surprise, the nacho ended in small pieces on the table. There was a moment of silence – as if he needed a few seconds to "absorb" what had happened. Then he slowly and with confidence took one of the wet pieces from the table and put it in the woman's mouth.

[1] The concept body-mind was first introduced by Dewey (1925).

The boy was too young to use verbal language, but he seemed to understand the woman's question, possibly not her spoken words, but her body language. At first, he did not seem to want to respond to her request, but what happened later demonstrated that he was well aware of her wish and had planned to respond - it was just that dividing a nacho took longer than he had expected. In fact, it was probably the woman's wish and his emphatic desire to share, that motivated his physical action of struggling to divide the nacho.

At the same time, social motivation challenged him to explore the nacho-material's properties. Unlike breaking off pieces of bread, which he was used to[2], the nacho-material could not be divided by pulling, not even immediately after dipping it in water. As the nacho-material gave resistance, the boy could learn about its qualities: consistency, texture, absence of elasticity and so on. From his experience with the material he was learning how to use the capacities of his own hands and through the experience of succeeding, he also learnt the technique of breaking by bending[3]. The boy's learning would not be possible if the nachos and water were not available, if he was not allowed to play with them, or if the woman did not challenge him to share.

Illustrated in the above example, the first argument discussed in the thesis is that children's interactions with three-dimensional (3D) materials and their social interactions are mutually connected to each other, as well as they are related to children's interdisciplinary learning. The thesis will further argue that allowing children explorative, imaginative play with 3D-materials and supporting their experiences is essential for children's many-folded learning. On the basis of the results from empirical, interpretative and interactionist study of young children's (3-5 years old) experiential learning during visual art activities, it will be discussed how children enhance their cognitive[4] abilities through experience with 3D-materials in social contexts. Further the thesis demonstrates that this experiential learning is especially enhanced when materials provide resistance to children's treatment and motivate their negotiation of meaning[5].

In summary, the thesis has two main objectives:

[2] His mother told me that he used to dip bread in milk and tear it.
[3] I can with confidence state that he had learned this, since, a week later, when I tried to reconstruct the event, in order to take a photo of the activity, it was not possible to reconstruct it because the boy now knew how to brake the nachos without dipping them in the water - he easily broke them by bending.
[4] The concept cognition refers to the integrated theory of cognition (Efland, 2002), where meanings are constructed from individual experiences (including both experiences with physical environments and social contexts).
[5] Negotiation of meaning is a central concept in this thesis and is presented under terminology.

- To illustrate the necessity for respecting young children's experiential, embodied and holistic ways of learning and negotiation of meaning.
- To understand children's interactions with 3D-materials in visual art educational contexts and generate knowledge about how interactions with 3D-materials contributes to their negotiation of meaning.

This thesis is part of larger interdisciplinary project[6] related to early childhood education and care[7] and situated within a socio-cultural framework. The goal of the thesis was to approach young children's learning from a position of visual art's perspective, where both individual and social aspects of learning are considered as equally important. The study thereby applies an "integrated theory of learning" where learning is guided by meta-cognitive strategies, organized around the motivations of the learner, but also dependent on social interactions and facilitated by teachers and others (Efland, 2002). Such understanding of learning combines the individual child's unique understanding, experiences and imagination, and influence of specific social contexts and inter-subjectivity.

The topic of the study touches different fields and conceptions of 1) visual art education, 2) early childhood education and 3) research with young children. Applying an inter-disciplinary approach is challenging, but is also found to be necessary for this study, for the following reasons:

- The study is situated in visual art education, where children's individual and unique ways of experiencing, imagining, creating and expressing are valued (Efland, 2004a; Eisner, 2002). At the same time, the process of learning is seen as collective and socially shaped (Bruner, 1990), and creativity understood as both an individual force necessary for learning (Runco, 2006) and as a collective achievement (Sawyer et al., 2003).
- The study is situated in early childhood education in Norway, where children are viewed as competent actors (Ministry of Education and Research, 2005, 2006). Applying this view of children as 'competent', demands that the researcher respects and acknowledges children's embodied, emotional and imaginative ways of being in

[6] The umbrella-project called "Children's learning about language and through language" was funded by the Norwegian Research Council from 2007 to 2010.

[7] Early childhood education in Norway includes children from 0 to 6 years. It can be confusing that the term for early childhood education and care in Norway is *kindergarten* (directly translated from *barnehage*). Being aware that the term kindergarten has diverse applications in different places in the world, I will use the abbreviation ECEC for Norwegian form of early childhood education and care. However, the terms kindergarten and preschool are used in Norwegian official documents and literature about the same age group (0-6).

the world. This further requires that the researcher regards the children's competences in a holistic manner, where their embodiment, emotions and imagination are integrated in their ways of living, and not regarded as belonging exclusively to arts education (Bresler, 2004; Dissanayake, 2007; Efland, 2002; Egan, 2002; Eglinton, 2007; Eisner, 2002).

- Research with young children who are not fully capable of expressing their feelings, thoughts and experiences verbally, demands an approach where their all modes of communication are taken into account if their actions are to be understood. This challenge has had important consequences for the research design and approach.

1.2 A Vast Field of Study

This study has been funded by the Norwegian Research Council and is a part of an umbrella-project called "Children's learning about language and through language" being conducted at the department of early childhood teacher education at the Vestfold University College. The name of the project implies that children learn both about, and through language while they engage in activities and communication with adults (Gjems, 2007, 2009). Within the project, seven teacher-educators are involved in practice based research, with the aim of exploring the significance of language as tool for children's learning about the world. As one of the studies within the project, and the only PhD-study, my own study develops towards a wider understanding of the term 'language'.

The term language usually refers to linguistic forms of communication, but in the interdisciplinary umbrella-project "Children's learning about language and through language" the term includes multimodal[8] forms of communication, including body language and communication through three-dimensional form. The study presented here was first titled 'Sculpturing Words' and aimed to shed light on interrelations between different modes of language during children's play with 3D-materials in educational contexts. However, since language is closely related to thinking (Vygotskij and Kozulin, 2001), the exploration of children's languages gradually developed into an exploration of children's meaning making through verbal and non-verbal forms of communication. The children's experimenting processes during physical activities with materials, and communication with teacher and peers, merged into one process. Such process of meaning making that

[8] Communication through different modalities: Body language, words, sounds, touch etc.

takes place during children's engagement with arts[9] is considered to have specific qualities that unite cognition with experience and expression, and has in Scandinavian countries been called *aesthetic learning process* (see Austring and Sørensen, 2006; Hohr and Pedersen, 1996; Häikiö, 2007; Selander and Lindstrand, 2009). The concept 'aesthetic learning process' is relatively new and this study can be considered as a contribution to a deeper understanding of the concept.

The study is situated within visual art education, which is, according to Efland (2004a, p. 756), a research area where one has to approach learning "without guidance of broad generalizations or principles". It is also situated within a socio-cultural paradigm and early childhood education, but touches on individually oriented psychology; it is informed by research in arts education, but also by the emerging field of multimodal studies, which developed from linguistic tradition. Figure 1 reflects the conceptualization of these research fields in the thesis. The gray area illustrates the study's position and how it cuts across the different fields.

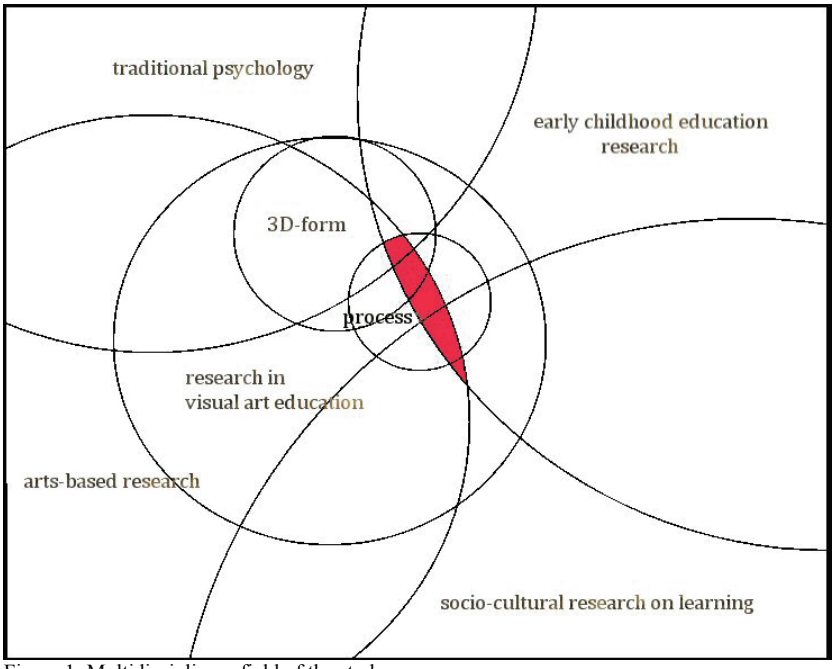

Figure 1: Multidisciplinary field of the study

[9] Like dance, drama-play, painting or sculpturing.

Within visual art education in early childhood, the focus is on activities where children deal with 3D-materials, physical tools and handcraft. Drawing on the ideas of John Dewey and Elliot Eisner, joining the Neo-Classicists' movement in visual art research (van Halen-Faber and Diamond, 2008) the thesis promotes children's physical activities with materials as a fundament for cognition – or as addressed here: negotiation of meaning[10].

The thesis focuses on the *processes* of experiencing, exploring and transforming 3D-materials, not on product making. More weight is given to the processes, than to children's symbolic representation, because the aim is to understand how children negotiate meaning, and not to determine their development by analysing the products. Moreover, since young children's development of concepts and symbols is considered to be related to social contexts, the focus is not explicitly on children's products, but rather on the unfolding of the processes that take place in the specific physical and social contexts.

The interdisciplinary approach in this study reflects children's real lives, where their experiences, understanding and embodied actions are mutually dependent, and where disciplinary boundaries of knowledge generation exist only to a very limited degree. If one perceives school disciplines as "human fabrications" (M. Greene, 2001), and not experience domains of the world as such (Efland, 2004a), this methodological choice is reasonable. Additionally, from a child's point of view playing with 3D-materials is part of a spontaneous experience and not exclusively connected to visual art, physical education or some other discipline. Children's embodied ways of being in the world are seen here as rather holistic, incorporating senses, feelings, memories, thoughts, imagination and multimodal forms of expression.

On the other hand, research areas are distinct and one has to reach out to research disciplines other than one's own to approach the holistic view that children employ. Interdisciplinarity implies crossing borders to other disciplines, which also implies the risks that the researcher acts as an amateur in the disciplines s/he crosses borders to (Pink, 2003) and appears as ignorant, arrogant and naïve. In this setting, a prudent attitude towards other disciplines other than one's own (in this case visual art education in early childhood) is mandatory.

A pro-interdisciplinary argument also lies in the seemingly infinite and complex relations between the human body-mind and the social world (Stake, 2006). To get closer to understanding children's processes of

[10] The concept is explained in terminology.

learning, one needs to approach these relations holistically and contextually (Graue and Walsh, 1998), however complex they are. Organisms develop in non-linear and qualitative ways – the development is messy, fluid and context-sensitive (Thelen and Smith, 1994).

Combining interdisciplinary research from cognitive psychology, anthropology, computer science, education, linguistics, neuroscience and philosophy, Thelen and Smith (1994, p. xv) suggest:

> The organism is viewed as containing none of the information for its final destiny, but as absorbing structure and complexity from others in the environment through experience with the environment.

From this point of view, children's learning processes cannot be studied as isolated. That is why systematic choices and delimitations are necessary in order to cope with, and order the complexity. However these same choices and delimitations have demanded that many important and interesting issues that are related to this thesis had to be left outside the domain of this study.

1.3 The Structure of the Thesis

The first person form is used explicitly and deliberately in this thesis, since the issues discussed widely relate to my personal experiences. I also wish to make myself visible and responsible for the choices I am making while constructing this text as a piece of "virtual reality" (Bresler, 1996).

The first chapter introduces the field and topic of the thesis. It places the thesis in contemporary early childhood discourse in the Organisation for Economic Cooperation and Development (OECD) countries and Norway. The research questions, terminology and main ethical considerations, which frame the study conducted in early childhood education, are introduced.

The second chapter starts with a reasoning related to the choice of the specific interactionist enquiry. The multiple case enquiries, used in the empirical work, are further discussed. Questions of ethics are reviewed, but now in direct relation to the research design. Following the advice from Crotty (1998) the methods are located inside methodological, theoretical and epistemological frameworks, and also related to discussion of practice-based research, which could be said to concern issues beyond epistemology.

The third chapter presents the theoretical foundation of the thesis. The three main fields with the most relevant theories are presented and discussed:

- Visual art education
- Early childhood education
- Embodiment, multimodality and materiality.

The fourth chapter introduces the nine cases, which form the basis for the multiple case study. The chapter describes the processes of data construction[11] and coding. Each of the nine cases is presented together with observation from the field that informed the process of data construction. After the cases are presented, the chapter describes the process of establishing nodes in a software program for qualitative analysis called NVivo, and the process of coding according to the established nodes.

The fifth chapter describes the process from coding to identifying of themes and issues that emerge across the cases, and elaborates the four most emerging cross-cutting issues:

- Using the whole body in experiencing activities.
- Materials' affordances as foundation for children's embodied metaphors.
- Negotiation with materials' resistance.
- Influence of inter-subjectivity on children's experiences and negotiation of meaning.

These issues are analyzed in relation to relevant theories, further proposing a perspective on how children's experiences with 3D-materials' affordances and resistance motivate their processes of negotiating meaning with the materials and the teacher. Based on these discussions, the "model of negotiating grasp" is introduced.

In the sixth chapter, five vignettes exemplify the research process and its results so far. Contextual analysis of the five vignettes illustrate the cross-cutting findings from the cases and, related to the "model of negotiating grasp", shows how meanings are negotiated with the resistance and affordances experienced through 3D-materials and social contexts.

The seventh chapter builds on the cross-cutting findings and the contextual analysis, but lifts the discussion to more general level. The focus is mainly related to the tensions between embodied and verbal forms of learning, and between individual and social influence on children's process of negotiation of meaning. The question of children's competences is considered, and a number of such competences are identified. The chapter also presents some implications of the study for understanding the role of ECEC teachers and curricula development in ECEC.

[11] The concept 'data construction' is synonymous with data gathering, but is preferred because the data here was constructed through the interactions between the children and myself.

The eighth chapter draws conclusions, evaluates the thesis' contribution to knowledge, reflects on its methodological and other limitations, and suggests further research developments.

1.4 Research Questions and Terminology

1.4.1 Defining the Problem

In 2000, when my son was 3 years old, he brought home a plaster sculpture from his ECEC center. I wanted to encourage him and expressed my pride: "You made this so nicely!" I said. And he replied: "I didn't make it! My teacher did![12]" He did not seem to be engaged in the sculpture at all. He also did not seem to want to accept the honor (or blame) for the sculpturing work someone else had done. In the context of my son's ECEC center, it was probably socially accepted that adults made something in the name of the children. However, the question remains if my son had any chance to learn anything about the material, form or technique during the so-called visual art activity, where he possibly did not even touched the material.

Wallin (2007, p. 7) tells a similar story from his childhood in the late 70-ties in Canada, where visual art education was practiced through the ideology of production and functioned as a "public relations device between the school and home". He describes his experiences as unpleasant and frustrating. I cannot tell about my own experiences from ECEC, because I did not attend one, but I can recall many pleasant experiences from playing with sand, snow, wood, stones and textile pieces, while I was growing up in the beginning of the 70-ties, in Belgrade. I remember that I was not allowed to use a needle, and therefore had to invent new ways of making dolls dresses without sewing. One of the greatest memories I have is from a period of laying new pipes under our street, which made it impossible for cars to pass. The work took months, leaving literarily tons of sand all over the streets, a perfect ground for building the largest sand city we could imagine. We were 5-6 children, who spent days involved in sand building activities. Motivation was high – we owned the project. We used natural materials, waste materials and whatever could serve the purpose for building schools, bridges, playgrounds and so on. Our parents did not seem so interested and we had to solve all our problems by ourselves.

The reason for giving these examples is not to imply that children do not need early childhood education or visual art teachers, but to suggest that children need to have materials available and to have a chance to be involved

[12] He used the teacher's name.

in meaningful and challenging activities, if they are to learn through physical experience. This sounds obvious, however, a research in Swedish ECEC shows that materials, which spread easily and demand the teachers' time to clean, are seldom used (Nordin-Hultman, 2004). Nordin-Hultman reports that it is exactly such materials, which allow explorative play, that are little available to children.

Teaching visual art to teacher students in the ECEC-teacher programs, since the late 1990s, I have observed how students' personal experiences from product-oriented activities from their own ECEC attendance can influence their expectations to content and methods of visual art activities in their practice as ECEC teachers. However, through contact with ECEC centers in the south of Norway over the last 13 years, I have also experienced that an increasing number of ECEC centers are trying to improve their visual art methods, often inspired by educational philosophy from Reggio Emilia.

With the Norwegian government's demand for full ECEC coverage[13] in 2007, new questions have been raised about ECEC quality. The national Framework Plan[14] (Ministry of Education and Research, 2006) demands that teachers provide for children's creative development[15] through process-orientated activities. It is my opinion that the increased number of children between 0-3, which is a consequence of the full coverage offer (Brenna, 2010), demands renewed discussions about how young children's creativity can be supported and what significance process-oriented activities can have for their learning.

This thesis does not aim to evaluate the status of visual art practice in Norwegian ECEC, but attempts to elucidate how the process of experiencing 3D-materials can provide an arena for children's holistic learning. In this study, the process of explorative play is seen as essential for children's negotiation of meaning (Austring and Sørensen, 2006; Bresler, 1994; Eckhoff, 2008a; Efland, 2002; Eglinton, 2007; Eisner, 2002; N. R. Smith, 1982), and experiencing physical environments considered as the key to human understanding (Dewey, 1956a, 2005 [1934], 2007 [1938]; Eisner, 2002). The main purpose of the thesis is to generate knowledge about educational benefits from the processes of children's experiential play with 3D-materials by uncovering what happens during such processes.

[13] The Norwegian Government's requirement that each municipality has to have enough ECEC places for children whose parents wish to enrol them.
[14] The full name of the plan is "Framework Plan for the Content and Tasks of Kindergartens".
[15] The concept development is not clearly defined in the Framework Plan in terms of what it refers to and how children's creativity can be "developed".

Child development in arts has been an attractive topic for many studies conducted by psychologists and educators (Kindler, 2004b). However, most attention has been given to children's two-dimensional representations (drawings) and only a few studies have been conducted with a focus on children's three-dimensional representations (see Golomb, 2004; Piaget, 1930; Trageton, 1995). In most studies of both types (2D and 3D) the main interest has been directed towards identifying stages of children's psychological development. More recently there has been a growing interest in contextual study of children's visual representations from multimodal perspectives (see for example Fredriksen, 2008a; Heydon, 2007; Hopperstad, 2002; Narey, 2009), and also a few multimodal studies of children's three-dimensional representations have been conducted (for example Kress and Jewitt, 2003).

This study's approach to children's engagement with 3D-materials has the following delimitations:

- Investigating children's experiencing activities with 3D-materials without aiming to define their stages of development.
- Focusing on children's processes of experiencing, exploring and expressing, rather than on their representations or products.
- Highlighting the importance of individual differences and specificity of contexts.
- Recognizing multimodal forms of communication and the idea that thought can be embodied.
- Taking into consideration the dynamic nature of inter-subjective construction of meaning.

1.4.2 Research Questions

The following section presents the research questions that have guided this study, thus it also presents a process of searching for relevant concepts. The research process is aimed to develop knowledge about young children's exploratory processes, continuously challenged my understanding. I was learning along with the children's processes of learning, and enhancing my understanding of how the concepts of learning, meaning making and negotiation of meaning related one to another.

As an onset of the study, the first formulation of the problem question was: *What do children learn about 3D-materials and through 3D-materials when they play with them?* The question was inspired by the title of the umbrella-project "Children's learning about language and through language". However, I soon realized that the term *learn* could be problematic. Since *learning* is usually considered to be something that takes place inside the individual's mind (Bruner, 1990), this question would be difficult to answer

on the basis of observations, because we cannot know what happens inside a child's mind. Meaning making, as introduced by Bruner (1990), refers to acquiring of knowledge (learning), but as a social and not purely individual achievement.

Bruner (1990) complains that the term "learning" has been used for long time to describe one-way-directed activity, where a student learns while being taught by a teacher. In contemporary socio-cultural understanding of how knowledge is acquired, one sees this process rather as two-way-directed, where construction of meaning – meaning making – takes place between the involved individuals. That meanings are shared and socially constructed (Bruner, 1990) implies that both children and teachers acquire new understandings while they communicate, and that they mutually influence each other's processes of understanding. To make, or construct, meanings implies that one's understanding does not take place in some kind of closed mind, but that meaning construction is a dynamic process that is influenced through other people's suggestions, emotions, expressions and so on. Meaning making and construction of meaning[16] are therefore closely connected with interactions between people and with inter-subjectivity.

In relation to what has been said here, the problem question was revised: the verb 'learn' was replaced with 'make meaning'. In this way, the question became more relational and to a larger extent included the influence of social contexts on a person's learning/meaning making:
How do children make meaning about, because of, and through 3D-materials?

By placing 'children' as the subject of the research question I did not intend to suggest that children make meaning on their own, but together with others, as the concept meaning making implies. The study was situated in educational contexts in early childhood and the question aimed to uncover the processes of meaning making that took place between children and teacher. With this as the broad basis of analysis, the specific focus of the study was mainly directed towards a child's interaction with 3D-materials.

After the data was collected and coded according to the main research question, an additional research question was required to help the cross-case analysis. Extracting the most significant themes was supported by a subsequent question that begins with "Which kinds…". The formulation of the question implied structuring and categorizing:

[16] *Making* and *construction* of meaning seem to be used interchangeably, for example by Efland (2002).

Which kinds of interplay take place between 3D-materials and children during their experiential play in educational contexts?

The fifth chapter presents how the data was analyzed according to this question. The question helped extracting four main themes/issues emerging from the study. The two most interesting themes concerned children's relations to 3D-materials' affordances and resistance. I decided to look more closely into these relations and pay attention to how these relations unfold during the process of children's interplay with the materials. For this purpose, an additional research question was formulated:
How do materials' affordances and resistance influence children's process of meaning making?

This third (and subordinate) question begins with the word *how*, requiring more descriptive answers. The question is answered in the sixth chapter through presentation and analysis of five vignettes from the field.

As described here, the main research question has been applied during the empirical study and in the beginning of the analyzing process. However, during the further process of analyzing theoretical reflections and the process of writing, I became aware that meaning making was still not the best concept to describe the process I was trying to understand. I realized that using the concept 'meaning making' could also exclude individual dimensions, implying that meanings are made exclusively socially – thus implying that individual components of 'learning' were not significant.

During the study, I became more aware of how significant the individual's embodied relation to 3D-materials was in the process of acquiring new understandings. The concept 'meaning making' now appeared too narrow. It was not enough to acknowledge that social interactions were important for meaning making; acknowledging that construction of meaning also comes from individuals' own efforts of knowledge-seeking became necessary (Efland, 2002). The individual components of experience, emotions, imagination, embodied activity, and so on should not be excluded in the process of meaning construction. Efland suggests that socio-cultural understanding of learning might be too narrow in relation to learning in visual art: "Socio-cultural theorists run the risk of minimizing or denying the possibility of independent thinking at variance with the norms of the culture" (Efland, 2002, p. 77). It is my opinion that such individual 'independent thinking' is always important and should be valued as in arts where experience, imagination and personal expressions matter the most.

In the course of the study I also realized that materials have advocacies, as Lenz Taguchi suggests (2009). For this reason, I found it relevant to use the term 'interplay' in one of the additional questions, in order to illustrate that the children's play with materials is a two-way process, where materials respond through their specific qualities. Though the concept 'interaction' could also be used, I did not find it completely applicable to the kind of relations with non-living objects (materials), since the word 'interaction' usually refers to two-way activity between two or more people. The word 'interplay' was found more suitable.

The realization that the concept 'meaning making' did not properly take into account the importance of physical environment, neither the individual component, forced me to further reflect about the concepts 'learning' and 'meaning making'. At the time of writing, I find the concept 'negotiation of meaning' to be best suitable to describe the dynamic nature of negotiating new understandings that took place during the peaceful but intensive 'struggles' between children, materials and teacher (me).

The verb 'negotiate' refers to active part-taking by all participants in an educational context – including 3D-materials, objects and physical space. In this sense, the concept 'negotiation of meaning' is wider than the concept 'meaning making' adding individual and material dimensions to the social dimension of meaning construction. At the same time, the verb 'negotiate' implies that the process of negotiating meaning demands mutual efforts. As the thesis will show, this is consistent with the finding that facing resistance supports the process of negotiation of meaning.

The writing of this thesis has been a journey. I wanted to reflect the paths I have chosen rather than wiping them away. The concept 'meaning making' has therefore remained as central in the thesis[17], whereas closer to the end of the thesis the concept 'negotiation of meaning' is used more frequently, parallel with my growing understanding about the process that the concept tries to embrace.

1.4.3 Terminology

The following terminology describes frequently used terms in the thesis. I do not claim dictionary correctness, but rather intend to explain how I interpreted the terms throughout the thesis.

[17] For example in the fourth chapter where the process of coding is closely related to the original research question.

Arts and visual art: The plural form 'arts' is often used to include a number of schools of discipline (aesthetic disciplines) such as: music, visual art, dance and drama. To avoid confusion this thesis uses the singular form for *visual art* about the discipline that in Norway to refers to teaching with both drawing and 3D-materials.

Affordances: The term was introduced by Gibson (1979) in a his theory of ecological approach to visual perception. It has later been applied in different fields, for instance Multimodal studies, where it is used in relation to what words and language can "afford". In this study, the term affordance first of all refers to properties of a 3D-material (weight, transparency, consistency, texture etc.), but also to socially assigned affordances of materials, objects and activities.

Becoming competent: The term signifies a concept established for this thesis. It is used to describe the moment when a child manages to solve some kind of problem and experiences the joy of mastering it. The concept is closely connected to the concept 'micro-discovery' (explained below), but also to a child's sense of success with some kind of physical achievement, like lifting, cutting, hammering etc. That children are becoming competent does not mean that they were not competent before, but rather that they are 'becoming' more competent. They make transitions from meeting problems in mastering something, to mastering something better. This, however, does not mean that children are becoming competent in the way competence is defined by adults, but in the sense that they experience their own mastery.

Cognition: This thesis applies Efland's and Eisner's description of the concept cognition. This includes "all processes through which the organism becomes aware of the environment or its own consciousness" (Eisner, 2002, p. 9). Cognition is both embodied and dependent on social interactions (Thelen and Smith, 1994) and imagination is an important part of it (Efland, 2004a). In such an understanding of cognition, meanings and knowing cannot be separated from embodied action, but are grounded in experience (Thelen and Smith, 1994).

Context: Contexts are understood here as entities situated in place and time, sometimes very small and narrow like here-and-now micro-contexts, at other times large cultural, global or historical contexts. Contexts appear as a Russian Doll principle: context-within-context, from here-and-now contexts, to contexts of a specific ECEC center, children's culture, local community culture, national, historical, global and vice versa. The different layers of contexts are always in some way connected, because our thoughts, feelings and actions are related to our experiences from different contexts. Our

attitudes are results of our cultural, social, geographical etc. attachment and we carry all of them with us when we, for instance, enter a micro-context. Additionally, all contexts are dynamic and under constant reconstruction (Graue and Walsh, 1998). This means that exactly the same context can never be repeated. This thesis uses the term **educational contexts** (or educational sessions) about the contexts delimited in time and space where I interacted with two children during the process of data gathering.

Embodiment: This concept refers to the unity of all functions of a human body-mind, including all the senses, as 'channels' for perception of the world, all embodied forms of expression/communication and all actions (mental and physical) that a body can undertake. The concept of embodiment has a large scope including the body's biological, emotional, physical, social and other dimensions.

Expression: The term expression is used to mean the externalizing of thoughts, feelings and ideas through different functions of the body (sound, movement, facial expressions etc.), but also through tangible materials or music instruments. Expression can function as an act of communication with other people, but it differs from communication in that an act of expression is not necessarily directed towards others; it can be a result of negotiation of meaning with a material or other external media.

Experience: Experience is applied to children's sensing and perceiving through active, physical interaction with 3D-materials. The process of experiencing materials can take place as a self-motivated activity lead by a child's curiosity to find out how something feels or functions, but experiencing also takes place during the process of making something. The experience itself is an inseparable unity of the intellectual, the emotional and the practical (Dewey, 2005 [1934]) that engages the whole body and is dependent on the qualities of the physical environment during the process of experiencing. A child's experience is independent of her/his ability to describe it verbally, but it can be influenced by verbal language and social interactions.

Inter-subjectivity: Inter-subjectivity is a form of dynamic, embodied and emotional interaction between human subjects present in the same physical context. Inter-subjectivity takes place consciously or unconsciously when people in some way share activities, thoughts and feelings. This happens when people are able to perceive each other as embodied beings and interpret each other's movements, speed of speech, direction of gaze, and so on, in addition to verbal communication. Inter-subjectivity constantly influences the

participants' understanding, attention and choices, and functions as the basics for mutual negotiation of meaning.

3D-materials: The word 'material' can be used in diverse ways, like for example in empirical material or data material. The concept of three-dimensional materials refers to materials that are concrete and tangible. Even though two-dimensional materials really do not exist[18], I prefer to use the concept 3D-materials here, because speaking about three-dimensionality also refers to types of activities such materials can employ. While children's expressions in two-dimensional form are related to their drawing, painting and what can be done in one surface, play with 3D-materials makes it possible to build three-dimensional forms. The concept 3D-materials therefore integrates space-related activities, because such materials are not attached to one plain, but have volume and weight, can be moved around and present diverse possibilities for a child's body to engage with.

Meaning making: Meaning making is a concept often used in socio-cultural paradigms to refer to learning as a social phenomenon. Meanings are constructed through social interaction, where "the process of responding and meaning making are inseparable" (Stables, 2008, p. 96). This means that meanings, which are made in one moment, immediately influences what can be said, done and understood in the next moment. I would like to emphasize that meaning making is here also understood in relation to physical and sensory experiences and expressions.

Micro-discoveries: Eisner (2002) refers to micro-discoveries as small surprises during a process of art making, where the surprise itself is the reward and motivation for the work done. This thesis uses the concept to mark moments where a child makes a personal discovery – a sudden new understanding. Such moments of micro-discoveries are personal, but the expressions that can signify that a micro-discovery has taken place are visible for others: a jump, laughter, smile or a verbal expression. The first part of the word *micro*-discovery indicates that such discoveries are very small, for adult's often obvious things, but however small for adults they are important for the children, who come to understand something "on their own".

The second part of the concept (discovery) does not refer to finding some hidden 'truth', but to individuals' new ideas. Eisner (2002) draws our attention that word "discovery" might not be suitable to describe children's processes of acquiring knowledge. He states that knowledge is rather construction than discovery and that the word can be misleading since it

[18] Even paper has three dimensions however small one of the dimensions is.

points to finding something which has already been there (Eisner, 2002). Even though Eisner criticizes the concept discovery, this thesis applies the concept 'micro-discovery' about moments when new meanings are made through a child's reconstruction and negotiation of experiences. Micro-discoveries are closely related to creativity and can be compared to moments of illuminating ideas.

Negotiating grasp: illustrates the conjunction between, on the one side, a child's physical action of exploring 3D-materials (like a hand grasp), and on the other, the child's mental grasping of new understandings (like through micro-discoveries). The word 'grasp' therefore refers both to a physical and cognitive grasp. The word negotiating refers to active negotiation with both tangible materials and other people, for instance teachers and peers. The "model of negotiating grasp", which will be presented in the fifth chapter, is meant to illustrate the complex relation between physical experience, social interactions and process of negotiation of meaning.

Negotiation of meaning: As already mentioned, negotiation of meaning is a concept that has been developed during the study. It refers to a combination of social, individual and material influence on the process of developing understanding, or grasping something through body-mind. Negotiation of meaning is a complex activity where immediate interpretations of dynamic interactions open possibilities, but do not determine what can happen in the following moments. Negotiation of meaning is a non-linear, fluid, context-dependent process dependent on all present "subjects" (human and non-human) and qualities they bring to the context.

Quintain: This concept is introduced by Robert Stake (2006). The word itself means a target one points to. Related to a multiple case study approach, quintain is the scope of the target one points to in order to look for some significant characteristics across the cases. One does not point only to the center of the target, because one does not know what would be possible to find across the cases one is studying. The quintain should not be too narrow, as that could lead to overlooking of some important features of the studied phenomenon. On the other hand, the quintain should not be too broad, since that could make the study too complex and ungraspable.

Sloyd: The word 'sloyd' can be translated with 'craft'. However, because the word 'craft' is used differently around the world (Garber, 2002), I decided to use the concept 'sloyd' in order to delimit the concept to Scandinavian contexts. When 'sloyd' is used in literature in English, the concept connotes the Scandinavian form of craft, including specific traditions of hand crafting. Sloyd is also a school discipline with focus on handcraft with three-

dimensional materials. The content of this discipline differs slightly from country to country: in Norway it involves woodwork, while in Sweden and Finland the concept also includes metal, textile, clay and other 3D-materials. In this thesis 'sloyd' is used about children's work with different 3D-materials.

1.5 Background Assumptions and Objectives for the Research

1.5.1 Experiential, Embodied and Holistic ways of Learning

Changing views about children have influenced how they have been treated in different historical periods. In the emerging paradigm, where children are seen as competent individuals from birth (Bae, n.d.), they are viewed as social actors, who can take an active role in their learning, simultaneously acting upon their environment and being shaped by it (M. Freeman and Mathison, 2009). The Norwegian national "Framework Plan for the Content and Tasks of Kindergartens" presents children as competent and active individuals, who express and learn in diverse ways (Ministry of Education and Research, 2006; Moser, 2009). The OECD report about content and quality of ECEC, praises the 'Nordic tradition' for acknowledging children as agents of their own learning through activity and play (OECD, 2006, p. 141).

Contrary to the 'Nordic tradition', the OECD report (OECD, 2006) claims that development in all other OECD countries is moving towards less play and more traditional teaching in order for children to attain higher scores of measurable cognitive achievements. The children's linguistic and cognitive achievements have been measured (see for example Belsky et al., 2007; Melhuish and Konstantinos, 2006) assuming that higher scores in early childhood would lead to higher economic benefits in adulthood. When educational policies are output driven, the arts are generally not viewed as an important part of education (Bamford, 2006, p. 142). From my point of view this narrow focus on certain competences threatens the diverse and holistic ways of children's knowledge acquiring.

Despite praise for respecting children's ways of learning, recent trends in Norway seem to be influenced by the contemporary development in other OECD countries. In an evaluation of the implementation of the national curriculum, Østrem et al. (2009) report that Norwegian ECEC centers have lately been focusing on children's measurable skills and that less attention than earlier has been given to the arts. Since the 'linguistic turn' significant in the last three-four decades (Luff, Heath, and Pitsch, 2009), there has been a

tendency to over-focus on linguistic forms of learning. This means that the cognition has not been understood as emerging "from bodily and sensory experience" (Efland, 2004a, p. 761), but rather as acquired through linguistic forms. As a consequence, the arts, that traditionally promote embodied forms of knowledge, have not been highly valued in education (Bamford, 2006) or represented in research (Colbert and Taunton, 2001). Very few studies have been conducted with focus on visual art, especially in education in early childhood. The fact that there were no studies in arts published in the European Early Childhood Education Research Journal from 1993 to 1997 (Vejleskov, 1999) can indicate the absence of research in the area. At the same time, there is an increasing political demand to improve children's skills and knowledge. There is a need for renewed conceptualization of knowledge where embodiment, and arts-based approach to knowledge, are taken seriously (Herskind, 2008).

Recent research in popular culture, multimodal studies of learning, and arts-based research in school education, show examples that new understandings emerge from learners' emotional and physical engagement (Ackermann, 2004; Biggs, 2004; Davidson, 2004; Dicks, Soyianka, and Coffey, 2006; Eckhoff, 2008a; Heath and Wolf, 2005; H. L. Johnson, 2007; Narey, 2009; Pahl and Rowsell, 2005; Piazza, 2007; Pink, 2009; Wallin, 2007). New interdisciplinary research, that combines the areas of neuroscience, psychology, philosophy and phenomenology also underlines the importance of embodiment in cognitive processes (Juelskjær, Moser, and Schilhab, 2008).

A recent question in this context is how different modes of communication mutually relate to each other and if it is the multimodality itself that is essential for learning (Dicks, et al., 2006). The study presented here promotes interdisciplinarity in early childhood education, advocating that linguistic and experiential knowledge do not have to be separate. When a holistic view is applied to the process of negotiation of meaning, multiple forms of cognizance can only exist "beyond dualisms that divide the body from the mind, thinking from feeling, or individuals from their social world" (Efland, 2004a, p. 770). However, there is a lack of conceptual framework to explain how cognition emerges from complex relationships within the holistic understanding of cognition (Dicks, et al., 2006).

Some have suggested that holistic understanding of children's lives involves acknowledging their different 'languages' (Forman, Edwards, and Gandini, 1998; Goodman, 1976), 'modes of thought' (Eisner, 2002) or 'modal affordances' (Kress and Jewitt, 2003). A holistic view on children's learning also involves imagination, which is essential for rationality (Efland, 2004a).

To be able to improve early childhood education, and to maximize children's cognitive potentials, we need to understand how meaning and rationality relate to imagination (Efland, 2004a), and to be able to approach such understanding we have to take a holistic view on children. On the basis of this, the first objective of this study is to illustrate the necessity for respecting young children's experiential, embodied and holistic ways of negotiation of meaning.

1.5.2 Interaction with 3D-materials as Arena for Negotiation of Meaning

Arts acknowledge the importance of senses in learning about natural and social world (Efland, 2004a). The importance of things, art objects and technological devices is also acknowledged in learning (Ackermann, 2004; Luff, et al., 2009; Schoultz, Säljö, and Wyndhamn, 2001). However, such tools for learning are often objects with predefined functions: a toy that can be pushed in certain way, a globe that can rotate, and so on. The study presented here builds on the acknowledged importance of physical objects, but it focuses on "un-structured materials for play" (Trageton, 1995). Such un-structured materials, and natural materials as promoted by Dewey (1956a), are without predetermination as to how they are supposed to be used. Agreeing with Dewey and Trageton, I find un-structured materials especially relevant for young children, because such materials invite explorations in individual ways.

Natural materials are un-structured and offer a large variety of qualities that challenge differentiation of senses (Eisner, 2006). Natural materials afford us with qualities to experience, explore and to negotiate with, during the process of reshaping them. The results of this study show that 3D-material's resistance has an essential role in children's negotiation of meaning.

Sullivan (2004, p. 800) suggests that one should study the practice of art making in order "to better understand how art education can contribute to human understanding". In order to learn about the nature of creativity, studies of designing process have also been used in disciplines other than arts (Luff, et al., 2009). The study presented here shows how young children's experiential play with 3D-materials can release children's imaginative, embodied forms of thinking. It seems that young children, with their immediate, spontaneous, imaginative ways of relating to the world, can teach us what creativity is all about.

Stelter (2008a) suggests that learning is body-anchored and experience-based. We need to understand in which ways embodiment and perceptual experience are foundations for cognition and meaning, as Efland (2004a) proposes. The

second objective of this study is to understand the interplay between 3D-materials and children in visual art educational contexts, and how such interplay contributes to negotiation of meaning.

1.6 Ethical Considerations

Ethical reflections are important in this thesis, since all aspects of the research process are closely connected to the lives and rights of young children. In the empirical part of the study, children were the participants, their experiences were the object of the study, and the way they were viewed and treated framed the conditions for making the study possible. In the process of analysis and presentation of the results, describing children's position as co-researchers (which made it possible for me to learn from them) also became a form of promoting their holistic experiences and ways of learning. My multiple roles as a researcher and a teacher demanded making ethically responsible decisions, which were, at times, also conflicting.

Additionally, by taking the view on children as presented in the existing Kindergarten Act (Ministry of Education and Research, 2005), the study also questioned how best to position children as competent, active participants with their own rights. In this respect, the study found itself in the middle of the turbulent dynamics of the emerging view on young children. The mentioned conditions, and other tacit conditions, interweaved the question of ethics into research practice, methods and results. The following sections are written with the intention to elucidate the background that influenced the ethical considerations of the study.

1.6.1 Respecting Children's Rights and Competences

The United Nations Convention on the Rights of the Child (UNCRC) promotes children as rights holders (Clark, 2005). In consistency with UNCRC, the Norwegian Kindergarten Act demands respect for children's voices and their active participation in the content of their ECEC centres. The OECD report presents views on children and curricula organisation in two contrasting early childhood education traditions: "Readiness for school tradition", and "The Nordic tradition" (OECD, 2006, p. 141):

Readiness for school tradition	The Nordic tradition
"The child as a young person to be formed, as an investment in the future of society: the productive knowledge worker, the compliant well-behaved citizen… A benevolent, utilitarian approach to childhood in which State and adult purposes are fore grounded. Pedagogy focused on 'useful' learning, readiness for school... A tendency to privilege indoors learning."	"The child as a subject of rights: autonomy, well-being… the right to growth on the child's own premises. The child as agent of her/his own learning, a rich child with natural learning and research strategies… The child as member of a caring community of peers and adults, in which the influence of the child is sought. An outdoors child of pleasure and freedom. A time for childhood that can never be repeated."

Figure 2: ECEC traditions

The OECD report paints a positive picture of Norwegian ECEC practice, however Bae (n.d.) reports that it is unclear for practitioners what children's participation, and meeting a child as an active subject, actually means. My own experiences from earlier practice-based studies (Fredriksen, 2007a, 2007b, 2010; Fredriksen and Thorkildsen, 2008) are that ECEC teachers struggle to understand how to implement children's rights and voices into their everyday practices, as required by the Kindergarten Act and the Framework Plan.

With the rising number of children under three, children with another mother tongue (Brenna, 2010) and other children who are unable to express their needs verbally, there is a growing need to understand how these children practically can contribute to ECEC content. Further, it is also uncertain what consequences the integration of children's views, ideas and rights can have on the ECEC content, curricula and methods, as well as for teachers' qualifications. The integration of children's views in ECEC curricula is in itself a large ethical challenge: teachers are on the one hand responsible to integrate children's views into the curricula, and on the other hand they are responsible for ensuring the quality and security of the educational settings; young children are supposed to influence the educational settings, but responsibility cannot be demanded from them. In order to be able to understand what quality of educational settings is from children's points of view, one needs to study children's experiences (Clark, 2005; M. Freeman and Mathison, 2009; S. Greene and Hogan, 2005; OECD, 2006). Achieving better understanding of children's experiences can help us realize in which ways children are competent, and this is again necessary in order to facilitate their participation.

Clark (2005) provides examples of how teachers, who became aware of children's competences, also became more confident about leaving the curricula open for the children's future influence. As a consequence of the possibility to show their competence, the children gained more respect from the teachers. From this perspective, the teachers' ability to allow possibilities for children's competences is essential if children are to be able to earn respect for their competences. In this way, the concept of teachers' active listening becomes a question of ethics, and is highly relevant here.

To be able to capture children's ideas and needs, a teacher[19] has to be attentive and listen to all forms of children's expressions in order to allow their participation (Clark, 2005, p. 489). Such listening "is not about extracting information from children in a one-way event, but dynamic process which involves children and adults discussing meanings" (Clark, 2005, p. 489). How well teachers listen and respect their students, is a question of professional ethics, but ability to inter-subjectively engage in listening is also a matter of individual's competence. According to Habermas, a person's moral choices are influenced by culture and tradition, but are still fundamentally individual (Øverbø, 2009). As long as teachers do not interrogate their own "common sense" formed on the basis of their own past experiences, they will continue taking their own experiences as the basis for ethical decisions concerning young children. In this way, they will have difficulties to connect with the children's views (Bae, n.d.). Non-reflective attitude towards own experiences in turn perpetuates the preservation of teachers' old assumptions and retaining of the existent power order, norms, assumptions about upbringing, and so on.

Habermas claims that it is a listener's ethical responsibility to listen and try to understand. Similarly to what Clark (Clark, 2005, 2010; Clark and Moss, 2005) says about listening, referring to Habermas, Øverbø (2009) writes that achieving mutual understanding demands active participation – observation is not enough. Mutual inter-subjectivity between participants depends on trust and the will to share knowledge (Øverbø, 2009). To be able to understand a child therefore demands an essential "ontological attitude to accept this other person as a human being in a certain cultural specific context, which is the life-world" (Øverbø, 2009, p. 176). If a person (a teacher or a researcher) is able to achieve such a state where s/he truly views a young child as competent is a question of professional attitude, but also personal assumptions, expectations, morality and rationality – these personal components are called "normative presuppositions" by Habermas (Øverbø, 2009). The question of ethics in early childhood education, and education of

[19] Also a researcher.

teacher students, becomes highly complex if one considers the influence of normative presuppositions on communication and education with young children in the emerging view about them.

Habermas' view on communication ethics[20] focuses on equal and impartial relations between participants. Tholin (2003) discusses whether such an ethical position is practically applicable in ECEC, taking into consideration the asymmetry that exists in the relations between a teacher and a child. My question is if respect for a competent child can be realized when the existing asymmetry is simply accepted, and not challenged. One of the reasons why research with children is so complex and challenging might be exactly this unsettled relationship between, on the one side, ideological intentions to establish equality between child and teacher/researcher, and on the other side, the existing relations of power and responsibility.

As a practicing teacher educator, approaching the children in the study I was an outsider in the ECEC practice. This gave me the opportunity to interpret the government documents not through the framework of the existing ECEC practice, but on a theoretical level. The theoretical level also allowed me to adjust Habermas' philosophy to my own ethical attitudes: I assumed that it was my ethical responsibility to genuinely respect the children as autonomous beings.

The mentioned question of asymmetry in relations between ECEC teachers and children is a matter of power distribution too. Some forms of such power cannot be avoided (Clark, 2010), for instance, age difference, and the power gap is even wider if the children belong to a marginalized group (Clark, 2010). However, power difference can to some degree be reduced when children are seen as co-researchers and teachers and researcher take on the role of co-learners (Clark, 2010).

The increased emphasis on children's rights and citizenship in early childhood has resulted in an increased number of research projects where children are active participants and co-researchers (Veale, 2005). This is a natural extension of a social constructionist approach where children are seen as co-constructors of meaning (M. Freeman and Mathison, 2009). However, seeing children as co-researchers empowers their position in society and therefore also has a political agenda. This brings the discussion about ethics to another level. At the same time, new questions about relations between competence, power and responsibility emerge: Can young children be

[20] Or ethics of discourse (Tholin, 2003).

responsible for their competent actions? Who will take responsibility for promoting children's competences?

Ethical practice is about creating change in the world (Ryen, 2001) and making "the lives of young children visible at a strategic level" (Clark, 2005, p. 502). But it can also be unethical to promote children's voices if we happen to misunderstand them. Stake (2010) expresses his worries that researcher's wishes to help people, might be exactly what can harm the people they are trying to help. As researchers we intrude into lives of others with a wish to do them good, but: "How accurately do we read their needs?" (Stake, 2010, p. 202).

To consider promoting children's rights and competences is a huge responsibility and ethical challenge. The purpose of this study was not primarily to promote children's competences. Nevertheless, the study sometimes opened possibilities for their competences to become visible, and when this happened it seemed unethical not to promote them.

1.6.2 Viewing a Child as both Competent and Vulnerable

The ethics of research with young, competent children are complex, possibly because of the following tensions:

- Between a child's uniqueness on the one side, and similarity with other children of the same age, culture, community etc. on the other.
- Between a child's own views, and the way her/his views are understood, interpreted and promoted.
- Between a child's vulnerability, and her/his competence.

According to the UNCRC, children have rights to provision, protection and participation (Hauge, 1999). However, a tension between these three demands seem to exist (Hauge, 1999): need for provision implies that children cannot be held responsible, need for protection implies that children are vulnerable, while the right to participation implies that children are competent. The practicing of the three rights requires adults who are responsible, respect children and care for them. The same is required of researchers who spend time with children.

If we consider a child as competent, it would be inconsistent with this view to ignore her/his suggestions and wishes (Backe-Hansen, 2001). On the other hand, treating children as completely competent would not be ethical if this means to make them fully responsible for their actions. Treating children as both vulnerable and competent is a challenging balance. That children are competent does not mean that they are less vulnerable (Backe-Hansen, 2001).

But how can we know when they are vulnerable and need cherishing and care, and when they are competent and can have responsibilities?

What makes young children vulnerable might be that they:

- Do not have developed verbal language to explain their needs, or are not aware of their needs: "the younger the children, the less likely they are to be able to articulate their feelings, needs, desires, confusions, and other needs for assistance" (Katz and Goffin, 1990, p. 199)
- cannot be held responsible for actions they cannot understand (Backe-Hansen, 2001)
- are emotional and cannot separate between feeling and thought, and they need adults who are able to interpret their feelings and moods (Katz and Goffin, 1990)
- are loyal to adults and socialized into power-order where adults make most decisions (Clark, 2005)
- are not physically strong, are not well coordinated motorically (like for example in using tools) and can easily hurt themselves
- lack experience and are not able to foresee when something dangerous is about to happen.

And they are competent possibly[21] because they:

- Have individual and unique experience (S. Greene and Hogan, 2005)
- have their own needs, ideas and wishes
- have their own ways of approaching problems, play, learning etc.
- have social networks and friends (Greve, 2007, 2009)
- have growing competence to promote and share their needs, wishes and experiences (Clark, 2005)
- are competent to play (Johannesen and Sandvik, 2008)
- have highly developed imagination (Egan, 1999).

Children's competence is successively growing. Through the on-going process of enhancement and of understanding they seem to be in constant transition from being vulnerable to becoming competent. It might be exactly this transition that requires flexible and well-balanced application of protection, respect and children's responsibility? And if learning is a result of the process of negotiation between children and adults, then the adults'

[21] The list of children's possible competences is composed on the basis of different literature. I use the word "possible" here to remind the reader that the list was made before my empirical study and according to assumptions I had about children at the beginning of the study. However, during the study I learned more about children's competences. The seventh chapter presents the new insights and discusses children's competences more comprehensively.

flexibility is probably the most essential in order to provide the right balance between protection, respect and responsibility for each child at a certain time.

Owing to their vulnerability, young children are especially dependent on adults in order to become competent. Being 'social by nature', or 'biologically cultural' as Barbara Rogoff (2003) says, young children rely on and learn from adults, and are influenced both by the content and forms of interactions with others (Gjems, 2007, 2009). Becoming competent requires courage to try; it requires comforting and care if the child fails, and support and respect when s/he succeeds. However, it also requires something to become competent about. In visual art, becoming competent is for example about learning how to handle tools, or how to use hands to make clay flat. In this study, young children were provided with situations where they could become competent through interactions with materials and tools.

During my own interactions with the children, I tried to be attentive to their ideas and needs, and conduct the research honestly, ethically and responsibly. However, interactions with the children demanded continual, sometimes exhausting, ethical considerations.

In research, ethical questions often concern content and presentations of the results, but in research with young children, ethics also concern the process of interacting with them. Studying with children is therefore intellectually, physically and emotionally demanding (Graue and Walsh, 1998). They have to be simultaneously protected from injuries, to be challenged, supported and given responsibilities. A teacher or a researcher who interacts with them has to take quick decisions. The interaction therefore challenges the teacher's and the researcher's attitudes, feelings and knowledge, but also her/his flexibility and ability to improvise.

1.7 Summary of the Introduction

This chapter presented the main challenges of this thesis. The study is interdisciplinary and touches simultaneously upon different academic disciplines. The interdisciplinary requirements have influenced the choices in writing this text.

The introduction has further situated the research questions, objectives, background and basic assumptions. It has presented some relevant contemporary issues in early childhood education, which have both influenced the selection of the topic as well as contributed to ethical and methodological choices in the study. The issue of viewing a child as competent is closely related to children's ability to take part in construction

of meaning, and is essential in the study. However, if I did not believe that young children were competent this research would unfold in a completely different way. Thus, personal views on children, visual art and construction of meaning influenced my choices, methods and ways of conducting the case studies - and consequently, also the outcomes of this study.

2. Research Methods

This chapter discusses the methodical, as well as ethical, pedagogical and research-based issues related to the research design. The study presented here is conducted in one Norwegian ECEC center and informed by different theories. Prior to and during the empirical work, literature studies and reflections about the research process contributed to study design. Throughout the two years I had contact with the ECEC center, and especially the four months during which the data was collected, new experiences with the children contributed to further development of the research design. That the research process was a journey is probably evident in this chapter since it chronologically presents the process of method developing. The descriptive form of writing demands much space, but is necessary in order to make my advocacies and choices visible.

2.1 Finding my Role in Relation to the Children

2.1.1 How to Answer the Research Questions?

Studying people is different to studying natural phenomena or objects (Flyvbjerg, 1996). Human relations are complex and fluid, under constant influence of changing social and physical contexts. I had to seriously ask myself: Is it possible to study something as complex as the process of children's meaning making?

Eisner (2008) suggests that one first has to examine the specific features of what one wants to research, and then find appropriate methods that can serve the aims to be achieved. This thesis follows his advice. In qualitative, and interdisciplinary research, methods sometimes have to be created in order to serve the purpose of the study (Crotty, 1998). This chapter presents my approach to create such methods.

Help from the children was necessary in order to answer the research questions. As experts in their lives (Clark, 2005) they had the needed expertise. But since young children rarely write books and are too young to explain their experiences[22], the research questions had to be approached empirically and inductively. Observing children's visible activities and communication had to serve as a way of studying their invisible process of

[22] And adults too old to remember their childhood experiences.

meaning construction. The study was not aiming to measure the children's knowledge, or to define how it develops over time, but to understand the qualities of the phenomenon 'meaning making' during play with 3D-materials. For this purpose, the same child did not need to be studied, neither the same 3D-material. However, there was a need to get as close as possible to the children's activities, experiences and expressions. To gain insight into the processes the children were going through, their facial expressions and the smallest movements needed to be detected, as well as sounds, words, and multimodal expressions of for example surprise, amazement or pride.

The study was situated in early childhood education and aimed to demonstrate the educational benefit of children's 3D-play. It was therefore not enough to study children's 3D-play in unorganized settings, for example in home environments. Additionally, the understanding that meanings are constructed through social interaction, and that outcomes of educational contexts depend on teachers, demanded that data gathering was carried out in settings where children and teacher interacted.

Before the process of data collection, different empirical approaches to the studied phenomenon were tested. Some of the trials and challenges that contributed to the methodical choices are presented in the following section.

2.1.2 Becoming a Practitioner Researcher

The methodical choices of this study were not only dependent on the nature of the studied phenomenon, but also on factors such as the personal experiences of the author and ethics of research in the early childhood education. The following section illustrates these factors and the development towards the selection of methods.

In the years prior to this PhD-study, I had conducted a number of research projects in early childhood education, cooperating with children, teacher students and early childhood teachers (see for example Fredriksen, 2005, 2007b; Fredriksen, 2008a). From two action research projects, with quite different outcomes (Fredriksen, 2007a, 2008b; Fredriksen and Thorkildsen, 2008) I experienced the challenges of collaborative research in ECEC and learned that success of action research projects depends on ECEC center's organizational structure and leadership, on mutual trust and appropriate sharing of responsibilities. I learned that the action research method is a fragile form of ECEC research and for this reason I did not choose it for the PhD-study.

At the end of 2007, contact was established with one standard Norwegian ECEC center whose personnel were interested to cooperate. The smaller-scale study, Sculpturing Words, started then, and eight months later[23], developed into the PhD-study presented here (from now on called Negotiating Grasp). As part of Sculpturing Words, I observed eight visual art activities lead by the ECEC center's teachers and assistants[24] during the spring of 2008. The teachers could decide when to invite me to observe their activities with children. Still they did not seem so comfortable when I was watching them, and were often asking about my "evaluations". I explained that I was not evaluating them, but wanted to see what the children were doing in their experimental play with 3D-materials. However, the fact that I was a visual art teacher, researcher and a guest, that the institution was small and everyone friendly, made it difficult to establish a professional relationship. Another factor that made our cooperation difficult was that our working conditions were different: I was a full-time researcher, and they did not receive any compensation for cooperating with me. Could I burden them with my requirements, and yet criticize their work later?

None of the teachers in the ECEC center were visual arts teachers and their attitudes towards art education were probably dependent on their assumptions about the nature of arts education (Bresler, 1994). Most probably, visual art education could offer more to young children than what was offered in this institution. Within the observed visual art activities with 3D-materials, the children made products assisted by the teachers, but did not have many chances to explore the materials. There were some indications that the teachers' discomfort with my presence disturbed the children's learning processes: If the teachers assumed that making nice was synonymous with successful teaching, they possibly tried to help producing nice products in order to please me. This insight triggered my ethical responsibilities concerning both the children and the teachers. It would be unethical not to consider that my presence could affect (or even hinder) the children's learning processes. On the other hand, it would also be unethical to criticize the teachers and hurt their feelings through the presentation of my observations. I therefore decided to set an early boundary, as Stake (2010) suggests, in order to prevent that someone felt offended.

Adults are less spontaneous when they are observed (C. Björklund, 2010) and professional differences are not so easy to overcome in research in ECEC (Graue and Walsh, 1998). Close collaborations with teachers take their time and energy away from the children (Cochran-Smith and Donnell, 2006), and

[23] At that point I received the funding from the Norwegian Research Council
[24] Without teacher education

it is not ethical if the children suffer because a researcher "steals" their teacher from them.

My observations of the ECEC teachers in action led to an understanding that validity could be threatened by teachers' discomfort. Ethical considerations concerning the teachers had to be taken seriously in the research design. Fortunately, the study was not about teaching practice, nor about evaluation of present ECEC quality, but about something that was possible to study without observing the teachers. However, because the children were to be studied in educational contexts, someone had to take a role of a teacher. This led to the decision to interact with the children myself; instead of being a burden for the teachers, I could contribute and at the same time avoid the ethical dilemmas concerning ECEC teachers. Additionally, if children's experiential play with 3D-materials was seldom in this ECEC center, I could provide conditions that enabled this play during the data gathering.

Another reason for choosing practitioner inquiry was derived from my observations of children's free play[25] in the playground. During the spring of 2009, as part of the course in arts-based qualitative research[26], I filmed children's play in the snow, to experience how my distance from them was significant for what I could observe. I was carrying a small digital camera, and when I moved close to the children, to be able to record their voices, they did not seem to be interrupted by the presence of the camera, but more by intrusion into their space. They sometimes stopped playing and started to watch me. They possibly wondered what I wanted or how I dared to interrupt them, or they were just pleased that I was interested in their play. They sometimes wanted to chat with me. In any case their play was not the same "free" play any longer, but changed by my presence.

Young children need to trust adults in order to feel safe (Kristiansen, 2001), so it was essential to respond to the children when they addressed me. Instead of observing them "neutrally", as if they were objects, it was important to make them feel comfortable and respected. A responsible teacher builds confidence between her/him and children. Thus, my attempt was to be honest and act naturally with my whole body, since confidence manifests itself through the whole body: movements, gestures, color of voice and so on (Kristiansen, 2001).

To conclude: Filming in open spaces was not practical because children constantly moved and their voices were difficult to capture. This made it

[25] Not organized or lead by teachers.
[26] By Prof. Liora Bresler in Stockholm spring 2009.

necessary to move the camera closer to them and, since I was holding the camera, I also had to move closer. But getting closer to them caused intrusion into their space. Consequently, it appeared impossible to capture all features of children's multimodal languages during their free play, without influencing the play.

Both the ethical challenges with observations of the teachers, and the methodological challenges of engaging in children's play, could be solved if I interacted with the children and acknowledged that the contexts would be influenced by my presence. In fact, it could be exactly my engagement that could gain me access to the children's experiences.

Participatory methods provide possibilities to follow up the process of meaning making as it unfolds and to generate knowledge rather than "extract it" (Veale, 2005). Mutual engagement is derived from situations when members are taking part in the negotiation of meaning (Stelter, 2008a), and the fact that the researcher is engaged makes it possible to experience the process from the inside.

> Participatory research methods may contribute to the generation of democratic knowledge that includes both adults' and young children's perspectives (Clark, 2010, p. 115)

and also provide access to alternative forms of knowledge - a form of "slow knowledge" which could not be retrieved through questionnaires, and which possibly contribute to more surprising results (Clark, 2010).

The methods chosen here drew on phenomenological inquiry, with focus on the first person's life experiences. Such enquiry builds upon the fact that everyone has once been a child and the experience of childhood is therefore an integrated part of each of us. The purpose of this study is similar to that of phenomenological study of children, where one aims to strengthen one's own sense of what it means to be a child in certain contexts (Danaher and Briod, 2005). However, one has to accept that own competences can stand in contrast to the children's (Herskind, 2008) and that children's experiences can be quite different from one's own, concerning the cultural, historical, geographical and other differences that shape everyone's experiences.

2.1.3 ART-ography – a Way of Organizing my Roles

There are many possible ways to perform research *on* young children as if they were objects. However, carrying out research including children themselves as competent subjects requires a different approach.

The body of research on children's experiences is growing, but is still not large (S. Greene and Hogan, 2005). There are therefore not so many examples of studies that are comparable to this study of children's arts-based experiences. Consequently, it was more relevant to create a combination of methods that could serve the purpose than to try to find an existing method appropriate for the study Negotiating Grasp. The book "Researching Children's Experiences: Methods and Approaches" suggests some relevant for research on children's experiences, and presents "creative methods" as method type that explicitly makes space for children's imagination (S. Greene and Hogan, 2005). However creative methods, as the name implies, have no guidelines, but open up for researcher's individual solutions (Veale, 2005).

As explained, I had already chosen to interact with the children during the data gathering process and to combine my roles as teacher and researcher in an interactionist manner. Interactionist approach is based on the attitude that the researcher seeks to understand a certain phenomenon on the basis of her/his own experience (Järvinen and Mik-Meyer, 2005). Such part taking is challenging, since it demands the researcher's full attention during the whole process of data gathering. The researcher's experiences from the contexts s/he is studying need to be considered as they are being lived, i.e. trying to grasp human meaning holistically through the researcher's lived experience (Van Manen, 1997). The interactionist approach is not unusual in educational research, however there are not many examples of the application of this method in early childhood education contexts.

Contrary to interactionist approach, ethnographic research methods are frequently used in research with young children (see for example Gjems, 2007, 2009). In ethnographic research, video observations are often used, for example in order to capture the complexity in young children's learning, as done by Björklund (2010). I also chose to use a video camera in order to capture children's multimodal expressions, however my methods cannot be called ethnographic since interactionist approach does not seem to be compatible with ethnography.

In some forms of participant observations *listening* is considered a method of interaction and a way of acknowledging and recognizing children's perspectives (Clark, 2005). Listening as method of interaction was relevant for the study Negotiating Grasp. I planned to engage in the activities as a responsible adult, and not pretend that I was a child, as Warming (2005) did in her form of participant observation, where she aimed to learn about children from perspective 'as a child'.

The types of approach, found relevant for the study of children's interplay with 3D-materials, though not common in research with young children, are: sensory ethnography (Pink, 2009), hermeneutic phenomenology (Van Manen, 1997) and educational connoisseurship in art education (Eisner, 1991). Sensory ethnography is a quite new approach and consequently unexplored, while the two last mentioned approaches, are closely related to qualitative arts-based methodology, which was finally chosen for the study presented here.

Eisner uses the concept "connoisseur" which refers to someone, who has experience from the field s/he is studying, for example an artist, who researches on art teaching. Connoisseurship is the ability to differentiate between the qualities, complexities and nuances of aspects one has a special interest for (Eisner, 1991). It is about one's "ability to make fine-grained discriminations among complex and subtle qualities" (Eisner, 1991, p. 63).

A/R/T-ography is a research inquiry, closely related to Eisner's approach to educational research. It is a type of practitioner inquiry where the roles of Artist, Researcher and Teacher merge (Irwin et al., 2006; Irwin and De Cosson, 2004), and where artist-researcher-teachers "integrate these roles in their personal and professional lives" (Irwin, 2004). As visual art teacher and dress designer I found the A/R/T-ographic approach highly relevant for the study, because it allowed the integration of my professions and interests into the research process. In addition to my own competence with arts-based activities, the study was focusing on children's process of visual art practice. It can therefore be said that practice of art-making had two anchorage points in the study. Using an approach that acknowledges integration of knowing, doing and making (Irwin and De Cosson, 2004) was therefore found highly relevant for the study.

> A/R/T-ographers don't simply research phenomena in the arts using qualitative means; they are artists-and-teachers-and-researchers, who examine educational phenomena through an artistic understanding and inquiry process (Springgay, Irwin, and Kind, 2008, p. 87).

They take seriously the inter-subjective nature of meaning construction (Springgay, et al., 2008), where meaning "circulates, moving in all directions simultaneously" (Springgay, et al., 2008, p. 86). The quotations presented here triggered my curiosity and I hoped to be able to live up to the tasks of an A/R/T-ographer. However, I did not know of any other study where A/R/T-ography was applied in early childhood education. Choosing such an approach was therefore an exploratory act - I was taking some chances.

Daniel Barney (2009) conducted an A/R/T-ographic study where he, as a dress designer and teacher, interacted with primary school students. He was using his roles as teacher, artist and researcher to study the student's design work. In the study Negotiating Grasp, the artist role is less dominant[27] and the 'A' rather stands for appreciation of arts (and visual art teaching[28]) than 'artist'. The 'T' refers to the role of ECEC teacher.

Though A/R/T-ography is about merging roles which are different, to make my methodical choices visible for the reader, I will in the following section try to distinguish between them.

2.1.4 Organization of Interactions with the Children

The data was gathered (or constructed) over a period of 15 weeks, from September to December 2009. The ECEC center was visited 1-3 times a week to conduct observations, have meetings with ECEC teachers and to carry out visual art activities with the children.

When I met the children, from their point of view[29] I was probably simply regarded as an adult. From my point of view, I carried with me the three roles[30] and had them available when they were needed, though such merging of roles was sometimes confusing. A kind of system was needed in order to organize the roles in the research design, as is usually necessary in practitioner research (Cochran-Smith and Donnell, 2006). Cochran-Smith and Donnell (2006) suggest systematisation and intentionality in practitioner research: systematisation is about "ordered ways of gathering and recording information, documenting experiences" and making records, while "intentionality refers to planned and deliberate rather than spontaneous nature of practitioner inquiry" (Cochran-Smith and Donnell, 2006, p. 510). I found this suggestion helpful. This is how the three roles were systematised in the process of data gathering and analysing:

- In the role of researcher, I observed the children in free play and organized activities with their teachers. In these "non-participant" observations[31] I was looking for information about, who played with whom, what they played with, what were the themes of their play, how much space they used, what they were curious about etc. These

[27] Even though I can refer to my practice as dress designer, I do not call myself an artist, particularly not in this study, where materials other than textiles were also used.
[28] Since 1998, I've been teaching visual arts in early childhood teacher education programs at Vestfold University College
[29] At least for the youngest.
[30] Visual art teacher, researcher and early childhood teacher.
[31] I call them 'non-participant' in order to distinguish them from the visual art activities, where I was participating actively; still I interacted with the children in some of the non-participant observations.

observations gave me ideas about suitable 3D-materials for the planning of educational contexts with visual art activities.

- On the basis of my observations, in the role of early childhood teacher and visual art teacher, I planned the educational contexts with 3D-materials.
- In the role of visual art teacher, I supplied materials of suitable qualities, considering the children's interests, age, preferred play forms etc.
- In the role of early childhood teacher and visual art teacher I conducted the planned educational contexts with two children at a time. The activities were filmed by a stationary video camera.
- In the role of researcher, and on the basis of my lived experiences as early childhood teacher and visual art teacher, I analysed the videos from the educational contexts.

Eleven non-participant observations and nine educational contexts were carried out during the data collection period. The nine educational contexts, together with non-participant observations and other information that informed the contexts, are treated as nine separate cases and will be described in chapter 4. It is important to remember that each of the cases informed the next. I was also continuously acquiring new knowledge about children's and my own actions and according to them planning further educational contexts. The process of data gathering (the five points which have just been described), was repeated nine times, but one new non-participant observation did not always lead to a new educational context. This means that some observations inspired more than one educational context[32].

Capturing children's interests through observations of their actions and expressions[33], and applying the observations in the planning of educational context, is a form of providing for children's participation (Fredriksen, 2010). Besides the observations, the communication with the ECEC teachers contributed to better understanding each of the children and made it possible to learn about the children's interests. This knowledge was necessary in order to plan educational contexts that the children could find interesting, meaningful and challenging. It could therefore be said that the educational contexts were "tailored" for each of the children.

[32] This will be described in details in the fourth chapter.
[33] Which can be considered as 'listening'.

2.2 Organizing Empirical Work: Multiple case study

The A/R/T-ography method is related to the organization of roles. Another method used in the study is multiple case method, which is applied to the organization of data. Having introduced the reasoning for why a method for organizing data was needed, sections 2.2, 2.3 and 2.4 present the multiple case method and illustrate how it is applied to the subsequent process of data collecting and analyzing.

2.2.1 Multiple Case Method

Graue and Walsh (1998) claim that to get closer to the children's experiences and understand the meanings of their actions, one needs to go beyond studying their behaviour. The best way to capture evidence of learning is through close studies of interactions (Erickson, 2006). A case study is considered to be a relevant methodological approach for intensive and complete examinations of a single phenomenon or an issue (Denny, 1978).

> A case study is an empirical inquiry that investigates a contemporary phenomenon in depth (…) especially when the boundaries between phenomenon and contexts are not clearly evident (Yin, 2008, loc. 643-48)[34].

In the study Negotiating Grasp the phenomenon investigated is children's interplay with 3D-materials in specific educational contexts. The study aims to understand the complex child-material-teacher relations, for which a case-study approach is most relevant.

> The case study strategy may be used to enlighten those situations in which the intervention being evaluated has no clear, single set of outcomes (Yin, 2008, loc. 687-92).

Yin considers case and multiple case designs to be two variations within the same methodological framework, however, "the evidence from a multiple case is often considered more compelling, and the overall study is therefore more robust" (Yin, 2008, loc. 1321-26) - multiple case studies can provide better understanding of a phenomena than single case studies (Borman, Clarke, Cotner, and Lee, 2006; Yin, 2008).

Case studies can be of more or less quantitative or qualitative character depending on the kinds of answers one seeks to find, and according to the

[34] Some of the books used in this thesis are digital and adjusted to Amazon Kindle reading device. Since Amazon Kindle books do not deal with page numbers, but locations, such locations are referred to instead of page numbers.

theoretical framework[35] developed prior to the data collection (Yin, 2008, loc. 687-92). Stake (2010) presents case study as a mainly qualitative approach to a phenomenon – it is about "studying how things work" in specific contexts. In his view, single case study is a qualitative approach, while multiple case design is both qualitative and quantitative. Nevertheless, there are many possible ways to conduct a multiple case study. The question is why more than one case is chosen: Does one aim to compare differences across cases, or to provide more evidence about the same issue? Does one intend to generalize, or to study each case contextually?

Cross-case analyses, sometimes in combination with participant observations, are used in practice based research, for example in education (Borman, et al., 2006). The study Negotiating Grasp aims to generate a better understanding of one phenomenon. Varity of contexts is expected to provide better possibilities to understand the phenomenon. Here is how and why a variety of cases were selected for the study:

- Drawing on Trageton's (1995) research on children's play with 3D-materials, at the beginning of the study, my assumption was that 3D-materials' contribution to children's play was fundamentally different from that of 2D-materials. However, I did not know which qualities of 3D-materials made them more suitable or desirable for children's play. For this reason, as well as because of my assumption that children had personal preferences, different 3D-materials were used according to Trageton's (1995) material specifications[36].
- From my earlier activities with children I had sometimes experienced moments of children's sudden and surprising expressions while they deeply engaged with 3D-materials. In these moments the children seemed to experience illuminating ideas that they desired to share with others. Before the study, I was not sure how and when such moments of sudden discoveries could take place - this is exactly why the phenomenon was chosen. I feared that the moments of sudden surprises were not so common and I assumed that they were dependent on the quality of children's interactions with teachers. It was therefore decided to collect data from multiple situations with different children in order to provide better chances to collect moments of sudden discovery.
- The quality of the data depended on my teaching skills, successful application of technical equipment (camera angle, light and sound quality etc.), as well as on practical issues at the ECEC center: if the

[35] Theoretical framework for this study will be presented in the third chapter.
[36] See subsection 2.3.4.

children arrived on time, whether the chosen room was occupied, whether the schedule was changed etc. For the PhD-study, my research skills needed to be proven and I could not risk having poor data. Knowing that unexpected conditions could threaten the study, it was decided that the study could be strengthened by a larger number of cases. The most suitable cases/events could later be selected from the range.

- Because all contexts are unique, every educational context would be unique even if conducted with the same children. Instead of risking choosing children who happened to feel uncomfortable with me, I chose to invite different children to the educational contexts. Respecting children's choices, I decided that the activities would be suspended if for some reason a child did not wish to carry them out. Meeting a variety of children therefore provided better chances that at least some of them would want to carry the activities out. However, during the period of data collection, spending time with me became popular among the children, and the choice of children became an ethical challenge; Many wanted to spend time with me, and because I did not want to disappoint them, I ended up conducting as many educational contexts as were practically possible.

The educational contexts were tailored to fit the study. This is not unusual:

> For qualitative fieldwork, we will usually draw a purposeful sample of cases, a sample tailored to our study; this will build on variety and create opportunities for intensive study (Stake, 2006, p. 24).

In a multiple case study there has to be both variety and similarity between cases (Stake, 2006). The relation between similarities and variations is, again, dependent on the nature of phenomenon one wants to study. In studies that aim at a better understanding the main purpose is not to generalize. There is therefore no need to randomize in order to cover geographical or other diversities {Stake, 2006 #153@25). The study presented here did not seek to uncover common forms of visual art education or usual ways of children's play. It was therefore not necessary to study the phenomenon in "natural settings" – which would be undisturbed free play. On the contrary, the accessibility of the specific phenomenon was decisive for being able to study it at all. As Stake says, "for education and social science researchers, multi-case designs usually require cases to be chosen" (Stake, 2006, p. 23). The sample of cases was designed with purpose to study the same phenomenon, with its variations, across the cases. Still, the study is contextual and qualitative.

In multiple case study it is important to examine both the common and the specific characteristics of a phenomenon (Stake, 2006). Stake suggests that, for a single researcher, the number of cases should not be larger than 6-10 so that the sample is "embraceable" for a researcher to comprehend and remember – to be able to remain close to own experiences from each of the cases (Stake, 2006). Researcher's experience from each case is essential to be able to grasp the multiple cases as one whole. "The study of situations reveals experiential knowledge, which is important to understand the quintain" (Stake, 2006, p. 12).

When a researcher points her/his attention to a quintain, issues that run across the cases can be detected (Stake, 2010). One has to take a cross-cutting look at all the cases and pay attention to similarities, differences, repetitions and issues that emerge across them, but also to keep the specific features of each of the cases in mind. There has to be a balance between searching across the cases, and taking a close look into specific features of one case (Stake, 2006). How such balance is practiced in this study will be described in section 2.4.2.

2.2.2 Contextuality of Educational Contexts

Walsh and Graue (1998) suggest that an empirical study of young children that seeks to understand the meaning of their activities, always has to be contextual. The term 'context' addresses physical, historical, cultural, social and other features of a situation in space and time. In order to delimit the extent and complexity, this study does not stretch across different layers of contexts, but focuses on the narrow contexts delimited in place and time: the specific educational contexts of visual art activities with 3D-materials and two children. Such contexts are relatively narrow, but dependent on the larger contexts. Still, however narrow one educational context appears to be, it consists of living entities, immediate interpretations and choices of action, and is therefore complex (Graue and Walsh, 1998). The educational contexts were influenced by 3D-materials and social interaction, but also by participants' attitudes, wishes, understandings and emotions their actions depended on.

In linguistic terms, context is also a framework for possible forms of communication. Halliday uses the term 'communication context' to explain conditions that guide communication between participants (Halliday and Matthiessen, 2004). According to him, communication is highly dependent on the relations between the participants, the type of activity that is taking place, and the role that the language/communication has during their interaction (Halliday and Matthiessen, 2004; Maagerø, 2005). In other words, the forms of communication and interactions that can possibly take place between participants, is dependent on their expectations of each other, how

well they know each other, what they are doing, why they are together, which agendas they have, and so on.

In qualitative research, instead of reduction of reality, one works towards complexity and expansion of possible meanings and ways of understanding (Stake, 2010). Nevertheless, a structure for comprehending the complexity is needed (Cochran-Smith and Donnell, 2006). In addition to a structured organization of my researcher role, I decided to organize my data according to the nine educational contexts conducted with children.

The following conditions constituted the structural framework for each of the educational contexts that were conducted, filmed and analysed:

- Two children at time
- Inside a closed room
- Content of activity tailored to fit the children
- Starting around 10.00 and continue as long as the children want, but not longer than to lunchtime (12.00)

The presented framework is adjusted to the following criteria: The ECEC center's day-structure: conducting organized activities only before lunch; The nature of children's play in the ECEC center: high sound level demanded that the activities were conducted in closed rooms; The children's needs and my ability to pay close attention to them - this was why only two children were involved in each context.

Such a structural framework may appear to resemble an experiment, rather than a real-life world situations (Yin, 2008). However, as earlier mentioned, the study did not aim to find out how things were in the real-life situations, but how they might work in optimal situations. For the purpose of finding out how things work when children have possibilities to explore 3D-materials, specific educational contexts were constructed to fit the study. Each of the educational contexts will be presented in the fourth chapter.

2.3 Ethical Considerations in Practice

The large number of ethical challenges presented in the first chapter[37] has, more or less directly, influenced my choices during the empirical study and the whole research process. The following sections present some practical choices, relating them to current questions of ethics of teaching and of research.

[37] In section 1.6.

The specific historical, geographical and cultural context of research in early childhood education in Norway at the present moment, has largely influenced my understanding of the researcher role. The methods were chosen with the purpose of approaching young children's experiences and learning about their processes of meaning making. At the same time, using educational practice as the site for research, and the fact that I myself interacted with the children, obliged me to consider both the ethics of the research and of teaching. I felt responsible to integrate requirements of the Kindergarten Act and of the Framework Plan into my approach.

Methodological positions influence ethical considerations throughout the whole research process (Ryen, 2001). In qualitative research, where one approaches complex and unpredictable reality, no clear ethical guidelines are possible (Ryen, 2001). According to Bresler (1996) ethical considerations are especially important in qualitative research because of the following aspects of qualitative research:

- Complexity of the field
- Contextuality
- Constructed social reality
- Subjectivity
- Interpretation of meaning

Research ethics in qualitative research concern dignity, privacy, confidentiality and avoidance of harm (Bresler, 1996). All of these dimensions are especially challenging in research with young children (Graue and Walsh, 1998), amongst other things because of the specific combination of their vulnerabilities and competences. In the study presented here, the ethical challenge is additionally large owing to the merging of A/R/T-ographer roles. Also the ethics of teaching and of research interact and sometimes confront one another. For instance, my interests concerning data collection could hinder children's possibilities to learn. Different forms of ethics could also be conflicting, for example promoting children's competences could even lead to harming of their dignity or privacy.

In participatory research one gets close to children and engaged in their lives. Such engagement is loaded with all kinds of emotions and cannot in fact be avoided if a researcher intends to be honest and trusted by the children. Wanting to understand children's experiences, I tried to empathetically connect with the phenomenon I was studying. Such an approach "assumes the researcher's ability to experience those cultural interactions as a child world" (M. Freeman and Mathison, 2009, loc. 670-73). However, it is not possible to experience the child's world as a child (Østrem, 2008). At the

same time, on the basis of our own diverse human experiences, we are able to imagine how others might feel, and we are able to empathetically connect with them in order to understand their views (Bresler, 2006b). In arts-based research, the researcher's empathy is essential in understanding the researched phenomenon (Bresler, 2006a).

All participants in a research process are unique people – it is exactly their differences that can challenge each other's views and achieve an overlapping between their areas of knowledge and expertise (Bresler, 1996). Positioning myself as co-learner I tried to listen to the children and take their voices seriously, both during the preparation of educational contexts and interactions with them. The following sections[38] describe how the children influenced some of the practical choices in the study, and which ethical and other considerations had to be taken into account in order to allow children's contribution to the research process.

Chapters five, six and seven will present ethical choices concerning interactions with the children during the data gathering.

2.3.1 Getting Consent

In research with young children the question of consent is more complex than in research with adults. One assumes that adults understand what their consent means and that they can take responsibility for their choices (Ryen, 2001), but asking young children for consent is different: we cannot be sure that they understand the consequences of their choices (M. Freeman and Mathison, 2009). As a responsible adult, a researcher sometimes has to protect the children from their own choices, if these choices can come to hurt them (Backe-Hansen, 2001).

In ECEC research in Norway, formal procedures for getting consent from children's parents exist. The procedures themselves also have to be approved by the Norwegian Social Science Data Services (NSD). In the beginning of my contact with the ECEC center, the study Sculpturing Words was presented at a meeting for parents and personnel. Three letters were sent to the parents asking them to approve their children's participation in the study[39]. The first letter was written when the contact with ECEC was established (fall 2007) at the beginning of the umbrella-project "Children's learning about language and through language". This was before the PhD-study Negotiating Grasp had started, and at that point I did not know that video observations would be a part of the study. The second letter was

[38] From 2.3.1 to 2.3.5.
[39] The letters can be found in the appendix.

written at the beginning of the PhD-study to ask the parents approval for the use of video observations. The third letter was written to additionally ask the parents if the video material could be shown to my colleagues involved in the umbrella-project during the analysis process. All of the letters were approved by the NSD and the parents gave their consent.

An additional contact was established with one family, in order to get approval to use one boy's first name, since this was desirable for better analysis of one educational context[40]. However, the boy's privacy is well protected since both the name of the ECEC center and its geographic attachment are anonymous, and the boy's name is common across Scandinavia.

Winning children's and parents' trust was an important part of gaining access to the children's experiences. When the parents experienced that I honestly wanted to learn from their children, and not in any way misuse the information I got from them, they seemed more proud than afraid that I would cause any harm to their children. Being trusted is positive, but it is also a big responsibility, demanding honesty and consistency in treating the data.

The children were not asked for consent at the beginning of the study, but asked one by one before each educational context. By that time they were already familiar with me, and the plans for educational contexts were made, so that children could be properly informed when they were asked to participate.

2.3.2 Choice of Children

The ECEC center had four units. In cooperation with the center's personnel, two of the units were chosen for the study. At the beginning of our contact, during the study Sculpturing Words, children's verbal language was assumed to have larger importance than children's other languages. I therefore assumed that 4 and 5 year old children would be more relevant for the study. It was the ECEC center's personnel who suggested that I should include 3 year old children in the research. That year they had one unit that consisted of only 3 year old children, which was not usual and therefore a unique possibility, they said. I am thankful for this suggestion because I later understood how much I could learn from exactly 3 year old children. The other chosen unit consisted of 4 and 5 year old children.

The children and I had a year and a half to get familiar with each other before the process of data collecting. Denny (1978, p. 8) suggests that informants

[40] See case study1 in the fourth chapter, and the vignettes in chapter 6.

should have a chance to test the researcher – a researcher should make her/himself "sufficiently accessible for testing by the field". Spending time around the children and occasionally interacting with them, made both parties more confident with each other. When I later started to conduct observations, the children did not seem to treat me like an intruder, but rather as someone they could trust and ask for help. This seemed consistent with Clark's (2005) claim that young children often like adults who help them and play with them.

The information that was collected for the purpose of pedagogical planning of educational contexts has been treated contextually. This means that what was observed in relation to one child informed me what this child might prefer, however some observations relating to a specific child could also reveal more general preferences of materials and forms of play. Observing the children, I imagined possible 3D-activities that specific children could find interesting and meaningful. Since friendship is important for young children (Greve, 2007, 2009), I also looked for indications about who liked to play with whom in order to suggest which children might want to participate together in the same educational contexts. The ECEC teachers, with their in-depth knowledge about the children, also contributed to making the choices of research participants.

The curriculum for each of the educational contexts was organized with intention of matching the children's interests and encouraging their "knowledge-building activities in ways that are natural extensions of the knowledge they already possess" (Swann, 2008, p. 47). Though, it was sometimes not possible to conduct the activities as planned, for example if a child was sick, another child stepped in. Hopefully, with some improvisation, the planned activities were also interesting for the substitute child for whom the activities were not directly planned.

The children were asked if they wanted to join the activities and they were free to change their mind whenever they wanted. Owing to the power difference that exists between teachers and children, the way the children were asked if they wanted to participate needed to be considered ethically. It is difficult to know if a child is honest when s/he says "Yes" to participating, or if s/he just wants to please the adult. Once, a girl did not want to join me, but later changed her mind. By the time she had changed her mind, I had already conducted the activity planned for the day. Still, I decided to conduct

an additional activity alone with her[41], since I wanted to show her that her choices were respected and that it was all right to change one's mind.

Larger number of boys than girls took part in the study (12 boys and 8+1[42] girls). The intension was to involve approximately as many boys and girls, but this was not so easy to accomplish. The number of children present in the ECEC center changed from day to day, the children were busy with different activities, were absent, did not like playing with another child, and so on. In short, there were so many parts of the puzzle to be fitted together that it became impossible to control the number of boys and girls at the same time as considering the methodological, practical and ethical conditions in the choices of participant. The issue of gender was not specifically important for the study and was therefore not given high priority when compromises about participant selection had to be taken.

Though the issue of gender might be interesting to mention in relation to some of the findings, I did not find it relevant to compare the girls and boys, and have no intention to look for causalities between their gender and their actions. Each child was considered as unique, and gender was regarded as part of their personality.

2.3.3 Choosing Materials and Tools

The common properties of 3D-materials are that they are graspable, have consistency, mass, weight, texture, temperature and so on. Their properties allow them to be lifted, moved, manipulated, reshaped, and in some way enable interaction with them. Given the choice, children often prefer to engage with 3D-materials, rather than engaging with 2D-expressions[43] (Heath and Wolf, 2005). However, according to a Swedish study, despite the knowledge that 3D-materials invite experiential activities, they are seldom available to children in early childhood education (Nordin-Hultman, 2004).

For the visual art activities in this study, 3D-materials with specific qualities were chosen in hope of awakening the children's curiosity and inviting them to participate in activities and meaning making. My assumption was that materials' affordances and constraints could influence children's learning processes, and the aim of the study was to try to understand how this works. For this purpose, different materials were chosen according to Trageton's (1995) specifications: shapeable materials (clay, two different types of sand), flexible construction materials (branches, textiles, yarn, wool), solid

[41] In the table that shows the summary of cases, this girl is the extra girl (in brackets) in the second case.
[42] The additional girl mentioned above.
[43] Drawing, painting etc.

construction materials (planks, glass balls), and building blocks (cardboard boxes). Shapeable materials are those which easily can be formed, divided into smaller pieces and put back together without tools. In contrast to shapeable materials, flexible and hard materials for construction have clearly defined units that can be assembled.

Flexible and hard construction materials usually demand tools and additional materials for assembling (such as nails, glue, rope, etc.). Children are often interested in using tools, and giving them possibility to use tools can provide them with meaningful experiences. However, using tools can be dangerous and it is the teacher's/researcher's responsibility to keep the children safe. A teacher/researcher therefore needs to consider a child's motoric skills and safety. If a teacher overestimates children's motoric skills, this could lead to an inappropriate choice of tools, which can be dangerous for the children. The choice of materials and tools is therefore a pedagogical challenge, as well as an ethical challenge. Both as teacher and researcher I had obligations to protect the children and had to choose tools with care.

Trageton (1995) presents building blocks as a particular group of 3D-materials that in specific ways differ from hard construction materials. Blocks can be made of different materials, but what they all have in common is their rectangular shape which allows one to build with them without assembling and without tools.

Figure 3 summarizes the types of materials that were chosen in the study, the gender and age of the children. The activities presented in the table were partly planned, and partly initiated by the children during the educational contexts. The far-right column states the activities that actually took place in the educational contexts/cases.

	Children's age: years, months, days	Materials	Activities that took place
Case 1: Woodwork	Boy, Emil 3,4,25 Boy, Morten 3,9,3	Branches, planks, string, tape	Sawing, whittling, taping, binding, tying
Case 2: Pink textiles	Girl, Eva 3,4,17; Girl, Marit 3,4,19; (Girl, Karin	App. 35 different types of textiles, in shades of pink	Tearing, cutting, dressing-up, making crowns

	3,6,4)		
Case 3: Clay play	Boy, Helge 3,1,3; Boy, Tom 3,0,18	12 kg of soft clay	Making prints, storytelling, stamping, rolling out
Case 4: Clay and yarn	Boy, Brede 4,5,8 Girl, Pia 5,5,23	Two similar installations, one made of clay, the other made of cotton yarn in the same color, shape and texture	Playing with textures, shaping the clay with hands, feet, natural materials and tools
Case 5: White yarn	Boy, Even 4,11,2 Boy, Markus 5,6,22	11 yarn balls of the same size, different textures, softness, small, yarn thickness etc.	Knitting with a circular knitting machine
Case 6: Cardboard boxes	Boy, Thomas 5,5,8 Boy, William 5,4,9	78 cardboard boxes of different sizes and shapes	Building houses for animals from a song/book
Case 7: White sand	Girl, Line 3,10,3 Boy, Are 3,10,12	White clay-like sand and usual sandpit-sand	Making prints and shapes with hands and toys
Case 8: Building with Wood	Boy, Alexander 5,5,11 Boy, Terje 5,2,16	Large number of plank pieces in geometric shapes	Hammering, taping, making boats
Case 9: Blue wool	Girl, Stine 4,6,11 Girl, Pia 5,6,27	Brushed wool in 7 shades of blue	Felting

Figure 3: Summary of the cases

From my earlier experience, I knew that the quantity of materials could be significant for the activities which could take place. Having available many pieces of the same material, for example cardboard boxes, or a large amount of the material could have essential importance for motivating children to explore and play.

However, using materials just to explore their qualities, and not to make anything "useful", is often considered as wasteful. The economic situation of ECEC centers is seldom so good that children are allowed to use as much materials as they wish. Additionally, use of large amounts of materials can cause problems with transport and storage. Since my choices of materials had an educational dimension, the choice of materials was also an ethical challenge. What if the children learned that it was all right to waste? On the other side, exposing them to recycled materials, like the plank pieces and the

cardboard boxes, could indirectly teach the children to take care of their environment.

When choosing the materials, apart from considering children's interests, motoric skills and tools, the physical space for the activities with the materials also had to be considered. Some of the materials were better fitted to use outside because using them was noisy or in other ways "polluting" the ECEC center's environment for the rest of the children. The room size also had to be appropriate according to the size and amount of the materials.

Knowing, from my earlier experiences, that the way materials are introduced is significant for how the activities could unfold, the introduction of the 3D-materials was planned according to each of the educational contexts. Some materials and tools were visible at the time the children entered the room, others were hidden but available for me to introduce when the time was right.

2.3.4 Space and Video Filming

In September 2009, an educational context was conducted in the ECEC center's playground[44]. The intention was to interact with the children attentively, without having a camera between us. Thus someone else filmed my interaction with the children. However, this proved to be difficult, since the resulting video was not of a sufficient quality to analyze and use in the study[45]. It was therefore decided to use a stationary camera in smaller spaces in the data gathering process that followed.

Placing a camera in one position and letting it film continuously is less disturbing and results in relatively comprehensive records of social interactions (Erickson, 2006). If the camera is fixed in one place and angle, one has however to make sure that all participants are inside the camera range. Therefore, to ensure that participants are visible on the film demands further decisions about where, when and how to conduct the activities and filming. To limit the children's movement range, secure the sound quality and prevent the camera from attracting (or being damaged by) other children, a decision was taken to conduct the following nine educational contexts indoors.

[44] This educational context conducted outside, has been called nr. Zero. Because of the bad data quality it has not be used in this study, and is not presented in Figure 3.

[45] Firstly, the children's sounds were difficult to record outside. Secondly, the children moved around a lot, so their expressions and activities could not easily be captured by the video camera. And thirdly, when the camera-man also moved around in order to capture the children's activities, the children got very distracted.

The size of the room was decisive for the range of shooting. Children usually like using a lot of space, but using the largest room in the ECEC center for the activities with only two children was an ethical challenge[46], and also had practical consequences because children's moving around made it difficult to capture them during the filming. However, the range of children's physical movements could be limited by the size of a room, the size of materials and the furniture used. I did not wish to limit the children's possibilities to move around, but had to make some compromises in order to capture their activities on video. In most of the cases, chairs were placed around a table and the children assumed that they should sit on them when they entered to the room. They were shown where the camera was placed and, if they wanted, they had the possibility to explore the camera before the activities[47]. Principally, children should have the option to accept, or reject being filmed and to know how the video material will be used, but the simple explanation that I needed to watch the videos later in order to learn from them were more understandable than complicated justifications (C. Björklund, 2010).

Gathering data inside closed rooms was necessary for the quality of the data. As explained here, my approach was guided by the need to limit the complexity and collect good quality video material, but still remain conscious that the children, I and the physical environment influenced our communication.

2.3.5 My Responsibilities as Teacher and Researcher

Young children need adult's continuous attention and intensive listening (Clark, 2005). However, because of the "the selective nature of our attention" (Thompson, 2009b, p. 33), it is difficult to listen to more than one child at the same time[48]. Recording and watching one's own interactions with children, can help to reflect on one's own attention and to improve the next occasion, but this does not help to re-do what has already been done. What matters for the children is what happens during the interaction. The quality of interaction is dependent on the researcher's/teacher's attention in a here-and-now-situation and immediate interpretations in order to make on-going choices of action. The nature of inter-subjective relations, "require(s) of the researcher that he or she stands in the fullness of life, in the midst of the world of living relations and shared situations"(Van Manen, 1997, p. 32). Continual and simultaneous interpretations of children's actions need to be undertaken in

[46] When two children and I needed the large room, all the other children from the group (16 children), had to find other places to stay. This demanded much organization from the ECEC teachers and was difficult to coordinate. Freeman and Mathison (2009) also report that negotiating spaces and time for research in ECEC can be difficult.
[47] Some of the children also communicated about, and with the camera, during the activities.
[48] I could clearly see this when I watched my own interactions with the children.

order to save them from being hurt and to acknowledge their ideas. Van Manen (1997) suggests that in pedagogical interaction, one needs to investigate one's own experiences as one lives them, in order to undertake suitable actions.

Being a teacher and researcher with young children is demanding especially when they are less capable of articulating their feelings, needs and interests. Teacher's/researcher's interactive skills are required in order to grasp the particular meanings behind each child's expressions and actions that can tell about their unique experiences (Katz and Goffin, 1990).

In order to be as attentive as possible to the children, I chose to conduct visual art activities with few children each time. Still I did not choose only one child, because I assumed that that could be uncomfortable for the child. If there were two children and I was one, I thought this might minimize my power.

Though the children did not directly[49] influence the choice of 3D-materials, they were free to influence the activities. By choosing the materials with certain qualities I set agendas for what could be learned (Eisner, 2002), but during the educational contexts the curricula remained open. I also tried to be open-minded and let the children contribute with their imaginative suggestions - since open-mindedness is the key of democratic thinking and action (Bruner, 1990).

There is an intimate relationship between knowledge and power (Clark, 2010). In interactionist forms of research (like A/R/T-ography) one strives to reveal power differences between the participants, especially when one sees children as co-researchers and oneself as a co-learner. Such cooperation with children in knowledge building, can give the children status and empower their competences (Clark, 2010). The term "co-researcher" itself indicates sharing of power (Clark, 2010).

In order to allow children to take active part in the process of collective production of knowledge, the researcher needs to be genuinely interested to learn from children (Clark, 2010). Clark and Moss (2005) have earlier referred to this researcher role as being an "authentic novice". Clark (2010, p. 120) explains the role of an authentic novice as a position where a researcher acknowledges that s/he does not know everything. However, such role is possibly easier for a person who is new for the setting than for a ECEC

[49] However, they influenced it indirectly, through my observations of their interests.

teacher who knows the children, and whom children know (Clark and Moss, 2005).

It is the decision-maker, who sets agendas (Clark, 2005). When a teacher asks children about their wishes there is always a certain power difference between the teacher and the children because of the age difference, size and strength of the body, amount of experiences, competence to express verbally, and so on. Allowing children to set agendas in local contexts of their ECEC center's is a natural extension of viewing them as competent. This gives them the possibility to experience that they have power to participate in decision-making about issues that affect their lives (Clark, 2005). However, allowing children's participation is usually complicated and difficult to achieve (Pascal and Bertram, 2003)[50]. This is understandable if we consider that children's participation is, in a way, a force that works against the established power difference.

A teacher has to suppress her/his position of power to be able to bring out children's competence and enable their contributions. However, much of a teacher's power is invisible and hidden in adults' assumptions and predetermined expectations of who children are, and how they should be treated. These assumptions are part of our attitudes and they direct our reasoning about children. Reducing the power imbalance requires a researcher (and a teacher) to reconsider hidden values and advocacies s/he acts upon. Respectful interacting with young children is therefore challenging at many levels, both professionally and personally.

2.4 Treating the Data

2.4.1 Editing of Videos

During the period of data collection, notes from non-participant observations, from meetings with teachers, conversations with children, photos, objects and videos were collected. Based on this information[51] nine accounts were written; one of each case. Each case presentation, as shown in the fourth chapter, includes:

- The inspiration for planning the educational context
- The practical preparations
- The presentation of the educational context

[50] Pascal and Bertram (2003) measured teacher's level of allowing children's participation ("autonomy") in the UK to conclude how complicated this is.
[51] Excluding the detail of the videos.

- What emerged most significantly[52]

The case-descriptions gather and summarize written data related to each educational context, but do not include transcriptions of the videos. The videos included an extensive amount of data that needed more advanced treatment. Each video recording was transferred to the computer immediately after the educational context had taken place. In order to make the video-data manageable, the films were cut into approximately 5-6 minutes sections[53], before they were placed in NVivo[54], a software program for qualitative data analysis. Video-editing software Pinnacle Studio Plus was used for the editing. Each film-piece was saved with a name and number, and placed inside the same case-study file so that the contextuality of each educational context/case could be preserved. The software NVivo provided structure for arranging information, easy transcription, examination of relationships, coding etc. NVivo is a helpful analysing tool with many possibilities, however it is a researcher's task to make needed structures, organize the data as best suitable for the study, create nodes, code and analyse.

2.4.2 The Analyzing Process

Perception is central in our knowledge about the world (Eisner, 1991). Nevertheless, the more we know about what we are studying, the better we can perceive and understand the hidden qualities of the studied phenomenon. Those who teach specific disciplines "use their specialized knowledge of pedagogy to identify on the video record certain phenomena of research interest" (Erickson, 2006, p. 180). A teacher's or researcher's personal experiences, qualifications and interests have essential importance for her/his possibility to understand. Each researcher has to develop her/his own analyzing strategies for video recordings (Erickson, 2006).

Writing about aesthetically based research, Bresler (2006a) compares artistic experience and qualitative research. In both cases an observer needs to connect with the studied object/phenomenon in order to understand it. Deeper meanings of an art object, or a social phenomenon, are hidden for an impatient eye. To be able to understand better, one should seek to establish meaningful connections, not just with the eyes, but with all the senses. Bresler (2006a) suggests that empathic understanding is at the core of both qualitative research and aesthetics, further proposing that a process of

[52] This forth part reflects my feelings and experiences immediately after each activity was carried out.
[53] See details about film cuts in the appendix.
[54] I started using NVivo8, and later upgraded to NVivo9. Therefore, when I refer to NVivo, it includes both versions of the software. Information about NVivo8 and NVivo9 can be found on: http://www.qsrinternational.com/products_nvivo.aspx

connecting to an art object is applicable to the process of arts-based research. She refers specifically to John Armstrong's (2000) five aspects of *perceptual contemplation* of art objects: 1) Noticing details, 2) Seeking relations between parts, 3) Seizing the whole as a whole, 4) Lingering caress and 5) Mutual absorption.

In this study, the five aspects of perceptual contemplation are used as supportive structure during the analyzing process. The aspects will be described here, and it will later be explained how they were applied to the analyzing process. Chapters 4, 5 and 6 will present the analyzing process more thoroughly.

The five aspects of perceptual contemplation are not parts of a linear process, but rather of an interactive and circular process (Bresler, 2006a). In relation to a research process, the aspects can be described in the following way:

- 'Noticing details' is about rapid looking, scanning over the studied events, cases or happenings. This is a conscious effort (Bresler, 2006a) where a researcher "with specific interest on her/his mind, sweeps widely across happenings, variables and contexts, and lets her/his mind and eye scan" (Stake, 2006, p. 28)[55].
- 'Seeing relations between parts' is about how the elements refer to each other. This aspect involves identifying significant elements, themes and issues, noting relations and patterns (Bresler, 2006a).
- 'Seizing the whole as a whole' involves identifying interplay between the details and whole during the process of description and interpretation. It is about the tightening and widening of one's focus (Bresler, 2006a) – tightening the focus from the whole to specific events (micro-contexts), and enlarging the focus from a specific micro-context to the contexts of the study.
- 'Lingering caress' is achieved through prolonged engagement that mobilizes new ways of seeing and invites discoveries. Through such prolonged engagement, one enters "dialogic space for creation of meanings" where "ideas and issues are processed and become internalized" (Bresler, 2006a, p. 59). "This dialogic, affective /cognitive connection encourages us to go beyond our pre-conceptions and ready-made categories, expanding conventional responses" (Bresler, 2006a, p. 60).
- The final aspect of 'mutual absorption' refers to a condition of "melting" and "merging" between the observer and the observed; between the researcher and what has been researched; where "I" is

[55] Stake does not write about 'perceptual contemplation' or 'noticing details', but I find his words about cross-case analysis relevant in this setting.

> changed by "Thou" as Martin Buber suggests (Bresler, 2006a). "This dialogue involves a change of self where the shaping of meaning involves a 're-seeing', implies in turn being reshaped by the encounter" (Bresler, 2006a, p. 61).

The purpose of describing the aspects of perceptual contemplation is to help the reader to better understand the process of analysis in the study Negotiating Grasp. The application on the five aspects to this thesis will soon be presented; however, the five aspects have not been applied as completely separate phases, but rather interchanging. A significant distinction in this study is made between the first phase of analysis, which included analysis across the cases[56], and the second phase, which involved more contextual analysis of selected events[57].

The first phase of the analysis process started during the data collection and ended with defining significant issues across the cases. In this phase, the first three aspects of perceptual contemplation were applied. A cross analysis of the cases was performed in order to identify similarities and differences between them. Details were recorded and a scanning across the data was done, in order to identify the most significant and emerging issues.

The video clips were viewed many times, the relevant parts transcribed, and the data coded across the cases[58] according to the research question: How do children make meaning about, because of, and through 3D-materials? Further analysis included looking for the quintain – scanning for significant activities, expressions, interactions, and facial expressions, that could help in approaching the question: Which kinds of interplay take place between 3D-materials and children during their experiential play in educational contexts?

Through the tightening and widening of focus, I was sizing the whole as a whole (aspect 3) searching to identify the most significant themes and issues. Four issues identified across the cases included: 1) the high level of children's embodied experiencing activity, 2) the material's affordances as related to children's metaphoric expressions, 3) the material's resistance as motivation for problem solving, and 4) the high level of inter-subjectivity. These four issues detected across the cases will be described in chapter five.

The second phase of the analysis process started after the four issues were identified. I was now looking across the cases in order to identify certain

[56] Presented in the fifth chapter.
[57] Presented in the sixth chapter.
[58] The coding process will be described in detail in the fourth chapter.

events that could best illustrate some of the four findings. The third issue[59] was found the most interesting. I was now looking for the moments of a child's intensive interplay and physical negotiation with a material. I was looking for the moments of total involvement, which according to Experiential Education researchers, are clear indicators that learning is taking place (Laevers, 2003).

When the coding-density function in NVivo showed a high density of coding[60] this indicated that something of extraordinary importance was taking place at that place in the video. A number of interesting events/micro-contexts were identified and five of them are described in form of vignettes[61] in the sixth chapter. Through the identification of the most significant micro-contexts, the volume of the data was substantially reduced and prolonged engagement and mutual absorption could be achieved[62]. The sixth chapter consists of a micro-analysis of five vignettes.

2.4.3 How to Present the Results

A researcher's engagement in the research process and the nature of lived experiences challenges the forms of research presentation. The process of writing is therefore also the process of making meaning (Wolcott, 1990). In interactionist research the empirical material becomes researcher's dialogue partner, which challenges her/his understanding (Alvesson and Kärreman, 2005).

Representing children's voices is a big challenge: Besides protecting the children's autonomy, the researcher is responsible for ethical representation of the children's experiences (Clark, 2005). This concerns both the presentation of each child, and representing the children as a group. Each writer has power to choose what to write, how to write it, and how to use the writing (Bresler, 1996). To protect the children, in case the researcher has misunderstood them, it is important to make visible that any text represents only "a piece of a puzzle, a close-up of one aspect of one segment of a larger world" (Bogdan and Biklen, 2007, p. 209).

When writing about children's experiences, a researcher who tries to take the child's perspective, has to be aware that s/he can never do that completely. The children are totally dependent on researcher honesty, no less because they cannot read and respond to the writing. Usually, in research with adults, one asks the informants to read the text that presents their perspectives and

[59] Concerning materials' resistance.
[60] This meant that different expressions, interactions and activities took place at the same time.
[61] See also section 2.4.3.
[62] Aspects 4 and 5 of perceptual contemplation.

that they approve the way they have been portrayed. With children, and especially with young children, the researcher has to take responsibility for her/his own writing and make even more clear that the text is a piece of a construction – a piece of virtual reality (Bresler, 1996), that presents the researcher's own interpretation of children's experiences, feelings or thoughts.

In arts-based qualitative research a large variety of presentation forms are used: sometimes highly multimodal, visual and poetic like in recent A/R/T-ographic writings[63]. Even though the study presented here makes use of A/R/T-ographic research methods, more traditional forms of representation are generally applied. It is only in the sixth chapter that narrative form of representation is used to reconstruct my own experiences from interactions with the children.

Denny (1978) suggests that story telling is the best form to present case studies from qualitative, educational research, because "a story documents a given milieu in an attempt to communicate the general spirit of things" (Denny, 1978, p. 3). As the oldest forms of knowledge dissemination, stories are tools for organizing our emotions (Egan, 2002).

Narratives are a fundamental part of the process of meaning making (Stelter, 2008a). They are a mode of thinking and a vehicle in the process of education (Bresler, 2006a). In narrative writing, evocative language can present a researcher's lived experiences, contextualized descriptions, help visualize the variety of children's multimodal expressions, and poetic forms of language, at the same time, being able to evoke the readers emphatic understanding (Barone and Eisner, 2006). However, "storytelling is part of the craft of the qualitative researcher" (Stake, 2010, p. 170), and I might not be able to live up to the challenge.

2.4.4 The Question of Validity and Applicability

Reliability, defined as insurance that the data collection can be repeated with the same results (Yin, 2008), is impossible in qualitative research that recognizes the contextual uniqueness and researcher individuality. However, this does not mean that the results should not be trusted. The main value of qualitative findings is not their generalizability, but their meaningfulness (Sullivan, 2004). Even if we cannot apply the findings directly, they can be relevant in similar situations (Sullivan, 2004).

[63] See for example A/R/T-ography thesis at http://m1.cust.educ.ubc.ca:16080/Artography/nphd.php

Notions of the researcher's subjectivity and engagement raise important questions about validity of the results. Indeed, the

> …validity in qualitative research relies on the competence, skill, and rigor of the researcher. In fact, a fundamental precept of qualitative research is that the researcher is the instrument (Borman, et al., 2006, p. 130).

Seeing a researcher as an instrument, requires that others have access to the researcher's specific skills and advocacies in order to understand and accept the researcher's choices. However, it is also important for researchers to try to identify their own assumptions and biases:

> …without unpacking these assumptions and clarifying them, no one (including ourselves!) can really divine what our research has been or what it is now saying (Crotty, 1998, p. 17).

Knowing that there are no neutral relations, but that they always involve some kind of intentionality, phenomenological researchers should never avoid their own intentionalities (Danaher and Briod, 2005). Interpreting children's experiences is always conducted from the position of the interpretor's life-history from personal childhood, which means that s/he always brings own experiences into the interpretation. The interpreter's /researcher's memories, even though changed by time, can therefore rearticulate autobiographical reflections (Danaher and Briod, 2005).

One has to be conscious of one's own influence on what has been researched. Some of the advocacies Stake (2010) presents as the most common in qualitative researchers are: 1) caring about people we work with, 2) caring about the methods we use, 3) wanting to be heard, 4) advocating rationality, 5) being distressed by under privilege, and 6) advocating for a democratic society. My strongest advocacies, as presented in the introduction, are related to my desire to give voice to the experience of young children, and to promote their competence and experiential learning strategies.

In qualitative research, validity is about trustworthiness (Cochran-Smith and Donnell, 2006).

> …achieved through careful work in constructing the research design and approach, conducting the research ethically and honestly, analyzing findings carefully, and providing a presentation of results informed by rich descriptions (Borman, et al., 2006, p. 130).

In order to establish trustworthiness, in addition to presenting one's own advocacies, one also needs to thoroughly present the research design and methodology. This is what I have tried to do in this chapter.

2.5 The Methodology of the Study

Crotty (1998) defines "methodology" as the strategy behind the choices of particular methods. He suggests that the presentation of a study should begin with the problem, then present the method selection, and then present methodology, theoretical perspective and epistemology. This study is informed by arts-based educational research as its methodology, symbolic interactionism as its theoretical perspective, and social constructivism as its epistemological perspective. The following sections of this chapter will deal with methodology, theoretical perspective and epistemology.

2.5.1 Arts-based Methodology

Arts-based research is a form of qualitative research strongly informed by Eisner's (1991) view on qualitative research. Eisner (1991) specifies the main characteristics of qualitative research that apply to arts-based research:

- "Qualitative inquiry places a high premium on the idiosyncratic, on the exploration of the researcher's unique strengths, rather than on standardization and uniformity" (Eisner, 1991, p. 169).
- "Qualitative inquirers confer their own signature on their work" (Eisner, 1991, p. 169).
- "Qualitative inquiry works best if researchers remain aware of the emerging configurations and make appropriate adjustments accordingly" (Eisner, 1991, p. 170).
- "Qualitative inquiry requires a considerable faith that researchers will be sensitive to the significant and able to make right moves in context" (Eisner, 1991, p. 170).

Qualitative approaches can help us to approach and understand situations or phenomena that are complex, enigmatic or confusing (Eisner, 1991). It is through our careful attention to the qualities of a certain situation or a phenomenon that we can come to understand it better. Children's experiences and processes of negotiation of meaning are complex and constantly changing. To be able to understand how the processes unfold, focused attention is needed in order to capture details and nuances of qualities of these processes, and of the social and physical environments they take place in. For this purpose a qualitative arts-based approach has been found to be most suitable for this study.

The article "History of the Arts in Educational Research" (van Halen-Faber and Diamond, 2008) illustrates 14 different research approaches commonly used in art education research: the ethnography of communication, ethno-methodology, field study, participant observation, oral history, phenomenology, case study, connoisseurship/criticism, investigative

journalism, non-participant observation, human ethnology, natural history, ethnology and ethnography. For the purpose of research in early childhood it was difficult to find one method that could cover all the needs and requirements of research with young children[64]. In relation to this list of 14 approaches, A/R/T-ography and the multiple case study method which have been chosen for this study, can be compared to participant observation, phenomenology, ethnography and connoisseurship.

2.5.2 Arts-based Educational Research

Arts-based research is an 'umbrella term' for a number of methods that are derived from constructivist, emotive and empiricist research forms (Finley, 2008). It is

> …a methodological field that draws on our ability to connect with others to achieve emphatic understanding and can illuminate the fluid, embodied nature of lived experience (Bresler, 2006a, p. 21).

Arts based *educational* research (ABER) is a form of arts-based research, but with the two concepts being regarded as synonymous.

Susan Finley (2008) describes the genre of arts-based research through the four following characteristics:

- Arts-based researchers make use of their emotions, bodies, senses, experiences, imagination and intellect as ways of knowing
- they use interpretation to create meaning from experience
- they recognize that form of representation are important in shaping of meaning and
- tend towards blurring boundaries between science and arts.

Firstly, arts-based researchers actively use their senses, emotions and embodied experience to empathetically connect with, and be able to understand the phenomenon they are studying. Such "empathic understanding involves resonance, an embodied state of mind that is cognitive and at the same time, affective and corporeal" (Bresler, 2006a, p. 29).

> Experiencing a situation in a form that allows us to walk in the shoes of another is one way to know one aspect of it. Empathy is a means to understanding, and strong empathic feelings may provide deep insight into what others are experiencing. In that sense the arts in

[64] See dilemmas in relation to ethics, power, responsibility and competence presented in the first chapter and the first part of this chapter.

> research promote a form of understanding that is derived or evoked through empathic experience (Eisner, 2008, p. 6).

In the study presented here, researcher's and children's senses, emotions and embodied experiences are not only used as part of the approach, but are the central features of the study's content.

Secondly, arts-based researchers use their own experiences in their interpretations of the studied phenomenon. They use their subjectivities, but try to make their subjectivities and advocacies visible for others. In arts-based research, subjectivity is not seen as something to be eliminated, "but as an essential element of understanding human activity" (Stake, 2010, p. 29). One is aware that one's interpretations are not intended as general explanations, but as persuasion of one specific meaning as interpreted by the researcher (Stake, 2010). Diversity of interpretations of the same phenomenon, as results of interpretations made by different researchers with their unique subjectivities are desirable because they can provide a depth of understanding (Stake, 2010). I am aware that how I experienced, interpreted and negotiated meanings with the children, depended on my personal engagement, subjectivities and advocacies. I am also sure that other researchers would interpret completely different meanings in similar contexts.

Thirdly, in presenting the results, arts-based researchers aim to achieve connections with their readers in order to engage them in the researcher's own aesthetic experience and to help them re-experience what the researcher has experienced. For this purpose, arts-based inquiry needs to possess "certain aesthetic qualities or design elements that infuse the inquiry process and the research 'text'" (Barone & Eisner, 2006, p. 95). According to Barone and Eisner (2006, p. 102): "a good piece of ABER is designed to enhance meanings, to broaden and deepen ongoing conversations about educational policy and practice". However, to be able to write a good piece of arts-based research demands literary competence to apply metaphors and other forms of linguistic aesthetic agents. Additionally, to be able to write in such poetic ways, one needs to have an audience that appreciates such forms of research presentation.

And finally, arts-based research has been situated between research in arts and social science. If we consider the traditional boundary between arts and science[65], arts-based research is a methodology which crosses boundaries. In this zone of blurring boundaries, arts-based research takes

[65] Dewey (2005 [1934]) wrote: science states meaning, art expresses it.

> … shape in negotiation between public and private worlds, forming liminal spaces in which relationships are made between people and politics, imagination and action, theory and activism (Finley, 2008).

Even though the purpose of approaching young children's experiences in this study was to understand them, more general issues about young children's rights have been addressed. It can therefore be said that this study does blur boundaries between the private and the public, and questions the established power order between scientific and experiential knowledge.

Arts-based research has been described as "revolutionary" (Finley, 2005) based on understanding that recognizing aesthetic ways of knowing in research "is an act of rebellion against the monolithic 'truth' that science is supposed to entail" (Finley, 2008, p. 73). Another revolutionary aspect of this form of research is the researcher's explicit political and moral positioning in order to achieve enhancement of understanding about those that lack political power. Since young children lack political power, this issue can easily be related to my attempts to enhance understanding of young children's experiential forms of meaning negotiation.

ABER is characterized by its capacities: "to reveal what had not been noticed", "to promote new questions", "to focus on educationally salient issues", and to "enable the reader to make connections that had not been made before" (Barone & Eisner, 2006, p. 102). The researcher's imagination opens possibilities to experience and understand what has previously not been accessible (M. Greene, 2007). Finley (2008) suggests that arts-based researchers should integrate themself into the community of participants and learners – this is exactly what has been done in the study Negotiating Grasp. Such integration demands the researcher's active part-taking in the research process (Finley, 2008).

Similarly to how the role of artist-researcher-teacher is described in A/R/T-ography, Sullivan (2004) presents the artist-researcher as a key figure in production of new knowledge that is created in the process of meaning making: Researcher's "intuition, experience and tacit knowledge grounded in context-specific circumstances provide an empirical base for constructing new framework of understanding" (Sullivan, 2004, p. 801). This quotation can describe how I experienced the research process conducted in the role of an A/R/T-ographer.

2.6 Theoretical Perspective – Symbolic Interactionism

Still following Crotty's (1998) advice to make visible the background understanding for the conducted research, I now move to the theoretical perspective that informed the methodology and methods of this study.

According to Crotty (1998) most qualitative research practices are informed by the theoretical perspective called symbolic interactionism, which "at its heart is the notion of being able to put ourselves in the place of others" (Crotty, 1998, p. 8). However, symbolic interactionism has sometimes been addressed as a *perspective* in social psychology (2004) and in empirical social science (Blumer, 1969), and as a *theory* "on the border between micro-sociology and social psychology" Rock (2001, p. 26).

Many dimensions of the study Negotiating Grasp can be directly related to symbolic interactionism, for instance the views on physical and social environments, always changing contexts, continuity of joint action, as well as human's biological nature. I will therefore use some space to present the basic perspectives that inform symbolic interactionism.

Symbolic interactionism was founded by the philosopher George Herbert Mead, and later adopted by Herbert Blumer and enriched by John Dewey, amongst others (Charon and Cahill, 2004). Charon and Cahill (2004) outline five main perspectives in symbolic interactionism:

- Social interactions are dynamic activities where actors constantly influence one another and are simultaneously undergoing change on the basis of these interactions. These activities take place as interactions between people, in relation to their physical environment, but also as interactions within an individual (Crotty, 1998, p. 9). Human relationship to environment is central to life: "We are not simply shaped, conditioned, controlled by that environment (including other humans), but we act toward it according to our ongoing definitions arising from perspectives that are themselves dynamic" (Charon and Cahill, 2004, p. 41).
- Thinking is influenced both by interactions between individuals, and within an individual. Thinking is central to what we do (Charon and Cahill, 2004, p. 29)
- People act according to their definitions and according to meanings the objects they interact with have for them (Blumer, 1969). Such

objects can be organized in three groups[66]: 1) physical objects, 2) "social objects" (one self and other people) and 3) abstract objects (Blumer, 1969).

- How we chose to act is dependent on the present situation. To be able to understand people's reactions, the reactions have to be seen in relation to their contexts. New situations and problems constantly arise because people, environments, experiences, relations etc. are constantly changing. Participants are therefore always challenged to interpret other's actions, make choices and try to fit their own actions into the contexts[67] (Blumer, 1969).
- Human beings are active beings, who think, define, apply, handle, interpret and make meaning. "The life of any human society consists necessarily of an ongoing process of fitting together the activities of its members" (Blumer, 1969, p. 7), through the ongoing processes of joint action. "Joint action of the collectivity is an inter-linkage of the separate acts of the participants" (Blumer, 1969). This means that joint and individual actions are dependent on each other, as well as dependent on the specific contexts at the moment interactions are taking place.

Inspired by Darwin, Mead argued that humans should be understood in natural terms, "as part of the natural world, as part of our heritage in the animal kingdom" (Charon and Cahill, 2004, p. 32) – and therefore also social. What makes humans different from animals is our ability to understand the world symbolically and ourselves as symbol-using beings (Rock, 2001). This is how Eisner describes human's biological nature in relation to their social environment:

> Our biological system is designed to enable us to survive – with the help of others. But we also learn. We learn to see, to hear, to discern the qualitative complexities of what we taste and touch. We learn to differentiate and discriminate, to recognize and to recall. What first was a reflex response, a function of instinct, becomes a gradual search for stimulation, differentiation, exploration, and eventually for meaning (Eisner, 2002, p. 2).

Relating symbolic interactionism to the field of ethnography, Paul Rock defines the essence of research guided by symbolic interactionism:

> It is evident that any research grounded in symbolic interactionism will be tentative, empirical and responsive to meaning. The social

[66] This is a short classification of types of objects. Charon & Cahill (2004, p. 47) for instance present a list of 9 categories of objects.
[67] Blumer does not use the concept *contexts*, but *situation*.

> world is taken to be a place where little can be taken for granted *ab initio*, a place not of statics, but of process, where acts, objects and people have evolving and intertwined local identities that may not be revealed at the outset or to an outsider. It does not do to presume too much in advance. Knowledge, it is held, is not won in the library, but in the field (Rock, 2001, p. 29).

The study Negotiating Grasp draws strongly on Dewey's understanding of human relations with their physical and social environments. Firstly, similarly to what has been presented here about symbolic interactionism, the study views humans as part of the natural world, and does not assume humans to be so different from other organisms. From such a view, it is easier to acknowledge the senses and embodied experience as essential forms of knowing about the world.

Secondly, the study views children's physical activity as essential for their orientation in the world; for learning about themselves and others. Similarly to symbolic interactionists' view, I see humans as active beings, who engage in dynamic activities and act on the basis of their present understandings. And thirdly, the study Negotiating Grasp assumes that children's interaction with non-human objects (in this case 3D-materials) is as important for their understanding, as interaction with other humans is. I do not use terms "social objects" about children and teachers, but similarly to symbolic interactionists it is my belief that an ongoing process of joint action takes place between children, teachers and physical objects/materials, and that meanings are shaped, negotiated and constructed between all of them.

2.7 Epistemology

Epistemology frames our assumptions about "how we know what we know" (Crotty, 1998, p. 8). Whereas ontology is about what reality *is*, epistemology is about how we achieve knowledge about reality (Crotty, 1998). The concepts of ontology and epistemology are related, because it is difficult to talk about what something is without using assumptions about how we know (or believe) what constitutes reality (Crotty, 1998).

Constructionism is a commonly accepted epistemological position in qualitative research and can be defined as the following:

> It is the view that all knowledge (…) [is] constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context (Crotty, 1998, p. 42).

Meanings are made on the basis of human experience:

> No object can adequately be described in isolation from the conscious being experiencing it, nor can any experience be adequately described in isolation from its object (Crotty, 1998, p. 45).

Meanings are therefore both subjective and objective at the same time (Crotty, 1998).

In addition to constructionism, similar terms: *social constructionism* and *social constructivism* are used in different literature, sometimes interchangeably, and other times as contrasting concepts. Constructionism and social constructionism seem to be synonymous. However, social constructionism and social constructivism have different origins and refer to different epistemological positions. In social constructionism one moves attention away from understanding that learning takes place in isolation in the individual mind, and acknowledges the situated nature of meaning making (Graue and Walsh, 1998). On the other side, social constructivism has its roots in constructivists' assumptions that a human mind functions isolated from others.

> It should appear useful, then, to reserve the term constructivism for epistemological considerations focusing exclusively on 'the meaning-making activity of the individual mind' and to use constructionism where the focus includes 'the collective generation (and transmission) of meaning' (Crotty, 1998, p. 58).

However, this is not as simple as it may seem.

In their book Researching Children's Experiences, Freeman and Mathison (2009) compare the terms constructivism and social constructivism, and define *social constructivism* as an overlapping position that acknowledges both the social and individual components of children's construction of knowledge. Agreeing with Freeman and Mathison, the study Negotiating Grasp builds on a social constructivist understanding that social and individual dimension are considered as equally important. In contrast to social constructionists (who claim that everything is socially constructed) I assume that trying to understand children's art-based experience also has to account for the personal nature of human experience, and promote the uniqueness of each child as essentially valuable for her/himself and others.

2.8 Beyond Epistemology

A historical view on the word "epistemology" shows that it is derived from the word "episteme", which stands for knowledge. While episteme signified "contemplative understanding" of the world in antique philosophy, the term

was transformed during the scientific revolution, and connoted with testable and argumentative knowledge, as it is used today (Keitsch, 2006). Originally, Aristotle's philosophy consists of three fundamental modes of activity: theory, praxis and poesis. These, amongst others, are connected with three potentials of the soul: knowledge, prudence and know-how, and three professions: philosopher, politician, and artist (Keitsch, 2006). Theory as contemplative comprehension of the eternal truth possesses most value, followed by praxis as individual and collective moral action, and poesis as production.

Flyvbjerg (1992) poses a question as to whether practice based research[68] fits the current and conventional understanding of epistemology. Practical knowledge, both from my own practice of making and practicing teaching, is different to theoretical knowledge. Flyvbjerg suggests understanding of social science as *phronetic*[69] rather than epistemological. The "Phronetic Social Science" which he has founded, stands for a kind of knowing that lays behind our actions, and our intuitive, improvisational capability to adapt tacit knowledge and apply it to new situations (Flyvbjerg, 1992).

Flyvbjerg's characteristics of 'phronetic social science' in many ways overlap with characteristics of arts-based educational research. I therefore pose a question as to whether the type of knowledge produced in the study Negotiating Grasp is rather phronetic than epistemological, because it is practice-based, arts-based, focuses on embodied (non-linguistic) forms of knowing and acknowledges the inter-subjective nature of understanding.

2.9 Summary of Second Chapter

In qualitative research, knowledge is produced through human perception and understanding, and it is not possible to act without advocacies (Stake, 2010). As our perception of the world is influenced by our personal points of view (Eisner, 1991), no one is able to step outside their own body-mind, and abandon earlier experiences and tacit knowledge. However, it is important to uncover our own advocacies to make visible who we are, what we stand for, and what influences our actions, decisions, choices and interpretations in research. The second chapter attempted to uncover my advocacies and assumptions in order to make methodological and ethical choices transparent for the reader.

[68] Inclusive arts-based research.
[69] From *poesis* – or *phronesis*, as Flyvbjerg calls it.

3. A Theoretical Background for Exploring the Interplay between Children and 3D-materials

The study presented here builds on an understanding that an experiential approach to the world is essential for cognition. Very young children are not capable of using verbal language, but they learn through their senses and embodied, playful interactions with their environments. In fact, play and the arts have much in common: "both engage imagination, both require reflection, both profit from skill, both seek to generate new forms of experience, both lead to invention" (Eisner, 1990, p. 55). It can be said that both play and arts are a sine-qua non requirement for human development.

According to Eisner (1990), who refers to the American context, both play and arts are often marginalized in education priorities - this creates a need to explore *how* arts and play contribute to cognition. The process that connects visual art and cognition seems to involve play, imagination, creativity, embodied experience and is dependent on teachers, materials, and spaces. This chapter examines: 1) visual art education, 2) early childhood education and 3) embodiment, multimodality and materiality, in three separate sections, despite the fact that these phenomena have many overlaps.

3.1 Visual Art Education

This section presents visual art as a school- and ECEC discipline in Norway and relates Norwegian practice to other countries. Relevant Scandinavian studies are mentioned, however, the majority of the theories referred to are American.

3.1.1 Visual Art as a School- and ECEC Discipline

The organization of visual art education has developed differently in the Scandinavian countries. In Norway in 1960, the three school disciplines: drawing, textile and wood-work (sloyd) were united into one school discipline "Forming". This changed name again in the school reform of 1997 to "Art and Craft"[70] (Nielsen, 2005). The development was different in the

[70] Since different terms have been used over time, and in ECEC-education and school education in Norway, as well as across Scandinavia, I mostly use the term *visual art* to include all of the different terms, also including sloyd.

other Scandinavian countries. Sloyd is in Sweden an independent school discipline, where students work with different 3D-materials. It deals with practical work with materials, tools and techniques, applying craft and traditional design, as well as creative design.

There is a body of research related to sloyd education at "The Sloyd Educational Resource Centre" at Åbo Akademi in Vasa, Finland[71], where the international research organization NordFo was established in 1991 (Lindfors, 2000). Interest for research on relations between materials and learning has also been emerging in Denmark (Kragelund, 2005) and a centre for interdisciplinary research "Material Culture Studies" has been established in the Danish School of Education at Aarhus University. These two networks are important for developing Scandinavian research that includes 3D-materials. Other networks, such as "The network of Nordic Researchers in Visual Art Education", which has been in existence since the 1990s, and the Norwegian network "DesignDialog", which has been in existence since 2002, have also contributed to the development of research in visual art education (Nielsen, 2009).

Only a few studies in Norway have been concerned with visual art in early childhood education and at the time of writing no PhD studies have focused on young children' s activities with 3D-materials. For example, a report from 2008, about Scandinavian sloyd research, does not mention ECEC research whatsoever (Gulliksen and Johansson, 2008). As regards sloyd education in general (at all levels of education), relatively few studies have been conducted in Norway compared to other Scandinavian countries (Aakre and Randers-Pehrson, 2008).

The history of Norwegian visual art education has been quite different in early childhood education than in schools. The practice of ECEC was not regulated before the first Kindergarten Act in 1975 and the first national curricula plan in 1997. The second Kindergarten Act, which was introduced in 2005 and the second curricula plan, called the Framework Plan[72], introduced in 2006, defined more specifically curricula goals and teacher's responsibilities (Bleken, 2007) in relation to seven subject areas. One of these subject areas is "Arts, culture and creativity", which includes arts-based activities. However most of the discipline areas are interdisciplinary, with no clear borders between them. For instance, the subject area "Language, text and communication" can easily include drama or music, and the subject area "Numbers, space and form" can include visual art.

[71] See https://www.abo.fi/student/en/slojdresurs
[72] The full name is: "Framework Plan for the Content and Tasks of Kindergartens"

A recent evaluation of the implementation of the Framework Plan (Ministry of Education and Research, 2006) shows a tendency towards giving less time to arts-based activities than previously (Østrem, et al., 2009). The evaluation report suggests that the political focus on verbal language development supports competition between different ECEC subject areas[73] and that the arts consequently lose in competition with mathematics and verbal language based activities (Østrem, et al., 2009).

Curricula is a complex phenomenon with many levels of interpretation, including ideology behind national plans, teachers' interpretations, practical choices and students' experiences (Goodlad, 1979), as well as possible misinterpretations and hidden agendas (Bae, 1996). Therefore, introducing a new curricula plan does not necessarily lead to change of practice. For instance, a national school survey from 2006 shows that visual art education is still practiced in the same way as it was practiced before the previous curricula plan was introduced in 1997 (Aakre and Randers-Pehrson, 2008).

There is no research focusing on how the ECEC subject area "Arts, culture and creativity" is practiced in Norway, but one supposes that local culture often influences the practice and that ECEC practitioners learn from each other, thus preserving the practiced tradition (Bleken, 2007). Drawing on my 13 years of experience working with ECEC centers, I suggest that Bresler's research on practice art in American educational contexts can be relevant to compare with conditions in Norwegian ECEC.

Bresler (2002) presents what she calls "the hybrid genre: school art". She finds four main forms of practicing school arts at primary school: 1) child craft, 2) child art, 3) fine art and 4) art for children[74], where each of them has roots in different historical periods and contexts.

Child craft was introduced in the 19th century, and shaped by the Industrial Revolution. Child craft activities consisted of technical drawing, handcraft (similar to sloyd in Norway) for boys and decorative arts (in Norway with textiles) for girls. The activities in arts and craft did not include creative use of materials or children's own solutions. According to Bresler, today's version of child craft is more related to religious and other traditions:

> Rather that aiming at employable industrial goals, contents revolve around holiday and seasonal themes (e.g., Easter bunny decorations, winter penguins, Valentine cards), the cute rather than the useful (Bresler, 2002, p. 173).

[73] What would traditionally be called disciplines of knowledge.
[74] The last two categories are not related to children's own activity with materials and will therefore not be presented here.

Child art is about children's "free style" activities, like drawing (Bresler, 2002). This style of school art developed during the 20th century under influence of Herbert Read and Victor Lowenfeld, who promoted a romantic view of child art (see also Wilson, 2004). A child art teaching style is often practiced by art specialists, who plan the activities, focus on the elements of design, and support the children in their activities (Bresler, 2002).

Both 'child craft' and 'child art' are directed towards quick products and do not allow time to explore materials and techniques or to create something meaningful:

> Children's artwork reflected few indicators of exploration of ideas, moods or feelings. Thus, child art resembled child craft in its lack of personal expression (Bresler, 2002, p. 174).

Influence from the educational philosophy of Reggio Emilia pre-schools has been inspiring ECEC practice in Norway and triggered positive changes in the ways visual art is practiced. Still, similar practices to Bresler's definitions of 'child craft' and 'child art' are truly also present in visual art education in Norwegian ECEC centers. It is, however, more likely that teachers with little experience and interest in visual art, practice teacher-centered activities through step-by-step instructions (Bresler, 1991, 1994, 2002). Teacher's ability to provide conditions for valuable and meaningful visual art activities for children is dependent on her/his own experiences of meaningful engagement with visual art.

One of the curricula goals defined in the subject area "Arts, Culture and Creativity" is to provide children with

> … a multitude of opportunities for sensory perception, experience, experimentation, creative activities, thoughts and communication (Ministry of Education and Research, 2006, p. 23).

Another official document from 2007 "The Strategic Plan for Arts and Culture in Education" called "Skapende Læring" (creative learning) also values the importance of learning through arts. This is a document that concerns both ECEC and school education. Its main objective of the document is to develop student's and teacher's competence in the appreciation of arts, culture, and aesthetics - the disciplines of making (Ministry of Education and Research, 2007).

The strategic plan states that creativity and aesthetic sensibility are of great importance for motivation and outcomes of learning in all subject areas and require ECEC leaders to generate a creative culture in their institutions. The strategic plan claims that stimulating children's creativity and aesthetic

attention provides the basis for innovative thinking and supplies children with the competencies they need in their future lives and work (Ministry of Education and Research, 2007).

Lillemyr (2005, p. 220) regards the recent ECEC developments in Norway as promising "first of all because of (their) inclusion of aspects like play, creativity, experimentation and wondering". Still he poses a question as to how diverse forms of learning and play can be integrated into methods and curriculum. Lillemyr (2005) suggests that one should reflect on Dewey's ideas; taking up principles of "learning by doing" and "reflective thinking".

Efland (2004b, p. 697) describes an historical model of five internationally dominant views in visual art education over the last centuries:

- Academic Art, 17th-19th century,
- Elements of Design, early 20th century,
- Creative Self-Expression, early to mid-20th century,
- Art as Daily Living 1930 – 1960, and
- Art as Discipline (DBAE) 1960-1990.

Efland (2004b) presents the last four views as overlapping and influencing current and the future vision for art education. Efland himself emphasizes the imaginative cognition, suggesting that 'Creative Self-Expression' could be a possible future vision (Efland, 2004a, 2004b). His vision

> … differs from past efforts in drawing strength from recent advances in the cognitive science, and pursues a different purpose for art education, namely, to argue for the enhancement of cognitive ability through art experience (Efland, 2004b, pp. 697-698).

The study Negotiating Grasp builds on Efland's, as well as Dewey's and Eisner's, belief that arts are a powerful arena for the enhancement of diverse cognitive abilities. The study approaches children's imaginative cognition empirically in order to search for examples of such enhancement.

3.1.2 Research on Children's Drawings

Children's three-dimensional representations have received very little attention compared to the large interest shown for children's two-dimensional representations[75] (Golomb, 2002; Kindler, 2004a). Studying children's visual representations has often been a vehicle for psychological studies of children's development (Kindler, 2004b), since its first application in 1848 (Golomb, 2002). More recent studies of children's visual representations focus on social aspects of drawing. A number of doctoral studies in

[75] Which are also referred to as visual representations or drawings.

Scandinavia have concentrated on relations between different forms of communication, such as the relations between children's drawings and verbal language development (E. Björklund, 2008; Fast, 2007; Frisch, 2008; Hopperstad, 2002; Häikiö, 2007; Klerfelt, 2007).

Ingrid Lindahl (2002) and Ulla Löfstedt (2001) studied young children's problem solving and learning through drawing, whereas Kristian Pedersen (1999) studied how children's direct experience with objects from their world influence their drawings. My own smaller-scale study show that children's experiences, engagement and possibility to observe and touch what they are drawing has a strong influence on their representations[76] (Fredriksen, 2008a). A number of studies have been influenced by Reggio Emilia educational philosophy - this influence has been most significant in Sweden (Lindström, 2009).

At the time of writing, the international research trends are shifting from analyzing children's products to addressing issues of contextual development (Thompson, 2006). Matthews for example, (1999), in his book "The Art of Childhood and Adolescence: The construction of meaning", presents the development of children's visual representation as emerging from inside, but still highly dependent on relations between the child and his/her environment.

There is also a growing interest to explore how artistic thinking intersects with cognitive processes (Kindler, 2004b). One wonders if children's early representations emerge from a combination of their perception and their engagement with the process of making something (Thompson, 1995), and what happens during such a process. The question of how artistic process relates to cognition seems to be an emerging theme also in Scandinavia; often evolving through study of the concept 'aesthetic learning process'.

The concept 'aesthetic learning process' was first introduced in Denmark by Drotner, Pedersen and Hohr (Hohr and Pedersen, 1996; Pedersen, 1999), who viewed aesthetic activities as specific forms of learning. Such processes are seen as activity of expressing personal experience through a medium, where the process of mediation stimulates diverse development (Lindström, 2009). The main characteristics of an aesthetic learning process is that it is a process of transforming sensory and emotional experience into some form of communication (Austring and Sørensen, 2006). Several recent publications have focused on this subject (Austring and Sørensen, 2006; Hohr, 2005; Hohr and Pedersen, 1996; Häikiö, 2007; Lindstrand and Selander, 2009; Marner,

[76] The case in focus was animals.

2005), and a doctoral school with focus on this theme was established in 2001, in Stockholm (Lindström, 2009).

3.1.3 Research in Sloyd Education

Two Scandinavian research fields are found to be the closest to the study presented here: Material Culture Studies, in Denmark, and research in sloyd education, in Finland and Sweden. The Material Culture Studies is an interdisciplinary research field that deals with research on traditional objects and crafts, new forms of psychology, pedagogy and cultural studies that focus on the individual's learning process. The research approach assumes that the material, the cultural and the social have equal importance for learning (Kragelund and Otto, 2005). This equal importance is also assumed in this study - Negotiating Grasp. However, sloyd education research was found to be even closer to the study topic, because it focuses on children's activities with materials.

There is a great need for research that can extend understanding of how children's handling of 3D-materials can contribute to their learning and development (Johansson, 2009). Some studies have focused on learning process during sloyd activities. To be able to understand knowledge production in a practical discipline such as sloyd, knowledge has to be considered as holistic and not as divided between "the intellectual" and "the material" dimensions (Rystedt and Säljö). As Alexandersson and Lantz-Andersson (2008) propose, when children deal with practical activities with materials they learn *in* the world and *about* the world. Their involvement in physical activities also engages them intellectually (Johansson, 2008).

Dewey wrote that an artist (or craftsman) "does his thinking in the very qualitative media he works in, and the terms lie so close to the object that he is producing that they merge directly into it" (Dewey, 2005 [1934], p. 15). In sloyd education both students and teachers use their embodied experience and tacit knowledge of technique, material and tools (Illum and Johansson, 2009). If a student is to learn how to make specific changes in the material's consistency, s/he has to experience the material with her/his hands[77]. During the student's engagement in the process of transforming materials, her/his perception and cognition are challenged by her/his continuous evaluation and selection of materials, tools, shapes, textures and so on:

> Acts of selection become the essence of perception and this is obviously mental activity and not merely the passive reception of sensory stimuli (Efland, 2002, p. 43).

[77] Or other parts of the body.

Student's individual experiences merge with the collective experiences, leading to a development of meaning and cultural socialization (Illum and Johansson, 2009). According to Nygren-Landgärds (2006), the learning process in sloyd includes many different aspects: technological, social-cultural, social-economical, aesthetic, psychological, pedagogical and ideological. Lindfors (2000) also presents learning in sloyd as a complex system of embodied and mental processes directed towards production of a three-dimensional forms. The activities that simultaneously take place involve problem-solving, processes of choosing, evaluating and decision-making, and require memory, knowledge, reflection, innovative thinking and critical thinking. For this reason the process often involves emotions.

In her study of traditional production of Inupiaq clothes, Reitan (2007) describes the collective nature of vernacular design. Similar to what Dreyfus and Dreyfus (1999b) call master-learning process, Reitan (2007) concludes that learning the craft of vernacular design is a result of visual observation - watching, rather than oral or text-based teaching.

The teacher has traditionally had a dominating role in sloyd education (Hasselskog, 2010, p. 21), but in present sloyd education the main method is supervision (Sjöberg, 2008), where a teacher uses her/his experience at an 'expert level' to guide the students (Dreyfus and Dreyfus, 1999b; Illum and Johansson, 2009). In recent years, more importance has been given to social relations between teacher and student in sloyd education, but what remains the same is that sloyd education is always directed towards production of objects.

As humans, we are born with readiness to use our hands to make things from our natural world (Dissanayake, 2000). Referring to Susanne Langer, Innis (2009) says that it is the human hand that changed the course of human evolution; the diverse abilities of a hand: to feel surfaces, to grasp, to move in different ways, the refined sensibility, complex coordinations and so on, have also influenced our ways of thinking (Innis, 2009). Crafting with the hands has for ages been essential for human survival. However, in present times, in many places in the world[78], hand-crafting is not perceived as important for education and the economy, and as a result craft education is struggling to survive (Garber, 2002). Also in Scandinavian countries, dealing with sloyd in schools is sometimes considered irrelevant for today's technological societies. However, it is important to remember that the main reason for dealing with craft in ECEC and school is not necessarily to prepare students

[78] For instance, in Great Britain and Japan.

for a future occupation as craftsmen, but rather for them to experience the processes of crafting (Dewey, 1916).

When young children deal with hand-craft they learn through the activity of their hands - meaningfulness in life comes from the feeling of mastering something (Karppinen, 2008). It is the same experience of mastery and meaningfulness that initiates further motivation and courage to acquire more knowledge and improve the quality of one's own life through facing and solving unexpected problems (Karppinen, 2008).

MacEachren (2004) identifies even more reasons why humans should engage in craft-making. For him, craft-making experience is not just important for developing skills, but also for the development of commitment, patience, love for nature, good morals and a sense of active citizenship (MacEachren, 2004).

3.1.4 Three-dimensional Representation: Product and Process

Piaget considered children's interactions with materials and objects as essential for understanding (Sjøberg, 1996, September). Inspired by Piaget's stages of development, Arne Trageton (1995) conducted studies of children's play with 3D-materials. He did a remarkable job in observing, analysing and describing stages in children's play with four types of materials[79]. Apart from Trageton, also Claire Golomb and Nancy Smith write about children's activities with 3D-materials.

Golomb (2002, 2004) studies how children make human figures in clay. Her interest is to "delineate the development of representational conceptions and the discovery of modelling techniques" (Golomb, 2002, p. 52), and her main focus is directed towards representations. According to her, the concept 'representation' can be understood as both an object and a process. When it is an object, we speak about a visual form a child has invented in order to represent something from the real world (Golomb, 2002, p. 4). But

> …the concept of representation [also] implies a mental activity that goes beyond the perception of objects and events and transforms them with the means available in the chosen medium (Golomb, 2002, p. 5).

[79] As described earlier: shapeable materials (clay, snow etc.), flexible construction materials (thread, wire etc.), solid construction materials (stones, planks etc.) and blocks (wooden blocks, Lego etc.).

Golomb (2002) makes a distinction between two types of actions in children's representation process: "sensory-motor actions": where a child's activity is directed towards experiencing a material; and "intentional actions": where a child acts with the intention of making of a specific object. Applying these terms to the study Negotiating Grasp, it could be said that the focus is on children's sensory-motor actions. The study does not focus on the products, but aims to generate better understanding of what happens during the process of young children's sensory-motor explorations with 3D-materials. However, it also has to be acknowledged that children during such process also engage in intentional actions towards product making. It is important to note that the children in this thesis were never asked to make something - their intentional actions were self-motivated.

Before young children can become capable of making representations, they have to realize that one thing can stand for another. This is an important cognitive event (Eisner, 1990). Eisner (1990) explains the ways in which this is important: representation stabilizes children's experience and imagination, so that it can be reconstructed through an editing process, made public, and contribute to invention and to transformation of meaning.

Smith (1982) also studies children's representations, but seems to be more interested in the process of representation. She tries to explain the relation between children's process of symbolic representation in 3D-materials, concluding that visual art activities contribute to children's making and understanding of meaning - that 'meaning creation' takes place (N. R. Smith, 1982). She explains:

> …three different components of knowledge are used in forming a symbol: the symbolizer's knowledge of the material, knowledge of the referent, and of the possible modes of correspondence between them (N. R. Smith, 1982, p. 300).

Similar to Golomb (2002), Smith (1982) makes a distinction between representation and symbolization; proposing that symbolization is a broader term, and a symbol can become a representation only when there is some kind of correspondence between the symbol and the represented object (the referent). When a child plays with a lump of clay pretending that it is a car, Golomb (2004) calls that action "romancing". She explains:

> Romancing and imitating actions serve as short-lived substitutes for representation proper; they mark a transitional phase of development when functional pre-representational concepts and models are as yet lacking (Golomb, 2004, p. 335).

The moments Golomb calls 'romancing' are, in my view, very important moments that engage a child's imagination and creative thinking. In this thesis, I will suggest that it is exactly in such moments that a child engages in search of unique solutions by combining her/his own experiences. However, it seems worth asking if limitation to realize the correspondence between a lump of clay and a car is rather the educator's limitation than the child's. To refer to the child's representation as undeveloped, might be the shortcoming of an observer, who doesn't understand that a child applies her/his own personal and holistic experiences in the search for connections between the material at hand and a suitable referent. One can further question whether the similarity has to be a visual resemblance or could it also include other qualities, such as sound or texture that can trigger a child's associations? Possible answers to these questions will be discussed in the fifth and seventh chapters.

In conclusion, considering that a child's capability to create meaning is found in a corresponding relation of the physical and emotional aspects of an experience (N. R. Smith, 1982), it doesn't seem so important to mark the moment when a symbol becomes a representation[80]. Rather, it seems more enlightening to look at the process of exploration of materials and the process of representation as a continuum.

Apart from the significance of materials' qualities, the process of playing with 3D-materials has its own cognitive benefits. The fact that 3D-materials are concrete, makes it possible to manipulate them and get immediate feed-back (N. R. Smith, 1982). Play that takes place in the world of sensing and experimentation with materials contributes to bridging between senses and concepts (Hohr, 2005), as well as between thoughts and feelings (N. R. Smith, 1982).

Children's ability to solve *different* problems with the *same* materials also helps them to generalize (Sutton-Smith, 1997). Smith (1982) suggests that it is the manipulation of materials that leads to both differentiation and generalization. This means that children learn about specific features of the material in their hands, at the same time as they learn about general qualities of all three-dimensional materials, like mass, weight, shape, plasticity and so on (N. R. Smith, 1982).

Smith (1982, p. 300) further argues that "it is important for children to learn the nature of materials before they can use them in symbols". In contrast, Dewey (1916) emphasizes the importance of not knowing how the materials

[80] As interpreted by an adult.

will respond; in Dewey's view it is exactly the possibility of making mistakes and experimenting how to solve problems in new ways that is the driving force behind children's curiosity. He therefore suggests that materials, which possess qualities that might surprise a child, are better for their explorative play than pre-fabricated materials. A pre-fabricated material, such as Lego blocks, "forbid a chance for mistakes to occur, restricts initiative, [and] reduces judgement to a minimum" (Dewey, 1916, p. 231).

Similar to teacher-centred visual art activities[81] where every step in the making process is predefined, 'structured materials'[82] can also hinder children's learning through exploration and problem-solving. In many Western cultures, there is common understanding that children should be helped (Rogoff, 2003). However, it is necessary to consider that helping them by pre-defining products they are to make, can hamper the development of their abilities to create their own problems and struggle to solve them. By pre-defining products, one prevents them from applying own solutions, from getting emotionally engaged, motivated and proud.

The kinds of tasks that are assumed appropriate for children of different ages differ a lot from culture to culture (Rogoff, 2003). History, culture and economy can, for instance, influence which kinds of materials and amounts of material are considered appropriate for children's activities. For example, when I was a child, I was not allowed to use large pieces of textiles, but only scraps of material left-over from my mother's sewing. However, this was not a problem, but rather motivated my imaginative sewing solutions.

On the basis of cultural, individual and other backgrounds, each teacher has her/his own assumptions about activities and materials children should deal with; assumptions about what is appropriate and what is a waste of material and time; about what is reasonable or effective. Unfortunately, as long as assumptions are not questioned, product-oriented visual art practice may continue. This is especially problematic with very young children, since such activities can appear meaningless for a child who is far too young to understand and produce symbols.

During teacher training, students have often asked me: "What can a two year old child make?" I suggest that pedagogical work with visual art should rather be concentrated around posing the question: "Which materials, tools and techniques are meaningful for these children to play with?" If the purpose of art teaching is to make young children's construction of meaning

[81] Like for example "child craft" as described by Bresler (2002).
[82] I here refer to Trageton's (1995) distinction between less and more structured materials that can be compared to Dewey's distinction between natural and pre-fabricated materials.

possible, teaching might benefit from focusing on the aesthetic learning process rather than on products.

Even though making of an art object is usually related to craftsmanship, there is still a difference between making and creating (Saethre, 2003). Craftsmanship usually involves repetitive production of products. In this sense, the idea of crafting effectively can hinder possibilities for new, creative solutions. However, neither production of functional products or the creation of genuinely new solutions can be expected from young children's play with materials. Their play should not be valued according to quality of the products, but on the basis of how meaningful the process of play is for them in the specific context. Though, it is difficult to know what is meaningful for a child, this thesis will discuss how the depth of experiences, with diverse tactile and other qualities, can help to connect a child's own past and present experiences.

The possibility to connect personal experiences seems to be essential for emotional engagement and meaningfulness. However obvious, it should be pointed out that each person owns a unique combination of experiences – no matter what age, gender, religion, culture or language group s/he happens to belong to. In this sense, it appears irrelevant to mention that each child has possibilities to construct unique meanings during an aesthetic learning process and has something unique to contribute to with. If children's personal expressions are welcomed, if teachers value diversity and prize impulses from different cultures, contexts of 3D-play can become an arena where each child experiences that their expressions matter and that they have something to learn from each other[83].

3.1.5 Learning through Experience

Experience can be understood as "the result, the sign, and the reward of that interaction of organism and environment" (Dewey, 2005 [1934], p. 22). Dewey's notion of experience is more appropriate for this study than the narrower concepts: 'aesthetic experience' or 'artistic experience': Children's experiences with 3D-materials are embodied and holistic, and cannot exclusively be assigned to visual art or the arts, though their experiences

[83] A few years ago, I participated in an ECEC project conducted with a multicultural group of children. Half of the group were children who had recently arrived to a refugee centre close by. All the children and their parents were invited to teach each other how they use flour in food making in their cultures. The language difference did not seem to be a large hindrance, since everyone could see what was done with the hands, flour, water, oil, rolling pins and other more exotic equipment (like a tawa and a baking-cushion). The possibility to show some of their competences to others made both parents and their children proud, and seemed to awaken all the children's curiosity and positive attitude toward diversity.

include aesthetic experience, which is understood as "grasping qualities of observed objects or materials" (Parsons, 2007).

In the context of this study, the word 'artistic' is even less suitable than 'aesthetic', since the adjective 'artistic' gives the impression that the study assumes that children make art, which in turn implies associations with 'child art', which is not the topic of this thesis. However, all three concepts are used by the writers referred to in this chapter.

Experience is, as Dewey (2005 [1934]) says, a unity of emotional, practical and intellectual dimensions. In this study, the relations between the emotional, practical and intellectual seem to be essential for how children construct meaning out of their experiences. During children's play with materials a number of processes function as linkages between their emotions, senses, practical activities and cognition, and these processes appear to be related to imagination, metaphoric thinking and creativity. Each of the concepts will be briefly presented in this chapter, and elaborated on later.

"Experience is the result of interaction between a live creature and some aspect of the world in which he lives" (Dewey, 2005 [1934], p. 45). Art materials provide children with possibilities to experience their qualities (Eisner, 1990), and children's experiences and engagement with materials can initiate their 'reflective attention' (Dewey, 1956b, p. 149). Such reflective attention engages the children in activities of judging, reasoning and deliberation - "it means that the child has a *question of his own* and is actively engaged in seeking and selecting relevant material with which to answer it, considering the bearings and relations of this material – the kind of solution it calls for" (Dewey, 1956b, p. 149, original emphasis).

This is how Eisner describes the process of experiencing physical environments:

> Experiencing the environment (…) is a process that is shaped by culture, influenced by language, impacted by beliefs, affected by values, and moderated by distinctive features of that part of ourselves we sometimes describe as our individuality. We humans give simultaneously both a personal and a cultural imprint to what we experience; the relation between the two is inextricable (Eisner, 2002, p. 1).

Dewey describes learning as emerging from experience (Davidson, 2004, p.198), while Gibson claims that "perceiving is the best kind of knowing" (Gibson, 1979, p. 263). Parsons (2007) suggests that connections between embodied experience and mind can lead us to conclusion that thought is

embodied. These perspectives share the notion that the process of children's embodied experiences with 3D-materials can be closely related to some kind of transformation of experience to thought, and a process of meaning making.

According to Efland (2004a), abstract thinking emerges from metaphoric projection between cognition and sensory experience. The metaphors are regarded here as constructors of linkages that enable us to understand and structure knowledge (Efland, 2004a). In such a process of 'linking', imagination is a necessary asset for metaphors to emerge (Efland, 2004a). In contrast, Eckhoff (2008b) argues that a child's experience in itself is like fuel for creative imagination. The processes that connect experience, imagination, creativity and cognition seem to lead in many directions. These processes are dynamic, and according to Eglinton (2007, loc. 193-99) self-perpetuating: "...experience leads to more experience; discovery generates further investigation".

Interestingly, neither Dewey nor Vygotsky considered young children to be capable of "real" experience – at least they do not consider that children's experience could reach a great depth or breadth: "Because of lack of background from past experience, relations between underdoing and doing are slightly grasped" (Dewey, 2005 [1934], p. 46). Vygotsky puts it like this:

> The richer a person's experience, the richer is the material his imagination has access to. This is why a child has a less rich imagination than an adult, because his experience has not been as rich (Vygotsky, 2004 [1930], p. 15).

I can agree in that children do not have as much experience as adults, but knowing how engaged young children are in their experiencing process (Stinson, 2002) indicates for me much depth; Considering that children's ability to pay attention to details, learn with their bodies, and be present in the here-and-now[84], it would be more reasonable to assume that children's experiences are not poorer than adults' but are plentiful and holistic - though not verbalized.

In the book "Researching children's experience" Greene et al. (2005) pose the question as to whether we can claim that pre-verbal children have limited experiences simply because they cannot verbalize them.

[84] As Stern (2004) says, one's subjective sense of life is lived at the second-by-second local level.

Dewey further asserts that children's lack of experience makes them less capable of connecting their earlier and new experiences together (Dewey, 2005 [1934]), and Vygotsky writes:

> The creative activity of the imagination depends on direction the richness and variety of a person's previous experience because this experience provides the material from which the products of fantasy are constructed (Vygotsky, 2004 [1930], p. 15).

However, if we consider the possibility that young children are more imaginative than adults, as Egan (1999) suggests, young children might be better able to connect their earlier and new experiences than adults are. Dewey's and Vygotsky's assumptions about young children might be a consequence of the historical view of children in time they were writing and researching. Viewing children as competent is, after all, a quite new notion.

If imagination, experience and metaphor are so closely related to one another, could achievement of better understanding of one of them also help us to understand the others? Finding out what role imagination "can play in the creation of personal meaning (…) becomes the point and purpose for having the arts in education" (Efland, 2004a, p. 769). From my point of view, this is equally important for research in visual art education.

3.1.6 The Significance of Materials and Environment

In contemporary understanding of children's learning, a greater awareness is emerging of the influence of physical environment on learning. In Reggio Emilia the physical space has been called "the third pedagogue", in addition to teachers and children, who are the first and the second pedagogues (Vecchi and Giudici, 2004). In Reggio Emilia pedagogy a child is in four ways connected to her/his environments:

- "The child's relationship with her/his inner world: emotions, thoughts etc.
- The child's relationship with her/his body
- The child's relationship with other objects: materials, furniture, indoor spaces
- The child's relationship with entire environment, outdoors, society etc." (Häikiö, 2007, p. 283).

This view on the importance of physical space has influenced a number of Scandinavian projects that focus on school and ECEC space, as well as outdoor pedagogical environments. Sandseter (2007) has for instance studied young children's play in outdoor environments, finding out that children prefer risky play. Sandseter is one of a group of researchers, teacher educators and architects, who are participating in the ongoing interdisciplinary project "Places for learning, care and growth" at Vestfold

University College. The project focuses on the influence of physical space and materiality in ECEC learning[85].

Both Gibson (1979) and Dewey (2005 [1934]) argue that physical environments have essential importance for how all organisms live and learn. Dewey writes: "Life goes on in an environment; not merely *in* it but because of it, through interactions with it" (Dewey, 2005 [1934], p. 12, original emphasis). Both speak of humans as one of many organisms on the earth. According to Stables, Dewey made the most notable intention to overcome the dualism between the human and non-human (Stables, 2008). However both Dewey and Gibson also include social dimensions when they speak of humans' relation to their environment.

For Gibson (1979), physical environments consist of different substances that afford us with possibilities to walk on them, breathe them, swim through them, or eat them. To be able to survive, both people and animals need to know if they, for instance, can breathe under water. Some of these "knowledges" are genetically imprinted in our corporality, but many others have to be discovered, through an organism's own interaction with the physical environment (Gibson, 1979). However, when a child experiences a material or object for the first time, this usually takes place in a society, where others have already experienced the object/material and assigned meanings to it. Through interaction with the material, the child discovers meanings of the material's affordances, but during the same interaction the child also discovers, which values are socially assigned to the material (Gibson, 1979). In this sense, Gibson's term 'affordances' refers to a number of different relations: what substances can offer with their properties (plasticity, cohesiveness and so on), what social interaction can offer, and what social objects, for example words, can offer. Hence, the social value of objects and materials that a child meets for the first time has to be analysed.

I agree that a child, who plays with a specific object or material, can get to know about the socially assigned meanings of that object/material. However, whether this takes place or not, depends on the social interactions in the specific context. For a young child, it is sometimes an advantage not to know how an object or material is usually used – this opens the child's possibilities to explore and find new solutions for use of the object.

For Dewey (2005 [1934]), experiencing the possibilities, and above all resistance of an environment or material, contributes to the achievement of many types of learning. He states that without resistance from the

[85] See the project's blog page at http://barnehagerom.wordpress.com

environment a person would not become aware of him-/herself (Dewey, 2005 [1934]). It is the resistance that plays the most important role in discovering the meanings of self, of the other (either an object, material or another person) and of the possible relations between them.

> A man does something; he lifts, let us say a stone. In consequence he undergoes, suffers, something: the weight, strain, texture of the surface of the thing lifted. The properties thus undergone determine further doing. The stone is too heavy or too angular, not solid enough; or else the properties undergone show it is fit for the use for which it is intended (Dewey, 2005 [1934], p. 45).

Here, Dewey describes three different processes: the action of lifting, the person's "suffering" - experiencing the stone's properties, and his reflective evaluation of the stone's usefulness.

> In like fashion, children learn about persons by finding out what responsive activities these persons exact and what these persons will do in reply to the children's activities (Dewey, 1916, p. 317).

Dewey (1916) further says that it is the combination of challenges in finding out what things do to us, and what we can do to them, that constitutes experience.

Fisher and Madsen (2002) write that children are most engaged in activities where they have possibility to play and manipulate concrete materials – they have to grasp physically to be able to grasp mentally. Dewey argues that children's play with materials is essential for diverse forms of learning. Calling on Froebel's educational principals, Dewey claims that construction play with materials is:

> …better fitted than anything else to secure these two factors – initiation in the child's own impulse and termination upon a higher plane. It brings the child in contact with a great variety of material: wood, tin, leather, yarn, etc.; it supplies a motive for using these materials in real ways instead of going to exercises having no meaning except a remote symbolic one; it calls into play alertness of the senses and acuteness of observation; it demands clear-cut imagery of the ends to be accomplished, and requires ingenuity and invention in planning; it makes necessary concentrated attention and personal responsibility in execution, while the results are in such tangible form that the child may be led to judge his own work and improve his standards (Dewey, 1956b, p. 128).

Others have also noted the importance of children's play with three-dimensional materials. Nordin-Hultman (2004) noted that materials have

ability to give response and call children's attention to differences, and Eisner wrote:

> Imagination is strengthened as confidence in being able to control a material is increased. The ability to control a material liberates the child to think about matters at the heart of art making (Eisner, 1990, p. 51).

Dealing with 3D-materials seems to be desirable and enjoyable for young children (Fischer and Leicht Madsen, 2002). Furthermore, materials that simulate different senses and can be manipulated are especially desired by school children (Colbert and Taunton, 2001). Besides being a source of experience, materials are also media for the re-working of ideas and for expression. Smith (1982) claims that materials are a particularly satisfying medium for children's expression, because a child gets help from materials in organizing experiences, feelings and imagination.

Steiner (2004, p. 187) says "the children do not merely 'have an idea' in their hands; they feel the idea, since it flows into their whole life and feeling". I find it important to mention Steiner's ideas about the importance of children's engagement with materials and practical work with them, since they overlap with my understanding; however his educational philosophy builds far too much on metaphysics for it to be considered as relevant for this thesis.

The process of engagement with materials "involves continual observation of materials, and continual planning and reflection" (Dewey, 1956b, p. 133). During such process a child grasps the material/object in different ways: grasping with movement, grasping with body and grasping with the senses (Hansen, 1997). It is the preoccupation with practical work with materials themselves that "maintains a balance between the intellectual and the practical phases of experience (Dewey, 1956b, p. 133). Materials afford us with possibilities for transformation. "In visual arts, the physical and visual properties of materials provide structure and anchor the form-building process in the concrete" (N. R. Smith, 1982, p. 300).

3.1.7 The Role of Visual Art Teacher

Dewey presents aesthetic experience as a fragile and dynamic process during which a child gets pushed into the unknown (Shusterman, 2000). A teacher plays an important role in both supporting and challenging the child on this fearsome, but joyful journey. "Exploration of meaningful issues takes time and dedication. It has to be nurtured by active support and recognition of a community of practice" (Bresler, 2002, p. 177). It is therefore important that

teachers are aware how their attitudes can influence children's possibilities to learn.

Based on an ethnographic study in American primary schools, Bresler (1994) defines three types of roles of a visual art teacher, imitative, complementary and expansive:

> The first orientation regards teaching as presenting a model to be imitated, a set of skills to be mastered; the second as enabling the child's natural potential to unfold; and the third orientation as a complex procedure drawing on the communication of sophisticated adult knowledge while respecting the child's current experience and interpretations (Bresler, 1994, p. 101).

Children can, of course, learn something when their teachers practice 'imitative' and 'complementary' roles, but it is the teacher who practices the 'expansive' role that best can provide for children's learning through experience. Taking an expansive role, the teacher becomes a co-constructor of children's knowledge (Bresler, 1994).

As Bresler (1994) says, practicing the 'expansive' role demands respect for the child. In Reggio Emilia such respect manifests itself through listening to children's different languages – learning takes place through "'pedagogy of listening', where the learner develops theories, shapes them with others, redevelops them in a pedagogy that emphasizes the importance of relationships, listening (…) and avoiding predetermined results" (Dahlberg and Moss, 2010, p. xvii).

In Reggio Emilia children are encouraged to make their own decisions and choices (Katz, 1998) and through the process of experiencing, experimenting, testing, failing and succeeding they get to understand how problems can be solved (Dahlberg and Moss, 2010). To allow such processes, teachers have to be helpful when it is necessary, but not interfere with children's processes of experiential learning.

Respecting children's experiences and interpretations requires a teacher to understand that children's experiential processes are important; and their attentiveness during the unfolding. Vea Vecchi suggests what is needed to accomplish full respect for children's learning strategies:

> I am quite convinced that greater attention to processes, rather than only the final product, would help us to feel greater respect for the independent thinking strategies of children and teenagers (Dahlberg and Moss, 2010, p. xvii).

Vecchi places a great importance on process, as does this thesis, however, it is important that process and product are seen as parts of the same activity; mutually motivating each other (Dahlberg and Moss, 2010).

If children are to construct knowledge through experience, we have to allow open-ended material explorations (Danko-McGhee and Slutsky, 2009). Instead of making models for children to copy, or in other ways pre-determining the curricula, selecting suitable materials should be one of the main responsibilities of a teacher. By deciding which materials, tools, techniques, themes and so on children should deal with, teachers make certain kinds of meaning making possible, but they cannot determine what children will learn (Eisner, 2002). Teachers' careful choices can provide conditions for meaningful activities for negotiations of meaning. When teachers focus more on the process, and not on pre-defined products, each child has greater possibility to use her or his own experiences, associations and interests. This possibility to apply one's own experiences is exactly what seems to make the process meaningful.

Vygotsky poses questions about relations between individual learner and supportive others (Daniels, 2001), and introduces the term 'the zone of proximal development'[86], which is a zone with potential for a learner's development (Vygotsky, 1978) through dynamic process of negotiation with adults and peers (Daniels, 2001). Emotions and desire are already involved in The Zone (Levykh, 2008) and the importance of imagination and creativity acknowledged as essential for learning (Vygotsky, 2004 [1930]).

> We propose that an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers (Vygotsky, 1978, p. 90).

The Zone is situated between a child's internal and external possibilities (Daniels, 2001). In this zone, one has both to be exposed to challenges, and to be supported by peers and adults, in order to succeed with some task (Eisner, 2002).

Rogoff (2003) writes about the influence of cultures on the way children learn through social interactions. She presents the concept of "guided participation", which is how children's learning is guided by values and practices of their communities (Rogoff, 2003). 'Guided participation'

[86] Later in this thesis referred as 'The Zone'.

manifests itself through the forms of the adult response, such as explanation, teasing, or supporting a child's activity (Rogoff, 2003). These forms of adult response can be specific to certain communities, but are certainly also dependent on adult's personal attitudes and abilities; for instance, how quick one is to react. Dewey, for example, speaks about "flexible purposing", which is a kind of ability to quickly shift direction when something emerges (Dewey, 2007 [1938]), and Eisner (2002) compares flexible purposing to improvisation in teaching. In my opinion, improvisation in teaching requires a high level of teacher competence[87].

Young children are often interested in using physical tools, which give them possibilities to explore and experience materials in new ways (Fischer and Leicht Madsen, 2002). However, letting young children use tools can be dangerous and therefore raises ethical questions. Rogoff (2003) writes that assumptions about what is ethical differ from culture to culture. There are large cultural differences concerning what is considered to be dangerous, what one can expect from a child of certain age, and what is considered to be ethical to let a child do. She gives an example of an 11 month old child cutting a fruit with a sharp machete, concluding that what one finds appropriate depends on what we assume our children need to learn (Rogoff, 2003). In Western societies, we often consider it to be ethical to protect our children and not give them too much responsibility (Rogoff, 2003). Consequently, instead of challenging the children to explore, parents and teachers prevent from being hurt, but at the same time they constrain children's opportunities to explore (Rogoff, 2003), and prevent them from becoming competent.

Rogoff's theory is important in this thesis because it makes visible that everyone's attitudes (also teachers') are part of cultural heritage. I suggest that teachers need to reflect on their attitudes in order to establish a more open-minded view on children's vulnerability, responsibility and ability to negotiate meaning. However, it is important to remember that children's parents also have assumptions (influenced by their own cultures) about what is good for their children. Misinterpretations and misunderstandings can always occur between teachers and children, and between teachers and parents, but conflicts can be minimised if teachers are aware that they are also carriers of specific cultural and personal assumptions.

Very few parents, regardless of their backgrounds, are trained teachers. It should therefore be ECEC teachers' responsibility to act professionally, be open-minded and reflect on their own assumptions and those of other's with a

[87] Improvisation will be discussed in the seventh chapter.

view to what is best for the children. As professionals, ECEC teachers should both be able to meet parents' opinions with respect and be able to argue for the methods and content of their ECEC - for example, to explain why experiential 3D-play is important for a child.

The theories presented in section 3.1 form a framework for understanding the present situation in visual art education, with a special focus on 3D-materials, hand-craft and experiential process – the three main themes of this thesis. This chapter has so far dealt with discipline-specific issues that concern research and teaching in visual art and sloyd, but not specifically related to early childhood education. The following section approaches early childhood education form a pedagogical, psychological and interdisciplinary perspective. These perspectives are important for the study Negotiating Grasp, because it has an educational profile; seeking to generate knowledge about how children negotiate meaning. However, because young children's experiences are approached in a holistic manner, and the process of growing up is a continuum, it has been found necessary to examine diverse conditions that influence young children's experiences and lives. This will be done in the section 3.2.

3.2 Early Childhood Education

The following part of this text combines older and more recent theories from different disciplines. The scope of the theories referred to might appear broad; however, I have chosen to write only about the themes relevant for further application in this thesis.

3.2.1 Theories about Learning at an Early Age

What we know about early childhood education is, at least in part, dependent on the theories we've read. Views on young children have changed over time; however, the contemporary assumptions that influenced the theories remain captured inside them. It is remarkable how some theories are constantly referred to regardless of the assumptions that influenced them. It has for example been said that Piaget did not have pedagogical intentions when he conducted his experiments with children, yet his theories have had a strong influence on how we understand teaching (Sjøberg, 1996, September).

Piaget studied children as "solitary scientists" (Graue and Walsh, 1998) "inner-driven, very curious, and independent" (Ackermann, 2004, p. 18), but he also studied children's cognitive development as universal, and not as contextually dependent (Graue and Walsh, 1998). Understanding mental development in strictly hierarchical terms, "as rising in stages towards full adult reasonableness" (Stables, 2008, p. 107), as Piaget did (Sjøberg, 1996,

September), forces any research to aim towards defining progressive stages of children's development. However, an assumption that children's and adult's thinking might be equal[88], leads to another type of research methodology and results.

Vygotsky is often compared to Piaget, emphasizing the social dimension in Vygotsky's theory of learning. However, I do not consider it fruitful to compare studies with different purposes and methods. On the one hand, Piaget conducted his experiments under controlled conditions[89] (Piaget, 1930). He asked children to explain why something happened, but answering why-questions can lead to many different answers, especially when imagination is involved. I am not sure if Piaget was prepared to get many different responses or was looking for the 'right' answers? On the other hand, Vygotsky's empirical approach was quite different from Piaget's – indeed Vygotsky's methods were unusual at the time (Cole and Scribner, 1978): While conventional experiments focused on performance, Vygotsky focused on the process (Cole and Scribner, 1978); instead of presenting something for children to look at[90] and later answer questions about, Vygotsky provided children with a variety of materials, which could be used in different ways. Rather than reducing his results, he presented them through detailed descriptions (Cole and Scribner, 1978). In Vygotsky's methods boundaries between laboratory and field are blurred (Cole and Scribner, 1978). Consequently, Vygotsky's methods lead him to quite different answers about children's learning compared to those resulting from Piaget's methods.

Vygotsky understands verbal communication as essential for learning and recognizes speech as an essential part of children's cognitive development (Vygotsky, 1978). He proposes that it is the interaction between verbal language and perception that contributes to cognition. Vygotsky acknowledges the importance of a child's direct perception of physical objects (Sawyer, et al., 2003), however he considers embodied perception to have a lower importance for learning, and that verbal language is predominant. Vygotsky argues that "increasing sophistication in the use of language allows the child to become progressively more independent of the sensory field" (Daniels, 2001, p. 16). I wonder if he assumed it to be desirable to become more independent from sensory experience[91].

[88] Or that children's thinking, in some sense, can be more advanced than adult's thinking, as Egan (1999) suggests.
[89] Piaget wrote, for example, that windows always had to be closed, even in the summer. During my own study I have come to some of the same conclusions about the importance of controlling the physical environment where empirical study is conducted.
[90] Like putting a coin through a lid, as Piaget did.
[91] Relations between verbal and experiential forms of knowing will be discussed in the seventh chapter.

Referring to Hohr and Lorenzer, Austring and Sørensen (2006) write about three types of learning process: empirical, aesthetic and discursive. The empirical approach to learning is characterized by direct, phenomenological and embodied approach to physical environment. The aesthetic approach to learning builds on the empirical, but is additionally reflective and oriented towards communication. The discursive form of learning is the theoretical-analytical form of learning, usually connected with school-like learning. According to Hohr the discursive type of learning is opposite to the aesthetic type; discursive learning aims at fragmentation and reduction of experience, whereas aesthetic learning aims at gathering of fragmented experiences into one whole (Austring and Sørensen, 2006).

One of the most important discussions over time has been whether learning is an individual, or social achievement (Carpendale and Müller, 2004). Vygotsky's theories about knowledge as a social phenomenon were later developed by many others, among them by Barbara Rogoff, who claims that cognition is not defined as a collection of stored possessions, but is an active process that unfolds among participants (Stelter, 2008a). This thesis assumes that learning/negotiation of meaning is both an individual and a social process; that both individual experience and social interactions influence human understanding. The human mind is extremely complex; being an epistemological, a psychological and a social organ, all at the same time (Egan, 1999).

The following section will approach the question of individual learning versus social learning by drawing on classical and more recent theories about cognitive development. When one speaks of cognitive development, it is assumed that cognition develops from lower to higher forms, often in stages. Considering young children as already competent does not match with this concept. Vygotsky understood development as intimately related to learning (Thompson, 2002). It could be said that what is learned is accumulated and so leads to development. However, the question again is what one means by 'learning'. For example, I do not believe that learning defined as memorizing necessarily leads to development; however, if learning is about enhancement of *personal* understanding, it can lead to development.

Over the last decades the classical views on individual cognitive development have been challenged (Ackermann, 1998). The focus has moved from understanding development as universal and de-contextualized, to viewing development and learning as situated in and dependent on the individual style of the learner (Ackermann, 1998). The influence of social contexts and culture are today assumed to be essential for how we acquire knowledge,

however we should be careful not to "wipe-out" the individual differences; "Beneath the layers of socialization we are each of us a unique individual consciousness" (Egan, 1997, p. 167). This individual uniqueness is exactly what makes sharing of experiences, thoughts, ideas and feelings so valuable.

By introducing "Integrated theory of cognition" Efland (2002) reminds us that a nuanced understanding of learning, which includes both the individual's experiences and social influence, is especially needed in arts[92].

Vygotsky considers social interactions to be essential for children's learning; believing that "neither development nor learning could occur without the mediation of others" (Thompson, 2002, p. 132). However, he does not consider that young children are able to communicate with others; claiming that children under three do not have social speech, but only ego-centric speech (Vygotskij and Kozulin, 2001). From Vygotsky's theories a number non-reductionist theories of cognition have developed, one of them Lave and Wegner's theory of 'situated cognition' (Daniels, 2001).

Wenger explains what she means by situated learning: consider

> … we are a child who cannot speak. (…) We want to learn. We want to apprentice ourselves. We want to become one of them. We feel an urgent need to align our experience with the competence "they" define. Their competence pulls our experience (Wenger, 2003, p. 77).

This description demonstrates a child's urge to socialize, the cultural and social norms that already exist, and the social nature of experience.

Wenger (2003, p. 78) defines learning as "an interplay between social competence and personal experience" and identifies three essential dimensions that influence such interplay: engagement, imagination and alignment. Engagement relates to

> … doing things together, talking, producing artifacts. (…) The ways in which we engage with each other and with the world profoundly shape our experience of who we are (Wenger, 2003, p. 78).

Imagination is described as constructing an image of ourselves and our world, and being able to imagine new possibilities (Wenger, 2003). And 'alignment' refers to "a mutual process of coordinating perspectives, interpretations, and actions so that they realize higher goals" (Wenger, 2003, p. 79). The definition of learning described here was not made with respect to young children; however I find it relevant for young children. The

[92] As already mentioned in section 1.4.2.

importance of engagement and imagination are especially relevant in early childhood, and alignment is significant in early childhood education when considering the power relations between children and teachers.

Social interactions of all kinds, not only verbal, are important in communication and sharing of understanding and meaning (Kress and Jewitt, 2003). "Meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice" (Lave and Wenger, 1991, p. 29). However, it has been said that both Lave and Wenger's, and Vygotsky's theories, emphasize the role of verbal language in learning (Daniels, 2001). I agree that verbal language is important, but too much focus on verbal language can limit our understanding of pre-verbal children's competences[93].

3.2.2 Play, Creativity and Imagination in Learning

Play

When the notion of *play* is used here, it does not refer to playing a game such as card play, or sports, but rather to a type of activity without pre-determined rules that young children often engage in. Eisner compares such a form of play with art; expressing his disappointment that "both art and play, like imagination and fantasy, are not regarded as a part of the serious business in schooling" (Eisner, 1990, p. 43). As mentioned in the first chapter under the presentation of Nordic tradition, the situation is slightly better in Scandinavian lower school classes and ECEC centers, since the educational forms have been influenced by Froebel's view of play as essential for development (Flanagan, 2006; Röthle, 2007). The present Framework Plan states that play is the basic form of children's living, learning and expressing (Ministry of Education and Research, 2006). Through play, children acquire sensory experience of their environments and make sense of their world (Eisner, 1990).

Play is "an exploratory activity through which children (and adults) discover the possibilities of experience" (Eisner, 1990, p. 44); it is a form of constructing knowledge about the world and building of identity. Play provides open-ended situations where one does not search for single answers, but explores actual and imagined possibilities (Eisner, 1990). It is a flexible activity where intentions and interests can change during the course of the activity (Monighan-Nourot, 1990). It is exactly the freedom from pre-determined rules that characterizes a play situation (Monighan-Nourot, 1990) and such rule-free situations are a kind of safe "transitional spaces" - halfway between self and world, where children can take risks and test possibilities

[93] I will return to this issue in sections 3.2.5 and 3.3.3.

(Ackermann, 2004, p. 35). According to Bruner, it is the child's playful problem solving that is essential for learning (Lindqvist, 1995). This joyful and engaging activity involves practical reflection and supports development of imagination and curiosity (Sutton-Smith, 1997).

The term 'free play' is used in Norwegian ECEC centers about activities that are not organized by teachers. In free play, children play with whatever they find interesting, often outdoors. However, the fact that the activities are not organized by teachers does not mean that no learning takes place during the activities. On the contrary, when children engage with activities they find meaningful, their concentration and enthusiasm makes it possible to achieve mastery (Monighan-Nourot, 1990). This gives them self-confidence and further motivation.

I speak of play with 3D-materials and use the concept about my interactions with the children in the study; through the play I hoped to encourage their own choices during experimentations with the materials. Nevertheless, the 3D-play practiced in this study is rather organized than free play. The 3D-play was not "free", because the materials and tools were pre-chosen and the settings arranged by the teacher/researcher. However, similarly to free play, the contexts for 3D-play did not aim to produce any products or have predefined goals - the curricula was open for the children to fill it with whatever they found meaningful. Another reason for using the concept 3D-play in this study was to build on the concept "play with materials" introduced by Arne Trageton (1995), and familiar in Norway.

The concept of play in this study can be encompassed in the following way: Play is an active embodied process and

> … a mental process that builds upon and integrates many (…) processes in the developing child's mind – thinking, imagining, pretending, planning, wondering, doubting, remembering, guessing, hoping, experimenting, redoing and working through (Sutton-Smith, 1997, p. 37).

Dewey was inspired by Rousseau (Efland, 2004b) and by Froebel (Dewey, 1956b), and has done much to promote the child as a creative, active agent in own learning (Flanagan, 2006). Unfortunately, his focus on a child's playful approach to learning "is sometimes associated with the worst excesses of a do-as-you-please approach to elementary education" (Flanagan, 2006). When play is considered as impossible to unite with play, as it is often considered in education, the process of schooling and socialization threatens to suppress children's playful approach to learning (Eisner, 1990). Knowing that playful attitude, where children are spontaneous and less inhibited, is exactly what

allows children to think broadly, divergently and imaginatively (Runco, 2006), I hope a way can be found to successfully integrate play in education.

Creativity

Play is often viewed as related to creativity and imagination. The concepts creativity and imagination are sometimes used interchangeably, but here I will present them separately.

The term creativity has been used and misused for a long time and "it is probably time for art educators to rethink the meaning of the term creativity*"* (Wilson, 2004, p. 314). Earlier research on creativity has dealt with questions about what creativity *is* (Sullivan, 2007). The concept has sometimes been used as synonymous with production of craft products, and other times as having romantic and naïve connotations relating to children's "natural creativity" (Stables, 2008).

For some people, creativity is about what children do, while for others it is a capacity to be strictly reserved for only an elite few. Csikszentmihalyi (1996), for example, claims that children cannot be creative, while Runco (2006) presents creativity as connected to children's play and construction of meaning. Vygotsky claims that creativity takes place "whenever a person imagines, combines, alters, and creates something new, no matter how small" (Vygotsky, 2004 [1930], p. 10), and Runco (2006) reminds us that children's creativity is different to adult's and that children's creativity usually does not lead to tangible products. From the diversity of creativity theories it is only relevant to mention a few in relation to this thesis, since the theories that focus on Arts[94], creative inventions of global importance, or products with adult's standards, are not relevant for this thesis.

The conceptions of creativity have changed over time and differ from culture to culture, leaving diverse myths behind (Sawyer, 2006). One such myths is that children are naturally creative (Sawyer, 2006). Sawyer (2006, p. 19) explains that "scientific explanation of creativity shows that children aren't that creative". Defining the myth makes it difficult to consider possibilities that young children still might be creative; in this thesis I am trying to convince the reader about the falseness of this myth. The answer to the question about who is creative, depend on the ways we define creativity and which methods we use to approach he question. If one tries to measure children's creativity with high product standards, this would naturally lead to dismissing children's creativity, simply because children's creativity needs a more appropriate approach. In this sense, measuring prevents one from

[94] Arts with capital A refer to adult forms of artistic production.

achieving understanding about children's creative process. One intention of this thesis is to describe *how* children negotiate meaning and, as the thesis will show, creativity appeared to be essential in children's process of meaning negotiation. It also seems that it is exactly the creative process that can fulfil human needs for belonging, meaning and competence (Dissanayake, 2000).

Research on creativity has mostly considered products of creativity and not so much the process of performing creativity (Sawyer, 2006). Recent interests in research on creativity have switched from studying what creativity *is*, to *when* creativity manifests itself (Sullivan, 2007). Burnard (2007, p. 1177) considers recent development in creativity research in arts education as promising, since it is "generating renewed dialogue on the role and significance of creativity in arts education". However, creativity does not only concern the arts, but is considered essential for development (Sawyer, et al., 2003). Vygotsky views creativity as connected to the ability of the brain to combine elements, and he therefore claims that creativity is the most important issue in educational psychology (Vygotsky, 2004 [1930]). It is creativity that allows connections between seemingly unrelated parts (Kindler, 2004b), and may therefore be fundamental for cognition (Eckhoff, 2008b). "Educationalists agree that helping people to be creative is a crucial element of education" (Burnard, 2007, p. 1177). Better understanding *how* creativity functions might help us to provide suitable conditions for children's creative development.

Some researchers have studied aspects of the childhood of people, who later proved to be especially creative. A significant characteristic of creative people's childhood is that they have frequently had diverse experiences and opportunities to solve problems on their own (Runco, 2006). In studying the childhoods of successful writers, artists and Nobel-prize winners, Csikszentmihalyi remarks that

> …sometimes the only contribution of the parents to their child's intellectual development is treating him or her like a fellow adult (…) parents never talked down to them (Csikszentmihalyi, 1996, p. 161).

From my point of view, this supposedly minor finding might have crucial importance for understanding creativity. If parent's supportive and respectful attitude towards their children could be assigned to their child's later creativity, then viewing children as competent can be a good place to start. According to Runco, what is needed in order to develop creativity, is to help children to develop "ego strength", which "allows the child to stand up to pressures to conform and to believe in his or her own thinking and ideas" (Runco, 2006, p. 128). Supporting children's ego strength should be the most

important task teachers can perform to nurture children's creativity (Runco, 2006). Since supporting ego strength is dependent on the local community, children's creativity is dependent on whether teachers manage to create environments and a culture that encourages creativity (Eckhoff, 2008b).

The recent interests in creativity research have been inspired by the contemporary view of creativity as "good for economies, good for society, good for communities, and good for education" (Burnard, 2007, p. 1175). It is thought that creativity can help us to solve unpredictable problems in the future, and that is probably true, but it should also be acknowledged that creativity is about present quality of life. When people are creative they are also positive and optimistic that problems can be solved. Maybe it is exactly their 'ego strength' that helps them find solutions?

An important question has been whether creativity is an individual or social phenomenon. I believe, as Sullivan, that it is both: "Creativity is an individually directed and culturally mediated practice" that has "capacity to transform human understanding" (Sullivan, 2007, p. 1181). Sawyer emphasizes the social, inter-subjective nature of creativity, comparing it to collaborative improvisation, where creativity emerges from complex social processes (Sawyer, et al., 2003). However, mediating artefacts (paintbrushes, canvas, language or music) also play an important role in creativity (Sawyer, et al., 2003).

In this thesis, creativity is about children's ability to achieve new personal understandings. It is about the discovery of meanings new for the child itself. Creativity is a force that emerges from imagination and experience with physical and social environments, but also from a child's personal connections between past and present experiences. As will later be discussed, new understandings[95] are results of creative process[96] and emerge from a child's personal engagement during active negotiating of meaning in specific physical and social contexts.

Imagination

Since creativity has often been considered an activity that leads to some kind of physical product, Takaya suggests that the concept imagination is better fitted to a playful activity not focused on production. He states:

> Being imaginative suggests being in pursuit of ideas driven by curiosity and fascination about the subject/task without being too concerned about the judgement of others" (Takaya, 2007, p. 39).

[95] Also called micro-discoveries.
[96] Or aesthetic learning process.

Seen from this perspective, an imaginative person has to be strong and resistant in order to hold to her/his ideas despite negative judgements from others. It also implies that strict social norms can hinder imagination; since imaginative thinking is connected to a person's freedom and self-confidence (Bailin, 2007).

Sutton-Smith poses the question: "What if the imagination is primarily not mere fancy or imitation, but is itself thought's direction?" (Sutton-Smith, 1988, p. 7). Efland (2004a, p. 757) claims: "Imagination refers to the cognitive processes that enable individuals to organize or reorganize images, to combine or recombine as in creation of metaphors, or narrative production" through reorganization of previous experiences.

Vygotsky considers imagination to have a two-way connection to experience; on the one side, imagination is based on experience, on the other, experience is based on imagination (Vygotsky, 2004 [1930]). Dewey also considers experience and imagination to be connected. He writes that it is through imaginative play that a child reworks her/his experiences with materials and objects, and comes up with suggestions, reminiscence and anticipations (Dewey, 1956b). Imagination is necessary for "combination and reorganization of previous experiences" (Efland, 2002, p. 133), and construction of meaning (Efland, 2002).

Earlier, "in the heyday of Progressivism (…) teaching art was synonymous with freeing the imagination" (Efland, 2004a, p. 751), and this had negative resonance, because imagination was not considered to be a cognitive endeavour (Efland, 2004a). Yet, it is precisely the imagination that opens the way to intellectual possibilities (M. Greene, 2007) and ensures meaning-fulness of a learning process (Egan, 2007).

"In arts, imagination is given licence to fly" (Eisner, 2002, p. 198). However, in educational systems where arts are not considered particularly important, and where logocentric conception of mind is made essential, the imaginative and romantic side of human nature tends to be diminished (Eisner, 1999). According to Eisner (Eisner, 1999), that is one of the tragedies of many educational systems. Egan (2002, pp. 95-96) also claims that imagination is vital for learning and should be essential in education, because the "tools of the imagination [that] are precisely those needed to keep us intellectually flexible, creative, and energetic in modern societies".

Construction of Meaning through Assimilation of Experiences

Vygotsky (2004 [1930]) writes that a child during the act of play combines her/his previous experiences with something new, and does not simply

reproduce what s/he happens to observe. "It is this ability to combine elements to produce a structure, to combine the old in new ways that is the basis of creativity" (Vygotsky, 2004 [1930], p. 12).

Dewey says something similar claiming that meanings from past experiences assimilate with new experiences through a "transformation of energy into thoughtful action" (Dewey, 2005 [1934], p. 63).

> The junction of the new and old is not a mere composition of forces, but is a re-creation in which the present impulsion gets form and solidity while the old, the 'stored,' material is literally revived, given new life and soul through having to meet a new situation (Dewey, 2005 [1934], p. 63).

To emphasize the level of embodied assimilations of previous experiences, Dewey uses a powerful metaphor 'organs':

> Aspects and states of his prior experience (…) are the organs with which he perceives. Creative vision modifies these materials. They take their place in an unprecedented object of a new experience. Memories, not necessarily conscious but retentions that have been organically incorporated in the very structure of the self, feed present observations (Dewey, 2005 [1934], p. 93).

Inspiration for such assimilation of old and new experiences emerges from intimate and prolonged contact with materials' resistance (Dewey, 2005 [1934]). According to Dewey, resistance is an important force that pushes and presses: "Unless there is com-pression nothing is ex-pressed" (Dewey, 2005 [1934], p. 69). Also Eisner argues that resistance is motivating, meaningful and necessary for learning. Resistance "calls out thought, generates curiosity and solicitous care, and, when it is overcome and utilized, eventuates in elation" (Dewey, 2005 [1934], p. 62). For Eisner, opportunities for development of mind lie in a child's engagement with material's affordances and constraints (Eisner, 2002):

> Each material possesses unique qualities; each material requires the development of distinctive sensibilities and technical skills. From this perspective the selection of material or activity is also the selection of an array of forces that will influence how students will be challenged to think (Eisner, 2002).

Dewey compares the physical process of transforming materials to the processes inside the person's body-mind: "transformation takes place on the side of 'inner' materials, images, observations, memories and emotions" (Dewey, 2005 [1934], p. 77). He also compares sense-training to thinking;

saying that neither sense-training nor thinking occur for their own sake, but in order to meet some form of difficulty and find a way to overcome it (Dewey, 1956b, p. 135). On the basis of these claims, resistance seems to function as both a source of motivation, and the driving force that makes it possible to grow.

Writing about children's discoveries of meaning, Eisner (2002) says that they often come in forms of micro-discoveries; small and sudden surprises when a child realizes something new or when a new connection is made. However, taking risk is necessary for micro-discoveries to take place (Eisner, 2002). Taking risk means that some kind of difficulty is present that makes it uncertain if one will succeed or not. Such risk taking is then dependent on some kind of physical constraint or social resistance that challenges a child to struggle against it, and the challenge motivates the action. Further, when the child engages in such process, her/his perception becomes more "refined, imagination stimulated, judgement fostered" and technical skills develop (Eisner, 2002, p. 15). If engagement is essential for problem-solving, and constraints necessary to engage, then it can also be said that creativity profits from constraints (Eisner, 2002).

3.2.3 Verbal Language and Sensory Experience

Sensory experience is essential for the development of verbal language. In organized play with 3D-materials teachers can choose materials' qualities and in that way support children's experiences and types of language that can be developed. This section first presents some of the basic assumptions about how children develop early language. The assumptions are structured according to the following categories[97]: concept construction, categorization and differentiation, and metaphor. Metaphors are seen as especially important for the study, and have their own subsection in this text. This section continues by discussing verbal language with regard to very young children and their communication.

As mentioned earlier, the study presented here belongs to an umbrella-project that focuses on children's languages. In the umbrella-project verbal communication is seen as important for sharing thoughts and ideas, and construction of meaning. In the study Negotiating Grasp, physical activities and experiences are additionally considered as important. When young children gather around a physical material, they easily get engaged in conversations about what is happening here-and-now, and their conversations

[97] It is important to remark that the categories represent a collage of different theories with the aim of structuring parts of theory in a way that fits to this study, and not in order to make a new theory.

are driven by their associations related to the material and the activity (Fischer and Leicht Madsen, 2002). In such situations, play with materials can support verbal language (Høigård, 2006; Sutterby and Frost, 2006), and conversations about materials can support sensory experience (Eisner, 2002). I have compiled a list of different forms of mutual support between verbal language and 3D-play:

- Experience with 3D-materials gives food to concept formation (Dewey, 1956a; Eisner, 1990, 2002; Fischer and Leicht Madsen, 2002; Høigård, 2006).
- Experience with differentiated qualities gives possibility for concept differentiation (Eisner, 2002).
- Watching an activity of material transformation makes it possible to connect new words to the actions, changing texture, colors etc. Nuances in verbal language depend on the refinement of the visual and tactile sensibilities (Eisner, 1990).
- When people are gathered they can in many ways communicate with each other, give quick responses and encourage each other's actions (Rogoff, 2003).
- Gathering around a 3D-material motivates conversations about shared experiences and actions, and reflection about them (Thompson, 2009a).
- A teacher can use diverse and rich language when talking about materials, and through that help children to improve their vocabulary (Colbert and Taunton, 2001). Use of teacher's technical language deepens the depth of understanding (Eisner, 2002).
- What each participant experiences, depends on their personal history of experience and language (Thelen and Smith, 1994), which means that everyone's experiences are unique. When they meet in joint activity, they can get engaged in a "collective negotiation process in which all the members participate in some form or other" (Stelter, 2008a, p. 121).
- Through communication with adults children learn about the adults' cultural knowledge (Gjems, 2007). This also means that children through interaction with art teachers learn about the teachers' attitude toward aesthetics. Eisner (2002) emphasizes the importance of arts teachers' attitudes for children's learning.
- Internal monologues during the process of making, support reflection (Eisner, 2002).

According to Vygotsky, amongst others, thought and language are related one to another, and it is difficult to say if something is a word or a thought (Vygotskij and Kozulin, 2001). Through conversations with others, children develop verbal language, learn about the content of the conversation, but also

learn about moral, social and cultural norms (Gjems, 2007, 2009). They learn what is acceptable in certain contexts and what their parents or a teacher expect from them (Gjems, 2009). Language does not mirror the real world, but supports their construction of it (Gjems, 2009). That also means that the meanings an ECEC teacher assigns to words, activities and objects will become a part of the children's understanding of the world. It can therefore be said that language does not "neutrally" represent something, but "sets something in motion and transformation; materializes something" (Lenz Taguchi, 2007, p. 280).

Concept Construction

Learning or constructing new concepts is a complex process. When a child learns a new concept it means that s/he has managed to make a connections between an experience and a word (Høigård, 2006). A 'word' is a shell, in itself a meaningless composition of sounds, and a 'concept' is about the meaning behind the word. Every word is a symbol that represents something outside itself, but also has a phonological identity (sounds, length, rhythm) (Høigård, 2006). Each concept connects to a net of associations and emotions from a child's experience with the referent the word points to. The discovery of a word's meaning is therefore a dynamic process (Vygotskij and Kozulin, 2001).

Høigård (2006) claims that the basis for learning words lies in the child's sensing of an object with all her/his senses. A child experiences the emotional, physical and cultural contexts that surround her/him all at the same time. In this way, the new concept is interwoven with feelings and associations from the experience. Concepts are shaped by our sensor motor system (Lakoff and Johnson, 1999). Egan (2001) claims that it is precisely the emotional engagement that makes words meaningful. In this way, explaining to a child what a word means can never substitute the child's direct experience with the word's referent. In contrast to first-hand experience, concepts learned through second-hand experience are unclear and unstable for young children (Høigård, 2006). Showing something to children under two and letting them experience it themselves is much more effective than trying to explain it (Pramling, 1995).

Categorization and Differentiation

"Every living being categorizes" (Lakoff and Johnson, 1999, p. 17). To be able to survive, every animal has to be able to categorize, for example, what is edible and what is not. "It is an inescapable consequence of our biological makeup" (Lakoff and Johnson, 1999, p. 18); it is how we are embodied. Forming of categories is dependent on our experience (Lakoff and Johnson, 1999). However, some concepts are derived from experience from social

relations, feelings and other ungraspable things. Important concepts, like love or life, are abstract, but not disembodied (Efland, 2004a). Still, trying to categorize abstract concepts is not as easy as categorizing concepts that refer to concrete objects. Since abstract concepts cannot be seen, they have to be imagined (Efland, 2004a). Imagination therefore plays an important role in categorizing abstract concepts. "Power to develop category systems (…) relies heavily on the imaginative activity having its origins in bodily and perceptual experiences" (Efland, 2004a, p. 760).

According to Efland (2002), categories help us structure knowledge and social behaviour:

> Categories are structures of knowledge abstracted from multiple experiences that are largely perceptual in character, and that they are 'natural' in the sense that they arise from distinctive actions of the body such as grasping, touching, or seeing. Although categories are cognitive achievements, they are not disembodied. Their elaboration in cognition is, in part, a function of imagination, the ability to discern relevant similarities in a collection of cases that defines these as like things – that is as a category (Efland, 2002, p. 142).

Egan (1997) suggests that the first categories children make are binary opposites. Through them they try to structure their world - the structuring is a feature of their personal understanding, minds and language, and not an objective representation of the world (Egan, 1997). Forming of binary opposites is dependent on children's embodied experience with, for example, hot and cold. When a child has formed opposites, these binary structures function like two possible categories for the following concepts they learn. Egan says that children at this early stage often exaggerate (Egan, 1997).

Differentiation is a refinement of categories. According to Egan (1997), it is only once children have formed the opposites that they can start learning more nuanced concepts. To be able to fill the gap between the opposites, they need to be able to differentiate between the nuances along the continuum. The process of differentiation depends on their attention to details and the possibilities for them to experience specific qualities of their environments.

Through explorations with materials children have possibilities to experience different forms, textures, colors etc., which can later become the basis for their language classifications and taxonomies[98] (Høigård, 2006). Eisner emphasizes that differentiation of concepts is about development of mind:

[98] Taxonomies are more complex structures, having many levels and categories.

> The skilful use of language is the result of having developed both certain modes of thought and a receptive attitude toward their use. When teachers provide opportunities for students to engage in tasks that practice such skills and attitudes, they are providing opportunities for the development of mind (Eisner, 2002, p. 13).

Dewey suggests that children's learning of verbal language can spring from their actual or imaginative experience (Flanagan, 2006). Imagination has a linking function between what is and what might be. I suppose that imagination is also crucial when children wonder why something is as it is, or how something can be transformed. Høigård (2006) calls such wondering 'children's hypothesis' and says that children often make such hypotheses when they play and experience physical objects and materials. In Reggio Emilia ECEC centers they call such hypotheses 'children's theories' (Vecchi, 2010). In both cases, the hypotheses or theories are described as short-life-events, which are extremely valuable because they support children's contemporary curiosity and help them engage in the process of defining problems and exploring possibilities. Children's hypotheses and theories initiate reflection and lead to development of deeper insights into concepts.

Being able to experience different qualities, and learn to talk about them, are both dependent on having occasions to experience a variety of qualities (Eisner, 2002). Exploration of materials can provide such settings where children can develop aesthetic attention, but only under conditions where the social contexts are supportive, challenging and meaningful for the children. Development of verbal language with which to talk about nuanced aesthetic qualities is dependent on a teacher's linguistic skills, but even more dependent on her/his attitude towards arts (Eisner, 2002).

Dewey draws attention to the fact that categorizing is a form of generalization; where categories express generalized conditions (Dewey, 2005 [1934]). Stern (2003) even claims that young children's learning of verbal language suppresses their experiences, because their first words are too narrow to express the holistic experiences. Verbal language is better equipped for making statements, than for expressing holistic experiences; Statement is generalized, while expression is individualized (Dewey, 2005 [1934]). This again resonates with Dewey's previously mentioned view that "Science states meanings; art expresses them" (Dewey, 2005 [1934], p. 87). This is an interesting point to have in mind while I move onto relations between verbal and embodied understanding.

3.2.4 Metaphor

Earlier experiences become integrated elements within the body-mind constellation - they are our organs through which we perceive[99]. New experiences sometimes remind us about something earlier experienced. Associations are dependent on our memory, but the connections that are made seem to be dependent on some kind of immediate judgement. Association can emerge from only one aspect of present experience – the aspect one finds most crucial at the moment of association, or at the moment of representation as Kress and Van Leeuwen (2006) suggest. Most likely, associations and metaphors are related;

In this thesis 'association' is understood as an immediate connection function, while 'metaphor' is understood as a representation or an expression. However, metaphors can also create similarities and lead to associations (Indurkhya, 1992). In early childhood the distinction between an association, a metaphor and an expression does not seem so clear, especially when an expression is embodied, small and silent - like a body movement.

Lakoff and Johnson (1999) present an example where an infant comes to connect her/his embodied experiences of 'warmth' to the conceptualisation of 'affection':

> For an infant, the subjective experience of affection is typically correlated with the sensory experience of warmth, the warmth of being held. During the period of conflation, associations are automatically built up between the two domains. Later, during a period of differentiation, children are then able to separate out the domains, but the cross-domain associations persist. These persisting associations are the mappings of conceptual metaphor that will lead the same infant, later in life, to speak of 'a *warm* smile,' 'a *big* problem,' and 'a *close* friend' (Lakoff and Johnson, 1999, p. 46, original emphasis).

Metaphors are often verbal expressions – we say one thing and mean another (Langer, 1957). Approaching the concept from a linguistic perspective, Lakoff and Johnson

> … postulate a type of schema that begins with image and bodily experience acquired directly in perception as providing the foundation for categorization, abstract reason, propositional and non-propositional forms of thinking, metaphor and narrative (Efland, 2002, p. 146).

[99] As Dewey puts it and quoted earlier in this chapter.

Efland criticizes Lakoff and Johnson because they do not mention arts, despite the fact that it is in the arts that "one encounters metaphors as ways of establishing meaningful connections between ideas and concepts" (Efland, 2002, p. 143). According to Efland, metaphors are not just a matter of language, but also a matter of thought and reason (Efland, 2004a). Metaphors relate to sensory-motor experiences (Lakoff and Johnson, 1999; Parsons, 2007), and can take on many other forms than linguistic expression (Parsons, 2007). Efland (2004a) also suggests that metaphors can be visual and convey meaning without use of verbal language. Parsons (2007) suggests that metaphors are a kind of connection between body and mind and poses the question if it is the thought itself that is embodied.

Parsons (2007, p. 536) presents a metaphor of a metaphor in which metaphors are like electricity, like a wire network; "enabling thought to run further and in many directions, limited only by the complexity of the network". One might expand this metaphor in assuming that the speed of the impulses that run through such networks depends on the breadth and quality of a person's experiences; the depth of her/his sensory attention and her/his ability to remember, imagine and create new connections. Young children's ability to create metaphors benefits especially from their sensory attention and imagination.

The question of creating metaphors seems to be essential for understanding young children's relations between embodied experiences and their body-minds. Children have an ability to see similarities that adults do not any longer see (Høigård, 2006). Born like poets (Egan, 1999), children connect things that for adults seem distant and unrelated. Kress and Van Leeuwen say that children's "metaphors are less likely to carry the day" (Kress and Van Leeuwen, 2006, p. 8). However, evaluation of how well something "carries the day" in relation to adults' logic, gives different results than evaluation in relation to meaningful experiences. As Parsons puts it (2007, p. 534): "Metaphors make an enormous contribution to our understanding of ourselves and of the world". This means that children's metaphors are important for them, even though the metaphors might appear meaningless for adults. It might not be critically important whether adults (parents, teachers, researchers) understand children's metaphors or not; what is important is that adults support children's explorations of ideas through metaphorical connections. Connecting personal experiences is important because it is what holds one's world together and makes it meaningful (Hohr, 2005).

"Fresh metaphors (…) generate new insights and reveal new aspects of their referents" (Snodgrass and Coyne, 1992, p. 65). If metaphor is an asset to cognitive activities (Indurkhya, 1992), this might mean that when children

establish new metaphors, they also understand something in new ways. Additionally, the fact that two things (or two experiences) can never be identical, opens a space for finding specific meanings in each new context, which further "generates an 'emerging meaning', a linguistic innovation" (Snodgrass and Coyne, 1992, p. 66). Acquisition of new metaphoric meanings can be seen as a spiral, hermeneutic process, where the same past experiences initiate new meanings in new contexts, constantly modifying the existing version of our understanding (Snodgrass and Coyne, 1992).

3.2.5 Early Negotiation of Meaning

Very young children are not dependent on linguistic understanding of their environments. Emerging ECEC research with 0-3 year old children[100] raises new questions about how to understand young children's experiences and expressions. The study presented here includes children from 3 to 5, however, the most relevant examples have been found in the data collected from three year old children, who were not pre-verbal, but becoming-verbal. Still, since children's development is viewed here as contextual and a continuum without stages, I find it relevant to present some specific features of toddlers' (0-3 year olds) ways of engaging in the world.

The concept toddler has been introduced in Norway by Løkken (2000a), who studies one and two year old children's communication with each other. She presents the children as perceiving body-subjects in motion: "the young body, in being-in-the-world, involves itself in interactional actions toward things and persons, responding to their 'call'" (Løkken, 2000b, p. 18). Løkken (2000b, p. 19) concludes that "doing research on children's communication before speech, may imply studying the origins and meaningful silence beneath the words".

"Much modernist and postmodernist theory build on the assumption that human understanding is essentially languaged understanding" (Egan, 1997, pp. 165-166). Such assumption makes it impossible to understand "how a biological creature as a new-born child appropriates the cultural tools of his (…) environment" (Ivarsson, Linderoth, and Säljö, 2009, p. 203). However "we are human beings before we are languaged human beings" (Egan, 1997, p. 167) and our embodied ways of relating to the world provide us with lived experiences beyond our possibilities of articulation (Egan, 1997). We all have individual bodies before language is developed and it is the body that is "the

[100] It is emerging in Norway as a result of increasing the number of 0-3 year old children in Norwegian ECEC centers and the Government's financial support to research focusing on this age group.

most fundamental mediating tool that shapes our understanding" (Egan, 1997, p. 5).

It has earlier been believed that children under three are not interested in playing with other children and that their interests are mainly egocentric (Vygotskij and Kozulin, 2001). More recent research shows that humans are communication oriented from birth. "Human infants are born with predispositions and aptitudes that help them to become socialized to whatever culture surround them" (Dissanayake, 2007, p. 785). In addition to this, they are born with abilities to communicate with adults in order to be liked and taken care of (Dissanayake, 2007). Humans are social by nature – biologically-cultural, as Barbara Rogoff (2003) puts it. This means that we are born with predispositions to socialize into communities we happen to be born into. Rogoff emphasizes that individual learning is always influenced by, and cannot be separated from social, cultural and historical contexts the individual is a part of (Gjems, 2009).

> It can be said that babies are born wanting not only interaction, but specific kinds of interactions (…) vocalizations, facial expressions, and head and body movements (Dissanayake, 2007, p. 788).

An infant therefore starts communicating and socializing from the day s/he is born[101]. Facial expressions and body language play an essential role in communication. Infants are first attentive to sounds and body movements (Høigård, 2006), and their first reflexes gradually become conscious forms of interaction. Stern (2003) says that an infant first needs to grasp that s/he is sensory and physically separated from others – it is only then that s/he is able to experience inter-subjectivity and to communicate.

Dewey (2005 [1934]) explains how a baby's cry develops from a reflex into an expression. The transformation of infant's cry and babbling into expression takes place when the infant, through response from his environment, becomes aware of the meaning of his own sounds and actions. It is through the response that the infant becomes aware of her/himself and the meanings of her/his actions. The earliest forms of communication between an infant and an adult are touch, facial expressions and body language. Stern (2003) explains that communication is only possible when an infant and an adult share emotional condition and recognize each other. To be able to share thoughts and to communicate, they have to have joint attention for example about the same object, or to have shared intentions - that they both want the same. Inter-subjectivity is a form of sharing where emotions and thoughts, as well as imagination cannot be separated (Stern, 2003). To

[101] Or maybe even before.

conclude, Stern (2003) presents three types of subjective experiences that can be shared through inter-subjective relations between an infant and an adult: shared emotional condition, joint attention and shared intentions. The example of sharing a nacho, given in the introduction to this thesis, illustrates an inter-subjective relation established on the basis of all of the three types of sharing subjective experiences. The infants Stern writes about are less than a year old, and the boy who shared the nacho was 14 months old. I believe (and more examples will show) that communication through body, shared emotions, attention and intentions do not stop when children grow older.

> When the child begins to use language, (these) embodied modes of understanding do not simply cease to exist; on contrary, they are what situate, make possible, and give meaning to (…) linguistic performances (M. Johnson, 1999, p. 93).

Inter-subjectivity is, for practical reasons, addressed under this section about early forms of communication and meaning negotiation. As a precondition for communication, inter-subjectivity can be divided into primary and secondary inter-subjectivity. Primary inter-subjectivity is seen as part of human biological heritage present from birth, and secondary inter-subjectivity (that develops around the age of nine months) as being derived from practice of shared understanding (Uzgiris, 2000). It can be said that primary inter-subjectivity is a precondition for secondary inter-subjectivity that then stays with us throughout our lives.

Dissanayake (2000) claims that the earliest communications between an infant and her/his mother forms the preconditions for all later forms of communication and sharing of meaning in the child's life. She builds her suppositions on five basic assumptions: 1) mutuality between mother and infant is a prototype of love, 2) mother-child contact is essential for belonging (and acceptance) in a social group, 3) the same contact is essential for mutual meaning making, 4) for acquiring a sense of competence, and 5) for acknowledging the vital importance of these meanings and competences (Dissanayake, 2000). The facial expressions and body language, that are the basic forms of communication in infancy, remain as part of one's communication and inter-subjectivity during later life. However, they are often not considered as significant as verbal language.

This thesis considers inter-subjective relations between children and teachers to be of great importance for mutual understanding and negotiation of meaning. Even though most of the children in the study were able to communicate verbally, their competence to "read body language" and communicate through it had not disappeared, but seemed to be fully present and decisive for the meanings which could be made in the educational

contexts. During my interactions with the children, I experienced how competent they were at interpreting each other's and my body language, and I learned how important it is that teachers and researchers are aware of what their bodies communicate to children.

According to Stern (2003), children (and each of us) are competent to attune to non-verbal languages of others. By doing so each of us is able "to match other people's moods and emotions because of our ability to 'read' the form, the vitality, and the intensity of their movements" (Herskind, 2008, p. 280). These abilities are central for our embodied competence to inter-subjectively connect with others.

When children start using words, their first words are often connected to gestures and body language (Høigård, 2006; Løkken, 2000b). My son, for example, simultaneously slapped my cheek and said "mummy" the first time he addressed me. Judging from the intensity of his facial expression, I did not doubt that he had just discovered the connection between the word and its referent.

What a word means is dependent on the context it has been used in, as well as the way it has been pronounced and accompanied by body language (Gjems, 2009). During their learning of words, children continue to combine the words with body language and sounds. This is especially useful when they struggle to make themselves understood[102]. In developing their verbal language, children don't only imitate, but are also creative and make their own words when they need them (Høigård, 2006). Children invent words that "are expressively suitable to what they wish to say" (Eisner, 1990, p. 47), and they support what they want to say by active use of their bodies to 'explain through showing'.

In the process of learning, young children are activity-oriented, experience-oriented and people-oriented (Bae, 1996). Through their embodied activities they experience the world, interact and communicate, and their physical and social experiences somehow merge with their bodies. By reaching and grasping, a child learns about connections and not about isolated qualities (Dewey, 1916). Children learn both about materials and people through exploring what they can do with them, as well as how the materials or people respond (Dewey, 1916). Some of our concepts rely on experiences acquired before we had names to describe them – like, for example, the concept of balance (Efland, 2004a).

[102] See one example at the blog: http://sculpturingwords.blogspot.com/2009/10/facial-expressions-of-symbol-using.html

> The basic things about our lifeworld (such as the experiences of lived time, lived space, lived body, and lived human relation) are preverbal and therefore hard to describe (Van Manen, 1997, p. 18).

Writing about toddlers' experience with arts in the arts-appreciation project Glitter-bird[103], Eva Steinkjer (2005) reports that the 0-3 year old children "conquered" the art scenes, whether in the form of a play, a concert or a sculpture exhibition - they became the actors in the performances they actively and spontaneously took part in. Through their toddler-explorations they engaged with the art objects, pushed them and explored what could be done with them (Steinkjer, 2005).

It has earlier been said that children are imaginative and playful. Dissanayake claims that they are inherently artful:

> Artful predispositions of toddlers and young children are evident in their untaught readiness to sing and dance, to play with words, to make believe, to decorate their bodies and possessions, and to enjoy stories and dramatic presentations by themselves or others (Dissanayake, 2007, p. 793).

Aesthetic forms of embodied learning are essential in childhood, as Egan (1999, p. 92) puts it: "The basics of our educational development (…) are the arts". The study Negotiating Grasp builds on an understanding that young children get to understand their world (and themselves) through embodied, experiential and aesthetic forms of interaction with it. The themes touched upon in this section intended to present the most relevant understandings about young children's communication with other humans. The next part of the chapter will focus on embodiment and experience with physical materials.

3.3 Embodiment, Multimodality and Materiality

This study crosses boundaries between linguistics, nonverbal behavior and the material world. There is an emerging interest in embodied ways of knowing, and the relations between body and cognition. Some significant issues concerning embodiment are outlined here, before returning to the main theme of the thesis[104] - visual art education with 3D-materials.

3.3.1 Body - mind - environment

The significance of the body has for decades been ignored in Anglo-American analytical philosophy (M. Johnson, 1999). In generative linguistics

[103] See the evaluation report written by Borgen (2003)
[104] And the starting point of this chapter.

and first-generation cognitive science, amongst other areas, "'knowledge structure' is seen as a structure of signs (…) that are meaningless in themselves and have to be interpreted to be meaningful.(…) Such fitting of signs to things in the world (…) is both disembodied and 'literal'" (M. Johnson, 1999, p. 83). However, there is a re-emerging interest in experiential dimensions in learning (Stelter, 2008b).

All sensory and motor systems are integrated in the body (Parsons, 2007), and "we are biologically designed to be sensitive to the array of qualities that constitute our environment" (Eisner, 2002). We know the world through our bodies (Polanyi, 2000; Shusterman, 2008) and verbal language sometimes limits our understanding. Dewey complains that there is no word in English that represents body and mind as one unity. He therefore introduces the concept body-mind that "simply designates what actually takes place when living body is implicated in situation of discourse, communication and participation" (Dewey, 1925, p. 285). In more recent theories about the senses, cognition and interaction, the term has been extended to body-mind-environment (Howes, 2005) signalizing that human body-minds merge with their environments (Merleau-Ponty, 1994 [1945]). However, an extension of Dewey's concept might not be necessary, since his attention to environment seems to be already integrated in the body-mind concept.

Seeing body, mind and environment as closely connected leads one to conclude that reason is embodied. "Reason develops as it does primarily because of the nature of our bodies and the range of organism-environment interactions" (M. Johnson, 1999, p. 99). Raising the question of embodied reason demands a discussion about the influences between nature and culture. This is an area that has been very much avoided by "virtually all authors in the growing embodiment tradition" (Sanders, 1999, p. 121). Sanders (1999) suggests that embodiment can be understood from an "ecological first philosophy". As products of the evolutionary process, organisms are dependent on factors inside and outside their organism, and are products of interactions with their environments.

Embodiment concerns the fact that human bodies are mobile and capable of taking action. The environments they inhabit do not only provide them with sources of experience, but also afford them with potential for action (Sanders, 1999). Ability to move is fundamental for humans (Moser, 2010). The specific anatomic and physiological characteristics of human body developed during evolution have made it possible to deal with activities like walking, grasping and so on (Moser, 2010). At the same time the physical abilities of our bodies have made it possible to develop reason in specific ways (Moser, 2010).

Dewey's aesthetics accounted for all the senses, his somatic naturalism was "dedicated to rooting aesthetics in the natural needs, constitution, and activities of the human organism" (Shusterman, 2000, p. 6). Even though Dewey seems to focus on experience as individual achievement – "so-called private mental experience" (Shusterman, 2000, p. 28), he still emphasizes the individual's interactions with his/hers social and material surroundings. In this sense it is not difficult to unite Dewey's aesthetic with more dialogic forms of aesthetics. Shusterman (2000) suggests that Dewey's aesthetic "should be recuperated and refashioned".

Senses, experience and embodied knowledge have always been valued in arts (Davidson, 2004). It is through engagement with arts that we can "capture and embody meanings that bridge thought and feeling" (N. R. Smith, 1982, p. 299).

> The arts, unlike the traditional academic areas, are an arena in which the body is central to the process of inquiry and constitutes a mode of knowing. This makes dance, drama, music, and visual arts education a particularly rich place to explore what embodiment means (Bresler, 2004, p. 9).

A renewed consideration of the importance of embodied experience is also emerging from other disciplines than the arts - a sensual revolution is taking place in order to "recover a full-bodied understanding of culture and experience" (Howes, 2005, p. 1). Shusterman (1999), inspired by Dewey's somatic naturalism, proposes a new philosophical perspective 'Somaesthetics'. In the same vein, Pink (2009) suggests a new method in ethnography - 'Sensory ethnography', while "Lakoff and Johnson began to elaborate a theory of knowledge that could account for the mind as a power that develops multiple forms of thought" (Efland, 2002, p. 143).

The study presented here approaches young children with the assumption that their experience through senses is essential for their orienting in the physical and social world. It views children's sensory-motor activities as evolving from their inner needs, and focuses on the contexts where these "activities of organism" (as Dewey calls them) meet social/educational environments. By focusing art educational settings, this thesis makes visible the unfolding of meetings between a child's somatic experience and aesthetic norms imbedded in the contexts. When children negotiate their experiences with materials, they also negotiate with their teachers the foundations for their future understanding of the concept 'aesthetics'.

Eisner (2002) says that it is through the refinement of perception that differentiation enables construction of diverse concepts. For young children[105] their possibility to refine perception is dependent on the teacher's understanding of aesthetics (Eisner, 2002). Children's initial understandings of what aesthetics is, depends on how their interests, attention, emotional engagement, actions and so on, are nurtured and supported in educational settings.

3.3.3 Multimodality

"Language tends to be given the paramount position in many modern models of human cognition" (Egan, 1997, p. 169). However, what we know about the world is not limited to verbal language – there are many others modes of knowledge and thought (Eisner, 2002). This view has become more accepted in the last decades and different theories about diversity of communication forms have evolved from different disciplines.

One of the theoretical fields where the concepts language, text and communication have been extended is the field of multimodality. The term multimodality has been developed from social linguistics by Kress and van Leeuwen (Kress and Jewitt, 2003; Kress and Van Leeuwen, 2006). It refers to types of communication where meanings are realized through more than one semiotic system (Kress and Van Leeuwen, 2006). Even though Kress and Jewitt come from the linguistic tradition, they criticize conventional understanding of language and communication:

> Modes other that speech and writing are often regarded by educational research as ancillary, and marginal with little or no contribution to learning: 'language' is often considered to be the core of communication where rationality resides, and which defines humans as humans (Kress and Jewitt, 2003, p. 2).

They claim that the time has come to "take seriously and attend to the whole range of modes involved in representation and communication" (Kress and Jewitt, 2003, p. 1).

> Multimodality placed text making within a tradition from social semiotics, and understood signs as being multimodal, imbued with intention and culturally shaped and constituted (Street, Pahl, and Rowsell, 2009, p. 194).

Multimodality is both a theory and a methodological approach to studies of communication and meaning making (Jewitt, 2009), and can be usefully

[105] Probably also for school students.

applied in education research. Some studies in visual art education have recently been conducted using the multimodal approach, for example Hopperstad's (2002) study that focused on the process of young children's multimodal representations during drawing activities. The book "Making Meaning: Constructing Multimodal Perspectives of Language, Literacy, and Learning through Arts-based Early Childhood Education" (Narey, 2009), presents a number of studies situated in visual art education in early childhood. The message of the book is clear:

> The arts contribute immeasurably to the quality and quantity of ways in which children can convey not just feelings but also thinking and attain not only creative expression but also academic achievements (Jalongo, 2009, p. ix).

Multimodal studies have recently developed into a large body of knowledge; involving verbal, audio, visual communication and film, and to some extent also including communication through 3D-materials. One of the few multimodal studies that involves physical materials was conducted by Kress and Jewitt (2003) with children making dolls. They report that the 3D-materials made it possible for the children to play "with nameless and wordless concepts and 'fix' them in multiple variations of shapes, color, pattern, weights, densities, cloths, words, images" (Kress and Jewitt, 2003, p. 136). They emphasize the importance of material as a potent factor in meaning making (Kress and Jewitt, 2003).

Approaching the material world from the field of multimodality, Sigrid Norris suggests that modes like gesture, gaze and posture, together with verbal language should be called 'embodied modes' (Norris, 2007, 2009). She expresses her hope that, by uniting the verbal and non-verbal under the same concept, the modes might be considered equally significant. Consequently, she suggests that interactions with the material world should be called disembodied modes of communication, because one communicates through something external to one's own body (Norris, 2007, 2009). I find the term 'embodied modes' promising, while the term 'disembodied modes' is more problematic for me because it does not seem to acknowledge that communication through materials always involves at least touching and seeing, which cannot be said to be disembodied.

Emphasising a correspondence between experience, communication and expression, requires a reconsideration of the values of arts for cognition and body-mind comprehension. However, according to Pink (2009), multimodal approaches do not seem to acknowledge that our sensory organs are integrated parts of the same body, and that our diverse sensory experiences are united.

It used to be believed that humans have five senses. However, this number has now increased to twenty or more thus, one does not see any point in counting them any longer, or even trying to distinguish them clearly one from another (Stenslie, 2010). Between the visual and tactile senses, both important in visual art, the visual has been assumed as superior (Stenslie, 2010). This is evident when we compare the number of studies of visual representation compared to 3D-representations. This is also the case in the field of multimodal studies.

Two-dimensional representations (images, paintings, digital screens) do not have to be touched to be perceived. A three-dimensional form can be seen in many different ways because it can be visually experienced from different sides and in different angles, and also experienced through touch and movement. Remarkably, very few researchers have been engaged in studying tactility, possibly because the touch is the most subjective sense, "deeply personal and impossible to reduce and share with others, as one can do with sight and hearing" (Stenslie, 2010, p. 80).

3.3.4 Objects and Materials for Children's Play

The importance of physical objects for learning has been acknowledged. Different physical tools can be seen as prosthetic devices[106] that extend our senses, like for instance glasses. Such physical tools used in educational purposes can help children think and in a specific manner invoke their knowledge (Schoultz, et al., 2001) "Children's reasoning is supported by a cultural artifact" (Schoultz, et al., 2001, p. 177).

Lenz Taguchi (2009) presents a possible view on how physical and social dimensions influence each other in the process of meaning making. She suggests that learning in early childhood takes place between children, teachers, chairs, books, materials etc. through "intra-actions" between them (Lenz Taguchi, et al., 2009). That meaning making takes place between people and objects means that both mutually influence each other.

With development in digital technology, the level of visual communication has exploded, but also the number of different digital devices with visual and tactile qualities. Technology is a part of contemporary society and children are competent users of it. However, technological devices make embodiment appear less important in human life, since many operations can be performed without physical body use (Moser, 2010). The same technological devices

[106] This concept is used by Roger Säljö (Schoultz, et al., 2001).

and tools which help us in daily life also disconnect us from direct contact with materials and embodied activities.

There are a large number of digital toys on the marked, and industries are competing in producing the most desirable toys and games for children. Toys' ability to respond and interact seems to be popular for children (Ackermann, 2005, June). However, as long the toys have been manufactured by someone; their functions and design depend on the producers/designers assumptions about children's play and understanding of their interests, needs, learning, as well as being driven by economic benefits. This means that the toy industry tends to ignore individual and cultural differences, and hinders creativity in play.

Trageton (1995) presents a scale between more structured and less structured objects for play, where the level of structuring refers to the level of pre-definition of child's play with the form of an object. To illustrate this with my own example, consider a Barbie doll in a wedding dress, it is less likely that this doll would be able to perform as Little Red Riding Hood's grandmother. On the other hand, a single stick can be used to represent the grandmother. In this sense, the Barbie doll would be characterized as the more structured object for play, and the stick as less structured. Lego blocks for instance can be placed in the middle of the scale. They can be used to construct predefined models by using instructions, but they can also be used for more creative constructions that engage children's own fantasy; that include their personal experiences from own contemporary culture. If one has a large number of Lego blocks, more creative forms can be constructed, but few Lego blocks make it difficult to build organic forms, because they have stable geometric shapes and no possibility to be transformed.

The concept of play-objects' level of structuring is important in the study Negotiating Grasp, because the study argues that less structured objects for play (3D-materials) can provide children with a wider range of experiences than those that are not pre-defined by people with economic and other interests. This means that less-structured materials for play, such as natural materials, can offer children possibilities to play in unique personal ways and to apply their own experiences; when their past and present experiences assimilate. Less structured materials for play open possibilities for imaginative problem-solving and permit each child to form personal meanings and have unique experiences.

Björklund (2010) studied young children's learning processes during their building with blocks; with the aim of better understanding the complex interactions during these play contexts. In contrast, Vejleskov (1995) studied

children's play with Lego blocks focusing on their communication patterns and verbal competence and Ackermann (2005, June) studied children's play with interactive toys. However, both play with Lego and structured toys differ from play with less structured, open-ended materials. Sutterby and Frost (Sutterby and Frost, 2006) write that open-ended (or less-structured) materials offer more opportunities for children's imagination and problem solving.

Dewey suggests that materials for children's play should be "as 'real', as direct and as straightforward, as opportunity permits" (Dewey, 1956b, p. 125). Dewey (1916) says that use of pre-shaped material (I suppose like Lego) exaggerates mathematical qualities and supresses imagination. Dewey (1956a) presents three reasons why ready-made materials[107] are not as good for education as natural materials are:

- Ready-made materials' lack of organic connections makes the subject-matter formal and symbolic.
- External presentation lacks motivation.
- When subject-matter is presented as ready-made, it has already lost its quality.

Sutterby and Frost (2006) claim that children are able to create more diverse ideas when they play with open-ended materials like, for instance, clay. The type of materials, their quality, size and quantity, can also affect children's social interactions (Sutterby and Frost, 2006). To give an example; during the study I experienced how dealing with large materials initiated children's cooperation, because they need help from each other. The size and quantity of materials also affect the use of space and distance between children that deal with the materials, which further influences their forms of interaction.

3.3.5 Natural Materials

"Natural elements provide for open-ended play and creative exploration with diverse materials" (OECD, 2006, p. 198). Natural materials are less structured and offer a large variety of interpretations and possibilities for transformation (Änggård, 2009). Through play with natural materials children develop thinking, sensitivity, reflection, experience, curiosity and humour (Buaas, 2009). When handling natural material with tools children have the possibility to learn about relations between people and nature (Johansson, 2009).

[107] In his time, Dewey probably did not considered digital toys, but I suggest that digital toys could also be included when he talks of ready-made materials.

Making things by hand can make students realize that handcraft takes time and they can learn to appreciate it. They can realize the "ecological impact embedded in the craft's creation" and this can challenge them "to change their attitudes and actions in order to display more compassion for others working conditions" (MacEachren, 2004, p. 148). Dealing with handcraft and natural materials is essential for children's ecological awareness. Through dealing with natural materials, children can experience the large diversity of natural qualities and develop an affection and appreciation for nature. They can also experience that it takes time and effort to create (MacEachren, 2004) and indirectly develop respect for natural resources and the activity of crafting.

MacEachren (2004) suggests that the process of using natural materials should start with collecting them. The process of looking for the right piece of wood should be an integral part of the craft and can contribute to a holistic understanding of relations between nature and culture: "Collecting the wood, and carving a spoon requires a student to begin to notice details of trees and graceful curves and lines of a spoon's design" (MacEachren, 2004, p. 145). Engagement with natural materials during the process of making, forces us to prolong engagement with them and this in turn makes it possible to discover details and qualities, which otherwise might remain unnoticed.

Natural materials offer diverse sensory experiences, multiple possibilities for exploration and transformation, motivation, ecological consciousness, and above all resistance. Through body-mind negotiation with natural materials a child can meet unexpected problems and experience what it is like to create unpredicted solutions. Dewey (1956b) suggests that it is through embodied interaction with natural materials that a child can acquire skills and competences, which are much needed for the future. What humans need in order to meet future challenges is "the capacity to respond creatively to changing circumstances" (Flanagan, 2006, p. 150). Using hands (and body) in experiencing, exploring and transforming natural materials can teach children about nature, their own power, imagination, creativity, ability to contribute to others, and give them self-confidence to solve emerging problems.

The connection between two processes of transformation: the physical transformation of the material and the inner process of transformation, that Dewey (2005 [1934]) writes about, should not be ignored. I have myself experienced how the process of transforming materials constantly interacts with my experiences and feelings. Emerging challenges in the process of making constantly demand attention and aesthetic choices. Material transformation depends on the embodied activities of body-mind, at the same

time, all the senses are engaged in the aesthetic process of making. Gulliksen (2001) poetically describes her thoughts and feelings during her embodied interactions with a piece of wood she is carving. She observes her hands, tools and materials both from inside her body, and from outside: with her eyes, nose and ears:

> The wood needs a long period of intense persuasion to accept my ideas, but when the shapes are found at last, the knife follows the fibres as if they had a secret agreement as to where they were heading. The knife follows the directions of the fibres. When they meet, the fibres and the knife, they unite like rivers connect, meet gliding down through shallow valleys (Gulliksen, 2001, p. 57).

Studying the process of crafting a basket, Ingold (2000) observes three types of awareness that take place during the activity: the practitioner's force in relation to the material, the material's call for care and judgement, and the rhythmical movement of the basket's growing. The basket's growing seem to depend on the mutual interaction between the material and the practitioner; negotiating with each other. The material both offers resistance and calls for judgement, and the practitioner has to remain attentive, engaged with all of her/his senses and constantly call on her/his own past experiences in order to solve emerging challenges.

The study Negotiating Grasp intends to make visible the kinds of processes which take place during young children's embodied negotiations with diverse 3D-materials.

3.4 Summary of the third chapter

This chapter has presented the most relevant literature that can be applied to the study of young children's experiential play with 3D-materials. The review was structured in three main sections, separating visual art education, early childhood education and embodiment. These addressed themes overlap and merge forming the web in which this study is based.

4. Overview of the Cases and Cross-case Analysis

This chapter presents the process of gathering data and is organized into nine chronological cases. Each case was an educational context and was also informed by my observations, meetings and other events that took place between the educational sessions. The interactions with the children, either between or during the educational contexts, gave me new insights that influenced the further understanding, and therefore also the planning and conducting of the following educational contexts.

Chronological presentations, like stories, have the capacity to "knit experiences together" into a coherent and meaningful unity (Stelter, 2008a, p. 126). I hope that this chronological presentation of the cases can reveal the process of my growing understanding and allow the reader access to the background for my choices and conclusions.

The following case descriptions are made on the basis of notes from non-participant observations, meetings with ECEC teachers and from notes made immediately after each educational context was carried out. The non-participant observations were carried out on different days, and some of them informed more than one educational context. In the case presentations in this chapter, all relevant information that concerns the same educational context is gathered together. Each educational context (each of the nine cases) and the information that belongs to it is described with focus on the following aspects: 1) Inspiration for planning of the educational contexts, 2) The practical preparations, 3) The presentations of the educational contexts, and 4) What emerged most significantly. The four aspects represent different types of information from teachers and children, collected through the practice of different A/R/T-ographer roles.

Here is an outline of what each aspect will cover and its relation to my roles:

- "Inspiration for planning the educational contexts" presents relevant non-participant observations and meetings with ECEC teachers, where I acted in my researcher role.
- "The practical preparations" intend to inform the reader about the preparation of the selected 3D-materials, tools and physical space. These choices were made in my visual art teacher role. It also presents how I selected participants (children), pedagogical content

and pedagogical methods for each session, in my early childhood teacher role.

- "The presentations of the educational contexts" describe what happened. The educational contexts were conducted combining my visual art teacher and ECEC teacher roles.
- "What emerged most significantly" is based on the notes made immediately after each of the educational contexts. At that point I had fresh experiences from interactions with children. The writing of the notes was a kind of transition to my researcher role. During the writing of the notes I could reflect about my immediate embodied experiences from the interactions with the children as visual art/ECEC teacher. At the point of note writing I did not know what findings would emerge from the study. However, at the moment of writing this thesis (a year and half later) I find it relevant to tell the reader how the immediate experiences from the contexts can be related to the findings that emerged during the data analysis.

Presentations of the cases are intentionally short to provide an initial overview. At this stage, the reader might miss more detailed information, however, the discussion of the detailed content of the educational contexts forms the data that will be later described and analyzed in the fifth and sixth chapters.

Following the presentations, the second part of this chapter discusses how the video material from the cases/educational contexts was coded across the cases.

4.1 Presentation of the Cases

4.1.1 Case 1: Woodwork

Conducted on October the 7th, 2009
Participants/co-researchers[108]: Emil (boy) aged 3 ½ and Morten (boy) aged 3 ¾

Inspiration for planning the educational context

While watching children playing in the playground on September the 16th 2009, I observed a three year old girl (I will call her Line) playing with twigs and sticks. She was pretending to be a horse and using the sticks as a tale.

[108] See section 1.6.1 where children are first introduced as co-researchers.

On September the 22nd, I observed a group of three year old children singing with their two teachers, one with a keyboard in front of him. When the teacher asked the children which song they would like to sing next, one boy replied: "Emil from Lønneberga"[109] The song that was suggested was not part of the usual repertoire. I learned that the boy who made the request was also called Emil[110].

I guessed that Emil found the song especially interesting because of sharing the same name. He was also interested in telling more about the woodcarving activities that Emil from the book and film did in his woodshed. The teacher asked the children about what Emil from Lønneberga used to do in his woodshed. Line answered that he "twig-ed[111]" while she made whittling movements with her hands.

The girl's interest in wood and sticks, her knowledge about whittling and the boy's interest in the activities of Emil from Lønneberga, gave me the idea to tailor an activity for the two of them; where they could have the possibility to play with sticks, branches and suitable tools. The plan was discussed and approved by ECEC's personnel on October the 1st. Unfortunately, Line got sick the day that the activity was planned for and a three year old Morten stepped in.

The practical preparations

On the morning of October the 7th, I filled my car with fresh branches, roots, bark etc. in mystical forms, colors and textures. Some of them were more bendable and could be characterized as flexible materials for construction[112], while others were more solid, could not be bent, and required use of tools like a saw and a knife to be transformed. The bicycles were moved outside and the bicycle shelter was turned into a wood workshop. I hoped that this would create the possibility to recall the woodshed of Emil from Lønneberga. The wood materials were placed on the floor in front of three tree stumps that we could sit on. In addition, some carved figures were placed on the shelf together with tools and additional materials: a saw, a carving knife, scissors, masking tape and rope. A digital video camera was placed on a tripod as far back as possible in order to get a wide-angle that was directed at the three stumps where we would sit. Outside the door, I stuck a note: "Will be back soon! Emil" and went inside the ECEC to meet the children.

[109] Emil from Lønneberga is a boy from book written by Astrid Lindgren, which has also been made into a film.
[110] The use of his first name has been approved by his parents.
[111] She created a verb from the word "twig" (in Norwegian: "kvistet") which was understandable when she used it together with the hand movements.
[112] According to Trageton's (1995) material specifications.

The presentation of the educational context

First, I asked Emil if he had written the note. Then I also asked Morten if he wanted to come and find out which Emil might have written the note, and why. They were curious to find out.

The boys were surprised when they entered the room, though they did not ask what had happened there or where the bicycles had gone. They immediately started to explore the items in the room[113]. I hoped they would be interested in the natural materials (the wood which I had selected with attention to its specific qualities), but to my surprise, they seemed more interested in the tape and rope than the wood. They still played with the branches; binding them with rope and pulling them around the room. They did the same with the stumps and were constantly walking outside the range of the camera. They were also interested in using the tools: the saw and knife; and they sawed and whittled for the first time. Through these activities they could experience the consistency and hardness of the wood, the different textures of the bark and the moss, different smells, shapes, colors and the flexibility of wood.

The boys did not sit still at all, they were moving around looking for tools and materials to do things with. They were active for the whole hour and a half we spent in the shelter[114]. Their activities revolved between taping, dragging, sawing, cutting, wrapping, tearing the tape, cutting with scissors and searching for places in the walls that could be taped up or repaired. They mainly played individually (see figure 4) but were also attentive to what the other was doing. They cooperated to wrap a round piece of wood, which was a challenging task for their hands (see figure 7).

After a while, I mentioned Emil from Lønneberga, expecting that they would find this interesting, but Emil got scared and I had to improvise in order to make him feel better[115].

What emerged most significantly?

What I found most significant from this session was the boys' high level of embodied activity[116] in relation to the physical objects: materials, tools, camera and everything present in the room. They were attentively engaged in

[113] From this I learned that anything visible in a room can be interesting for children. This insight made me reflect about ways to introduce materials and tools in later educational contexts, and lead to more organized introduction of fewer tools/materials at time.
[114] The length of the film is shorter, since I took away the scenes where the children were outside the range of the camera. This is the only case where such cutting was done, since I later learned that the parts where children were not visible could also be important, because their voices were recorded.
[115] This episode will be closely described in the fifth vignette in the sixth chapter.
[116] Embodied activity is especially important in the first common finding/issue across the cases.

exploring the tools and the possibilities of the materials and as well as their own strength and endurance. Materials' resistance[117] - when something was difficult - seemed to be especially significant for their motivation. Another issue that emerged was the high level of mutual influence between the children's and my own actions. The issue of inter-subjective meaning making will later become one of the main issues in this study.

4.1.2 Case 2: Pink Textiles

Conducted on October the 21st, 2009
Participants/co-researchers: Eva (girl) aged 3 ½ and Marit (girl) aged 3 ½

Inspiration for planning the educational context

On September the 22nd, I met two three year old girls in the hall of the ECEC. One of them, Marit, was wearing adult-sized high-heeled shoes and pushing a pram. "Lovely shoes", I said, "but do they fit you?" "Yes, they do!" she replied. I was a bit surprised with the answer, but tried to understand: perhaps the shoes fitted her in a different way, rather than being the right size? "Oh, yes… they match the colors on your dress very well", I said. Marit immediately stopped the carriage, lifted one foot closer to her check dress (in orange, red, pink and violet) and started to compare the colors with the shoe until she found the same color.

While I was talking to Marit, sitting on the floor, another three year old Eva approached me with a book in her hands. She simply sat on my lap and opened the book: "Can you read for me?" I started to read and point at the illustrations: there was a picture of a pirate. She said something about the pirate, but I did not understand her. I suggested: "He has the same jumper as yours!" She pulled her jumper to the page and confirmed: "Yes, it is the same!", and added: "And he has the same trousers as yours!" She was right: My jeans were the same color as the pirate's trousers.

These two observations gave me an idea to arrange a session exploring textiles with the two girls.

The practical preparations

In the morning on October the 21st, Eva did not arrive. The teacher asked another girl (Karin) if she wanted to join me and Marit, and she refused. But luckily, Eva arrived a little later and we could start as was planned.

About 35 textiles with different qualities: different kinds of fibers, thickness, transparency, elasticity, texture, weight etc. were brought, all in the same

[117] The importance of materials' resistance becomes one of the most important findings from the study.

color (pink), but in different shades. This way, the name of the color would not be significant to distinguish between different textiles, and the girls could be challenged to communicate about the textiles' qualities other than color. In order to challenge their aesthetic attention, I would tell the girls that I was going to make a dress for my three year old niece and I needed help from them to choose the "nicest" textile for the dress[118].

A meeting room on the quiet side of the ECEC was selected for the educational context. The camera was placed in a corner of the room and directed towards a large table with three chairs at one end. Some of the textiles were placed on the table, while the rest of them were hidden under the table[119]. The plan was to introduce more textiles after the girls had time to explore those on the table.

The presentation of the educational context

I asked the girls a few times which textile they liked best, but instead of answering they wanted the best textile for themselves, and they sometimes argued about sharing. Each of them was given a pair of scissors and could share the pieces they both wanted. When I showed them how to tear they explored the textiles' tearing possibilities and different tearing techniques[120].

Textiles are flexible materials for construction and can easily be curled, tied or wrapped around one's body. Some of the textiles were transparent and their different qualities triggered a number of associations for the children. The explorations developed into an activity of making crowns, involving measuring, cutting, assembling and decorating, and a lot of learning by trial and error.

After the activity with Eva and Marit, when I followed them back to their group, I met Karin. She approached me and asked if she could join me now. I heard a teacher saying that it was too late, but I suggested that Karin and I could play with the textiles just for five minutes. This short activity was also filmed, but was quite different from the other activities. Firstly, Karin and I did not have time to get familiar with each other. And secondly, there was no

[118] Having a plan how to inspire children's activities and attention was what usually worked in my earlier projects with children. However, neither the plan in the first case, or in this case, functioned so well. Though the presentation of the problems (in this case my wondering about the best textile for the niece's dress) could have inspired the children in some ways, the problems defined by them were more important for them. I therefore decided not to put too much emphasis on similar plans in the following educational contexts during the study.

[119] This is what I learned from the first case where the boys seemed to have too many things to direct their attention to.

[120] See second image in figure

time for Karin's explorative play, because I rushed to make a crown for Karin and therefore did most of the measuring, cutting and taping myself[121].

What emerged most significantly?
Marit and Eva were using large movements in their explorations of the textiles: pulling, grabbing, tearing, wrapping. The size of the textiles mattered – the girls measured the pieces in relation to their bodies and sometimes covered themselves. They handled tools, such as scissors and measuring tape, with care and precision when they were cutting, measuring, taping. Through these activities they explored the material's affordances and resistance[122], as well as the strength and precision of their own bodies.

The girls' actions and choices were dependent on the communication contexts and inter-subjective relations between us; interpretations of each other's expressions influenced the immediate responses and further development of the interaction[123].

4.1.3 Case 3: Clay Play

Conducted on October the 27th, 2009
Participants/co-researchers: Helge (boy) aged 3 and Tom (boy) aged 3

Inspiration for planning the educational context
On September the 22nd, four boys and one girl, all about three years old, were sitting around a kitchen table and playing with green Plasticine. One of the boys, Helge, was not yet three and I was surprised by his detailed descriptions of boats and bridges. Helge's interest, verbal expressions and confidence to play with me, inspired me to arrange a context where Helge could explore clay.

On the morning of October the 12th, I observed Helge intently waiting for his friend Tom. I understood how important these two boys were for each other and therefore decided to ask Tom to accompany Helge in the educational contexts with clay.

The practical preparations
From my experience from the previous cases, especially the first case when Emil got scared, I realized how difficult it can be to find a source of inspiration that children would appreciate. Instead of planning what Helge

[121] This short interaction with Karin made me experience how I easily, when the time was limited, entered a role of a product-oriented teacher who did not make space for the child's own experience.
[122] See issues 2 and 3 in the fifth chapter.
[123] This later became the fourth common issue/finding across the cases.

and Tom could do, I decided to let the children explore clay and let my choices of tools predetermine what could be done. I placed a large piece of clay (a block of 12,5 kilos) on the table in the same meeting room I used in Case 2. The clay was soft, moist and light-colored (white when it dried). I brought some natural materials such as sticks, stones and shells, and different tools for making texture and cutting, as well as a rolling pin. Instead of placing too many things on the table before the boys had time to explore the clay with their hands, I planned to be attentive to their needs and provide them with suitable tools when they were needed.

The presentation of the educational context

The boys' explorations of the clay started with experiencing and making associations relating to its size, weight, volume, temperature and ability to change shape and texture. The boys made imprints in the clay and tried different ways of handling it with their hands, with tools and different parts of their bodies (see figure 4). After a while, Helge suggested that a large clay form on the table looked like a cave and we started to make symbols for a mother, a father, children and a troll, who lived in the cave and on the top of it.

What emerged most significantly?

Helge frequently made associations and compared his experiences with the clay to what he had previously experienced. Tom's words were difficult to understand, and he used diverse forms of communication, which complemented each another, in his highly multimodal language. Both his and Helge's expressions had metaphorical[124] forms. The improvised dramatizing with clay symbols was imaginative and highly inter-subjective[125]. The three of us constantly influenced each other's understandings, expressions and imagination, and I had to be highly attentive and was constantly improvising[126].

4.1.4 Case 4: Yarn and Clay

Conducted on November the 6th, 2009
Participants/co-researchers: Pia (girl) aged 5 ½ and Brede (boy) aged 4 ½

Inspiration for planning the educational context

The case studies prior to this were all conducted with pairs of children of same age and gender. In order to create a case scenario with a boy and a girl,

[124] Embodied metaphors will be discussed in the section 5.3.3.
[125] As earlier mentioned, inter-subjectivity became one of the four most important issues in the study.
[126] Teacher's improvisation will be discussed in the seventh chapter.

a five year old girl Pia, was suggested by a teacher, because she liked playing with boys[127].

On November the 3rd, I observed Pia playing with three boys. Their communication was complex and multimodal. On November the 4th, an ECEC teacher asked me to be responsible for a group of four children, among them Pia (5) and Brede (4). They were playing with Lego and I noticed Brede's comments about proportions, size and shape of dinosaurs they were making. Both Pia and Brede were attentive to visual observations and liked to explain their experiences verbally. This motivated me to arrange a setting where Pia and Brede could explore something together, and get curious and motivated to investigate and explain.

The practical preparations

On November the 6th, the same meeting room as in the two previous educational contexts was used. On the table I placed two small installations (see figures 4 and 7), which looked quite similar. One of them was made of clay pressed through a garlic press, the other one was made of yarn, which was the same color, thickness and length as the clay strips. I was curious what the children would say about the similarities and differences between the installations and the materials.

The presentation of the educational context

When the children entered the room, they quite quickly recognized the yarn and were not interested in it after they had identified it. Yarn is a flexible material for construction, but in this case, when it was cut into small pieces, there was not much the children could do with it. They were much more curious about the clay and used some time to explore its consistency. After they had found out that it was clay, they started suggesting and making different objects and animals. The children seemed to be oriented towards making products and were not so interested in speaking about their experiences or the materials' qualities.

What emerged most significantly?

What the children were creating seemed to be motivated by communication contexts, more specifically by their intentions to achieve some kind of response from me and the other child. For example, Brede wanted us to guess what animal he had made, and Pia was concerned about what the other children would think about what she and Brede had been doing. It seemed as though both children enjoyed the feeling of having a unique experience, the

[127] The reason why the pairs of children in the study usually had same gender was that their friend had the same gender.

other children could just wonder about. This was a form of motivation that they derived from their social relations with the other ECEC children.

I became aware of how my body language influenced the interactions between me and the children: I did not feel perfectly well this day[128] and found it difficult to be completely attentive and engaged. This issue concerned inter-subjectivity and a teachers ability to improvise[129].

The educational context was the first conducted with children older than three and I experienced that my role was somehow different – challenging in different ways to interaction with three year olds. The children seemed more product oriented. I had this experience in mind during the planning of following educational contexts.

4.1.5 Case 5: Yarn Balls

Conducted on November the 13th, 2009
Participants/co-researchers: Even (boy) aged 4 ¾ and Markus (boy) aged 5 ½

Inspiration for planning the educational context

When the selection of children was discussed with a teacher, a girl called Christina was suggested to accompany Marius in one of the educational contexts. However, when Christina did not arrive, the teacher suggested Even and explained that he had difficulties finding a playmate. She thought it would do him good to have some focused attention. On November the 4th, while conducting participant observation, I noted how interested Even was in finding technical solutions while building with Lego. On the 11th of November, I also observed how interested Marius was in finding out how a large pencil sharpener worked. He was wondering how the circular movements were transferred into a sharpening function.

At the time of planning I thought that the educational context would be conducted with one boy and one girl, and I tried to find ways to make the activity interesting for both of them; possibly by combining some flexible materials to some technological devices. I decided to introduce yarn, and hoped to engage them by using a small, circular knitting machine.

The practical preparations

I wanted the children to experience different qualities of yarn. For this reason, 11 types of yarn in shades of off-white were chosen. I selected varied fibers of yarn; wool, cotton, alpaca, polyester, as well as yarns with different textures, thicknesses, number of threads, softness and weights. I made a small

[128] I had a slight migraine.
[129] The question of improvisation is presented in seventh chapter.

ball (the size of a tennis ball) of each type of the yarn so that their shapes would also look the same (see figure 7).

From the previous educational sessions, I had experienced that it was best for children's attention to give them some time to explore a few materials before introducing the other materials and tools. I therefore hid the knitting machine (see figure 7) and placed the yarn balls in a textile bag before the boys came into the room[130]. I wore a hand-knitted dress made from one of the yarn types[131].

The presentation of the educational context

When the boys entered the room they first discussed sitting arrangements in relation to the camera - it was clear that each of the boys was concerned to be heard and treated equally.

I asked each boy to put his hand inside the bag, where the yarn balls were hidden, and to guess what was inside. They chose one ball after another, compared them, rubbed them against their faces, bounced them on the table, spoke about how the yarn smelt and felt, compared the balls of yarn to my dress and mentioned knitting. At that point the knitting machine was introduced (see figures 5 and 7).

Each of the boys wanted to handle the machine as much as possible and we had to make rules about sharing and responsibilities. This included counting and reading the machine's counter in order to make sure that each of them handled the machine equally. Later, the boys were interested in how long they could manage to make the pieces of knitting[132] and they measured the length with measuring tape.

What emerged most significantly?

The boys enjoyed turning the handle of the knitting machine. It was a physical activity that demanded perseverance and attention, and was immediately rewarded: one could see how the knitted tube grew when the handle was turned[133]. However, the knitting machine also gave resistance, which later emerges as an important issue in the study.

[130] The same room used in cases 2, 3 and 4.
[131] I assumed that what I was wearing was also a part of the physical environment that could have effect on the content of the interactions, and it did.
[132] The piece of knitting would fall off if they turned the handle in the wrong direction.
[133] This aspect will later be addressed as the process of becoming competent – that is important for self-confidence.

The boys' metaphoric expressions seemed to be both motivated by the materials' qualities/affordances and by the inter-subjective relations[134] between the participants. The boys influenced each other's comments and actions - they seemed to compete with each other[135]; regarding who could make the longest piece of knitting, who could come up with funniest association, and so on.

4.1.6 Case 6: Cardboard Boxes

Conducted on November the 18th, 2009
Participants/co-researchers: Thomas (boy) aged 5 ½ and William (boy) aged 5 ½

Inspiration for planning the educational context

On a few different occasions (one of them November the 3rd), I observed a five year old boy (Thomas) in his play with other children. He was very active and imaginative in dramatic play, using much space where furniture served as imagined landscapes. Following these observations, I decided to arrange an educational context where children could use larger materials and have more space. I was aware that this might not be possible, since there was only one large room at the ECEC.

Both Thomas and other children were interested in playing with Lego blocks. This gave me the idea to use some larger blocks for the activity with large materials, and cardboard boxes seemed suitable for this purpose. Cardboard boxes, like building blocks[136], could be used for building without having to attach them to one another. They were not too heavy and could easily be lifted and moved by children. In a meeting with an ECEC teacher, William was recommended to join Thomas in the educational session. I took the teacher's advice, since she also told me that Thomas could be demanding with other children.

The practical preparations

In order to make it possible to build large forms, I collected as many boxes as I could manage to transport: 78 boxes. Many of them were shoe boxes, but some were also large furniture boxes. The large boxes were flattened out during transportation. When I arrived at the ECEC center, I parked the car with the trailer outside the room's window. I had planned to pass the boxes

[134] Important findings across the cases concern materials' affordances and resistance, and inter-subjectivity.
[135] This is a form of social resistance that will be addressed in section 5.5.4.
[136] According to Trageton's (1995) material specifications, cardboard boxes would be specified as building blocks. However, if the cardboard we used as materials, i.e. the boxes were flattened out or cut, the materials would be fall under *flexible materials for construction*.

through the window and arrange them in the room before the boys arrived in order to surprise them - since surprise is a powerful motivating tool (Eisner, 2002; Fredriksen, 2010).

The presentation of the educational context

Thomas and William were sent to the room earlier than I expected. Therefore, I did not have time to arrange the boxes and set up the camera[137]. The teacher suggested the boys could help me to bring in the boxes and they seemed happy to help with bringing the boxes through the window and arranging them while I was outside the window[138]. The boys explored the boxes and suggested many different things they could do with them. Something inspired them to start singing rhymes from a children's musical called: "Hakkebakkeskogen" (written by Thorbjørn Egner), which is about different animals and their lives in the woods. The boys' activities developed around the figures from the musical and they made houses for the fox and the mouse from the songs. The house making challenged their understanding of size and shape, and challenged them to solve practical problems by constructing, cutting and assembling.

The materials in this educational context were more structured than in previous contexts - the cardboard was already shaped into boxes. However, since the boxes also were disposable materials, the boys could freely cut, reshape and use them as they wanted.

What emerged most significantly?

The boys explored the boxes' sizes in relation to their bodies[139] by climbing inside, crawling through them and wearing them as nappies (see figure 5). The boxes' size and form seemed to remind them of their earlier experiences with boats, cars, treasure chests or masks, and initiated their metaphoric expressions[140].

Each of the boys made a house. Unlike the younger children, these boys wanted to keep the products they made, and were happy when their teacher found a place to store the boxes.

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[137] The room was the only large room at the ECEC and the time I could use it was limited. The fact that only three of us used the room had an impact on the rest of the children in the group, teachers' planning and other daily activities. I learned how challenging this was for the teachers and decided not to use the large room again. I also learned that I myself should invite the children to educational contexts and only after the camera had been set up.

[138] This part of the session (the first 15 minutes) was not filmed, because I did not have time to set up the camera.

[139] This is one of the common issues across the cases, described in chapter five.

[140] This is another common issue across the cases.

4.1.7 Case 7: White Sand

Conducted on November the 26th, 2009
Participants/co-researchers: Line (girl) aged 3 ¾ and Are (boy) aged 3 ¾

Inspiration for planning the educational context

On many occasions (among them September the 16th and October the 26th) I observed that both boys and girls liked playing with sand. I heard the children talking about the sand's consistency: "You can't make cakes out of dry sand" and "When the sand is hard, we know that winter has come". A boy (Are) was pushing a truck and observing how the wheels made traces in the sand. Some children were playing with sand and water and a girl (Line) was playing with sticks and sand.

When I decided to prepare an educational session with sand, I had Are in my mind. He had asked earlier if he could come with me to "the room" one day and I had promised him he could. I discussed my proposal, that Are and Line could join me for the sand activity, with an ECEC teacher. She said that Are and Line did not usually play much together, but they knew each other well. She had other suggestions, but I did not want to disappoint Are.

The practical preparations

It was late November and was getting too cold to play with sand outside. Another ECEC center's unit had a special room for inside play with white sand[141] and it was arranged that I could use this room. To provide possibilities for the children to be attentive to the fine qualities of sand, I decided to use two different types of sand (see figure 6). In addition to the white sand we borrowed, the more common grey sand was placed in a large bucket beside the white sand which was in its own sandpit[142]. The white sand was more moist and sticky than the grey. Both of the materials can be classified as shapeable materials (Trageton, 1995) if they are properly wet.

The presentation of the educational context

The children played mostly with the white sand, but not with each other. Are was most interested in transporting the sand with small trucks, while Line was more attentive to the sand's qualities. She played that she was making cakes, pancakes and coffee, and was willing to share "her products" with us. In contrast, Are wanted things just for himself[143] and liked to destroy things with his trucks.

[141] The white sand was some kind of hybrid material, more shapeable than usual sand and similar to clay.
[142] The sandpit was shaped like a pool on four legs, approximately one meter wide and 1,5 meters long.
[143] The question of sharing will be discussed in the section 5.5.4.

What emerged most significantly?

The children associated the sand with snow, flour and cake sprinkle decorations and expressed multimodally and metaphorically[144]. I did not know the children so well and was not sure what was the best way to stop Are from destroying what Line had made. Line was not so confident and open to talk to me. Her voice was soft and I didn't always hear her, while Are was louder and took much of my attention[145]. I was nervous that the children might mix the two sand types, which I had been requested to prevent[146]. Line sensed my nervousness and was very accommodating. On the other hand, it might just have been my attitude that prevented her explorative play? This illustrates how teacher's attitudes can inter-subjectively influence communication contexts, and therefore also children's possibilities to make meaning. This will be discussed in the sections 5.5.4 and 7.3.

4.1.8 Case 8: Building with Wood

Conducted on December the 2nd, 2009
Participants/co-researchers: Alexander (boy) aged 5 ½ and Terje (boy) aged 5 ¼

Inspiration for planning the educational context

On different occasions I had observed 4 and 5 year old boys building with Lego. I wanted to introduce wooden blocks in a variety of shapes and sizes in order to challenge the children's interest in building and motivate their problem solving capacities. Their teacher had also told me that she wished they had more possibilities to introduce more 'masculine' activities than they currently did.

Spending time with me had become popular and the children, who had not been "playing" with me, hoped that it will be their turn next. I did not want to disturb the social relations within the group, and I asked the teacher to decide which children should come with me and build with wooden blocks on December the 2nd. She suggested two boys, Alexander and Terje.

The practical preparations

I brought a large bag with wooden pieces left over from cutting with a band saw[147]. Most of them had straight edges and at least two parallel sides, but they could not be characterized as building blocks, since they could not

[144] As mentioned, associations and metaphors motivated by the materials' qualities, form one of the common issues across the cases.
[145] I could see this when I watched the videos later, but was not conscious about it during the interactions. However, I sensed that something was wrong since Line did not seem happy.
[146] The white sand was special and expensive, I'd been told by the teachers.
[147] The material could be characterized as recycled.

simply be placed on top of each other; they had to be assembled in some way in order to build with them. The wood pieces can be called solid materials for construction, according to Trageton's (1995) material specification. In contrast to the wood used in the case one, these materials were pre-fabricated and appeared less natural. The structure of the wood was the same, but these pieces came from larger trees, which had been cut into planks and later cut into smaller pieces. There was no bark and only a few pieces had their original organic shape.

We were given a room usually used for visual art activities, however we were not allowed to use a hand saw in the room, since it did not have tables for such activities. I brought rope, wood glue, hammers and many different types of nails, some of them inappropriately large for the purpose. I was hoping that the boys would wonder which nails to use and might be able to learn from trial and error.

The presentations of the educational context

The boys familiarized themselves with all the available materials, and found some of the forms more interesting than others. Some pieces reminded them of car-jumps or bridges. They fetched some small cars and tested the tracks they constructed. Terje found some pieces that reminded him of a boat and he started to make a boat, and Alexander joined him. They discussed how to construct two boats with one pulling the other. Terje suggested that he could get a bucket of water to test their boats, and when they did so, they were surprised with what they discovered.

What emerged most significantly?

The boys were using their imagination and the shapes of wood pieces stimulated them to make associations about different things[148]. Their ideas about what they could make came from these associations. They imagined how things should be done, but had to reconsider when they met resistance from the materials; for example, when using the nails and hammer[149]. The resistance seemed to motivate their explorations in order to find other possibilities to solve their problems.

4.1.9 Case 9: Blue Wool

Conducted on December the 11th, 2009
Participants/co-researchers: Stine (girl) aged 4 and Pia (girl) aged 5 ½

[148] The shapes of the wood pieces afforded them with certain possibilities – materials' affordances are important in the second common finding across the cases it will be discussed in section 5.3.
[149] Once again, resistance is one of the main findings.

Inspiration for planning the educational context

Christmas was getting close and it was more difficult to find time, a room and children that could accompany me for another educational context. For this reason, my choice of informants depended on which children were available and when a room was available. The children were busy making Christmas related products with the other teachers. I did not find it appropriate for my study to introduce materials usually used for Christmas preparations, because I assumed this would cause the children to expect the same product orientated activities with me. I wanted to give them a chance to explore materials, and therefore introduced an unfamiliar material; brushed wool. Wool is a flexible material for construction (Trageton, 1995), but when it is treated with water, soap and rubbed, it can change its structure and be shaped into a more stable form, through this process called felting. Wool in seven shades of blue was provided. The idea was to motivate the children to be attentive to the color differences, as well as to the wool's specific qualities when dry and wet.

The practical preparations

Approximately the same amount of each color of wool was packed into boxes of different sizes. I hoped that this would possibly motivate the girls to wonder about mass, volume and consistency of the wool. The equipment needed for felting was prepared, but was not to be introduced until the girls had sufficient time to explore the core material. One of the boxes contained some small woolen balls made by felting that could possibly awaken their curiosity and lead us to the activity of felting.

The presentation of the educational context

The girls were curious to find out what was in the boxes. They were comparing the blue colors and reconsidering the names for colors in order to distinguish them from each other (see figure 6).

When we started to felt, it took more time to make small wool balls than we had expected. The material gave resistance and the girls were struggling with the rolling movements. They played with the foam used for felting and made bubbles. After a while Stine said that she did not like the smell of the soap and did not want to touch it any more.

What emerged most significantly?

Unlike the other cases, this educational context ended up stimulating more product-oriented activities. Even though the children in other cases (for example the cases 6 and 8) made some products; they were products they themselves had decided to make. In this case, when we "played" with wool, the play was not free, but influenced by the larger contexts: the ECEC

center's Christmas-preparation-contexts. It seems that my choice to hide felted balls functioned as a suggestion that the girls should also make such wool balls. I never said that they should, still they assumed that this was what they were expected to do. I think that this might also be the reason why they did not seem very interested; they seemed to give up when they experience the materials resistance.

This educational context provided me with different data from the other cases, but I still wish to present it here as a contrasting example, as well as to illustrate the teacher's role and difference between product-oriented and process-oriented activities.

4.1.10 Transition to Analysis Process

The descriptions of the cases present how the data was gathered and make visible my experiences from the educational contexts. Writing these case descriptions was a kind of transition from acting in the role of teacher to acting in the role as researcher. My lived experiences (as visual arts/ECEC teacher) informed and supported the process of video analysis. The process of participating[150] and the process of watching the video recordings[151] supported each other. What I could remember from the educational contexts was only what I was attentive to during the contexts. The video recordings showed what all three of us were doing, but I might remember just what one of the children was doing – the child that I was attentive to at a given moment.

The most challenging and puzzling situations are what I remember especially well, especially when the children were using dangerous tools, or when I struggled to understand them. At such puzzling moments I seemed to empathetically connect with the participants and their experiences in order to try to understand and respond adequately. It can be said that I got absorbed in the situations, in a way that could be described as 'mutual absorption' - the fifth aspect of Armstrong (2000) and Bresler's (2006a) model of "perceptual contemplation". In this sense, the experiences and reflections I acquired during the period of data collection were an integral part of the process of video analysis.

A few remarks about the images that follow: The most of the images have been extracted from the videos. The digital video material has been compressed to lower digital quality (less pixels) in order for computers to comprehend it. Because of this the quality of video grabs is not optimal. I

[150] Observing the context from the inside.
[151] Observing the contexts from the outside.

have still chosen to present them here in order to give the reader impression of the contexts.

In order to present the children more anonymously, images where their faces are not visible have been chosen, the faces are blurred, or cut away from the images. For this reason the compositions of the images should be valued due to their aesthetic qualities.

Figure 4: Images from the first, second and third educational contexts
At the top Woodwork; in the middle Pink Textiles; below Clay Play

Figure 5: Images from the fourth, fifth and sixed educational contexts
At the top Yarn and Clay; in the middle Yarn Balls; below Cardboard Boxes

Figure 6: Images from the seventh, eighth and ninth educational contexts
At the top White Sand; in the middle Building with Wood; below Blue Wool

Figure 7: Materials, a machine and a product
At the top yarn and clay as presented to children in case 4; in the middle 11 yarn balls; below left the circular knitting machine; below right the round product Morten made in the case 1

4.2 Analyzing Across the Cases

In qualitative research, analysis is an ongoing process that takes place during every stage of the study (Postholm, 2010; Stake, 1995), and every stage of the study is influenced by the researcher's advocacies. I experienced how apparently simple technical tasks, like transferring data from camera to computer, also depended on my advocacies. Cutting the films into shorter sessions demanded interpretation in order to avoid cutting in the middle of events, and this again required choices between a number of events that took place simultaneously. The video-editing process was guided by my interests and attention. The longer films were cut into 5-8 minutes sessions and about 8 hours of video material was saved as 84 short films[152]. The short films were saved in chronological order in folders in NVivo, which made it possible to view each of the educational contexts as one whole.

During the process of data collection my different A/R/T-ographer roles interchanged. It was only once all of the educational contexts were conducted, and video data gathered, that I could fully engage in the researcher role. The process of watching video-material did not require sudden and immediate actions; as required when interacting with children. The videos could be stopped and watched many times, which made it possible to dwell and reflect on points.

Related to the five levels of 'perceptual contemplation', the process of analysis across the cases can be said to consist of 1) Noticing details and 2) Seeking relations between parts. I first watched the films in order to observe details and find out which parts were closely related to the studied phenomenon. I was looking for emerging themes that where within the scope of the quintain[153].

Erickson suggests that one should "transcribe only those stripes that contain phenomena of research interest" (Erickson, 2006, p. 184), since transcribing is time consuming and transcription of non-significant parts contributes to unnecessary expansion of data. The parts inside the scope of the quintain were transcribed in detail, while parts of the video-material which were not central for the quintain were only described with a few words.

During the transcribing process, children's movements, actions and sounds that either concerned the children's processes of experiencing or expressing, were described. The process of transcription was helpful for sharpening my perception in order to notice details. The transcriptions would later be coded

[152] See the review in the appendix.
[153] See the terminology in chapter one, and the section 2.2.3.

and it was therefore important to name details that could have importance, for example specific movements, facial expression etc.[154].

4.2.1 Viewing the Video-material

The experiential knowledge from the educational contexts, which is essential for understanding of the quintain (Stake, 2006), helped me to re-connect with the events during the video viewing. The experiences from the contexts supported my perception during the video viewing. Perception is here regarded as an active process of exploration of meaning (Bresler, 2006a). Watching the videos was therefore not a "disembodied" objective activity (Erickson, 2006), but was guided by pre-understandings, intentions and the study's theoretical framework. My perception during the video watching was dependent on the followings competency factors:

- past attention and experiences during the interactions with the children,
- present ability to notice and identify children's actions and expressions,
- present ability to describe with words what I see and hear on the videos, and
- constantly developing understanding about the relations between children's experiences and expressions.

The two main types of phenomena that could be detected from the video-material were: firstly, what the children were doing (going inside a cardboard box, hiding under a textile, hammering, lifting, tearing etc.); their smaller movements (touching, squeezing, pushing etc.) and less noticeable activities such as smelling or listening, and secondly, the children's physical and verbal expressions. The expressions were sometimes highly ambiguous: a word, a sound, a smile, a sigh or just an open mouth, could be interpreted as signs of joy or surprise. The expressions could be described, but it was only when they were interpreted that they could convey meanings. In fact, it was often easier to interpret an expression[155] than to describe the details that the expression consisted of.

During the video transcription, I understood that the process of coding would disconnect different dimensions of children's expressions one from another, and that understanding meanings behind the children's expressions demanded that the expressions were seen as a whole. Still, the process of coding was a necessary stage of the analysis process and I tried to conduct it as best I

[154] I later learned that NVivo also allows coding directly from the videos.
[155] That could later be interpreted as expressions for surprise, joy, fear and so on.

could. The sixth chapter will deal with contextual interpretations, while the rest of this chapter will deal with the process of coding.

The NVivo software enables researchers to work with unstructured information like documents, surveys, audio, video and pictures. The software operates with two similar concepts: 'code' and 'node'. The first is a verb and stands for the activity of coding, while 'node' is a noun and stands for a category to which one codes parts of the data. The same distinction between 'code' and 'node' will be applied in this text.

To be able to code the data, appropriate nodes had to be created first. In this study, new sets of nodes were created three times, each followed by a round of coding. As it will be explained in this and the two following chapters; the processes of creating nodes and coding were constantly challenging my understanding. This means that I was learning through trial and error[156].

Coding of video material is a process of identifying specific moments and characterizing them as forms of something more generalized. For example, in coding body language a specific type of head movement can be characterized as a more general head movement, or even more generalized body movement. In this way jumping and head movement can be placed under the same node *body movement*. Body movement would then be a wide node, but might serve its purpose if, for instance, one wants to count how many times a person moves during their sleep. In another case, if a researcher is interested in dancing, the same head movement could be coded as *shaking the head*, and compared to other similar codes such as *shaking the shoulders* and *shaking the hips*. But what if the head shaking was an expression for "No", and not a response to music? In this case, coding of a child's expression for "no" as *head shaking* would disconnect the expression from its original meaning, and the movement would become meaningless.

Creating nodes that were both narrow enough and wide enough was a big challenge. I experienced the process of coding children's body language as practically and ethically demanding, because I could easily misinterpret. Also being in the position to define nodes and conduct the coding according to my own understanding (or misunderstanding) gave me power to define, and undermined the children's power position.

[156] The "errors" concerned some failing in finding appropriate concepts during the process of naming nodes, and therefore repeated rounds of coding as it will be describe later in this chapter.

The process of coding includes making taxonomies - placing nodes in different orders and levels. However, there are many possible ways to order concepts and it is the researchers' responsibility to create nodes and taxonomies that best can serve the purpose of the study. I speak here of responsibility, because the researcher's has the freedom, and power, to decide which nodes to make and how to systematize them. In this sense a coding activity cannot be neutral, but is influenced by the study's theoretical framework and the researcher's advocacies.

4.2.2 The First Round of Coding

The first nodes were made according to the research question: How do children make meaning about, because of and through 3D-materials? The question has three parts, and according to that, three main node-categories were made to match the *prepositions* in the problem question: Children's meaning making *about* materials, *because* of material's and *through* materials. The image below shows an overview of nodes inside the three node categories.

Separating the three node-categories (meaning making *about*, *because of* and *through* materials) was assumed to contribute to getting closer to answering the question: *How* do children make meaning?

Node category: Meaning making about materials
Established on November the 11th, 2009[157]

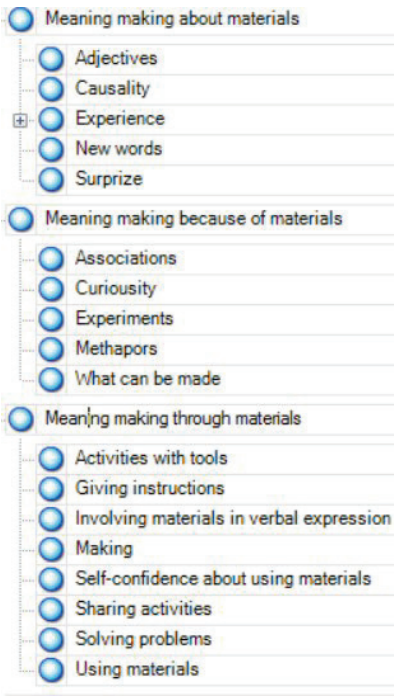

Figure 8: The first nodes

The node category *meaning making about materials* focused on children's expressions about materials. Since the word *about* relates to verbal expressions, the nodes under this category related to what the children were expressing verbally. The node category could help detecting the events when children were talking about their experience, about causality (for example explaining why materials were as they were) or when they were verbally expressing their surprise. The node *experience* was allocated three sub-nodes that made distinctions between children's talking about earlier experiences, about present experiences and about experiences in order to organize (cultivate) them.

The node category *making meaning about materials* included two nodes that indicated something about the type of words the children used when talking about materials: *adjectives* and *new words*. I was aware that the two nodes were not comparable terms - adjectives, verbs and nouns would for example be more comparable terms. Adjectives, rather than verbs or nouns, were preferred because adjectives are the kind of words that describe something *about* how things are, or are experienced to be. For example, indicating how the children experienced a material's qualities. The node *new words* was important, since it related to the children's struggle to find proper words or invent them in order to say something about the materials.

Node category: Meaning making because of materials
Established on November the 11th, 2009

[157] Since the process of coding is presented chronologically, I find it relevant to mention when the different node categories were established.

The nodes in the category *meaning making because of materials* were related to children's embodied and multimodal forms of expression. To be able to identify any relevant data for this node category, interpretations had to be made, since it was not obvious if children did something because of the materials. In fact the children were probably often unaware why they did something. It was not possible to clearly separate the two node categories *meaning making about materials* and *meaning making because of materials*: The children would probably not speak about the materials if the materials were not there. In this sense, 'speaking about' was also 'speaking because of' the materials. Still, there was a difference between speaking about and acting because of materials. The content of speaking about something would usually have explanatory form, where someone tried to describe something (for example, in order to understand), while doing something because of materials did not have to focus on the materials themselves. Doing or saying something because of materials could carry one away from the starting point, especially when children used their imagination. It can therefore be said that the nodes under the category *meaning making because of materials* were characterized by children's imagination and creativity.

Children's experiences with the 3D-materials often seemed to result in them making associations and metaphors; this was significant in the video-material across the cases. To include these expressions two nodes were made. In addition to associations and metaphors, three more nodes were created under the node category *meaning making because of materials*: *curiosity*, *experiments* and *what can be made*. The node *curiosity* captured the data where a child seemed to be curios because of her/his experience with the materials. Curiosity was often expressed through embodied forms of communication: a sigh, a sound, a jump or laughter.

The node *experiments* gathered the data where the children started to experiment with materials or tools immediately after their own, or somebody else's activity with the 3D-materials. Finally, the node *what can be made* was about children's suggestions about what the materials could be made into. This node is placed under *meaning making because of materials* and not under *meaning making through materials*, because it signified children's verbal expressions and not their activity with the 3D-materials. However, the node *what can be made*, was closely related to children's associations, because it was often some quality of a 3D-material that reminded them of something that could be made. In that sense, the node *what can be made* was also a form of an association, or a metaphor, referring back to the child's earlier experiences. However, talking about what could be made was also a future-related suggestion that involved the children's creative thinking and

expressed their confidence that the materials could be transformed into symbols.

Node category: Meaning making through materials
Established on November the 11th, 2009

The third node category, *meaning making through materials*, was meant to focus on children's 3D expressions. To make meaning through 3D-materials means to create something tacit. The term meaning making is related to construction of new understandings, and to make meaning through materials would mean to create a new symbol, a shape, a texture. I found many expressions through 3D-materials in the data, but it was not easy to separate 3D-expressions from other types of expressions. Usually the children were talking, showing and reshaping materials all at once.

The node category *meaning making through materials* includes diverse types of nodes where some indicate physical activities (the nodes: *activities with tools*, *making* and *using materials*), while all the other nodes involve both activities and different forms of expressions. It can therefore be said that the nodes in this node category are more like themes. This is especially significant for the nodes *self-confidence* and *solving problems*; to be able to identify such phenomenon in the video-material, demanded understanding of the contexts and of the connections between what children were doing and expressing.

During the process of coding according to the core question: "How do children make meaning *about*, *because of* and *through* 3D-materials?", I became familiar with the data and learned about the relations between its different parts. However, the coding process was challenging, especially because the children's expressions were simultaneous and multimodal. They were for example talking about materials, laughing because of them and at the same time doing something with the materials; expressing through them.

Node category: Democratic participation[158]
Established on November the 11th, 2009

A process of meaning making is dependent on participants' active taking part. If someone is to become a co-constructor of meaning, hers or his participation is necessary. One can learn something by quietly sitting and listening (listening is also a form of participation), but in this study, children

[158] The term democratic participation can be discussed in relation to what the notion of democracy here refers to. The term is used to include different features of children's active participation that could be assigned to the Norwegian term "medvirkning".

were given possibilities to be physically active and their participation was expected. Children's active engagement and motivation were closely linked. When they were engaged and motivated in an activity, they were keen to contribute. The study presented here depended on the children's participation. If they did not do anything with the materials and did not say anything, there would be no possibility to study their processes of meaning making. The more they participated and expressed themselves, the better. Thus, as a teacher and researcher, my responsibility was to motivate them to participate.

Trying to grasp the meanings behind the children's expressions requires one to also pay attention to the social relations between them. Could children's expressions be motivated by their social interactions? By asking this question, I did not negate the importance of children's experiences with the 3D-materials, but rather I wanted to establish if what they said because of materials, also could have been said because of something else. I therefore created the node category *democratic participation*. Participation is called *democratic* in order to emphasize that this form of children's participation is not only about their presence, but also about their active part-taking in making decisions and influencing pedagogical content. In other words, *democratic participation* stands for a child's conscious act of influencing and contributing to the "living curricula"[159].

The node category *democratic participation* included 14 nodes. Some of them represent expressions that have more apparent democratic intentions. They indicated expressions where a child communicated her/his will and needs: *asking for attention*, *claiming opposite*, *competing*, *decision making*, *expressing needs*, *giving instructions*, *problem-solving*, *taking initiative* and *teaching*[160]. Other nodes indicated more passive forms of participation, or at least without ambitions to influence the others or the contemporary events: *not interested*, *scared* and *just being polite*. If these nodes were used in relation to adults, they would probably not be considered as participation at all, but in ECEC such "participation" (or avoidance of it) reflects children's needs, and should be listened to and respected.

The node category *democratic participation* also included: *intense attention* and *sharing*. Children's attention was an important sign of their engagement. It was not a form of expression, but rather a condition or an attitude, and possible signal to a teacher (me). Sharing could be a passive act – letting others take something without complaining. It could also be a form or expressing that one cares for others. However, when this node was applied to

[159] The relation between children's participation and curricula; Irwin uses the term "curricula-as-lived" (Irwin and Chalmers, 2007)). This will be discussed in the seventh chapter.
[160] The properties of each of the codes will shortly be presented.

the data, it sometimes marked events where children did not want to share; where the sharing itself was a confrontation or negotiation. The scope of the node therefore became extremely broad. The node *sharing* became more like a theme that included social relations between children during their play with materials. It could be said that sharing was a result of a child's wish to possess the materials or toys they were playing with, and that the node would be placed under the node category *meaning making because of materials*. However, the phenomenon of sharing was sometimes an obstacle in children's processes of meaning making and therefore did not belong under the category *meaning making because of materials*. Dealing with the phenomenon sharing was also difficult to handle during the interactions with the children, and it influenced the inter-subjective relations and the process of co-constructing meaning[161].

When one makes a new node in NVivo, one can describe the properties of the node. Here is a list of the nodes, and their properties, under the node category *democratic participation*:

- *Asking for attention*: Addressing me or another child in order to get attention. This need for attention can also be expressed silently.
- *Intense attention*: A child is intensively attentive, sometimes without saying or doing anything.
- *Claiming opposite*: Strong expressions against my suggestions, expressing the child's own suggestions, beliefs or wishes.
- *Competing*: The children in some way compete with one another.
- *Decision making*: A child makes decisions about what s/he or someone else should do.
- *Expressing needs*: Expressing needs, wishes, asking for something.
- *Giving instructions*: A child instructs me or another child.
- *Just being polite*: Not interested or not attentive, but still answering my questions.
- *Not interested*: A child loses attention or is not interested in something I or the other child does or says.
- *Problem-solving*: Children's suggestions about how to solve a problem, or examples of how problems got solved.
- *Scared*: When a child is afraid or scared.
- *Sharing*: Sharing things with others, sometimes not so peacefully.
- *Taking initiative*: When a child suggests something we should do.
- *Teaching*: When a child takes responsibility to help me or the others, or tell us what to do or what should be done.

[161] This is something I will return to in the end of the fifth chapter.

4.2.3 The Second Round of Coding

During the process of coding I experienced how difficult it was to delimit nodes in such a way that they were not too narrow and not too wide. The nodes were expected to exclude one another, however, after the initial coding activity I detected that too many nodes were overlapping. Social interactions were merging with 3D-material interactions. This had been expected, but if the process of coding was to help me grasp the complex phenomenon of meaning making, I needed nodes that could separate some of the complex relations existing in reality. It was therefore decided that new nodes should be made with clearer distinctions between them and in such a way that would be more helpful in the process of analysis. In this second round of coding the following five node categories were developed: 1) *expressions*, 2) *teacher's activities*, 3) *exploration and experiencing*, 4) *new knowledge* and 5) *inter-subjective meaning making*. This section explains the role of each of the new node categories in the analysis process, which nodes were placed under them and which types of data it was intended should be captured under each of the nodes.

Node category: Expressions
Established on January the 16th, 2010

Experiencing is a subjective, embodied activity, which according to Dewey (2005 [1934]) has practical, cognitive and emotional dimensions. The process of experiencing is invisible from the outside until it is expressed. In the first round of coding, I was searching for children's activities and expressions to which the process of meaning making could be assigned. I had created nodes according to the types of relations between 3D-materials and children. However, could I be sure that the children were doing something because of the 3D-materials and not because of something else? They could have done something in order to impress or surprise their peer, and for many other reasons. In the second round of coding, I tried to be more precise in the choice of nodes and I attempted to separate different forms of children's expressions one from another. The following nodes were created (alphabetically organized by NVivo):

- *Asking*: Open questions or asking for permission to do something.
- *Crying*: Expressing something with a sad voice.
- *Dramatizing*: Pretending, acting.
- *Explaining*: A child tells me, or the other children, about how something is, or should be.
- *Facial-expressions*: Strong facial expressions as forms of communication, often combined with speech, and sometimes exaggerated.
- *Joking*: Playful, joking attitude.

- *Laughing*: Joy and laughter.
- *Moving body*: Dancing, jumping, rhythmic movements etc.
- *Story making*: Telling, imagining, making up, playing with words.
- *Singing*: Making sounds, rhythms, songs. Singing or making own songs.
- *Teasing*: Competing and expressing rival attitude, jealousy or something similar.

These nodes represent the diversity of expression and communication forms. Some of the nodes have a stronger emotional component than the others; like *crying*, *joking*, *laughing* and *teasing*. The nodes *asking*, *dramatizing*, *explaining*, *joking*, *story making* and *teasing* represent a different genre of communication. Such expressions could be motivated by the specific communication contexts, as much as they could be motivated by children's contact with 3D-materials; joking with their friends, showing off or playful teasing could be consequences of a child's new experience: "Look what I can do! (And you can't!)"

Distinguishing that expressions belonged to different communication genres, meant they had different purposes; like for example wanting to get permission to do something, and therefore asking nicely. However, the act of expressing something with a sad voice (*crying*) could also have a purpose to get permission to do something. Social interactions are extremely complex and dependent on many hidden variables. The children's actions seemed to be impulsive, immediate and driven by their tacit, embodied knowledge of what they assumed was suitable in the specific contexts. They (we) inter-subjectively influenced each other's actions.

Node category: Teacher's activities
Established on January the 16th, 2010

During the process of searching for children's expressions, I became more aware of how my own words and actions influenced the children's expressions during the educational contexts. Therefore, the node category *teacher's activities* was established in order to code my own interactions with the children. This node category, also incorporated my researcher role, since the roles of ECEC teacher and visual art teacher merged with that of researcher during the interactions with the children.

The node category *teacher's activity* was supposed to help me identify my own communication with the children, unintended expressions, and attitudes that could have influenced children's experiences and expressions. This node category included my participation, attention, attitudes and feelings, but also

my failures to respond to a child. Here are the nodes and their properties, as described in NVivo. The node *explaining* had four further sub-nodes.

- *Afraid*: Afraid that a child will hurt himself or another.
- *Allowing problem solving*: When I do not interrupt the children, or consciously let them work, play, or experiment with something in order to experience.
- *Asking*: Asking a question (different purpose).
- *Attentive to needs*: Attentive and interpretative in the moment the children are doing something, in order to understand what is possible and what is suitable curricula at that moment.
- *Attentive to someone else*: Attentive to another child, or focused on something else in the context.
- *Explaining*:
  - *about materials*
  - *about techniques*
  - *why should do*
  - *why should not do*
- *Helping*: Helping with practical things, with tools etc.
- *Misunderstanding*: When I didn't understand what a child meant during the activity.
- *Motivating*: Trying to motivate the children to get involved in an activity.
- *Not attentive*: Do not hear, do not see or do not have time to respond. Sometimes give a response, but am not fully "there" at the moment.
- *Re-directing*: Attentive to the children, but trying to motivate them towards something else.
- *Registering*: I let a child do something else than what I intended.
- *Showing*: Showing something that has been made, or how it can be done.
- *Suggesting*: suggesting what could be done, using own fantasy and playful approach.
- *Teacher making meaning*: Trying to understand what something a child did or said is supposed to mean: "What does it mean for *me* in the given context?" Wondering what to do to understand the child, and how to reply so that the child doesn't feel rejected.

Some of the nodes referred to data where my pedagogical choices were to not take any action: *allowing problem solving*, *attentive to needs* and *registering*. These nodes relate to passive acknowledging of the children's activities and through active listening becoming informed about their needs. In contrast, there were situations where I was not attentive or misunderstood a child (and

possibly acting against the child's needs). These were the nodes: *attentive to someone else*, *misunderstanding* and *not attentive*. Active responses to the children could be captured by the following nodes: *asking*, *explaining*, *helping*, *motivating*, *re-directing*, *showing* and *suggesting*. Each of these nodes had a different communication purpose in the pedagogical context. I was an adult and it was my responsibility to help the children and motivate them to engage further in activities with the materials. To let the children take initiative also demanded that I sometimes restrain my own ideas and initiatives.

The two remaining nodes *afraid* and *teacher making meaning* were colored by my emotions. Each of them was based on my embodied experience from participation in the contexts. For example, how it felt to be afraid that a child would hurt her/himself or others, and how fast I needed to think and act in order to prevent it from happening. Finally, the node *teacher making meaning* marked places in the data, where I was struggling to understand what a child was trying to tell. The meaning making in the moment of interaction depended on whether I was able to understand, and influenced the further activities and the processes of mutual construction of meaning. Generally speaking, meaning making is highly inter-subjective, thus it seemed useful to make a node category *inter-subjective meaning making*.

Node category: Inter-subjective meaning making
Established on January the 31st, 2010

In the case descriptions, especially the section "What emerged most significantly?", I indicated that the interactions during the educational contexts were extremely demanding. I had to improvise according to my interpretation of the children's needs. The children also made their interpretations and choices of actions, and we were all involved in the ongoing process of meaning negotiation. Some processes of meaning negotiation can be assigned to interactions between two children, and others to interaction between myself and one child. Accordingly, the following nodes were developed under the node category *inter-subjectivity*: *inter-subjectivity child-child*, *inter-subjectivity teacher-child*, and *inter-subjectivity all participants.*

Coding of the data according to the nodes and the reflection that followed this process (especially reflection about my own communication with the children) helped me to better understand the children's needs, wishes and beliefs, as well as the numerous responsibilities a teacher has[162].

[162] The issue of inter-subjectivity will be discussed in chapter five and seven.

Node category: Exploration and experience
Established on February the 4th, 2010

Exploring is understood as an activity where a child interacts with a 3D-material. Physical explorations (touching, looking etc.) of the materials, possible to detect from the video-material, were assumed to be sources of children's experiences. The node category *exploring and experiencing* was designed in order to capture the moments of children's experiencing. Since aesthetic experience is a cognitive act (Parsons, 2002), I hoped that capturing children's visible/heard activities could help me grasp the "invisible" processes of experiencing; understanding the cognitive acts behind the physical expressions. I paid attention to which senses they were using in their play with materials. Nodes were made for the types of sensing that were possible to identify from the videos: looking, touching, listening and smelling (the nodes: *visual*, *tactile*, *audio*, *smell*). However, the children were seldom using just one sense at a time. They were, for example, touching 3D-materials at the same time as listening and doing something with the materials. Their experiences were multisensory, and different qualities of a material were experienced simultaneously.

Some of the explorations/experiences did not fit under the four codes, as, for example, the experience of the movement of the air caused by waving with a piece of cloth. An additional node *other qualities* was therefore created for ambiguous experiences. The property of this node was explained in the following way: "Other qualities of materials and tools that are difficult to define as acquired through the four senses". Additionally the node *comparing material's qualities* was introduced. The activity of comparing seemed to be significant for children's experiences, because it often involved their reflections about the experienced qualities. Comparing qualities was an advanced form of aesthetic attention, possibly influencing the refinement of aesthetic attention.

During the coding of node categories *expressions* and *explorations and experiences*, I realized that exploring activities often merged with expressing activities. Treading on cardboard boxes, and wearing them as pants, was for instance both an activity of tactile experiencing, and an activity of expressing. Children's activities with listening or smelling something, could only be included if the activities could somehow be detected on the videos: children often stood completely still when they were listening or smelling and this could go unnoticed. The activity of experiencing was even more difficult to identify; at least until it led to some kind of expression. It was only when I noticed a child's expression on the video, that I had to go back to find the explorative, experiencing activities that took place before the expression. For

example, a girl's verbal expression: "That's my heart beat!" indicated that an activity of listening had just been conducted. To detect what the girl heard, I watched the video again and found that a hammering sound could be heard coming from the outside just a few seconds before her expression.

Node category: New knowledge
Established on February the 7th, 2010

During the process of coding I identified a number of moments where the children came up with similar utterances as "That's my heart beat!". I sensed that such moments of sudden, surprising expressions indicated some kind of new discoveries[163] - new links between thoughts and experiences. Were these moments possibly the moments when new meanings were made? Such moments of illuminating ideas were possible to detect only if I was attentive to children's multimodal expressions and interpreting them in relation to the contexts. When I was looking for such moments, I was not looking for any specific words or types of expression, but rather for specific places in data with some kind of "dramatic climax". To be able to identify such moments, I had to study the whole context and observe variations in children's expressions during them. When I thought I had detected a child's new discovery, I had to go back again and study the contexts before it in order to understand what might have caused the expression.

The nodes *new knowledge about materials*, about *techniques* and about *social relations* were created. During the coding activity, I was looking for the moments of sudden surprises. It was only after such moments were identified, that they could be observed more closely in order to distinguish between the three types of new understanding (the three nodes). I will give an example to illustrate what I mean:

> A three year old boy watches how another boy is tearing masking tape. The boy who is watching is slightly bending his body over the tearing hands. The same moment the tape is torn, the boy who is watching breaths in a short breath and straightens his knees, as if he makes a tiny jump.

The boy who was observing the tape being torn seemed to be surprised by the tearing technique and learn something about the material and the technique[164]. More examples will be presented in the fifth chapter as I move on to viewing the coded data, relating it to the quintain and identifying the

[163] These were the moments that were, later in the study, named micro-discoveries.
[164] His later actions showed that he really had learned about the technique of tearing.

most significant themes and issues. The further process of analysis across the cases will be presented in the next chapter.

4.3 Summary of the Fourth Chapter

The first part of this chapter accounts for the choices that influenced the process of data collection. Descriptions of educational contexts, with the related information, present how the educational contexts were planned, organized and conducted. Through the chronological descriptions of the nine educational contexts, the different applications of the A/R/T-ographer roles are also made visible.

The second part of this chapter presents the process of establishing nodes and coding in the software NVivo. The choices of nodes were explained and discussed in relation to the research question and the studied phenomenon. The process of coding matches the first two aspects of perceptual contemplation: 1) noticing details and 2) seeking relations between parts. This analysis will continue through the two following chapters. Chapter five will mostly focus on the third aspect of perceptual contemplation: 3) seizing the whole as a whole, and the sixth chapter will examine 4) lingering caress and 5) mutual absorption with the studied phenomenon.

5. Findings across the Cases

The following chapter presents the process between coding and identifying emerging themes/issues. The cases and the nodes have been presented in the previous chapter. This chapter aims to make visible how the most interesting common themes were extracted across the cases. It presents the progressive process of 1) coding the data according to the nodes, 2) identifying the most important nodes, 3) and identifying the most emerging themes/issues. The four key themes/issues which were identified, will be presented in this chapter with relevant illustrative examples from the study.

The analysis process can be compared to the third aspect of perceptual contemplation - seizing the whole as a whole - which includes tightening and widening of focus (Bresler, 2006a). During the process of coding data according to the nodes, the quintain[165] was kept in mind, as Stake (2006) suggests. In addition, the relations between each node and the quintain (and relations between the nodes) were examined in order to understand which kinds of interplay take place between the materials and children during their explorative play.

5.1 Identifying Themes and Issues across the Cases

5.1.1 Searching for the Quintain

The activity of coding consisted of searching the data in order to identify details; specific words or types of expression. Metaphorically speaking, the process of coding involved cutting sections of film out from their contexts and putting them in different baskets (nodes). At the end of the coding activity, different amounts of cut-offs were placed in each of the baskets. The process of cutting was challenging, because it was not possible to make clear divisions between children's different forms of expression, or between their experiences and expressions. Still, the process facilitated an awareness of the characteristics of different phenomena and the frequency of children's activities, interactions and expressions. After the second round of coding, the coded data was examined in relation to the following questions:

[165] To remind the reader, quintain is a scope of a target a researcher points to. Basically, the research question marked the centre of the target, but I was also open towards other related insights which could emerge from the study.

- What could the coded data tell about children's construction of meaning?
- How did the data coded at each node relate to data at other nodes?
- Which nodes had most coded data and which of them had the broadest scope across the cases?
- Which nodes were most significant in relation to the quintain?

To support the process of extracting outcomes from the coded material, an additional research question was formulated[166]. This supported the process of analysis across the cases, by providing a kind of data classification framework to respond to: *Which kinds of interplay take place between 3D-materials and children during their experiential play in educational contexts?*

Unlike personal embodied engagement in educational context, analyzing videos limited the multisensory data to what was possible to see and hear. In general, what was possible to perceive from the videos was what the participants were doing, and what they were saying[167]. As explained in the fourth chapter, the process of coding had two phases, where nodes were structured in different ways. It was now relevant to examine how the nodes (and the data coded to them) related to each another. I started to look at what the children were saying and doing - especially what they were doing with the materials. At this stage, I compared the frequency of coding at each of the nodes. Some of the nodes had an especially high frequency, which indicated three significantly emerging themes. In response to the question; *Which kinds of interplay take place between 3D materials and children during their experiential play in educational contexts?* - three main types of interplay were identified:

- The children were actively using their whole bodies in relation to the materials,
- the children's verbal expressions were somehow connected to their manipulation of the materials,
- the children were simultaneously conducting activities with the materials, expressing multimodally and solving problems.

Findings from different nodes pointed toward these three types of interplay. The following node categories and nodes relate to the first form of interplay - the children's embodied activities with the materials:

[166] As presented in section 1.4.2.
[167] Also which sounds we were making.

- Node category *exploration and expressions* - especially the node *other qualities* (88 references[168]).
- Node category *meaning making through materials* – especially the nodes *activities with tools* (57 references) and *using materials* (58 references).

What children were expressing verbally, they told about their interests, thoughts, ideas, imagination and associations. The following nodes were the most significant in relation to the second type of interplay - the children's verbal expressions connected to their manipulation of the materials:

- Note category *meaning making about materials* – especially the node *organizing experience* (54 references).
- Node category *meaning making because of materials* – especially the nodes *associations* (107 references), *metaphors* (31 references) and *what can be made* (22 references).

An interesting relation emerging from the coded data was the relation between what children were doing and what they were expressing. In most of the cases, the children were both doing something and expressing themselves; however, their expressions were sometimes especially strong, immediate or surprising. Such situations seemed to be extraordinarily important for the children – they seemed surprised by their own expressions, and wanted others to see what they had managed to discover or solve. The following nodes were the most significant for the third interplay type; which is about relations between children's activities and the materials:

- Node category *meaning making through materials* - especially the nodes *self-confidence about using materials* (27 references) and *solving problems* (82 references).
- Node category *meaning making about materials* - especially the nodes *new experience* (40 references) and *surprise* (19 references).

To conclude, as the descriptions of the cases in chapter 4 showed[169], some themes were experienced as emerging already during the educational contexts. The further process of comparing the nodes, and frequency of references coded to them, facilitated narrowing the study's focus to the three most emerging interplay types. These three themes became the main findings, though the formulation of the themes was slightly changed, following the deeper analysis and deeper understanding that followed.

[168] The term *references* as used in NVivo tells how many pieces of data were coded to the same node.
[169] Especially the part *what emerged most significantly.*

The first theme/finding concerned children's high level of embodied activities that gave them possibilities to experience the materials in diverse ways. The second theme/finding concerned the high frequency of children's imaginative expressions. I later came to understand that children's verbal and embodied expressions (and meaning making) were influenced by the materials' affordances, and children's imaginative, metaphoric expressions were later assigned to materials' affordances. The third theme/finding was not one of the most frequent phenomena, but rather one which was found to be most significant for the study – the closest to centre of the quintain. This third theme/finding was about children's sudden insights; such events where surprising new ideas emerged. These were similar to those I had experienced in my earlier studies[170], and which I hoped would occur during this study. The sudden insights are a part of the third finding and will also be called *micro-discoveries*.

When the data that pointed to micro-discoveries was further examined; close relations between the materials' resistance and children's problem-solving activities were detected. The third finding was concerned with how materials' resistance motivates children's problem solving. Each of the findings, or arising issues, will be presented later in this chapter. The visual model in figure number 5 illustrates the three thematic findings and how they inter-connect.

The difference between a theme and an issue lies in their problematic level. Stake (2010, p. 219) defines an issue as "a problematic theme having tension and advocacy". The findings across the cases have until now been called themes, however the first theme does not give the impression of being as "problematic" as the second and third. Identifying what the children are doing can simply be described without having to understand why they are doing it, but if one tries to understand the meanings behind their activities, the relations between what they are doing, how they are doing it, and what they are expressing, becomes much more complex and problematic. All the three themes will therefore be called *issues*, irrespective of their problematic level.

The quintain was directed towards the interplay between the children and 3D-materials, but also concerned the educational contexts where such interplay took place. Both the coded data and my lived experiences from the educational contexts, indicated that what was going on between the children and materials was dependent on what was taking place in the room. The

[170] This has been mentioned in 2.2.3 where I explained the reasons for choosing the multiple case design.

importance of social relations became an additional emerging issue of the study. This fourth issue pointed toward inter-subjective relations between the participants, especially between the teacher (me) and the children. This issue was an integral part of the other findings, since the qualities of social relations seemed to be pre-conditions for meaningful play with the 3D-materials.

As shown in the node overview in the fourth chapter, many of the nodes concerned relations between myself and the children; as well as the children's different forms of participation in the educational contexts. Additionally, the node category inter-subjectivity, with its three sub-nodes, was significantly important for understanding of the fourth issue. Here are the nodes that were most relevant for the fourth issue:

- Node category *democratic participation* – especially the nodes *intensive attention*, *competing*, *not interested*, *scared* and *sharing*.
- Node category *expressions* – especially the nodes *facial-expressions*, *joking*, *laughing* and *teasing*.
- Node category *teacher's activities* – especially the nodes *afraid*, *allowing problem solving*, *attentive to someone else*, *misunderstanding*, *motivation* and *teacher making meaning*.
- Node category *inter-subjectivity* – especially the node *inter-subjectivity all participants*.

Many of these nodes were overlapping and supplementing one another. It would therefore be misleading to state how many pieces of data (references) were coded to each of these nodes. The nodes will be structured and analysed in the last part of this chapter[171] where this fourth issue is brought to focus on inter-subjectivity.

5.1.2 Model of the Four Issues

To illustrate the complex relations between the four issues, a visual model has been created. This model was a tool for my own understanding of the complexity of the studied phenomenon. It helped me to systematize my understanding and reflect about the relations between the issues. However, the model over-simplifies the reality, as models usually do. In this sense, making a model in itself opens possibilities for misinterpretations - I have therefore chosen to draw an illustration by hand that appears unfinished.

The round form illustrates the scope of the quintain. The model does not show that it was the third issue that was the closest to the center; instead the three issues are placed together in puzzle form to illustrate their close

[171] See section 5.5.

relations. It would be even better if the issues were illustrated as overlapping, because in reality the areas merged, but this would have made the model impossible to interpret. The three issues inside the larger organic form flow inside the fourth, surrounding issue.

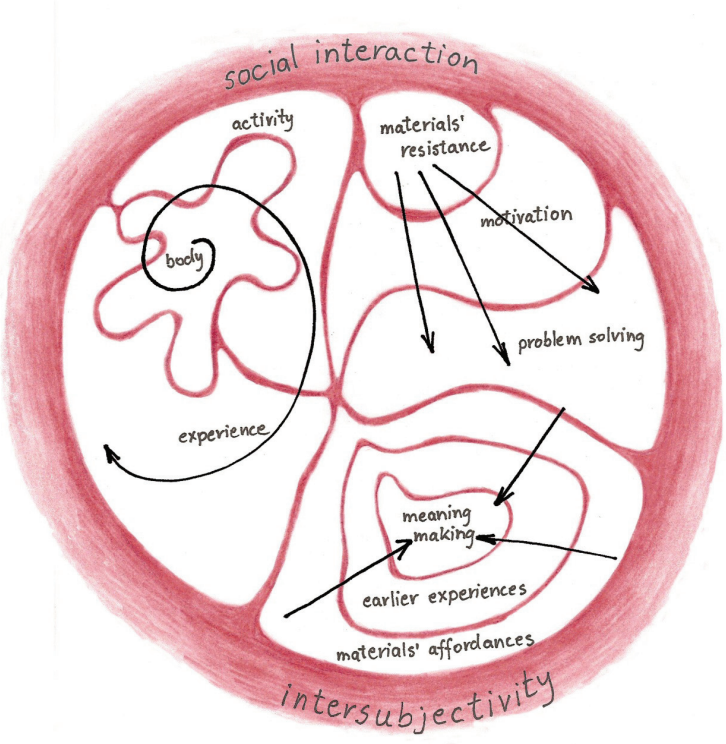

Figure 9: The model of the four issues

The first issue - high activity of children's embodied actions - is represented as a simplified body shape; flowing in its surroundings. The circular arrow is supposed to illustrate the child's activity through which s/he acquires embodied experiences. The part at the bottom illustrates the second issue where materials' affordances are initiators of the child's associations and meaning making. The part to the right illustrates the third issue where materials' resistance is the motivating force behind the child's motivation to define and solve problems. The fourth issue is illustrated by the encompassing space around the main form and named "social interaction and inter-subjectivity". This is to illustrate that the inter-subjective relations between teacher and children influenced everything that took place between

the children and the materials. However, the scope of the fourth issue is very large and reaches far beyond the range of this study. It can be said that the fourth issue is periphery to the center of the quintain[172], however it could not be ignored.

Later in this chapter, selected examples of coded data will illustrate each of the issues. All of the issues are overlapping, but I will try to avoid repetitions of examples. Only short examples will be presented in this chapter. Thick descriptions[173] of a few selected micro-contexts will be presented in the sixth chapter. Though the examples in sixth chapter are important for the study, they will not be discussed in this chapter[174], but will be possible to recognize.

5.2 Issue 1: Using Whole Body in Experiencing Activities

5.2.1 Activities with Materials and Tools

The children's activities with materials were diverse and many. As mentioned earlier, one node was established for each of the following senses: touching, looking, smelling and listening. Experiencing through the body could appear in variety of forms, and it was difficult to distinguish these forms from each other. The sub-node *other experiences* collected different combinations of children's experiencing activities. Most of the large-scale activities[175] and children's movements throughout the room were coded under the node *other experiences*. The types of activities included: lifting, tearing, cutting (with scissors, saw, knife, by stamping), hiding under, crawling through and so on.

The node *other experiences* had many overlaps with the node *using materials*. How the children used materials and which types of activities they engaged in, depended on the types of the materials. Some of the materials could easily change shape, such as clay and sand, while others, like branches, needed to be treated by tools in order to transform them. The most significant variables affecting children's experiences with the materials were the size, shape and weight of the materials, and the level of necessity to use tools in order to transform them. However, also the smaller differences in materials' qualities were significant for children's play. For example, the two cases with

[172] As the model suggests, the fourth issue is not delimited by any borders and spreads outside the centre of the study – in peripheries of the quintain.
[173] The concept thick description is first used by Geertz (1993), and often referred to in interpretative research.
[174] For the purpose of not being repetitive.
[175] Large-scaled refers to larger body movements.

wood (branches in case 1 and pre-cut geometric wood pieces in case 6) unfolded very differently, as well as the two cases (3 and 4) where clay was used. The way the materials were presented also seemed to influence the types of activities that could develop. Clay was, for example, presented in one large piece to the children in case 3, while it was presented in small pieces (pressed through a garlic press) for the children in case 4. Consequently the children in case 4 were more attentive that clay can be hard when it dries, because small pieces of clay dry much faster than a larger mass. In contrast, the children in case 3 were more attentive to the clay's weight.

When the children met the materials, they were able to explore the materials' possibilities/affordances and limitations. Gibson writes: "Substances have biochemical offerings and offer manufacture. Surface affords posture, locomotion, collision, manipulation, and in general behavior. Special forms of layout afford shelter and concealment" (Gibson, 1979, p. 137). Through their grasping and pulling, the children could test what it was possible to do with the materials; however, through use of physical force they could also explore the relations between their body and the materials. These activities did not only have purpose to experience the materials' qualities, but also to explore the possibilities and limitations of their bodies in relation to the materials' size (cardboard boxes), weight (clay), strength (textiles), density (wood) etc.

The activities using tools helped the children explore possibilities of using their hands and arms and get better insight into the material's structure, density, strength, and so on. The data coded at the node *activities with tools* included: cutting with knife, scissors, saw and string (for cutting clay); measuring, hammering, machine knitting, taping, rolling with a rolling pin and pressing with a garlic press. The children enjoyed using tools, though often not with any purpose to produce something. Similarly to what Trageton (1995) discovered.

"Skills and information about materials, tools, and laws of energy are acquired while activities are carried on for their own sake" (Dewey, 1916, p. 241). Through the tools, children could experience materials in new ways. The tools were forms of extension of their bodies (Schoultz, et al., 2001), that made it easier to succeed in treating the materials in specific ways. The children often found it satisfying to overcome some difficulty by treating a material, for example tearing a textile - the two girls who tore the textiles were laughing and enjoying the activity. In addition to experiencing the materials through tools, the tools also made it possible for the children to explore different techniques and to become competent. However, the tools

could also be experienced as objects with their own affordances and resistance. When applied competently, tools could offer valuable assistance to difficult tasks, but they could also be dangerous and had to be handled with care, like for example knives, scissors and saws.

A number of events coded under the node *activities with tools* tell about children's experience with tools; some of them referring to not so pleasant experiences. Karin for example (case 2) was scared of the measuring tape. Many of the children had the possibility to experience tools, some of them got hurt, like Alexander and Terje with the hammer in case 7, and some of them hurt me with a saw and a knife (Morten and Emil in case 1).

5.2.2 Movement in Space

The types of activities children engaged in were dependent on the size of the materials and the available space. However, the use of space was also dependent on whether the children were challenged to, or prevented from moving around. For instance, in case 1 I hoped that the boys would sit during their play, but the possibility to sit down was not even considered by them. True, they did not see any usual chairs and perhaps did not realize that I wanted them to sit on the tree stumps. In direct contrast to case 1, in case 2, where two girls played with textiles, they saw chairs when they entered the room, and so they sat on them. I suppose that they would have played differently with the textiles if the chairs were not there. When they saw chairs they automatically assumed that they should sit – they knew which affordances were, in their culture, socially assigned to these objects (Gibson, 1979). The boys in case 1 did not have any experience of using tree stumps for sitting on and these objects did not have any pre-assigned meaning for them. Consequently, the boys moved around and used their bodies much more than the girls had the possibility to do while they were sitting. However, the girls sometimes stood in the chairs, covered their heads and whole bodies with the textiles and lay on the textile on the table.

The boys who played with cardboard boxes (case 6) had a large room at their disposition, as well as large pieces of material (the boxes). They moved around the room, lifted the boxes, climbed inside them, crawled through them, and even wore the boxes as pants. The boxes were part of the physical space that could be viewed from different positions and angles, since their bodies could move around; carrying with them all of their senses. As Gibson says:

> One sees the environment not just with the eyes (…) but we also look around with the mobile head, and we go-and-look with the mobile body (Gibson, 1979, p. 222).

When the children explored the materials, it seemed to be important for them to stand, especially if the materials were larger (like for example cardboard boxes or textiles). When they stood, they had the possibility to compare their body size to the materials' size and shape. Standing seemed to be a more natural position than sitting. When they were standing, they could move more easily and interact with the other children; as for instance, in case 5, where the two boys constantly changed positions in order to handle the knitting machine fairly between them.

When the girls in case 2 covered themselves with the textiles, they seemed to measure the materials and compare the size to their body size. Covering their faces and bodies also made it possible for them to experience tactility in more diverse ways than through their hands only. When they covered their faces they could experience the softness, smell and transparency of the textiles, as well as how the textiles moved and hung. By moving, lifting and swinging the textiles, the girls could experience some of the textiles' otherwise invisible properties. For instance, when I once unfolded one of the textiles on the table, I did it with a specific motion in order to make it unfold in the air before it hit the table. This specific motion seemed to be recognized by one of the girls (Eva in case 2) as a result she started to talk about blankets and forgot all about what we were talking about. The textile movement seemed to initiate her forming an association (or a metaphor).

The body has its own volume – it is in itself an organic, topological space that occupies volume and place in the room. When children experienced the physical environments, their bodies were also a part of these environments. Our body is a perceiving subject, but also an object that can be perceived by others (Shusterman, 2008). Each body is a separated unity, which can move and change positions in the relation to other bodies and the environment. It is precisely our body movements that make it possible for us to grasp the world directly, in specific ways and from different positions (Merleau-Ponty, 1994 [1945]). When we move around we have the possibility to acquire diverse visual impressions from a long distance, experience different intensities of sound and smell dependent on our distance to the source, and to get so close that we can touch and taste.

5.2.3 Somatic Experience

Materials and spaces are usually experienced when the senses are directed, towards the world outside of our body. However, one often forgets that we also feel from the inside of our bodies. A three year old girl, Line (case 7) reminded me that we can hear the sounds from the inside of our bodies. When Line heard a rhythmic hammering sound coming from outside the room, she said: "That's my heartbeat". She compared the hammering sound

to the rhythm of her own heart. I was amazed by her attentiveness to this inner experience and how instantly she connected it to an outside-sound. She, of course, knew the sound of her own heartbeat. I probably do know my own heartbeat, but I am seldom aware of it.

Egan (1997) writes about somatic experience, which provides us with specific forms of understanding. Somatic experiences are acquired before we can talk and they stay with us throughout life; they are the basis for concept development and we continue to acquire them in parallel with other forms of understanding (Egan, 1997). Embodied, pre-linguistic understanding of the world is essential for development of individual personalities (Egan, 1997).

Paying attention to children's somatic understanding of materials, one realizes the importance of children's experiences using their muscles. Since thought is influenced by somatic conditioning and muscular contractions (Shusterman, 1999), the children's lifting of materials and coordinating of body movements, probably influence their somatic experiences and thoughts. Sometimes the children had to coordinate their body movements, for example, when the knitting machine (case 5) demanded stable circular movements in the same direction, or when the saw (case 1) demanded the right pressure during the activity of pushing and pulling at the same time as holding the saw in the same angle. These practical tasks that demand coordination of different muscles and attention to the affordances of one's own body, could also trigger somatic experiences.

When Line (case 7) connected her heartbeat to the hammering sound, her expression did not just indicate an activity of her ears, but also her embodied, somatic experience. Her experience was multisensory. The children's activities of exploring, experiencing and expressing were mutually connected and usually simultaneous. According to Parsons (2007, p. 535), all modes of understanding are interconnected in the human body; "for the body is where all sensory and motor systems, no matter how specialized, communicate and are integrated". Additionally, our bodies are not "closed rooms", we breathe the air around us, smell, hear, see – through intimate relationships with our environments we are "submerged" in them (Davidson, 2004).

Parsons (2007) suggests that thought is embodied. I also argue that young children's experiences with three-dimensional materials engage embodied thinking.

5.2.4 Negotiation between the Body and Materials

While the children played with materials, they explored what could be done with them and how they could be used. It can therefore be said that children's

activities were negotiated with materials' affordances. For example, when William (case 6) found out that the short side of a banana box had three round holes that reminded of eyes and mouth, he got an idea to make a mask. When the side from the box was cut out in order to make a mask, he further realized that his legs could be pushed through the two rectangular holes and the box could be worn as a nappy (see figure 5). Through meeting the challenges and affordances of our environments, and physically engaging with them, we can discover possibilities within the environments and of our own bodies. According to Dewey, knowledge emerges from experience acquired through embodied interaction with complex and challenging environments (Davidson, 2004). When William explored the material's properties, he realized how the material's shapes could match the forms of his body – he discovered the material's affordances, hidden to the adult eye. When the body is engaged in perception of the physical environment, the body is taking part in forming of our knowledge about everything around us (Polanyi, 2000).

The specific physical conditions of our bodies make variety of experiences possible. In another example, a three year old Tom (case 3) explored the relation between his body and clay. When he stepped on clay with his bare foot, his body weight had an effect, and when he lifted his foot he could see the result. Tom was so surprised and amazed by the print of his foot in the clay: "My foot! My foot! My foot!" he shouted and pointed at the print. The imprint was witness to the interaction between his body, his ability to stand on one foot, and the affordance of the clay.

"Our movements and actions in the space make it accessible and possible to experience" it in diverse ways (Merleau-Ponty, 1994 [1945], p. 94). It is the relation between possibilities of our bodies and the specific qualities of available materials that can be combined in different ways, and contribute to diverse experiences. The body is active, and even though materials seem to be passive, some claim that they are active in their own way; environments battle for our attention (Abram, 2007), have advocacies (Lenz Taguchi, et al., 2009) and contribute to mutual absorption between the body and its surroundings. In this way, "the individual mind and its environment cannot be separated" (Stables, 2008, p. 104). Human interactions with environment are so fundamental that they are carried along "into the very fabric of all cognition" (Thelen and Smith, 1994, p. 326).

5.3 Issue 2: Materials Affordances as Foundation for Children's Embodied Metaphors

5.3.1 Organizing Experience

The node *organizing experience* was in NVivo characterized[176] as "describing experience, explaining". The words describing and explaining refer to verbal expressions and thus to situations when the children verbally expressed their experience.

Some of the expressions coded to the node indicated that children had been surprised. When they discovered that their expectations did not match the actual properties of a material, they had to reflect about their experiences and reorganize their actions. When for example Alexander and Terje (case 8) realized that one part of their wood boat did not sink in the water, they were surprised and disappointed. "Oooooh, it is not supposed to float", Alexander said. However, this motivated them to test which objects and materials could sink. I assume that such activity, or testing, was their form of reorganizing experiences and earlier knowledge about floating. The reorganization probably involved connections between their earlier experiences and the new experience. Since old experiences are the organs through which we perceive (Dewey, 2005 [1934]), when the boys realized that their old theories did not work, they were motivated to explore and establish new understandings.

The data coded under the node *organizing experience*, included the children's verbal expressions about their experiences. However, in order to *explain* something about their present experiences, they usually compared them to relevant features of their past experiences. The process of organizing experience was therefore about children's relations between present and past experiences. Their present experiences sometimes recalled their memories of similar qualities of materials, and other times they remembered experiences from similar social contexts. Linking present experiences with materials to past experiences from social contexts seems to be especially significant for the youngest children. When a four year old (Brede in case 4) experienced that clay was heavy he said: "This is heavy"; when a three year old (Helge in case 3) experienced that clay was heavy, he explained his experience with a long story[177]. Maybe he was not familiar with the word "heavy" which would have allowed him to be more economic with words? Or perhaps he had no intention to use few words and wanted to tell a story? Possibly his long story

[176] NVivo operates with *node properties*.
[177] See the first vignette in the sixth chapter.

in itself was a form of organizing experience and constructing meaning, or a part of a dynamic process of discovery about the concept 'heavy'?

Concept formation and discovery of a concept's meanings are most often dynamic processes (Vygotskij and Kozulin, 2001). Drawing on Bruner's narrative mode of thought, Efland says that "narrative mode of meaning-making tells us a story of what something is about" (Efland, 2004a, p. 768). In this sense, the young children who told stories, possibly made meanings in the moments of telling the stories – there was no meaning before the moment of telling and the process of making the narrative was also the process of making meaning. For example, when a three year old girl (Line from case 7) explained her own process of distinguishing between the concepts 'cold' and 'hot', she told that she was not allowed to play with ice-cubes when she was little because she could burn herself on the ice-cubes. When I wondered if she really could burn herself on ice-cubes, she reflected further about this and explained that she at that time felt that the ice-cubes were hot, implying that she now knew that they are cold and not hot. This example shows that she was making meaning during our conversation, and how she realized that being hot was not an objective property of the ice-cubes, but the result of her own experience.

Eisner (2002) says that our ability to experience the qualitative of our world, is closely connected to our reflection. In this study, the children's reflections seem to be initiated by their new experiences, but reflections also sharpened their attention and made them more curious about the materials' qualities. The study shows many indications that children's verbal reflections were vulnerable. To want to share their reflections the children needed to feel comfortable and believe that their teachers and peers were interested to hear what they had to say. Verbal reflections therefore demanded support, respect and curiosity from teachers and peers[178].

It was mostly the oldest children that reflected about materials' properties and sometimes tried to explain causality. For example, five year old Terje (case 8) stroked the edge of a piece of wood and said: "Someone has cut it here with a saw", and Even (case 5) engaged in exploring one of the threads to conclude: "Now I understand! The thread has been broken! It has been separated, because it has been pulled like this", he said and showed small stretching movements with his hands.

The youngest children seldom explained something about materials or experiences by addressing what was going on in the present, but they just

[178] I will return to social relations and inter-subjectivity in section 5.5.

started to talk about something that happened in the past. Three year old Marit (case 2), for example, just said "I am fishing", while she was playing with a measuring tape.

It was sometimes difficult to understand why the children suddenly started to speak about something that, from my point of view, did not seem to have any similarity with the present activities. However, it was probably exactly my point of view that thwarted my understanding. Children's imagination seemed to help them make connections between experiences with even the tiniest similarities. Their organizing of experiences seemed to be closely related to their embodied experiences, and their associations between past and present experiences seemed to appear in forms of metaphors. For example, when Marit (case 2) simply said "Sofa!", when she touched a specific textile.

5.3.2 Materials' Affordances

Gibson (1979) explains how affordances of natural environments have for ages influenced human life; long before anyone was able to understand why certain materials functioned the way they did. Diverse materials' qualities afford both animals and humans with certain possibilities.

> Substances differ in all sorts of ways. They differ in *hardness* or rigidity. They differ in *viscosity*, which is technically defined as resistance to flow. They differ in *density*, defined as mass per unit volume. They differ in *cohesiveness* or strength, that is, resistance to braking. They differ in *elasticity*, the tendency to regain the previous shape after deformation. They differ in *plasticity*, the tendency to hold the subsequent shape after deformation. Presumably all these properties of substances are explainable by microphysical forces of attraction among molecules, but they do not have to be analyzed at this level in order to be facts. Flint and clay were distinguishable substances for our primitive, tool-making ancestors long before men understood chemistry. So were wood, bone, and fiber… (Gibson, 1979, p. 20, original emphasis).

In the study Negotiating Grasp, the applied materials had diverse affordances and could be treated in a variety of ways. There are different reasons behind the selection of materials for educational contexts. However, providing open-ended educational contexts made it possible for the children to apply their own choices of how to treat the materials. The children could use the materials in ways they found interesting and meaningful. What the materials could afford was therefore not limited to what I expected, but opened possibilities for the children to use personal experiences and unique ways of

engaging their imagination. It was through children's interactions with the materials that they could become familiar with the materials' affordances.

In some of the cases, children were familiar with the materials from previous contexts and probably had assumptions about how the materials could be treated, or what could be expected from the potential activities. Naturally, the oldest children had previously experienced materials like clay and wood. They also brought with them their experiences from the social contexts where these materials were used earlier. In contrast, the youngest children experienced some materials and activities for the first time, without pre-assumptions about what the adults might want them to do. Whatever the reason, the three year old children seemed to be the most attentive to the materials' qualities and frequently expressed their surprises. Eisner (2002) writes about surprise as an important driving force behind an artist's choices in creating an art work. Surprise in itself can be a motivating force, and is closely connected to children's curiosity and will to find out (Fredriksen, 2010). However, in this study, moments of surprise were also indicators of new experiences and new-made meanings.

The children sometimes just watched what the others were doing with materials. During such observations they could perceive the materials with some of their senses. Other times they actively interacted with the materials by comparing the materials with their body's size and shapes, and exploring materials with the weight of their bodies and the strength in their muscles. With their bare hands or with the help of tools they transformed the materials' size and shape. Whichever type of material-interactions they applied, the interactions could provide them with experiences. Yet it was touch, rather than sight, that gave them better understanding of the materials' qualities hidden inside. When the children got more familiar with the materials, they gained more differentiated understandings of concepts like hardness, elasticity or plasticity. As Eisner (2002) says, sensory experiences with a variety of qualities enable concept differentiation. And as the examples from the study show, when the children had time to explore a selection of materials in different ways they were reminded of their earlier embodied experiences. And when a child had time to play in his or her own ways, they had the possibility to connect their unique past experiences to their present experiences. Such connections between past and present experiences seem to be of extreme importance for the understandings they created – the new meanings they negotiated on the basis of their experiences.

Trying to distinguish the children's experiences of the materials' affordances from other experiences, the node *adjectives* was created; assuming that materials' qualities could be described through adjectives like soft, large or

transparent. However, such words were not common among the children's verbal expressions; probably because they were still not a part of their vocabulary. The only adjectives frequently used were the colors, especially the primary and secondary colors. When the children were challenged to name nuances of a color, they made names that compared the colors to other familiar colors: "Blue-as-sea", Pia said (case 9). And Karin (case 2) created a new word: "dark-violet-pink".

The children's adjectives were for the most part self-invented words, which did not exist in Norwegian, but which were made for the specific purpose they needed them for (Eisner, 1990; Høigård, 2006). In a sense, through constructions of new words, the children were also developing understanding of concepts. They were testing which meanings could be assigned to the materials and their properties. Their construction of meanings seemed to be negotiated in the social contexts, where the new words were tested. Still, the children's new words and concepts were dependent on their present and past embodied experiences.

5.3.3 Associations

Children's present experiences with materials' qualities reminded them of their earlier experiences, and new meanings seemed to emerge from such connections. The 3D-materials' specific affordances inspired the children's imagination, called on their memories and motivated expressions.

The data coded to the node *associations*, indicated the children made associations on the basis of the materials' textures, shapes, colors, softness, movement, weight. The materials' reminded them of the following things: pizza, sausages, pastry, a troll, TV-shows, tools, lifts, coffee, ice-cubes, cakes, fishes, a museum, a fence, cake sprinkles, a rat, a mouse, a train with a tail, a statue, dinosaur teeth, the moon, a superman ball, an angel, a dress, a crown, a spider's web, a trunk, a polar bear, a boat, socks, bandages, a dog, a house, a car, a treasure chest, a mask, pants, tiles and so on. The selection of the words shows what they spoke about and all of the words refer to concrete objects. This probably means that the materials they played with somehow reminded them of these objects. Sometimes it was a single quality of a 3D-material (like smell or movement) that seemed to initiate a child's memory of some object that s/he associated with the same quality. This was illustrated when Eva in case 2 said 'blanket' when she experienced the specific movement of unfolding the textile by shaking it in the air. Perhaps her concept 'blanket' was closely connected with her personal experience with a specific blanket? In this sense, her concept of blankets might have not been

generalized yet – as it is for adults – but was still colored by her embodied experiences and emotional attachment[179].

This experience-memory combination relates to Dewey's (2005 [1934]) assertion that statements are generalized and expressions individualized. Can it then be said that Eva's word blanket was an expression rather than a generalized category? When a word becomes a category, it stops relating to the uniqueness of individual cases (Efland, 2004a). Since categories are not properties of the world as such, but a result of an individual's bodily and perceptual experience, establishing them is an individual's cognitive achievement (Efland, 2004a).

Gibson (1979, p. 263) claims that: "Knowing by means of language makes knowing explicit instead of tacit". In the case of children's first conceptualizations, their somatic experiences are integrated parts of their understanding (Egan, 1997). If concepts are shaped by humans' sensory-motor system, as Lakoff and Johnson (1999) claim, does this mean that children's sensory-motor experiences are essential for their understanding before they are capable of using words? Does it mean that children when they learn new words assign their experiences to them? Vygotsky (2001) suggests that a word's meaning has to be discovered by a child, but if the concept was grasped before a word has been learnt, it is more likely that a child's experience is assigned to the word; rather than the word's meaning being discovered. Certain objects already mean something for a child before s/he can talk about them. It can therefore be said that it is the already existing meaningful experience that needs to be assigned to a specific word. From this point of view, a child would have to *compress* all of her/his experiences of a specific object, for example a blanket's smell, size, colors, softness, weight, emotional significance, functions etc., into one single word. I here use the concept "compression", because the general category of blankets is narrower than the diversity of a child's personal experiences with a specific blanket.

Egan (2001) suggests that becoming literate has its costs. I suggest that one such cost might be the reduction of aesthetic qualities that takes place when diverse meanings of an experienced object have to be compressed/generalized to a single word that functions as a category for, for example, all blankets in the world. In this sense, a thought expressed linguistically is narrower than an embodied thought[180]. Verbal vocabulary is sometimes too impoverished to be able to reflect the complexity of an experience (Herskind, 2008).

[179] This will be further discussed in the seventh chapter.
[180] The relations between embodied and linguistic thought will be discussed in the seventh chapter.

Many of the children's verbally expressed associations were accompanied by their body language. For example, when Even (case 5) experienced the texture of one of the soft, fluffy yarn balls, he stroke his chest and stomach with both hands in circular movements and said: "Maybe it can become a woollen… Many woollen clothes!" His gesture indicated that he had previously had pleasant experiences with wearing woollen clothes. Another example of a multimodal expression that was closely related to somatic experience, in this context with the experience of sound, occurred while Alexander in case 8 was hammering. He started to move his head and upper body to the rhythm of his hammering, and started to sing: "I was made for lovin' you baby, you were made for lovin' me…". In this case the body movements were not just a supplement to Alexander's verbal expression, but it was exactly the hammering rhythm and his body movement that seemed to initiate the singing of the song with a similar rhythm, leading to a form of embodied metaphor[181].

When the children expressed their experiences verbally, they sometimes told long stories, and other times used single words, or just made sounds or movements. As mentioned earlier, older children (aged 4-5) sometimes compared the materials with something they had experienced earlier: "This looks like…", while the youngest children (aged 3) usually just started to talk about something without explaining what reminded them of the story, or just said one word[182]. I assume the two examples, telling a story and saying a word, to be two different forms of expressing connections between past and present experiences. When the children explained "this looks like…", they consciously reflected about their associations. In contrast, when they expressed something without indicating why, such expressions were not comparisons, but metaphors. The metaphoric expressions seemed to emerge directly from their embodied experience, possibly unconsciously or without verbal forms of reflection.

The concepts of association and metaphor are not clearly separated. The third chapter tried to separate them by saying that an association is a process of connecting, either through conscious remembering or unconscious intuition, while a metaphor is a product of such a process. There is no doubt that these two concepts are a part of the same process and it doesn't seem relevant to separate them further. However, what is important for this thesis is that both concepts are seen as connectors between a child's expressions and all sorts of multisensory, social, past and present experiences.

[181] The relation between metaphor and embodiment will soon be addressed.
[182] Like when Marit said "Sofa!" when she touched a textile with specific texture surface.

Both associations and metaphors were at times shouted out with self-confidence, pride or laughter. I experienced such expressions as children's sudden discoveries - new-acquired understandings. Such micro-discoveries seem to be pleasant experiences the children wanted to share with others. They laughed, spoke loud and repeated their expressions in order to get attention from me and the peers. They were self-confident in the moment of expression, but it also mattered for them that their new discoveries were acknowledged by others. Many events from this study imply that the children's sudden and confident expressions, whether in form of words, laughter or gestures, signified the moments in which they established a link between their past and new experiences. This means that such micro-discoveries were the moments where new understandings were constructed.

Egan (2007) says that, in the process of learning, the newly acquired understanding has to be organized into the complex meaning-structures that already exist:

> All kinds of associations curl around each new fact. (…) In the process of learning, the student has to fit whatever is to be learned into his or her unique complex of meaning-structures that are already in place. This requires restructuring, composing, and reassessing of meaning (Egan, 2007, p. 13).

I suggest that the moments of micro-discoveries indicate that such processes of restructuring and reassessing meanings had just taken place.

The data coded under the node *what can be made*, gathered events where children suggested what the 3D-materials could be used for. However, the children did not distinguish between what the materials reminded them of, and what they could become. What they suggested could be made, was usually dependent on their earlier experiences, though, their ideas were often imaginative, proposing new ways to use the materials. Since, past experiences and new ideas were merged; their suggestions as to *what could be made* were loaded with their memories and associations, and were expressed in forms of imaginative metaphors.

In case 5, where two boys played with 11 white yarn balls and a knitting machine, they suggested a number of items that could be made: a moon, a Superman ball, plaster bandages, an angel, glory, a Christmas stocking, bæ-bæ (a sheep), a spider's web, decorations, an old lady, a dress, a jumper, a glove, a polar bear, a super-hero, a trunk, ropes for boats, a guinea pig, a toy for a guinea pig, a headband and muscle-man. Their ideas reflected their earlier experiences of smell, color, texture, but also their present experiences of the forms they were making. For instance, trunk, plaster bandages and

muscle-man, reflected the boys' experiences with the circular knitting machine. When we consider that the knitting machine was making tubes and that these tubes could be pulled onto their arms and legs, it was understandable that these things were suggested.

The suggestions about *what could be made* were often presented multimodally, with body movements, dramatizing voices, singing and laughing. Young children are competent users (and readers) of body-language and often combine their verbal expressions with body language in order to "explain" and make sure they are understood (Høigård, 2006; Løkken, 2000b).

To suggest *what can be made* demands imagining something that does not exist, but can be formed. What materials can be transformed into is both a question of imagined and real possibilities. For example, when the three year old boy (Helge from case 3) suggested that a piece of clay could become a troll, he did not expect the clay to become a real troll[183], but when an almost five year old boy (Even from case 5) suggested that wool yarn could become a glove, this possibility was more realistic. Both suggestions were creative because these ideas were new for the children in the specific contexts – they were imagining something new for them. According to both Vygotsky (2004 [1930]) and Runco (2006), such ideas can be called creative, even if they are not completely unique for the world outside the contexts.

As Dewey (2005 [1934]) says, both a material and a person have to undergo something in order to make something new. In the hands of the children, the 3D-materials were undergoing transformations and the children were grasping new meanings. The children's active engagement seemed to be essential for their ideas and expressions. It was through physical interactions that they could experience the affordances of the materials and possibilities and limitations of their own bodies. The experiences gave food to new ideas, and required imagination to play with the new ideas.

Children use their imagination to make sense of their world (Egan, 2002). However, I suggest that it was not just the children's individual imagination that was important, but also acceptance of imaginative play in the social contexts. In this respect, imagination was a collective phenomenon, and it would probably not last long if the children were not given time and space to experience, play and explore.

[183] I am sure he would not have liked that.

5.3.4 Metaphors and Imagination

The children's experiences were most often multisensory, and their expressions multimodal. Some of the expressions seemed to be extraordinarily loaded with multisensory experiences of sounds, tactile experience, smells, the way something moved (material or tool) or some kind of change the materials were undergoing. Such extraordinary expressions that managed to capture and hold the holistic multimodal experience, are here considered to be metaphors. Metaphors can appear in many different forms, as Efland (2004a) and Parsons (2007) suggest. The metaphors that will be presented here were often brief, but powerful. They were usually multimodal, included gestures and sounds, and were sometimes non-linguistic.

Here are some of the metaphors identified during the study (coded to the node *metaphors*):

- Emil (case 1) pulls a branch tied with rope and says that he is taking a dog for a walk.
- Marit (case 2) for 32 seconds dances with the measuring tape, using it like a ribbon in a gymnastic performance.
- Eva (case 2) says "birthday" when she puts a large piece of pink textile around her shoulders.
- "We have to wait for my mother", Helge (case 3) says while he watches me struggling to lift a large piece of clay.
- "Bæ-bæ" says Even (case 5) when he smells one of the yarn-balls (a woollen ball).
- Markus (case 5) makes the sound "Brrrrrruuuuum" while he turns the handle of the knitting machine around, faster and faster.
- William (case 6) sits in a cardboard box and swings from side to side with his body while he sings.
- Thomas and William (case 6) wear cardboard boxes like nappies and laugh[184]. After a while William say: "Underpants-pirate", and Thomas sings a teasing song about babies.

The eight selected metaphors can illustrate the diversity of expression forms. One can imagine which kinds of experiences each of the metaphors grew out of, though it is not possible to know if the metaphors emerged from the children's somatic experiences or observations of other people and activities. The metaphors were forms of expression; however they were also forms of experiencing. The children could, through their bodies, experience the expressing activities. For example, when William was swinging in a cardboard box, or wearing it, he could experience the new contexts of play

[184] They never mentioned the word nappy.

and interactions of his body and the material. As Eglinton says, "experience leads to more experience; discovery generates further investigation" (Eglinton, 2007, loc. 193-99).

During their play with 3D-materials, the children were attentive to all forms of experiences. During such open-ended activity, there was nothing restricting their associations. Consequently, their expressions varied greatly and their metaphors reached far from their present contexts. The tiniest details from a new experience could remind the children of something earlier experienced. Their association appeared to be immediate and spontaneous, and their metaphoric expressions functioned as interpretations of their present multisensory experiences. Through metaphors, they made connections between their earlier and new experience. The metaphors functioned as results of the process of assimilation between the past and new experiences; they were proofs of the body-mind activities and the new understandings. However, in a similar way to children's theories (Vecchi, 2010), children's metaphors were not the ending point in their process of constructing meaning, but rather functioned as vehicles of this process. Each metaphoric expression could become a source of new experiences for all participants in the context, and the new experience could further motivate someone's associations and new expressions. Contexts are fluid, always changing and offering new possibilities for attentive participants. Each new situation depends on the previous, at the same time it invites modified versions of the meaning that has just been constructed (Snodgrass and Coyne, 1992).

Drawing on Parsons' (2007) image of metaphor as a complex network of wires[185]; these wires seem to connect the children's past and new experiences. The process of associating between the past and present seems to be essential for reorganizing meaning and achieving new understandings. The metaphor itself is a thought in transition; it oscillates through the network of wires, moving to and fro with diverse experiences, searching to create new meanings in order to adopt the newest experiences.

Some of the metaphor examples would possibly never be used by an adult. One could therefore claim that children's metaphors are not understandable, that they make no sense and are not able to "carry the day" (Kress and Van Leeuwen, 2006). However, if children's metaphors function as indicators that construction of meaning inside of specific contexts is taking place, it makes no sense to compare them to adult's metaphors. In a similar way to children's hypothesis (Høigård, 2006) or theories (Vecchi, 2010); children's multimodal metaphors mark small steps in the process of their widening understanding.

[185] Presented in the third chapter.

Even if a metaphor can sometimes only be understood by the child who creates it, it is valuable and meaningful for the child because it can help her/him re-organize personal experiences, feelings and thoughts. Children's metaphors are not exclusively a matter of verbal language, but also forms of thought (Efland, 2004a). From this point of view, metaphors are essential for thinking. Additionally, when a metaphor is expressed, it also becomes a form of communication that can be further negotiated in the social settings.

I suggest that children negotiate meanings through embodied experiences with materials' affordances. Such negotiation of meaning seems to be a process of different mutually dependent functions. Children's negotiation of meaning include the following aspects that take place almost simultaneously, but in more-less the following order:

1. A child acquires somatic experiences in relation to materials' affordances,
2. negotiation between earlier and new experiences takes place,
3. when present and past experiences find a connection, a micro-discovery takes place
4. the micro-discovery is sometimes expressed through a metaphor and
5. from the moment of expression, the metaphor is negotiated in the social contexts.

According to Egan (2007), new meaning is to be found in the interaction between what is learned, the embodied mind, emotions, intentions and memories. If the moment of micro-discovery is the moment of establishing a connection between a child's somatic knowledge and a metaphoric expression, then micro-discoveries are significant roots of both verbal language development, and embodied knowledge. This means that embodied experience is necessary for young children's concept construction, and that metaphoric expressions can motivate different embodied experience.

Metaphors can arise as results of micro-discoveries and can function as rewards in the child's activity of meaning negotiation. I propose this because the moments of generating metaphoric expressions often seemed to be experienced by children as the most pleasurable. The activities that led to micro-discoveries seemed to be meaningful, because they were motivated from the inside, by the children's personal experiences. Additionally, when the metaphors were appreciated in the social settings, they became the driving forces behind the children's further interest to negotiate meaning. During the study, I experienced how my acknowledgment of children's expressions motivated them to come up with more and more suggestions, as for instance the boys in case 5 demonstrated.

Children do not have as many experiences as adults, but if we consider children's somatic experience to be closely related to their unconstrained imagination (Egan, 1997), then their abilities to learn from their own experiences could be regarded as superior to adult's; simply because young children seem to be more attentive to their embodied experiences. Egan (2007) proposes that it is the imagination that ties body and mind together. Imagination contributes with alternatives to "common sense or take-for-granted reality" (M. Greene, 2007, p. 658). This is true for adults, but young children often experience things for the first time and for that reason cannot take things for granted. That is why it might be easier for children to see more possibilities[186]. At an early age, the children's imaginative abilities are "uninhibited by the constraints of culture"(Eisner, 2002, p. 4).

> Our personal attributes are captured in the metaphors we choose or invent to describe them. It is through such descriptions, at least in part, that we enable others to understand how we feel and, indeed, enable us to recognize our own feelings (Eisner, 2008, p. 8).

Cognition is dependent on imagination, and metaphors are the expressions of embodied and social processes that derive from imaginative cognition, as Efland (2004a) calls it.

Children's metaphors might "sprawl" in different and distant directions, connecting apparently unrelated things, but they still mirror their embodied experiences. Children's metaphors can be seen as poetic, but children do not make metaphors in order to be poets[187]; their metaphors are vehicles on the journey of meaning negotiation. Children's metaphors can be considered as cute, but should not be considered as useless. On the contrary, their metaphors need to be respected, because they are part of the serious business of knowledge construction.

Instead of "dismiss[ing] poetic and metaphorical language as meaningless utterances" (Eisner, 2008, p. 9), teachers and researchers should recognize that what might seem meaningless for adults, might be meaningful for the children. As any other expression, children's metaphors are meaningful for those who make them and for others who find them applicable in relation to their own experiences.

[186] On condition that social contexts permit this.
[187] In the same as they do not draw because they think they are artists.

5.4 Issue 3: Negotiation with Materials' Resistance

5.4.1 Experiencing Materials' Resistance

While children were lifting the materials, pressing them, cutting, tearing and so on, they were getting familiar with what could be done with the materials and getting ideas about what the materials could be used for. In the process they also experienced the resistance of the materials. During my observations, I witnessed the children's use of physical force with the materials. They sometimes expressed something with words when it did not go as they expected, or they asked for help. However, it was mostly the straining of their muscles; breathing and body language that were evidence of their physical efforts and intentions. Other signs that some kind of negotiation with materials was taking place, were the children's expressions in the moments of achieving what they intended. These moments were often sudden and joyful; the children would start laughing, shouting out or get an instant wave of self-confidence: "Look what I can do!", "I can do it!" or "I am so handy!" And soon after they had solved the problem for the first time, they would start showing me and their peers how things should be done – they had become experts. The self-confidence seemed to function as further motivation, and could also be a sign that construction of meaning had taken place.

In the coded material, there are overlaps between the data coded under the nodes *surprise*, *self-confidence about using materials* and *new experiences*. Here is an example of an event coded under the node *new experience* and also coded under the two other nodes:

> Eva (case 2) makes a short cut in a woolen cloth and tries to pull it with both her hands, as if she wants to tear it, but the felted wool is impossible to tear. I find another textile, thin woven cotton, and ask the girls to make a small cut at the edge. Marit makes the cut, I show her how to hold the textile when she pulls, and when she succeeds she laughs while she is holding the newly torn piece in her hand. Eva also wants to tear and when she starts pulling, using both hands without help from me, she starts laughing really loud. She pulls hard, screams and laughs with all her body, so that she almost falls off her chair.

The example with tearing showed the girl's surprise about the technique and self-confidence (expressed by laughing) in achieving the intended change of the materials shape. Judging by the level of their tearing-competence at the beginning of the event, it seemed obvious that the tearing experiences was new for the girls.

Young children are capable of reading body language of others and sometimes seem to empathetically engage with the experience of other people while watching them. Children's observations of experiences of others can become their second-hand experience. The data coded to the node *new experiences* sometimes concerned such second-hand experience. However, the second-hand experience could not lead to self-confidence in the same way as first-hand experiences could. The children's expressions of self-confidence were usually connected to their feeling that they mastered something physically – something they had had chance to experience through their own negotiating with materials. Here is an example of a second-hand experience coded to the sub-node *new experience* and *surprise*, but not *self-confidence about using materials*.

I am showing Helge and Tom how clay can be cut with a piece of thin string (case 3). I hold a piece of string in my hands. I am bending over the clay and the table, towards the boys and I start pressing the string down on the edge of the large piece of clay. The string disappears into the clay, slowly cutting its way through. The boys are very attentive; it is almost as if they are holding their breath. At the moment a slice of clay falls on the table in front of Helge, he starts to breathe with a short laugh. I also laugh, and Helge makes a specific movement with his hands; he lifts both hands up in front of his chest and opens them quickly, at the same time as he breaths out and looks at his hands. Then he looks at me and laughs again.

Helge seemed surprised with how easy it was to slice the clay. The hand movement he made is difficult to describe, but as I understood it the hand movement said: "Just like that!" Helge's experience of the clay slicing was visual, but also multisensory, because he could hear the thudding sound of the moist clay falling on the table in front of him and he could smell the fresh earthy smell. When he later cut the clay himself he had to engage his own muscles, to coordinate the process of pulling between his arms, and at the same time control his fingers which were holding the string. This example cutting clay, shows how Helge's observation gave him experience with techniques, however, it was only when he conducted the cutting himself that he could engage more of his senses in somatic experience.

Second-hand experiences are acquired through watching and listening and can be important forms of learning how to use a tool, or make traditional designs, as Reitan (2007) points out. However, first-hand experiences and somatic experiences additionally provide the experience of touching and using muscles. In this sense, it was only through their own interactions with 3D-materials that a child could experience a material's resistance. As Dewey (Dewey, 2005 [1934]) suggests, it is the direct, embodied interaction with a

material that initiates thinking through the material one is treating. However, if a child had earlier experienced a physical struggle with a material, s/he might be able to empathetically connect with other people's physical struggles. In this sense, their past first-hand/somatic experience would be essential for their ability to connect empathetically.

First-hand experience can be compared to a first-person perspective, which according to Stelter (2008b) leads to implicit, pre-reflective, non-linguistic forms of generating personal meanings on the basis of embodied experience. "The first-person perspective is an access to understanding the interplay of the individual with his/her world, and in this dialogue with the environment the world becomes meaningful" (Stelter, 2008b, p. 61).

One of the events coded under the node *self-confidence about using materials* was Morten's (case 1) activity of sawing. This was his first time to cut with a saw, so this activity was also coded under the node *new experience*. While Morten was becoming competent, he was also becoming more self-confident. I did not help him at all, except for holding the branch with my foot (see figure 4). When he was doing everything himself, he could experience the pleasurable feelings of using his muscles and of exploring the right position of his body in order to "fight" against and experience the wood's structure and resistance. While he was cutting he seemed more and more self-confident. From time to time I let him know that his competence amazed me, but I tried to be careful not to flatter him unnecessarily - he needed to know that I was taking him seriously. Once he got a good sawing rhythm, I told him: "Oh, Morten, you have really learned how to cut with a saw!" "Yes!" he replied, smiled and continued to cut. "I managed to cut here", he said and pointed to one of the marks he had made in the wood. His growing competence and self-confidence were highly significant in the way he treated the material and the tool, in the way he spoke and moved his body, and in the way he later instructed me how to hold the piece of wood he was sawing. Morten also expressed his self-confidence and pride through a discussion with Emil about whose tool was the most dangerous.

Working with 3D-materials requires physical strength, both the grip of the hands and of the whole body. When Morten used the saw he had to coordinate a large number of muscles and embodied functions; how hard to press the saw against the wood, how firmly to hold the handle and so on. Through a range of different resistances he was learning about his body, the wood and the tool, and could experience how the body-mind-environment functioned as a whole. When Illum and Johansson (2009) study "what is

appropriately soft" and Jenny Frohagen[188] studies "how to saw straight", such apparently simple research questions can lead to understanding the complexity of transforming materials, and how mastering of motoric challenges can contribute to cognitive growth.

The three episodes (tearing textiles, cutting clay with a string, and sawing) show examples of children's first- and second-hand experiences and suggest how both types of experience can have importance for children's new understanding of a material, tool or technique. However, I propose that it is the direct embodied experience (first-hand experience and first-person perspective) that is superior, since it provides possibilities for use of more diverse senses, and it can become a source of self-confidence.

5.4.2 Solving Problems

The data coded at the node *solving problems* included different forms of problems and different ways to solve them. Sometimes the situations involved tangible problems and other times imagined problems. The children were sometimes working on practical solutions, and other times only making verbal suggestions about how a problem could be solved. The examples that will be presented here illustrate different types of problem solving.

When the children met some kind of challenge or resistance, this sometimes led to defining of a problem that needed to be solved. The resistance could be of a material, social or even imaginative nature. This meant that some problems were caused by the materials, others by social resistance, and others needed to be solved for the imaginative play to continue. Not all the suggested solutions were realistic, but they still formed part of a process where a child applied embodied thoughts, reflections, connected experiences and so on, in order to solve the problem.

Realistic suggestions about how to solve a problem

Here is an example of a practical design problem that concerned the use of materials, tools and techniques. Even (case 5) did not know much about the differences between knitting and sewing, however during the activity with the circular knitting machine he seemed to realize some new possibilities of the materials and the technique. When Even realized that the dress I was wearing was knitted and that this was the same technique the circular knitting machine dealt with, he suggested that we could make a dress. To challenge his further reflection, I tried to direct his attention to the shape of the forms the knitting machine was making[189]. I also expressed my worries that I did

[188] In her current PhD study about sloyd education in Sweden.
[189] As earlier mentioned, the machine could only knit tubes.

not know how a dress could be made from such a narrow tube. In this sense, it was first Even who suggested that a dress could be made, and then it was my expression of concern that possibly initiated his empathy and further suggestion that knitted pieces could be sewn together.

Through our interactions, the process of defining the problem and suggesting solutions was a process of dialogue. This could lead further to problems relating to dress design; how the pieces could be sewn together, the size and length of the dress, the type of thread, the sewing technique and so on. This example is similar to the types of problem-solving that could take place during visual art education classes with older students. The problem that needed to be solved was both posed by the material's/technique's affordance, the social resistance/challenge, and the resistance of the material's shape – that the tubes were quite narrow and would not fit the shape of a body. However, the example also shows how the boy's different understandings about textile making techniques made it possible for him to pay attention to the textile's qualities, and to the differences between making of a fabric and assembling it. The latter is a question of design.

Solving concrete problems with imaginative solutions

Even's suggestions were realistic and possible to apply to solve the problem. However, his solution was not practically conducted, but only discussed. A number of "real problems" would probably occur if the dress-project was put into action. The example that follows here shows a girl's treating of materials and her physical attempts to solve a chain of practical problems. However, some of her suggestions were not possible to do.

> Eva (case 2) wants to cut a textile for her crown. I see that the piece she is holding is the last piece of the specific fabric which is still large enough for her crown. She insists on cutting it herself, and I let her do it. I suggest the direction she could cut in order not to spoil the only piece left, but she has already made up her mind where to cut, and she continues. She is cutting with confidence and when she has almost cut to the end, she tries to tear it. She realizes that it is not possible to tear this textile, so continues to cut and when she is finished she says proudly: "I made it!"
>
> She now intends to make the textile into a tube shape using masking tape[190], she manages quite well and makes a form similar to a crown. She is now holding the doll-sized crown in her hands and realizes that it is too small. She suggests that we should take another piece of

[190] The textile's specific smooth surface makes it possible to join it with masking tape.

> textile. I measure this other textile around her head and we both see that this piece is also too short.
>
> Eva says: "That there – we can make it! We can make it!" and she points at the measuring tape. I measure around her head and measure the textile showing her that the measured length on the tape is longer than the textile. She now takes the measuring tape in her hands and starts stretching it. "We can stretch" she suggests.

From Eva's point of view the process of crown-making included many different problems that needed to be solved: how to cut with scissors, how to tear, how to join with tape, how to make a tube, and so on. From my point of view the presented event had one most important problem: the size of the textile and consequently the size of the crown. One could say that the problem was imposed by the material which was too small, however it was Eva's decision to cut it that made it too small. I warned her and tried to prevent her from cutting, but when I realized that she was so determined to cut her own way, I let her do so. Cutting her own way, though, seemed to make her even more self-confident and sure of her own actions. I remember how hard it was to watch her "destroy" the textile. I was afraid she would be sad when she realized that she might not be able to make a crown, but I am glad I let her do all of the mentioned tasks herself. Letting her cut demanded that I gave up some of my control, but it also made it possible for her to face a number of challenges and experience how it happened that the textile became too small. She was so engaged and proud, and I respected her choices. She had possibility to learn from her first-hand experiences.

What surprised me was that Eva did not get angry when she realized the textile was too small. She was probably sad; for a minute she looked worried and did not say anything. This realization of the material's resistance seemed to lead to two micro-discoveries that followed. Firstly, she suggested that we could use the measuring tape. This suggestion was a kind of micro-discovery marked by her sudden hope expressed verbally with "We can make it! We can make it!" To suggest using a measuring tape was an appropriate suggestion, but it came too late after the textile was already cut. Secondly, when the measuring tool also presented resistance (it was either too short, or too long), she suggested that the measuring tape could be stretched. This second micro-discovery reflects her "theory under construction"; she had understood that the length of measuring tape was significant for the results of measuring, but she was not sure *how*. Her imaginative suggestion to stretch the measuring tape in order to make the textile longer could be considered as "cute", but this would be a disrespectful way of interpreting her serious efforts to solve the problem. Indeed, her suggestion was an indication of her

struggle to understand and solve the problem, and was, I suggest, an important part of the process of meaning negotiation.

Solving imaginative problems with concrete materials

In case 6, where William and Thomas played with cardboard boxes, during the activity they developed a framework for their play. Their play was inspired by a music-story[191] "Hakkebakkeskogen" and involved different animals from the music-story. When they had the idea to make houses for some of the animals, the houses were to be made of solid materials, while the animals were imagined and dramatized through the children's own bodies. In this sense, the fox and the mouse were alive, but also imagined. I am making a distinction between what was real and what was imagined, because it was confusing who they were actually making the houses for; the animals or themselves. This question had consequences for the size and shape of the houses, especially since going inside the house was what seemed to matter most.

The concrete problem they needed to solve was related to the design of the mouse's house. They did not have a cardboard box which was large enough for both of them[192]. When they realized this, they started to discuss how different boxes could be joined together. They further discussed where the door and windows should be placed and how the holes in the cardboard should be cut. They were solving concrete problems in tangible materials, and the houses they were making looked more like human-houses than "animal-houses"[193]. However, it was probably exactly the shape and size of the boxes' cubic forms – the affordance of the material – that reminded them of human houses and gave them the idea to make houses for the animals.

The boys' play was imaginative, but the construction problems were real. In imaginative play,

> …symbols often take on a life of their own, and it is their ability to do so – both *be and not to be* what they stand for – in the pretender's mind, that enables their creative use (Ackermann, 2004, p. 21, original emphasis).

The boys constantly switched between being animals and being themselves. This was especially noticeable by the voices they used. In animal-roles their voices were made up but spoke human language, whereas out of their roles

[191] With music-story I mean that this is a music CD; mixing songs and story, where different animals speak and sing. This specific play "Hakkebakkeskogen" was written by Thorbjørn Egner.
[192] The fox was supposed to visit the mouse.
[193] That would be holes in ground or similar.

they spoke with their usual human voices. Even though the inspiration for their play came from a music-story and they knew exactly what took place during it, this did not make their play conform to the story, but formed a framework where imagination and reality merged. They sometimes mixed the lines from the music-play and applied them to their "human-conversations". Their discussions were sometimes impossible for me to understand, because I did not know if they were talking about real or imagined problems. To conclude, their construction was motivated by imagined problems, but solved in tangible materials. The process of building involved a chain of emerging challenges that concerned shape, size, cutting and assembling techniques, as well as the use of tools. The collective design process they engaged in demanded that they understood each other.

5.4.3 Negotiating Grasp

A large number of events, similar to the three problem-solving activities depicted, took place during the study. It is impossible to suggest exactly how many, since the number of events is dependent on the way of counting. For instance, when Eva was cutting the textile in the example above, she faced many small problems like how to hold the scissors, in which position and angle to place them in relation to the textile, which part of the scissors blade to press against the textile and so on. I did not find it relevant to count the problem-solving activities as disconnected from their contexts; on the contrary, I found it relevant to describe how such activities unfolded[194].

Solving problems was always connected to some form of resistance – if there was no resistance, there would be no problem to solve. It was only when children faced resistance and acted against it, that they could discover new situations. In order to resolve the problematic situation, in their body-mind they seemed to search for similar situations from previous experiences, and when such connection was established, a micro-discovery could take place. As described in section 5.3.4, a child's present experience with material's affordances could lead to expressions in the form of a metaphor. In a similar way, and even to a larger extent, a child's active engagement against materials' resistance also led to micro-discoveries. This process of facing the resistance was a form of negotiation between the 3D-materials' qualities and the children.

This is how Barone describes similar processes when students[195] negotiate with materials:

[194] See the vignettes in the sixth chapter.
[195] Most probably older than the students in this study.

> A dialogue between the student and the materials being shaped, a qualitative problem-solving process in which the student-worker-artist struggles with possibilities, tentatively moves on the material, encounters resistance, and manipulates the component parts (Barone, 2001, p. 25).

When a child met 3D-materials' resistance s/he negotiated possible solutions and through that also negotiated new understandings. Resistance seems to be a power that motivates a child to invent and create (Dewey, 1956b). Such negotiation of new meanings is what I have called *negotiating grasp.*

The activity of facing the material's resistance is likely to be driven by the child's curiosity to find out, and to be rewarded by the satisfaction of discovering something new. However, in addition to internal motivation, positive response from parents and teachers is probably also important[196]. Imagine, for example, the positive response an infant gets from her/his parents for standing on own feet for the first time. Such achievements of sitting, crawling or walking on one's own are highly individual and rewarded by a child's own satisfaction and by positive social response. I suppose that embodied memories of both internal and social support encourage young children to meet emerging problems later in their life.

A micro-discovery is here regarded as an intrinsic form of creativity. A micro-discovery is the moment when a new idea is born as a result of parallel processes of on the one side embodied physical negotiation with materials, and on the other of inner negotiation between past and present experiences. Micro-discoveries can take place when a person deals with materials in a context where no one else is present[197]. However, when a micro-discovery is accomplished and expressed in a social setting; where the expression can be shared with others, it seems to have an important effect on the child's experiences of their own micro-discovery. It is only when the new discovery is somehow shared that it can meet response from others; be acknowledged, awake curiosity, be misunderstood etc. Through an expression in social contexts, the new idea, metaphor or a problem-solution can be further negotiated in the social contexts[198].

In short, micro-discovery is a moment of a new understanding. Such a moment does not take place often, but is part of a process that here is called

[196] In section 3.2.2 it was mentioned that parents of "creative people", as defined by Csikszentmihalyi (1996), treated them as "fellow adults".
[197] This claim is based on my own experience from material negotiations, and observations of my son when he was not aware that I was watching him.
[198] This will be addressed in the section 5.5.

the process of negotiating grasp. The whole process of negotiating grasp includes a person's: 1) embodied negotiation with materials, 2) inner negotiation between past and present experiences, and 3) negotiation inside the social context. However, these three parallel processes are not separated, but interwoven. While analyzing the micro-discoveries in this study[199], I tried to distinguish between more detailed parts of the process of negotiating grasp without separating the three parallel processes, but still looking at the chronology of the process. Nevertheless, the ten-point "model of negotiating grasp", suggested below, is not considered a completely linear process.

When the model was applied to concrete situations from the study[200] it did not match them exactly, since each process was a unique and context bound event. However, what usually identified the presence of negotiating grasp was that some form of micro-discovery had taken place. It was only when I identified a micro-discovery in the video material, that I could closely observe the events that took place immediately before and after the micro-discovery, and analyze the process according to the "model of negotiating grasp".

The process systematized[201] in ten-points is described in the "model of negotiating grasp":

1. A child tries to do something with a material, but *experiences* that it does not work the way s/he intended.
2. The child's experience of the materials' *resistance* motivates her/him to explore the material's possibilities by using physical force, grasping, pulling and so on.
3. The material's resistance, or some kind of social resistance, makes the child *define a problem* that needs to be solved.
4. Because of the materials' resistance, the child gets *motivated* to invent new ways to solve the problem, but first has to define the problem.
5. The process of "incubation"[202] is initiated, the child's *attention to details awakes* and s/he tries to find another solution for the initiated problem.
6. *Past and present experiences merge* and the new solution comes in the form of a micro-discovery.

[199] See detailed descriptions in the sixth chapter.
[200] See chapter six.
[201] This systematization in ten points is of course a construction - the described phenomena are in reality not clearly separated one from another.
[202] The word incubation refers to one of the stages in the creative process defined by Sawyer (2003); it is described as the most difficult phase to understand (see 7.2.5).

7. The moment of *micro-discovery* is a surprising moment when the child gets happy and expresses her/his new discovery in some way – for example through an embodied metaphor.
8. Such *expressions* (embodied metaphors, verbal expressions, pointing etc.) usually also express the child's self-confidence. The child wants others to become aware of and to acknowledge her/his micro-discovery.
9. The expression of micro-discovery is further *negotiated* within the social contexts.
10. The expression needs to be *accepted* in order for the child to experience the social reward and feel that her/his efforts are respected as valuable for others.

The micro-discoveries in the study often took place very rapidly - the incubation phase seemed to be very short. In the moments of constructing new meanings the children seem to hurry to express and their expressions had not been thought through. I would not say that the expressions were random – on contrary, the expressions seemed to be well rooted in the child's embodiment and intuition, but the expressions ware not always *final*. The children often added additional explanations, new expressions and more details. The children's micro-discoveries and expressions appeared to be a part of on-going processes of meaning negotiation. The meanings were under construction and open for influence from the social contexts. Additionally, the process of negotiation usually consisted of spiralling pattern of influence; where one form of negotiation initiated and supported another, especially when a child's expressions of micro-discoveries triggered a positive response from other participants. Such positive response did not have to be expressed in words, but could appear inter-subjectively through body language that expressed interest, support or curiosity. In contrast, if a child was already feeling self-confident, some kinds of small resistance from the social environment could also function as motivation for problem-solving activities and meaning negotiations[203].

Dewey saw resistance as a driving force behind motivation to learn. "Resistance that calls out thought generates curiosity and solicitous care, and, when it is overcome and utilized, eventuates in elation" (Dewey, 2005 [1934], p.62). In this way, resistance from the physical environments and social environments are necessary for a person to become aware of him or herself (Dewey, 2005 [1934]).

[203] This will be elaborated in section 5.5.4.

During the process of negotiation, both materials and human thought undergo some kind of transformation (Dewey, 2005 [1934]). However, while materials suffer force from the outside, the transformation of human, embodied thought is exposed to inner forces of memories, past experiences and imagination. During the process of negotiation of thought, it is precisely the combination of what is understood and what is yet not understood that provokes the new thoughts (Dewey, 2009 [1909]). I find the verb 'negotiating' suitable to describe the active process of provoking, pushing, pulling, adjusting and exploring in order to discover meanings applicable to the present moment. Since the contexts are always changing, the meaning that has just been negotiated would possibly not fit the next moment, when another child expresses something or other past experiences emerge. The concept of negotiating grasp is therefore an ongoing process; where what has just been grasped, in the next second has to be set free, in order to meet new possibilities with open hands.

5.5 Issue 4: Influence of Inter-subjectivity on Children's Experience, Meaning Negotiation and Creativity

In addition to material's resistance, other forms of resistance were also present through the social interactions. For instance, during the study the children provided resistance enabling me to learn. Their actions and choices challenged my ethical judgments, personal needs, attitudes, feelings, body language. This section will deal with the social relations between the children and myself during the educational contexts and will be written from my personal perspective.

5.5.1 Nodes about Inter-subjectivity

During the interactions with the children I experienced how my choices of words and facial expressions influenced the children's reactions. When I watched the videos I realized that my gestures were sometimes exaggerated and that children were sometimes overlooked or misunderstood. The video material reveals the fluid, inter-subjective communication that took place during the educational contexts and shows how the inter-subjectivity influenced the children's interactions with the materials.

During the coding activity, 18 nodes were made under the node category *teacher's activities*. The node category *inter-subjective meaning making* was also sub-devided with three nodes: *inter-subjectivity all*, *inter-subjectivity child-child*, and *inter-subjectivity teacher-child*. Additionally, the node category *democratic participation*, with 14 nodes, also referred to social

relations between the participants. Since interplay between children and materials is the main focus of the thesis, this is not the place to address all the nodes. However, because the study considers the importance of social contexts for the process of meaning making, I find it necessary to address some aspects of the social interactions.

In order to make a selection of most relevant nodes, I decided to focus on the same concepts that have been central in relation to material's qualities: affordance and resistance. One of the meanings of Gibson's term affordances is related to what social interaction can offer (Gibson, 1979). Dewey (2005 [1934]) also speaks about social resistance as important for learning. Though the concepts affordances and resistance sound very technical and are not so appropriate to describe the flowing, interactive processes of human communication, I have chosen to use them in order to structure the extremely complex processes of inter-subjective negotiation of meaning that took place during the educational contexts.

As earlier mentioned, the children provided different forms of resistance that challenged me to reflect and develop new understanding. Acting in the role of teacher, my actions and choices sometimes functioned as resistance for the children and at other times afforded possibilities for children's play, explorations and meaning making. From the large number of nodes mentioned above (all together 35) a few were selected for each of the following categories: teacher's affordances, teacher's resistance, children's affordances and children's resistance.

	Affordances	Resistance
Teacher's actions that influenced children	Giving time to explore (node: *allowing problem solving*) Supporting children verbally (node: *motivating*) Suggesting materials and tools at the right moment (nodes: *suggesting* and *attentive to needs*)	Misunderstanding or overlooking a child's effort to communicate (nodes: *misunderstanding* and *attentive to someone else*) Teacher afraid (node: *afraid*) Teacher did not know something, or pretended to need help from the children (node: *suggesting*)

Children's actions that challenged the teacher (me)	Children were attentive (node: *intense attention*) Children were active (nodes: *problem solving*, *taking initiative*, *teaching*) Children were interested and taking initiative (node: *laughing, joking*)	Children were competing with each other (nodes: *competing*, *teasing* and *sharing*) Children not interested in teacher's suggestions (node: *not interested*) A child got scared (node: *scared*)

Figure 10: Social affordances and resistance

Each of the 12 types of social affordances and resistance will be exemplified briefly. The vignettes in the sixth chapter will make it possible to view how inter-subjective communication unfolded during five events. The issue of inter-subjectivity in relation to teaching in early childhood education will be discussed in chapter seven. Sections 5.5.3 and 5.5.4 in this chapter will therefore not discuss the examples in great depth.

5.5.2 Meanings as Negotiated through Social Interactions

Micro-discoveries were the results of the children's negotiations with physical materials, but were also dependent on social interactions. The last three points of the ten-point "model of negotiating grasp" concern social acknowledgement of children's expressions and imaginative ideas. Children's metaphors, and other forms of expressions, were undergoing negotiations in social contexts; where they were tested, reformulated and hopefully acknowledged. When the expressions were appreciated, this seemed to encourage the children and motivate their further explorations and expressions, through making them feel accepted and confident. The mutual respect and acknowledgement seemed to establish the foundation for empathic connections between the participants. Such empathic connections motivated the participants to help each other, especially if there was a problem to be solved. I suggest that it was exactly such a social climate, where participants wanted to be helpful towards each other, that they were also most motivated to solve problems.

As mentioned in chapter three, children are already competent to communicate through facial expressions from birth (Dissanayake, 2007). Infants are dependent on communication through body language, because they need to sense what is dangerous through embodied communication with their parents (Stern, 2003). In order to learn how to react to sudden dangers, they need to be highly attentive to the body language of adult's. In turn, the adults have to be honest in order for children to be able to rely on them and

feel safe. To be honest, in such contexts, means that there has to be a connection between the adult's body language and the level of danger they communicate to a child. An infant's ability to read body language does not disappear during the process of growing up[204].

When the 3-5 year old children and I interacted, much was communicated through our bodies. This was especially significant with the youngest children that often combined their verbal and body languages. However, I was also communicating through my body, though I was seldom conscious of that. The analysis of the video material made it possible to observe how my facial expressions and body language immediately influenced the children's understanding and responses[205].

Inter-subjectivity is possible only when participants respect each other (Stern, 2003). This means that each person has to be recognized for who s/he is, with all her/his competences and potentials, in order for this person to have influence on another. The first forms of communication which can channel such respect are achieved through facial expressions, touch and body language between a baby and a parent (Stern, 2003). A further condition for establishing inter-subjective connections is, according to Stern (2003), that some form of sharing has to be present: shared emotional, joint attention or shared intentions.

In the educational contexts, where 3D-materials were physically placed between the participants, the materials were the objects of such joint attention. The activities with 3D-materials involved many different and more-less individual intentions. For example, some activities were the result of one child's desire to explore relations between own body and a material. In such cases, the child could get absorbed in the experiencing activity and did not pay attention to what the others were doing. In other situations the children would observe what the others were doing and this would give them ideas for what they wanted to do. It can therefore be said that intensions were not shared all the time, but often; when two or three of us engaged in problem solving. In case 3, where Tom, Helge and I developed a role play with clay pieces and had to cooperate to save the shell-family from the dangerous troll – the situation involved all three types of sharing Stern refers to: shared emotional condition, joint attention and shared intentions. In this specific activity of doing a role play, none of us knew what was going to take place in advance, but we all contributed with suggestions which were immediately implemented in the story as it developed. During this process we also shared

[204] Though, it can be suppressed.
[205] As the examples in sections 5.5.3 and 5.5.4 will show.

emotions – all of us cared for the shell-family; wanted to protect them from the troll and gave them something to eat when we were ourselves were hungry. All of the three forms of sharing were dependent on our abilities to communicate – in this case mostly through body language rather than verbal language[206]. At times we struggled to understand each other's verbal language, but still established emotional, empathic connections with each other, and with the shell-family.

5.5.3 Social Affordances

When teacher provided time to explore

It was important not to help the children too much when they were sawing, tearing fabric, cutting with scissors and so on. If I helped them I would have taken away their possibilities to experience and negotiate with the materials through their own bodies. Giving children time to explore, solve problems and make meaning was an essential affordance of the pedagogical work with them. It simply means that a teacher should not speak too much, not press children to be effective, and not assists them if they do not really need help. Thus, it is strange how such a simple task of not helping seemed to be difficult to accomplish. I had to restrain myself not to intervene, but still remain attentive and supportive. I guess that the urge to help the children came from my previous beliefs; not really understanding how young children are competent. When I abstained from helping them, they were able to feel competent, because they did not need any help, and the same feeling of competence seemed to motivate their further actions.

When teacher supported children's activities

I was often laughing, or making surprised face and through embodied forms of communication trying to encourage the children. I tried to show them respect and interest. However, I had to be careful that my expressions did not appear exaggerated, since this could have the opposite effect; the children could get the impression that I was not honest. Additionally, if an adult cannot be trusted, then her/his responses would not really matter. Embodied expressions were essential for inter-subjective relations. I had to be supportive, but also selective about what kinds of praise and encouragement the children needed. It would be disrespectful to compliment a three year old about doing something that the child her-/himself assumed to be a simple task. The children needed support in what they were becoming competent about and not about other irrelevant things. This was challenging, because I did not know the children so well, but I somehow sensed (probably inter-

[206] Since I could not understand Tom's words, and he did not yet have so many words.

subjectively) that they needed support about the activities they struggled with and were themselves proud of.

When teacher suggested materials and tools

In all of the cases a selection of additional materials and tools was hidden. This meant that all materials or tools brought to an educational context were not introduced at the beginning of the contexts, but could be introduced later during the contexts. In order to decide when the right time to introduce a material or tool was, I had to listen to the children. In this way, I tried to help the children to concentrate on a few things at time, and I could renew their attention by introducing a hidden item, if they needed further motivation. For example, in case 5, the knitting machine was only introduced when Even started to compare my knitted dress to one of the yarn balls. The children were curious and liked surprises. However, if they knew that there was something hidden, like in case 2 where the boys had seen the bags with additional materials, they were so curious that they were not attentive to what was in front of them and only wanted to know what was in the bags. The items from the bags (stones, sticks, shells) were therefore introduced much earlier than intended[207]. Having some ideas, tools and suggestions in "reserve" seemed to be a good way of prolonging children's attention. The surprises motivated them, and what seemed to be especially significant was the fact that they had a chance to experience the materials' resistance before some tool or other material was introduced to assist with a problem. If the tool had been there from the start they might not have had a chance to experience the problematic and challenging phenomenon of the material. However, the fact that I understood (and introduced) at a certain point what they needed, often made them happy – possibly because they also sensed that I was attentive to their needs and I acknowledged their struggles, which showed them that they were respected.

When children were attentive to the teacher

When the children were attentive to the introduction of materials or tools at the beginning of an educational session, there was a chance for them to get interested in an activity. The educational contexts were not intended to teach the children something through paying attention to what I (the teacher) was doing or saying (as usually is the case in schools), but rather aimed to motivate the children's own actions. Therefore, it was not necessary that they paid constant attention to what I was saying and doing. The type of attention referred to here is not about obedience and polite listening to a teacher - it is more about curiosity - I could not expect the young children to have a long attention span focusing on what I was interested in. The moments I got their

[207] Six and a half minutes after the start.

attention had to be used wisely in order to inspire them, so that they did not have to depend on my actions. However, if they first got motivated, they could engage and remain attentive to what they were interested in for a long (Stinson, 2002).

If the children were to learn by doing, they had to be engaged in what they found meaningful. It was I who had to be attentive to them, and not they who had to "listen to the teacher".

When children were active

The children's physical activity was an affordance in this study; because it was through their own activities that they could experience the 3D-materials best. Emil and Morten in the first case were physically active from the start. They actively moved through the room and carried out different activities. However, being active was also about taking initiative, defining problems and trying to solve them. In this sense, there were the physical activities that lead to processes of problem-solving, and also to micro-discoveries.

Some of the children used more time to become physically active, however, this did not mean that they were not active in other ways. For example, three year old Tom (case 3) was very silent in the beginning; even though apparently passive, he was very attentive and therefore engaged in the "active act of mind" (Dewey, 2009 [1909]). He first observed what the others were doing, then copied their activities and after a while started to take initiative and make suggestions[208].

Many of the experiences seemed to be new for Tom and he seemed to need time to grasp them – for instance when Helge and I started to imagine that pieces of clay could represent something (for example a troll); this seemed to be the first time for Tom to experience symbol making. The symbolic play developed into a dramatizing activity, and 50 minutes later Tom started to make his own symbols and invent further developments of the story. Tom needed time to dare to take initiative, but during this time he seemed to collect small positive feed-backs that gave him more self-confidence.

Self-confidence seems to be of essential importance in order to take initiative and actively engage, and therefore also in order to make meaning. Thus, self-confidence is dependent on the inter-subjective relations in social contexts, because one needs to feel accepted and respected in order to feel self-confident. The feeling of being accepted comes from inter-subjective

[208] The second vignette in the next chapter shows Tom's first self-initiated suggestion during the contexts.

relations where, through embodiment, one can sense that her/his subjective experiences are shared with the others (Stern, 2003).

When children were taking initiative

It was only when the children were active that they could express and share their experiences, thoughts and ideas with the others. They also had to be active in order to negotiate meanings. When negotiation of meanings was about suggesting how something could be done, such negotiations of ideas could also concern negotiations of power. When a suggestion from a child was accepted as valuable, this child in turn acted with self-confidence, but sometimes her/his initiative threatened my power to decide. When the children experienced that their initiative was welcomed, they were sometimes pushing and pulling my boundaries and I had to make quick decisions about how to react. They challenged my pedagogical choices. It is probable that they could inter-subjectively sense that power balance between us was skewed.

Here, I am addressing children's initiative as an affordance of the educational contexts; because it was important that they had possibilities to take initiative in order to become competent. It was my intention to provide possibilities for the children to become competent, but their growing competence could also threaten me as a teacher, because I could not decide over their actions any longer. Hence, in some cases, when the children took initiative, this was both an affordance, because it made their meaning negotiation possible, and a resistance that challenged my teacher role[209].

5.5.4 Social Resistance

When the teacher misunderstood a child

Two of the children in the study were difficult to understand; Eva in case 2 and Tom in case 3. I frequently didn't understand Tom and this might also be the reason he took so long to become confident and start to take initiative. On the other hand, my own failure to understand him probably functioned as a resistance, which initiated his creative use of body language to support his verbal expressions.

I did not understand Eva well either, but she had a different personality; full of self-confidence from the first time I met her[210]. From the outset of the educational context, I did not understand her request: "Can you help me". Fortunately, I still helped her, even though I did not understand what she was

[209] This will be further elaborated in the section 7.3.

[210] As presented in the case description: Eva was the girl who, the first time she saw me, simply sat on my lap with a book requesting that I read for her.

asking[211]. Here is an example from our conversation that led to specific activities which would probably not have take place if I had understood her: on one occasion Eva said something like "namma". When I observed this on video, the same word sounded more like "hjemme" – which means at home. However, during our interactions I interpreted it as "nam-nam" – meaning sweets or something that tastes nice, which I thought feasible, since the textile she was pointing at had small protruding balls in red and pink colors, which could be seen as resembling sweets.

> I said "What does it mean… Nam-nam?"
> Eva started to laugh: "Sweets!" I thought she meant that the balls on the textile reminded her of sweets, and I also laughed.
> "Do you think they look like sweets?"
> "Yes" she replies.
> This is how we started to talk about the small balls which reminded us of sweets but were stuck to the textile. Eva tried to pull them off.
> The other girl, Marit, said: "I am very good at taking them off!"
> "How would you do that?", I said.
> "Cut them off with scissors", Marit said.
> That was when I searched in the bag to find two pairs of scissors for the girls and we ended up cutting and tearing different textiles.

When I misunderstood Eva and interpreted her word to mean "sweets", she assumed that I was joking and started to make jokes herself. On the other hand, when we started to play that the woolen dots were sweets, but attached to the textile, Marit suggested solving the problem by cutting them off with scissors. Through this suggestion Marit had a chance to express that she was competent in cutting with scissors. The misunderstanding led to conversations and actions that might not have happened if I had understood what Eva meant. The immediate interpretations (either understood or misunderstood) led to inter-subjective construction of meaning that influenced further directions of the joint actions.

Stern (2003) says that misunderstandings can also function as motivations for a child to learn verbal language better. This seems to be the case in the conversations with Tom, as the second vignette in chapter six will show.

When the teacher was afraid

Watching others and experiencing their struggles can be a form of learning, like when my hand was cut in case 1 and the children could learn how dangerous the tools were because they could see what happened. Also my

[211] Possibly I intuitively understood her body language and therefore helped her?

reaction when I pulled my hand quickly and made a sound that indicated that I was hurt, indicated that cutting oneself was not a nice experience. To begin with, the boys were laughing when I was cut, and I said: "This is not funny - this hurts!" Though I was not hurt badly, I found it appropriate to say this in order to let them know that the tools were dangerous, and also in order to ask for some empathy. I thought that it was pedagogically and ethically appropriate to be honest about my feelings and expect some sympathy from them. As the third vignette will show: it seems to be precisely one of the boys' ability to empathetically connect to my experience that led to his creative problem solving, where he invented a finger-protection. That I was hurt and afraid that the children could be hurt was a social resistance that prevented the children from using the tools as much as they wanted. However, it also defined a social problem that one of the boys found a solution for[212].

On another occasion, I was anxious, not because the children or I would be hurt, but in order not to upset the other teachers. I had been told that the white sand we played with in the seventh educational context was very expensive and should not be mixed with the grey sand. This request not to mix the sands significantly influenced my communication with the children. I do not know how expensive the sand was, but my fear that the sand might get spoiled, practically restricted the children's possibilities to experiment and explore. From my observation of the videos I could see how my anxious comments to Line affected her joyful play. She probably experienced me as an authoritative teacher when I said: "Don't mix the sands". This was probably even more confusing, since at other moments I tried to be friendly – she possibly experienced me and an unreliable and dishonest adult?

When the teacher needed help

When the children felt that their help was needed, they seemed to be extra motivated to explore possibilities and find solutions. Child's imaginative, interpretative and expressive engagement often comes exactly from situations that require her/his commitment in order to solve a problem (Colbert and Taunton, 2001). The situations where I expressed that there was something I did not know how to do, appeared to be especially motivating for the children in the study. In such cases, they seemed to engage empathetically with my problems and genuinely wished to help me. It does not sound nice to say that I sometimes pretended that I needed help from them. However, when I expressed that I was "powerless" this seemed to reduce the power imbalance between us, and made it possible for the children to feel competent and

[212] See vignette 3.

motivated to contribute. Children feel self-confident when they experience that they can contribute to others (Dysthe, 1999).

When children competed with each other

When Are in case 7, wanted all the toys for himself, leaving nothing for Line, my ECEC teacher role was challenged, as well as my ethical judgments. He was negotiating his will in the social context and learning from the experience. I felt responsible for what he would learn about sharing with others and I felt even more responsible for protecting Line from being emotionally hurt. I tried to talk Are into sharing, but he resisted. I tried to make him feel empathy for Line, but he did not seem to care. I felt uncomfortable, because I did not know how to solve this problem[213] and I suppose that he inter-subjectively sensed that. Fortunately, after a while he cooperated; when Line asked him very kindly to give her one of the toys[214].

When I was later watching the videos, I realized that I was not as attentive to Line as I was to Are. He had taken too much of my attention and Line was in many ways overlooked. She never complained and acted very mature, but she seemed serious and possibly hurt. My struggles to find a solution to the resistance Are exposed me to, influenced our inter-subjective relations and I was unable to give Line the attention she should have had.

Even and Markus (case 5) did not really argue, but there was a competitive tension between them. This challenged my teacher role. I had to make rules for how long each of them should use the knitting machine; we counted together, used the machine's digital counter of knitting rounds, and the boys used measuring tape to measure the length of the tubes they made. In each of the solutions, their mathematical understanding was challenged in order to solve the social problem (equal and fair use of the knitting machine). In this sense, the type of social resistance functioned as a positive motivation to understand numbers and measuring techniques.

When children were not interested

The oldest children seemed to have more expectations to the educational contexts conducted, especially when the educational contexts were conducted close to Christmas. This challenged both my teacher and researcher roles, because I did not know what they usually did and what they expected from me. When we came together for the ninth educational context, one of the girls wore a typical red and white Christmas dress, and from the sounds outside

[213] The ECEC personnel, who were familiar with such challenges, as well as with Are, would probably know how best to respond.
[214] Forms for making shapes in the sand.

the door, it was obvious that activities at this time of year were supposed to be Christmas-oriented.

I did not feel that what I had prepared was interesting enough for the girls. They were not uninterested, but I felt that they were being polite and did what they thought I expected them to do. They did not seem engaged and did not take much own initiative. My efforts to motivate them might, for them, have sounded like I was using my power to make them do something I wanted, but I did not tell them what I wanted. I once detected a girl's facial expression which asked me: "What do you actually want?" This made me uncomfortable and discouraged me.

It was not easy for the girls to know what I wanted. I did not want the educational contexts to be product-oriented, but they knew that Christmas preparations were usually product-oriented. Young children are usually quick to recognize and sense the teacher's attitude (Bresler, 2002), and I think that they sensed I was uncomfortable. Our inter-subjective relations and empathic understanding made it possible to sense each other's feelings. No harm was done, and the resistance I experienced motivated my reflection to understand how expectations and inter-subjectivity influence possibilities for meaning making.

When a child got scared

Already in the first educational context I unintentionally scared one of the boys. My intention to make the activity interesting for him, introducing "Emil from Lønneberga", was experienced in a completely different way to what I expected. This possibly happened because my facial expressions were exaggerated, or because I did not know Emil so well. I was worried the moment I realized that he was scared. His fear was a kind of social resistance that made me think fast to find a suitable solution for the emerging social problem[215].

5.5.5 Inter-subjective Relations between Children

The node category *inter-subjectivity* was meant to capture the moments where construction of meaning seemed to take place between the three participants. I tried to separate the three different relations[216]– but realized that most of the interactions were between all three participants. However, children influenced each other's actions and their needs to promote their own competence were often expressed to their peers: "Look what I can do!"

[215] This event will be presented with 'thick' descriptions in the next chapter – in the section 6.6.
[216] Between me and a child, between two children and between all three of us.

The second chapter presented how the children were selected for the educational contexts. Most of the children were friends and knew each other well. Though in some cases the two children did not usually play together and needed time to get familiar with each other. This was the case with Are and Line.

For some of the children acknowledgement from their peer seemed to be as important as acknowledgement from the teacher. They sometimes tried to make the other child laugh and generally wanted to be seen and to contribute in some way. Their actions were guided by the communication contexts and their need to be accepted. When a child got a positive response from her/his peer, their interactions sometimes developed into engaging and mutually inspiring play, as for example happened in the case 6. This is how Thomas (case 6) at the end of the educational context, expressed his amazement about his and William's play: "What a theatre this has been!"

The children often imitated each other and were highly attentive to each other's actions and choices. It can therefore be said that the process of their meaning making was dependent on the multimodal interactions between them. The contexts that developed were not disconnected from previous contexts and relations between the children, but were extensions of already established expectations, friendship and power dynamic between the children. However, new forms of interactions and expectations could develop in the present communication context. As earlier explained, communication contexts are dependent on children's expectations, the purpose of spending time together and intentions with the activities (Maagerø, 2005). These three conditions influenced the unfolding of the children's communication; the conditions motivated their attention, their cooperation in problem solving and contributions to the joyful atmosphere in the educational contexts.

5.5.6 Inter-subjectivity in Early Childhood Education

In this study, the phenomenon of inter-subjectivity has been large and overreaching. Inter-subjective relations are like transparent, fluid, or universal glue covering all of the activities, interactions and choices that took place during the educational contexts. As the structure and content of the section 5.5 indicates, the issue of inter-subjectivity has been difficult to grasp as a whole and I have struggled to find relevant ways to present it here, finally deciding to present the data as partly disconnected from the process of coding and more connected to my embodied experiences. I will now make a transition between my own experiences of inter-subjectivity, to how inter-subjectivity can be understood as a part of early childhood education. The seventh chapter will further elaborate on how inter-subjectivity can influence understanding of a teacher's role and ECEC curricula.

As the examples of social affordances and resistance show, one person's expression could motivate someone else's meaning making, expressions, material explorations or other types of action. The mutual exchange of the participant's actions accumulated in the context, defined their relationship and outlined further possibilities. What one participant said or did influenced what other participants could find suitable to say or do. "Individual action is generated out of social interactions and the meanings they create" (Graue and Walsh, 1998, p. 41).

Bresler (2006a) writes that the researcher's empathy makes it possible to connect with what has been studied and to grasp deeper meanings behind people's actions and expressions. Empathic connecting makes it possible to feel what the others are feeling. It is through one's own embodied knowledge[217] that we can intuitively recognize the feelings of others. Intuition is not some kind of superficial force, but our embodied knowledge acquired through somaesthetic experience (Shusterman, 1999). When we are empathetically connected, the sorrow and joy of others become our own, and we experience a deep human desire to help, support, care and contribute in other ways to others.

Bresler (2006a) suggests that empathic understanding is at the core of both qualitative research and aesthetics. However, I also find empathy to be essential in interactions with young children, since they use all of their senses to understand the world, their thoughts are embodied and communicated multimodally. In order to connect with their embodied thoughts and feelings, and be able to support their negotiation of meaning, a teacher must connect with them empathetically. From this point of view, empathic connection is not only necessary in visual arts, but also in all forms of education and research with young children. It is only when a teacher and children mutually connect that they can truly listen to each other (Clark, 2005) and make suitable choices of actions. The teacher's choices need to fit the situation, since further actions, feelings and thinking depend on them (Stern, 2003). What someone said or did could remind the children of their earlier experiences. In this sense the interactions were constantly contributing to new connections between past and present experiences.

The study Negotiating Grasp shows examples of how possibilities to learn depend on relations between individuals inside an educational context. As people constantly act, perceive and express, they also constantly contribute to changing circumstances inside a context. When materials are involved, the

[217] Accumulated since early childhood.

physical environments also get transformed through the activity. However, if we consider that also the physical materials interact, this process of mutual influencing, pushing and pulling, becomes even more complex.

Vygotsky speaks about the zone of proximal development as a zone with potential for learning (Levykh, 2008). In order for learning to take place, this zone has to be both safe and challenging.

Inspired by Vygotsky's concept zone of proximal development, applied to the conducted educational contexts, I imagine the Zone as a large soap bubble around two children, 3D-materials and me. How large the bubble could get, which shapes it could take on and for how long it could last before bursting, depended on the negotiations and inter-subjective relations that took place inside it. Through our activities and expressions, like in free play, we were pushing each other against the transparent walls of the bubble. We needed to push and give resistance to each other in order to expand the flexible borders of the Zone, however if we pushed too hard, someone could have fallen through the thin wall and get hurt. The negotiations had to be adjusted and re-negotiated according to the rhythm of our constantly expanding understandings.

My understanding of children's needs seemed to be essential on order to act responsibly inside the Zone. Since the children's competences and knowledge were constantly growing, the Zone had to be extended according to that. To be able to become aware of the children's growing competence, constant listening and empathic connecting were required.

I experienced that the children's processes of acquiring new knowledge were closely related to my own knowledge acquisition. Together we were negotiating new understandings – learning from each other. Our learning processes influenced and challenged each other:

> By discovering others' horizons their ideas become intelligible, without our necessarily having to agree with them. The interactive, open-ended aspect of dialogue for both self and others enables the expansion of self in interaction with the environment (Bresler 2006).

The seventh chapter will address questions concerning ECEC teacher's competence to take on-going decisions throughout the process of pedagogical improvisation.

5.6 Summary of the Fifth Chapter

This chapter presented the main conclusions that emerged from the coded data. As biological and cultural environments melt together (Merleau-Ponty, 1994 [1945])**,** children's interactions with 3D-materials, human-made objects and human bodies were interwoven during play and negotiation of meaning. As Taguchi says, meanings get constructed in the space between people, objects, and materials that mutually influence each other in constant pushing and pulling in the continuous flow of time (Lenz Taguchi, et al., 2009).

Chapter five suggested an interpretation of how young children construct meaning during their negotiations with 3D-materials, past experiences and social contexts. A theory (with small 't'), called Negotiating Grasp, suggests a ten-point model that illustrates how 3D-material's resistance contributes to children's micro-discoveries, which in themselves are discoveries of new meanings achieved through imaginative cognition and somatic experience. The "model of negotiating grasp" includes both physical and social forms of negotiating meaning, as well as individual, experiential, communicative, cognitive and social aspects of the phenomenon.

The following chapter presents the in-depth analysis of five micro-contexts presented as vignettes. The vignettes are analysed contextually and related to the discussions from this chapter.

6 Contextual Analysis

The coding process described in the fourth and fifth chapters illustrates the challenges of classifying and systematizing complex relations that took place during children's play with 3D-materials. Separating one phenomenon from another was necessary in order to make them graspable, but at the same act of cutting data into smaller pieces led to significant de-contextualization.

Flyvbjerg (1996) claims that it is not possible to grasp meanings of human activities if one tries to study them out of context. His claim is equally applicable for this investigation: if the process of coding led to counting and statistical analysis it would not be possible to grasp meanings behind the children's actions.

Though, the process of coding demanded certain forms of de-contextualization, the process of data analysis across the cases was conducted with constant references to the concrete contexts. However, the four cross-cutting issues that have been identified and discussed might gain increased argumentative credibility when exemplified through descriptive, more contextual analysis. This chapter will present further analysis, which constituted the second phase of the analysis process. In relation to the Bresler's (2006b) model of perceptual contemplation, the following analysis can be compared to the two final aspects: 4) Lingering caress and 5) Mutual absorption. As presented in the second chapter, lingering caress is about achieving prolonged engagement with a studied phenomenon in order to grasp a deeper understanding of it, whereas mutual absorption signifies a form of mutual melting between the researcher and the studied phenomenon. Mutual absorption will be mainly discussed in the last part of this chapter.

The beginning of this chapter briefly presents the process of further coding in order to approach the data contextually. Unlike the previous process of coding, this coding had the intention to gather parts of data in order to help create confluent stories. From the data material five such stories – vignettes - are chosen to be presented and interpreted in this chapter. Their function is to illustrate the findings across the cases more specifically, and to illustrate the children's processes of a negotiation with materials' affordances and resistance. The fifth vignette especially focuses on the issue of inter-subjectivity.

6.1 Searching for Vignettes

6.1.1 Coding Significant Episodes

From the four key findings across the cases, the second and third[218] were found to be the most central for the quintain. Further analysis was directed towards trying to understand how the 3D-materials' qualities could be significant for children's negotiation of meaning. The following research question supported the analysis process: How do materials' affordances and resistance influence children's process of meaning making?

The question points specifically to the materials' affordances; trying to uncover how they stimulate children's negotiation of meaning through imagination and metaphoric expressions, and to the materials' resistance in order to uncover how it can motivate children to solve problems through micro-discoveries.

During the educational contexts, I experienced certain episodes as particularly triggering. These were the episodes that during the process of analyzing showed to consist of micro-discoveries. Such episodes have so far been identified and discussed in the fifth chapter, but they have still not been viewed contextually in relation to the events that preceded them; the episodes were mentioned in the process of cross-case analysis, but they still triggered my curiosity - I felt there was more to be grasped about children's process of meaning negotiation if the episodes were analysed more thoroughly.

At this point, I decided to view each educational context as one whole and look for events that could be relevant for the *same* micro-discovery. I was now looking through the data case by case, and searching for activities, interactions and expressions where a 3D-material's properties seemed to influence *the same* micro-discovery. I looked for possible relations between the material's qualities, and the child's explorative activities and expressions; I dwelt on the moments of a child's deep concentration and paid close attention to her/his facial expressions and body language.

The specific function of NVivo (see figure 11) helped to identify most coded moments in the videos[219], which were often related to micro-discoveries. When a micro-discovery was identified, I searched through the video footage before and after the micro-discovery in order to identify other significant activities or events that could be related to it.

[218] Children's relations to materials' affordances and resistance.
[219] Each colored stripe shows one node that the part of the video has been coded to.

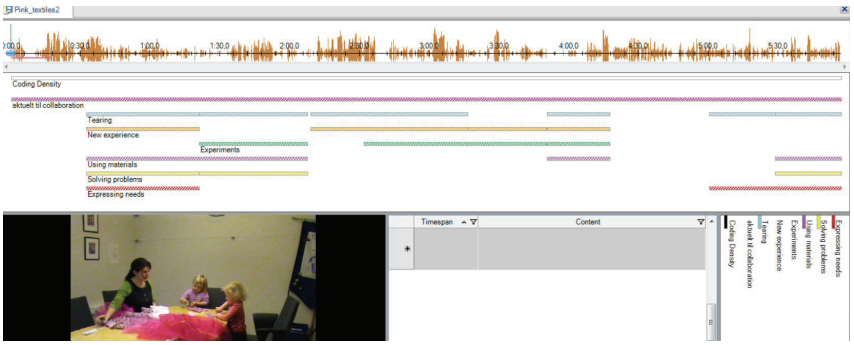

Figure 11: Coding density

Node category *materials' challenge* was established (on March the 3rd, 2010) with sub-node categories for each of the educational contexts/cases. Under each of the cases, further thematic nodes were established. Such thematic nodes were meant to link related activities that concerned the same theme during the educational contexts[220]. This could for example be one child's interest in the same activity, as activities collected under the node: *Morten tapes and ties* (case 1), or activities where both children were involved, for example the node: *Making a boat* (case 8).

In order to reduce the amount of data for further analysis, the number of sub-nodes was limited to two in each case, which were the most relevant for the study question above. Even so, the resulting 18 thematic nodes pulled together too much data for contextual analysis.

Although many interesting events took place, only a few could be selected for more in-depth study; "only a few can be studied thoroughly" (Stake, 2006, p. 3). To further narrow down the amount of data, four episodes[221] were selected to be described as chronological stories and analysed contextually. These vignettes[222] are unique, but still representative of the rest of the study. The first four vignettes are meant to illustrate the most important features of the study and attempt to answer the research question: How do materials' affordances and resistance influence children's process of meaning making?

[220] As mentioned earlier, during the visual art sessions, many activities took place simultaneously and the children were switching between different activities: They would start doing something, then pay attention to something else, and later return to what they were doing earlier.
[221] The five vignettes present what happened during four different events: the fifth vignette describes the situation that had already been presented in the third and fourth vignette, but now from another angle, focusing on the researcher's embodied experience.
[222] Also called stories or narratives.

Even though the four vignettes focus on the issues concerning materials' affordances and resistance (issue 2 and 3), the issues concerning children's embodied experience through physical activity (issue 1) and inter-subjectivity (issue 4) were always a part of the educational contexts and therefore had to be mentioned. Moreover, since the question of inter-subjectivity had such a strong influence on the educational contexts, and is highly relevant for understanding the role of visual art teacher, an additional fifth vignette that illustrates the issue of inter-subjectivity is also presented.

6.1.2 Writing the Vignettes

When data was coded under the same node, NVivo gathered the coded pieces in the same document with direct links to the relevant video parts. The data pieces collected under each node could in this way be viewed as coherent descriptions, though they had to be rewritten in chronological order to function as stories/vignettes. Some parts of the text could be described in a few words, while other parts needed more detailed descriptions. Unlike multimodal analysis, where one gives the same attention to video material second by second (see for example Norris, 2009), the aim here was to put more emphasis on the parts that were more important than others. It was for example sometimes necessary to describe the fine nuances of the children's movements, gaze or breathing[223]. A choice of words were significant for such qualitative descriptions so that the reader could grasp the meanings behind the children's actions, and be able to empathetically connect with the children (Bresler, 2006a). Such a form of writing comes close to fiction and is partly subjective. It is dependent on writing competence, as well as on the ability to connect with the phenomenon one wishes to describe. When I was writing the vignettes I tried to describe children's expressions with as much detail as possible. A child's facial expression or tone of voice could be significant for later interpretation.

This chapter distinguishes between the vignettes and interpretations of them[224]. Nevertheless, it is true that the process of writing the vignettes was also a process of interpretation (Wolcott, 1990); the choice of words also conveys certain meanings. Since words are never neutral, distinguishing between descriptions and interpretations cannot be done with a completely clear cut.

I was aware that every stage of the research process was unavoidably influenced by my own understanding and interpretations. However, in arts-

[223] The descriptions were, of course, influenced by my own interpretations and choices of words.
[224] See the structure of this chapter.

based educational research a researcher's personal voice is a welcome asset. A researcher's subjective descriptions can help the reader to re-experience what has earlier been experienced by the researcher (Barone and Eisner, 2006). Presenting research in the form of a contextual story/vignette can reveal the texture of an educational setting (Denny, 1978). Such texture can be achieved through "thick descriptions" Geertz (1993).

> To develop thick descriptions of children's actions, we must go beyond simply detailing what people are doing. Going beyond involves exploring meaning and intention (Graue and Walsh, 1998, p. 40).

"The goal of interpretative research is to understand the meaning that children construct in their everyday *situated actions*" (Graue and Walsh, 1998, p. 40, original emphasis). The aim of this part of the study is to understand how the children negotiated meanings in the specific contexts. Their situated actions, experiences and expressions were approached through the vignettes. The vignettes could, as a narrative form of writing, capture the chronology during the process of meaning construction (Bruner, 1996).

"To get a sense of motives, it is important to watch children's interactions closely, to listen to children's explanations of their actions" (Graue and Walsh, 1998, p. 43). It is only when I paid close attention to what the children were doing, singing or watching, that I was able to see, hear and experience in new ways and gain access to the "dialogic space for creation of meaning" (Bresler 2006).

6.1.3 Analysing the Vignettes

Alvesson and Kärreman (2005) suggest that one should search for surprises and mysteries in empirical material. They further say that reflection about the mysteries can help one to think in new ways, to get new ideas and arguments. Each time one gets a feeling that something is interesting, this might mean that the present experiences have been tested against earlier experiences, and the new experiences found to be extending in relation to the old (Alvesson and Kärreman, 2005). In my case, the process of qualitative analysis seems to be parallel with children's processes of negotiating meaning. While I was looking at the children's connections between past and present experiences, I discovered how my own learning process also connected my own past and present experiences and understandings. Meanings I made were dependent on the children's words and actions. The vignettes thus also reflect my own process of meaning negotiation about the children's processes of meaning negotiation.

The first four vignettes present events from the first and second case. They have already been mentioned in previous chapters, but will here be described with more details and then analyzed and discussed. The form of analysis can be called micro-analysis, since it focuses on the narrow contexts in time and space. The theoretical framework applied in the analysis in the fifth chapter will also be applied to the micro-analysis in this chapter.

The fifth vignette is written from the researcher's/teacher's personal point of view. It presents my experience gained in the first educational context. I found my interaction with the three year old boys especially challenging possibly owing to the following factors; this was the beginning of the empirical study, I had high expectations about what was going to take place, and I thought I was well prepared. The fifth vignette shows the ways in which my actions and choices could influence what the children had possibility to negotiate meanings about. The vignette reflects the ongoing process of negotiation of meaning as it was experienced during the interactions. Expressing my experiences about the complexity of interactions can be helpful in further discussions about the role of a visual art teacher, and development of early childhood curricula[225].

6.2 Vignette 1

6.2.1 We Have to Wait for My Mother

When three year old Helge and Tom enter a small room in their preschool, they are met by a large block of clay on the table[226]. They are looking at it attentively and without comments. I ask them if they know what it is, pointing at the clay. When Helge responds "No", I ask again: "What can we do to find out what it is?" Helge suggests: "We can look around it".

As a response to his suggestion, I now start rotating the clay block which is placed in an upright position and is about 30 cm high. The boys follow my movements with full attention – Tom with half-open mouth. I consciously use only my forefinger to push the clay. The clay is heavy and soft. My finger sinks into the clay, slides and leaves a deep trace. I say: "That was heavy… Do you want to try?" Helge is surprised: "A?"
"You can also try to turn it around!", I say.

[225] This will be discussed in the seventh chapter.
[226] About 12,5 kg.

Helge thinks for a second and replies: “I think we have to wait”.
I nod and acknowledge his wish to wait, but I wonder: “Why do we need to wait?”
Helge: “Eee… maybe …. maybe we have to wait for my mother!?”
”Oooh”, I say and try to understand what he is saying
“…..because…. because your mother…. Is your mother strong and can lift heavy things like this?”
“Yes!”, Helge shouts gladly and nods.

“I see…”. With both my hands I now lift the lump of clay and lay it on its side on the table, while Helge is telling: “Or my daddy! My daddy is very strong!” While he is saying this he lifts both his arms up as if he is lifting weights.

We now play making prints in the clay and talk about different things. About eight minutes later, Helge has pressed a shell into a piece of clay and is trying to take it out, but does not manage. Instead he suddenly lifts the clay with the shell inside and says proudly:
“Look! I can lift the clay with the shell inside it”, and he lifts the clay with his both hands. My facial expression shows him that I am impressed, and he now uses only one hand.
“I can even do it with one hand!”, he says.
I look really impressed and I say: “Oh, you are so strong!”
Helge now explains: “It ‘cranes’ itself”, and I repeat his sentence, curious about what that means[227].

He says proudly: “Yes, with one hand!” He holds his hand strait up stretching his upper body to reach as high as possible while he is sitting.

“Oh, is it a crane that can lift like that?”, I ask while I show an arm movement where I slowly elevate my hand up above my head.
Helge: “Yes!” he is still holding his hand high, and I can hear in his voice that he is physically straining.
“Have you seen big cranes lifting heavy things?” I ask.
“Yes” he replies and continues to explain: “I’ve seen it at home. We have a large remote-controlled helicopter … though it does not

[227] I think he means that the crane lifts something up. Helge here invents the verb ‘to crane’ in order to describe the specific motion of crane-lifting.

work now… We, we…. We have plans to buy a new one that works."
I say: "And what are you going to do with this helicopter?"
Helge: "It flies up, up…" he now also elevates the other hand in the air "and when we drop it down, we do like this", he shows with his hand how his finger realise the grasp.

While Helge talks, Tom is filling a shell with clay, and starts saying something I do not understand, at the same time as he lifts the shell up: "Up, up, up…" he says. At the point his hand is at the highest point he can reach, both of the boys simultaneously stand up in their chairs[228] each holding a shell with clay as high they can reach.

6.2.2 Discussion: We Have to Wait for My Mother

This story tells us about Helge's explorations of a specific quality of clay, its weight. His activities and suggestions resulted from his reflections about how lifting of clay challenges muscles, demands knowledge of lifting techniques and affects all the body. I suppose that these reflections have been derived both from his experiences and observations of others' direct experiences, for example observing his mother lifting something heavy. Olga Dyste (1999) suggests that children have a need to contribute to others and that this need often functions as an motivation for learning. Helge's suggestions and rapid connections between his earlier and present experiences might have been initiated by such a desire to contribute and be helpful when he realized that I had problems moving the clay on the table.

Helge's associations about his parents' strength took place at the beginning of the educational context, before he had a chance to experience the clay's weight with his own body. Watching my effort to move the clay probably reminded him of his past second-hand experiences; watching his parents' strain and succeed in lifting something. Both my clay-lifting and possibly his parents' past lifting-activities would be his second-hand experiences. I suggest that the connection between them was a result of Helge's ability to empathetically connect with other people's experiences. However, since it is less likely that his parents also lifted clay, but rather lifted other heavy things, it can be said that Helge's association established connection between similar social contexts that dealt with the same theme: weight and body strength.

[228] The chairs are called "tripp-trapp-chairs" and have a small stare for the feet – that is why they could stand up without climbing off the chairs or climbing on the seats.

When I pushed the clay with one finger, I knew it was difficult to move the clay that way, but I deliberately wanted to show that I struggled. Despite the fact that my struggle was exaggerated (or maybe exactly because it was exaggerated) Helge seemed to understand that there was a problem that needed to be solved. The clay was too heavy for me, but not for his mother, or father. We should wait for his mother because she was strong. Helge made verbal expressions about strength, but he never described the clay's weight or mentioned the word "heavy". Instead he spoke about people and machines he assumed were strong – cranes and helicopter. His understanding of the concept 'strength' seems to parallel to the concept of 'weight'.

One can, of course discuss if waiting for his mother had any other intention than helping with the lifting. As the story shows, Helge mentioned his mother when I asked him to try to lift the clay, though it was I who suggested that his mother was strong. Helge's suggestion challenged my reflection and I was trying to understand why he mentioned his mother, and trying to find out how to respond in an adequate way. One can say that expressing that his mother was strong was our shared idea. One could also wonder how differently the event would unfold if I ignored what he had said. My point is: this episode can illustrate how meanings were negotiated through the inter-subjective relations between Helge and me, possibly also Tom who was an attentive observer in the beginning and contributed after a while.

Weight is a material's resistance. It constrains one's body and demands strength. Helge seemed to have an understanding of strength as a valuable quality, something one could be proud of. His verbal expressions expressed his pride: "Look! I can lift the clay up with the shell inside it![229]" The next time he wanted me to look at him, he was lifting the clay with only one hand. He wanted me to see that he could lift progressively higher and higher. He was competing with himself, challenging his own strength, and the clay's resistance helped him to push the boundaries of his zone of proximal development. He wanted me to see him and acknowledge his competence. In this way, the social contexts also motivated him to challenge possibilities of own body[230]. His motivation to test his own strength was probably also motivated by the presence of his friend and the competition between them. This is especially significant when both of them suddenly stood up, holding their arms high, as if they were comparing and measuring who could lift the clay and shell highest.

[229] As if the shell made the clay much heavier.
[230] This challenge was more imagined than actual, taking into consideration that the weight of clay was not significantly increased when a small shell was stuck inside.

From this episode, we do not get to know much about Tom. As mentioned, he did not speak much and it was Helge, who usually took initiative when speaking was required. However, at the end of this episode Tom started to imitate Helge's actions; he filled a shell with clay and lifted it up, and it was him, who seemed to stand up half a second earlier than Helge. I suggest that Tom also wanted to show that he could do the same, or even better than Helge. It is possible that this competition between the boys, that made itself visible at the end of this story, had been present throughout the context, and functioned as invisible social resistance. Helge was negotiating his understanding of strength. Thus, it seems obvious that Tom's actions were motivated by his wish to show that he was also competent, attentive and strong. In Tom's case, it was mostly his body language that showed that he was making his own meanings.

Helge's expressions about cranes and helicopters took place after he had had a chance to explore the clay. His own lifting of clay was an embodied experience, which seemed to remind him of his earlier observations of cranes. When he steadily lifted the clay in his horizontally held palm, this movement seemed to establish a metaphoric connection with a crane, which lifts heavy objects in a similar[231] way. His mentioning a crane's movement and not the crane machine was a multimodal metaphor expressed through his body language and the words "it cranes itself". The concept of height was also significant in this episode. It seems that the boy's understanding of strength is closely related to how high one can lift something and not necessarily related to how heavy something is. Possibly this embodied metaphor supported Helge's explorations of the concepts 'weight' and 'height', as metaphors are central in children's concept development (Egan, 2001).

According to my definition, the two expressions 1) crane-like lifting of the clay, and 2) the verbal expression "We have to wait for my mother", were embodied, metaphoric expressions that were derived from Helge's micro-discoveries. Possibly also a metaphor about helicopter was present, but it is difficult to say what the helicopter story actually was about and what initiated it. Possibly it was the theme 'height' that suddenly overtook the focus from the theme 'weight'. Maybe Helge had seen helicopters lifting things, or he had simply seen a crane and a helicopter in the same toyshop and therefore connected these two? There is no point in trying to guess – what matters here is to show how active children's imagination is, and how difficult it can be for an adult to understand.

[231] Such similarity is not objective, but very personal and can rely on only a few similar details.

This vignette can illustrate how Helge's first- and second-hand experiences with clay's weight initiated his connections with earlier experiences. The physical negotiations with the 3D-material, together with social negotiation of one's strength, created possibilities for the mutual negotiation of meaning. The boy's imagination helped him to connect his apparently distant experiences, and his physical activity of lifting made him and his friend proud and self-confident. I suggest that the activity was meaningful, because of their personal engagement, and it became a part of their experience repertoire to refer to in later experiencing.

6.3 Vignette 2[232]

6.3.1 Stamping on Clay

Helge, Tom and I have been exploring clay for about 30 minutes, smashing it into the table, making prints in it with stones and shells, and talking about different ways to make it flat. We are now looking at a large piece of clay with a smooth surface. I try to initiate a conversation about the clay's flatness and smoothness:
"How did we make it so smooth?"
Helge says that he had once used a rolling pin. I find this to be the perfect moment to fetch a rolling pin from under the table, where I am keeping tools and objects not yet introduced. Tom spontaneously takes the rolling pin from my hands and starts to roll out the piece of clay. I help him to press the rolling pin down.

Suddenly, he lifts the rolling pin up – and I quickly remove my hands. While he is holding the pin with both hands above his head and with pride looking at the clay he says:
"Aaaa!" (which, in this context, means something like: "Look what I've made!").

I repeat the sound and add: "Look at that! *You* made it!!!" I also ask him something about the rolling pin, but he is not listening any longer. Tom is now holding the rolling pin in front of his face and looking at it. Then the look in his eyes becomes absent - he is thinking about something else and does not hear me.

He slowly puts the rolling pin down on the table and interrupts me in the middle of my sentence: "Aaaa… allo….alle aaaa…."

[232] The second and the third vignette have been published in an article (Fredriksen, 2011).

He turns around in the high chair as if he were climbing down, moves his feet, looks at the floor and continues: "Aaa….amp[233]!" The moment he finishes the word (which does not mean anything in Norwegian) he turns his head and looks at me, as if he were asking me something.

I bend forward to hear him better: "What are you saying? What do you want to do?"
Tom: "A… amp again[234]!"
I repeat what I believe he says: "A… amp again?"
Tom: "Yes!"
But I do not understand him and I ask Helge (who is used to translating when people don't understand Tom): "What does that mean? Can you help me to understand?"
Helge: "No!"

I turn to Tom again: "Do you want to do something *now*?"
Tom says "Stap again[235]" and starts climbing down from the chair, at the same time as I walk around him to help him get down.
I ask again: "Amp – what does that mean?"
Immediately as Tom gets down on the floor, he starts stamping on the floor.
I say, surprised: "Stamp[236]!? You want to stamp on the clay?"

I suggest that we should take our socks off and stamp on the clay, and we all take our socks off. Tom is amazed when he discovers the prints of his foot in the clay: "My foot, my foot, my foot" he shouts with joy, proudly pointing at the footprints in the clay.

6.3.2 Discussion: Stamping on Clay

This was Tom's first time playing with clay. He used stones and sticks to knock the clay, pressed the clay between his fingers and against the table. He experienced the plasticity of the material and how it changed its form under pressure. We spoke about making the clay flat and a rolling pin was introduced as a flattening tool.

Tom pressed the rolling pin down on the clay. The clay was soft, but still yielded resistance. I helped him to push the tool against the clay while he made the rolling movements. When he suddenly lifted the rolling pin and

[233] He said "pramme" in Norwegian.
[234] He said: "pramme igjen" in Norwegian.
[235] He said: "Trappe igjen".
[236] I say "trampe" which the proper word for stamping.

looked at the clay (to see if it had changed) and at me (waiting for my reaction), something seemed to happen in his body-mind.

First he smiled when expressing his pride, and then the look on his face changed. As if his eyes focused on something on the wall, his gaze became distant. It was obvious that he was thinking about something outside the context. For a few seconds he did not hear or see what was happening in the room. The specific facial expression spoke of total engagement with something he had on his mind. At that moment the idea to stamp on the clay seemed to be born. This seemed to be exactly the moment of a micro-discovery.

Dewey suggests that some kind of energy transformation takes place at the moment when new and past experiences meet; that "transformation of energy into thoughtful action, through assimilation of meanings from the background of past experiences" (Dewey, 2005 [1934], p. 63) takes place. The process of experiencing the clay seems to have affected Tom's sensory awareness (Eglinton, 2007). I suggest that the new awareness made him remember his earlier experiences with materials of similar qualities, like sand, snow or mud, and his embodied knowledge of sinking through a soft surface. The new experience with the clay reminded him of the memories that were earlier collected through the activities of his body (Otto, 2005), and this junction of the new and past experiences resulted in a "thoughtful action": the suggestion to stamp on the clay.

In order to practice the activity he had imagined, Tom had to express the idea and to ask for permission to stamp on the clay. His multimodal expressions (attempts to say the word "stamp" and the foot movements) therefore had a social function. His expressions were both questions and suggestions. When he said the word "stap" even though I did not understand it, I experienced it as a question, because he looked at me each time he pronounced it. However, his expressions were more determined and self-confident in the beginning, and his self-confidence gradually sank each time I failed to understand him. Still, he kept trying to make himself understood. This motivation might have come from his will to share the idea and contribute to others, and from his curiosity to experience what happens with clay when one stamps on it. I guess that both sharing his idea and testing it, were important for him.

To share an idea with and adult, or ask for permission, is a vulnerable moment, when a child can experience being rejected, or even worse, ignored and not respected. To be able to feel competent, a child needs to experience that her/his contributions are listened to – a child needs to experience adults' confidence, respect and trust in order to become more competent

(Kristiansen, 2001). The fact that I did not understand him, and therefore repeatedly questioned him, probably made it even more difficult for him, because my actions could be experienced as pressure and an indicator of the uneven power balance between us. On the other hand, the resistance he experienced when I did not understand him also seemed to function as a motivating force for him to apply his body language and to "find" the word that could illustrate his embodied knowledge. As earlier mentioned, when children want to be understood, they feel motivated to learn words (Stern, 2003).

In this educational context, clay was the object of joint attention (Thompson, 2009a) and its malleability was one of the communication themes. Different techniques of pressing, hitting and grasping the clay were tested out in the context and the boys probably experienced that these activities demanded use of muscles and were dependent on their strength[237]. I suggest that it was precisely the clay's resistance that awoke Tom's curiosity to search for an easier way to press it flat. I suppose that his body remembered its past somatic experiences of sinking through similar materials (sand, snow, mud). Even though he could not explain or understand how the weight of his body could influence different substances and make them change form, he had an experience of such interactions between his body and soft materials on ground. This is probably why he needed to get down from the chair and stamp on the floor, and not just show the movement of his feet while he was sitting. The possibility to change under pressure was an affordance of clay, sand and snow, and the ability to push things down was an affordance of his body. When he was stamping on the clay, he deliberately stood on one foot at time. This gave me an even stronger impression that he had an embodied understanding that the "power of his feet" was greater when all the weight was gathered in one foot.

Tom's suggestion to stamp was his own creative idea. The fact that I had not considered the possibility of handling the clay on the floor, made it difficult for me to understand what Tom wanted. This episode also shows how our understanding of each other's actions and expressions was constantly dependent on our inter-subjective relations, and how the meanings of present activities and future possibilities were dependent on our mutual attention and listening. Clark (2005) also defines this type of listening.

Related to the ten-point "model of negotiating grasp", the episode with clay stamping could be described in the following way:

[237] As also the first vignette indicates.

1. Tom tries to press the clay flat, but this is difficult to do with hands and even with tools like a rolling pin.
2. Tom's experience of the clay's resistance motivates him to think of other possibilities to achieve the intended effect.
3. The material's resistance makes him define the problem he wants to solve: How to make the clay flat?
4. The material's resistance, and the feeling that he can contribute to the social context, motivate his internal, imaginative activity of looking for a solution.
5. The process of incubation is initiated and Tom seems to be mentally absent (he is thinking, remembering, recalling something inside his body-mind) for a few seconds.
6. During his internal attention, his past and present experiences seem to merge and the new solution comes in a form of micro-discovery.
7. Tom's moment of micro-discovery is the surprising moment when he realizes that he can stamp on the clay. However, this process becomes more complicated because he now meets the social resistance: How to explain what he wants.
8. Tom's micro-discovery is expressed through an embodied metaphor that includes verbal expressions, sounds, foot movements, rotating his body and gaze directions.
9. The metaphor needs to be negotiated in the social contexts in order to be understood by others. Tom's micro-discovery needs to be acknowledged and its testing approved. For that reason, the moment of Tom's micro-discovery gets pulled out – he cannot feel that he has succeeded until his theoretical suggestion about how to solve the problem is practically tested.
10. Finally, when he gets the chance to show the print in the clay, he can experience that his idea in order to overcome the clay's resistance was successful. The moment he experiences how his feet sink through the clay and sees the footprints, he can finally express his happiness and joy.

During the process of negotiating grasp, Tom's negotiation of meanings could contribute to his new understanding of 1) properties of the material, 2) ability of his body and 3) social relations. However, all of the new understandings could contribute to growth of his self-confidence, since he could experience that he was capable of inventing solutions, changing his physical environment and contributing to others. The growth of his self-confidence was actually visible during the educational contexts. After his successful suggestion about stamping, Tom became more actively engaged in communication; he made jokes and invented stories.

6.4 Vignette 3

6.4.1 Finger Protection

When three year old Emil is holding a whittling knife, I stand behind him and cover his left hand[238] which is holding the small plank, and with my right hand I help him press the knife down in order to cut small pieces off the wood. The moment I look up to see what the other boy is doing, the knife slips and cuts a finger on my left hand. It is just a little cut, but I react surprised: "Ow that hurts!" I put the knife on a high shelf and suggest that we should do something else.

Sometime later, Emil finds a wooden knife[239]. He suggests that he could whittle with it and he does that for ten minutes or so. He is working hard, holding the wooden knife just in the right position and whittling in different directions, but this does not work the same way as it did with the real knife. "There is just dust coming off", he says and laughs. He leaves the knife and the plank and looks for something else to do.

He finds a roll of masking tape, and both of the boys get very interested in tearing the tape and taping things. While I am busy with the other boy, Emil suddenly shows me his index finger. There are thick layers of tape around the finger:
Emil: "A..a..a… Made a plaster!"
I look at him and say with surprise, "Oh!.. Around you finger!" and I laugh.
He shows me his finger proudly: "Look at it!"
I say: "Now you have protection on you finger... You cannot cut yourself... Your finger is protected..."
Emil: "I have like this.... Like Eva's grandfather!"
I: "Eva's[240] grandfather?"
Emil: "Yes."
I: "Does he have something like that?"
Emil: "That's plaster."
I: "Oh… (affirmatively). Does Eva's grandfather have a plaster on his finger?"
Emil: "Because he injured himself."

[238] In order to protect his hand from being cut.
[239] The wooden knife is an example of a product that has been whittled.
[240] A girl from his ECEC center.

> Emil approaches the other boy, Morten, who is busy with something in his hands. Emil bends and presses his head between Morten's face and hands in order to steal his attention and says proudly: "Morten, now I cannot cut my finger, Morten!!"

6.4.2 Discussion: Finger Protection

Emil was interested in tools and enjoyed using the knife. When he experienced my finger being injured and my response of taking the knife away, he was slightly frightened. However, he did not want to give up whittling. He did not ask about the knife (until later), but found the wooden knife and continued to whittle the same piece of wood with it. When he remarked that whittling with the wooden knife only resulted in much dust, I did not assume that he was complaining (he was laughing), but this remark could also signify his acquired understanding that whittling with the wooden knife was not effective. The resistance of the tool and the material was probably what he experienced during the dialogue between him, the material and the tool (Illum and Johansson, 2009). The fact that he still continued with the activity tells me about his motivation. The combination of his desire to use the knife, and his fear of it seem to be a source of motivation to solve two self-defined problems: "How to use the knife without cutting one's own fingers" and "how to get permission to use the knife again."

Emil's experiences with this activity; with the hardness of the wood (even if it was soft balsa) and the sharpness of the knife were his new experiences. When he apparently gave up the whittling, and started to play with the masking tape, he also gained new experiences with the tape's qualities. Tape is usually not seen as a three-dimensional material for construction play, but rather as an additional remedy in work with two-dimensional materials. Since children's experimenting with materials can be considered wasteful, I suppose that Emil did not have the opportunity to experiment with this type of tape earlier.

Thompson (2007) says that children create new meanings when they are given the possibility of improvising with materials. Emil tested the tape's properties and improvised with it for a long time before he came up with the idea to protect his finger. The tape was off-white, sticky on one side, and paper-textured on the other. It was about 2 cm broad and could be torn into chosen lengths. The specific qualities of the tape seemed to remind him of bandages and his conversation with Eva's grandfather, who had bandages on

his hand[241]. Some kind of internal negotiating of meaning seemed to take place motivated by his desire to use the knife – as if his past and new experiences merged in order to solve the imagined problems.

I do not know when Emil got the idea to protect the finger. Perhaps the idea came first, or perhaps he accidentally got some tape on his finger and this gave him the idea (?) Since experience and imagination are mutually dependent (Vygotsky, 2004 [1930]) either is possible. The video shows that wrapping the tape around the finger did not take longer than 20 seconds and that it was conducted with his full attention and new-acquired competence about the tape's qualities[242].

Emil's process of meaning negotiation seemed to take place over a longer period of time than Tom's and Helge's processes did. Emil seemed to collect different experiences during the educational context and merge them into a complex problem solution. This process probably engaged his new experiences, thoughts, feelings and memories of past experiences. The new experiences with the sharp knife and the tape, seemed to revive his memories about the hand which was hurt and therefore wrapped in bandages, and this memory initiated his problem solving.

Dewey says:

> The junction of the new and the old is not a mere composition of forces, but is a re-creation in which the present impulsion gets form and solidity while the old, the "stored", material is literally revived, given new life and soul through having to meet a new situation (Dewey, 2005 [1934], p.63).

Such "stored material" – Emil's understanding that bandages can be used if one is injured – has been re-created into a new meaning in the situation which required protection from the sharp knife. The new meaning that Emil assigned to bandages was that they could be applied *before* one gets hurt. The paper tape was also given new meaning and significance when it was used as bandages.

The mutual influence between Emil's different experiences seemed to be established through his imaginative, associative thinking. Imagination, which is what allows the flexibility of mind (Egan, 2007), enabled Emil to make connections between a broad spectrum of experiences. Imagination was also

[241] Emil used the word "plaster", but I am quite sure that the grandfather's hand was in bandages, because this made such an impression on Emil, whereas plasters are seen much more frequently used especially on children's knees.
[242] I observed him exploring the tape and learning how to prevent the tape from curling and bunching up.

necessary for him in order to express; to be able to produce something new, he first had to imagine possible solutions.

Imagination is a form of thinking that has an important cognitive function; it enables us to envisage possible ways of doing things in our "mind's eye" (Eisner, 2002). The wrapping of the finger was a three-dimensional expression of Emil's meaning making. It was his personal solution to the problems he was facing. The motivation did not come from outside; in a form of an assignment telling him what to make, but it came from his internal desire to use the knife again, and to use it safely. As Dewey (2005 [1934], p. 64) says: "There is no expression, unless there is urge from within outwards".

Emil's desire to use the knife led him to try to use the wooden knife, but this was not successful enough. The tool did not have the qualities demanded in order to meet the wood's strength and structure. He needed the real knife, and the problem he was now facing was not of a material nature, but of a social nature: he had to persuade me in order to get permission to use the knife. It can therefore be said that his negotiation of meaning and problem-solving was motivated by the material's and tool's resistance, but also related to social resistance. His moment of micro-discovery took place when he got the idea to wrap his finger, but it was only once he had created the bandages and expressed his idea through materials, that he could show it to others and be proud. He had a large smile on his face when he addressed me: "I made a plaster!" and later he told his friend the wonderful news: "Morten, now I cannot cut my finger, Morten!!" But the whole problem was finally solved when he asked me to use the knife, and got permission to do it. An additional success was that he could feel safe with his fingers protected.

Emil's testing of the wooden knife and of wrapping his finger were attempts to solve imagined problems that also led to new experiences. According to Eglinton (2007), children experience, discover and create during "artistic processes". One experience leads to more experiences and motivates the process through which children undergo *personal transformations*, construct new concepts, acquire skills and develop aesthetic competence (Eglinton, 2007). I suggest that this is what happened with Emil during three parallel negotiations: inner negotiation between his past and present experiences, physical negotiations with the materials and social negotiations.

To summarize, Emil's process of negotiating grasp could be described in the following ten points:

1. Emil wants to whittle, but the real knife is too dangerous, and the wooden knife is not sharp enough.

2. He experiences the resistance in the use of the tool – both because he is afraid of it, and because I am afraid to let him use it[243]. He earlier during the context experienced that my fingers were cut by the knife and the saw.
3. Both resistances make him define a problem he wants to solve: how to protect his fingers.
4. Both resistances motivate his present activities and engage his imagination in order to find a solution to the problem.
5. The process of searching for the solution awakens his attention to details of the materials he has at hand. During the process of incubation (inner negotiation), his diverse present and past experiences meet.
6. When the past and present experiences merge he discovers a possible solution. This is the moment of his micro-discovery.
7. Emil's moment of micro-discovery is not so significant – it is first when his idea is expressed through materials, when the finger is wrapped, that he is proud and happy.
8. The creative expression and embodied metaphor, which the wrapping the finger can be called, is a solution to his imagined problem.
9. Emil is happy with his creative solution, but his idea still needs to be negotiated in order to be accepted. He has to present the idea and ask for permission to use the knife.
10. It is only once his idea is acknowledged - that the wrapped finger can function as a solution to the social problem: getting permission to use the knife. When he finally gets permission to use the knife this becomes the final reward for his process of problem solving, though the fact that he managed to have the idea and to successfully make the bandages were also rewards he had experienced during the negotiating process.

6.5 Vignette 4

6.5.1 Tying Something Round

When Emil and Morten find a reel of string they immediately start to bind the large branches and pull them across the floor. Martin is constantly walking around the room looking for something to tie: "I have to tie something… I have to tie…"

[243] Which constitutes a form of social resistance.

When the boys find rolls of masking tape, they both get very interested in tearing it and taping things. They experience how easily the tape crunches up and sticks together, and they are working hard at tearing it and holding it straight. Martin is constantly looking for something to tape, some crack to "repair": "I have to tape! I need to tape something!" During the first 15 minutes at the workshop, he verbally expresses his wish to tape and bind 16 times. And then he comes up with an idea: "…I am going to bin… bind…… something that is round!"

It takes some time for him to find something that is round. He finds a ball-like piece of wood, approximately 4 cm in diameter[244]. He tries to tie the string around it, but it falls off. Emil also gets interested in the same project and tries to tie the wooden ball while Morten fetches some more tape. I am squatting facing Emil and helping him to hold the wood form while tying the string around it. I watch Emil struggle with the string and suggest: "Maybe it would be good to tape the string to the form first? Can you two do it together?"

Morten is back with a long piece of tape in his hands. He now stands impatiently beside Emil and addressing him in a loud voice, as if he has something very important to say: "I am going to tape! We *have to* … *have* to tape, Emil!…. Tape the thread! We… we should tape! *Have to* tape the thread so that it….. (he seems to be thinking hard at this moment) … it….rolls around…"

Morten comes closer with his tape and lets me help him to attach the tape to the string and the wood form Emil is holding. Morten works patiently and carefully with his fingers until the piece of tape is used up. He seems absorbed in the activity. Then he immediately says: "I need more! I need even more tape!"

He gets more tape continuing to talk: "I am going to tape…. because I have to tape the ball. I have to tape here!"

During the next 30 minutes Morten goes to and fro involved in his activity of taping and tying. He addresses me once in order to help him with a curled tape. "Something is wrong here", he says and I help him to straighten the tape. Otherwise, he does almost everything by himself, applying layers of tape and string on the

[244] An unfinished spinning top.

wooden ball, patiently interchanging between the two materials. The wood-tape-string ball grows in size, but the round shape remains (see figure 7).

6.5.2 Discussion: Tying Something Round

Morten showed great interest in exploring the materials, especially string and tape. In the beginning, his activities did not have any specific goal: he was exploring what could be tied with the string, what could the tape be used for, and how the tape could be divided in smaller pieces. In short, he seemed to explore the materials' affordances and possible applications. He verbally expressed his desire to carry out the activities (that he *had* to tie and tape) and he constantly used verbs and not names of objects he would make or repair. The expressions of his needs seem to be derived from his internal desire. I suggest that his motivation was internal because Morten often seemed to be talking to himself while he was walking around and looking for something to tie. Other times he addressed Emil to tell him what they had to do. For me, it seemed that the materials constraints and affordances triggered his distinctive skills and challenged him to think, as Eisner (2002) suggests materials' properties do with students. Morten's experience of the materials' properties seemed to urge his problem solving, however he did not have any real problem to solve, until he suddenly got an idea to tie something round. Could the materials' properties initiate this sudden idea?

One can wonder why Morten would come up with such an idea. Tying a string around a ball-shaped form was the most challenging tying task he could come up with. This idea was not derived from any intention to make something. It was the activity itself that was in focus, and tying something round was a challenging task for a three year old. Did he possibly choose this task in order to challenge his own skills and show to himself (and to others) how competent he was? Possibly he did – at least it did seem to matter for him that Emil and I heard and saw him.

Morten did not give me any clues as to why he was so determined to wrap something that is round – I can only speculate about it. However, instead of speculating, I will rather focus on his micro-discovery about how string and tape could be applied in layers.

True, it was initially I who mentioned to Emil that string could be fixed to the wood-ball with a piece of tape. Nevertheless, Emil did not seem to understand what I meant, or did not know how to do it. It was while Emil was holding the wooden ball and trying to tie it that Morten stood beside him and tried to explain what they had to do. Morten's verbal explanations seemed to make visible his process of meaning negotiation: he struggled to explain,

repeated his words and added new dimension to the short sentences that followed one another:

> I am going to tape! We have to … have to tape, Emil!…. Tape the thread[245]! We… we should tape! Have to tape the thread so that it….. (…) … it….rolls around…

At the place of the brackets, I could see from his body language how hard he was thinking. His explanation "to tape the thread so that it rolls around", did not make much sense. Also it did not seem he was completely satisfied with this new-made theory about taping the string in order to roll. He seemed to have problems with verbally explaining what he wanted. However, when he got the chance to use his hands and to express through the materials, the activity he was carrying out proved to be extremely complicated. His body and hands had knowledge and competence his words could not explain.

Morten's micro-discovery was his illuminating idea to tape the string. But this idea had to be shared with others and acknowledged in order to give him the wooden ball and let him test the idea on the 3D-materials. At the moment of his micro-discovery he was desperately trying to explain what should be done. However, it was only when he was trusted and respected that he was given the chance to test the idea that they could live up to his expectations.

One might say that Morten was pushing for attention. It could also be said that the two boys competed with each other for my attention, but I would not say that these calls for attention were meaningless. On the contrary, the boys were clearly expressing when my attention mattered to them: sometimes they asked me for help, other times they wanted my acknowledgement, and when they got it they seemed to become even more independent and motivated to conduct extra difficult tasks. The boys were also attentive to each other, and it could have been precisely Morten's experience that he had understood something that Emil did not understand that motivated him to explain to Emil what should be done. In that sense, the activities and expressions of all three of us contributed to Morten's activity of meaning negotiation.

Morten's process of negotiating was not easy for me to grasp. I cannot imagine what could have initiated his activity. I cannot know if there was some kind of external problem he was trying to solve, or it was the material itself that was both the motivation and the solution of his imagined problem. However, the motivation might simply have come from a social challenge: How to show others that one is competent? Or: How can I develop skills and achieve success in taping and tying?

[245] He meant the string.

The ten-point "model of negotiating grasp" might contribute to understanding the child's actions:

1. Morten experiences that tying and taping is difficult and challenging.
2. His experience of the materials' resistance is the motivating force for further actions.
3. Social resistance (that he wanted to be seen as competent) and the materials' resistance makes him define a problem which is challenging to solve – tie something round.
4. During the exploration of the materials he learns about their specific qualities. He is attentive to the details and makes continual meanings about the materials and his own hands and techniques.
5. When he tries to tie something round, he experiences even more resistance, does not give up, but instead invents a technique which can solve the problem.
6. He gradually becomes more competent in tearing the tape, holding it in his hands, and controlling his fingers while he wraps the tape around the ball.
7. Morten's micro-discovery (how to interchange between taping and tying) takes place immediately before and during his suggestion to tape the string.
8. His micro-discovery is expressed through his verbal expression and body language.
9. Through his repeated words, Morten is negotiating permission to be given the wood-ball in order to express his idea through 3D-form.
10. Morten works on his project by himself for long time. I cannot find any evidence that he experiences any new surprises during this activity. Possibly he does not have time to finish his work during the educational context (?). However, the product tells me how amazingly competent he has been (see figure 7).

I will comment briefly on a significant happening after the educational context which made better aware of the significance of Morten's experiences from the woodshed. One and a half months later[246] Morten recalled the activity:

> We were in the bicycle shelter. Everything was different. We tied with string, and then we had to tape around on the string… so that it became round. There were some large branches we had to tie. I cut them with a saw.

[246] On November the 25th , 2009.

The fact that this was what the Morten remembered tells me that what he experienced during the educational contexts gave him some valuable experiences. What he recalled here were exactly the moments when he was deeply engaged in solving self-motivated problems and when he was fighting the materials resistance with his own hands.

6.6 Vignette 5: From the Researcher's Point of View

6.6.1 Who is Afraid?

I thought that I was well prepared for the first educational context. After more than ten years of teaching I felt confident to be able to prepare a lesson, though, my usual students were much older than three. Another exception was that what was about to take place was not an "ordinary lesson", but also research.

I had collected fresh, nice smelling juniper branches and mossy roots with mysterious shapes; turned the bicycle shelter into a woodshed similar to the one from Lønneberga [247]; prepared the tools and collected a number of small hand-carved sculptures to place on the shelves. The camera was fixed on a tripod and three stumps to sit on placed inside the camera range – the lesson could start.

When the two boys entered the room, they looked around for a second and then started to walk over to the branches on the floor, pull them, tie them, tape them. They moved around looking for something to tie with the string, looking for cracks that needed to be repaired with the tape. They overturned the stumps, rolled them and walked them like dogs on leads – and were constantly going outside the camera's range.

I started to play with the wood in order to make them become attentive to it (not the string and tape). I showed them the branches' forms and how they smelled, but they did not have time – they had to rush and do what they wanted to do; Morten wanted to cut with a saw. Both his hands were holding the handle while the sharp teeth were jumping and biting the piece of wood. He slowly adjusting his movements and sometimes even managed to get the right rhythm. Holding the piece of wood he was cutting, I could feel the vibration in my hand. The saw was being tamed, I thought, but it suddenly

[247] View a video clip from "Emil from Lønneberga":
http://video.google.com/videoplay?docid=6908548345704690898#

opened its jaws and bit my hand. “I think you should try doing something else now”, I said to Morten.

Emil wanted to carve with a knife. I stood behind his back, with my arms over his shoulders and hands like protecting shields over his hands. I could feel how he was struggling to adjust the position of the blade, the angle and directions of his movements against the wood. He was struggling to grasp the wood piece strongly enough in order to make it resist the pressure of the knife. I had to concentrate on the knife. I could not risk that he got hurt, but I had to take a short look at what the other boy was doing: “Don’t tie the camera, Morten!”

While I was watching Emil’s hands, Morten found the saw and wanted to cut with it again. I asked him to wait, but he was full of confidence; he could do this by himself his body language said. I now stood between the boys, watching that Emil’s knife did not slip and hurt Morten who was also standing close, while my foot held the branch Morten was cutting with the saw. The moment I looked at Morten and remarked how well he was sawing, Emil’s knife suddenly slipped and slid into my hand. I quickly removed my hand, and Emil laughed surprised. “Ow, that hurts!” I said, and asked him to do something else.

Forty minutes had passed and the boys still had not mentioned Emil from Lønneberga. I thought I had given them enough hints (a note at the door, the materials and tools, the wooden sculptures) – such tracks usually worked[248]. I tried to talk about carving and making sculptures and I showed them the small sculptures on the shelves. They were polite and attentive for a few second, but were not so interested. I was bothered and decided to mention “Lønneberga’s Emil”.

“May be it was Emil from Lønnebraga that made the sculptures?” I said with my eyes and mouth open, wanting to look surprised.

Morten was walking around, lifting his feet high over the tied branches and talking with excited voice: “Maybe Emil will come here and wonder what we have been doing with the string, and what we have taped?”

[248] As I experienced in my earlier projects with young children (see for example Fredriksen, 2005).

I was squatting beside Emil, smiling to him and suggesting "Maybe he will be surprised when he later comes back?"
Morten liked the idea: "Maybe…. maybe, maybe….. he will get surprised by us?", he smiled.

I realized that Emil was too silent. I touched his hand, smiled at him and asked him: "What do you think Emil? Would he get surprised?"

While Morten was trying to get my attention, I saw how Emil slowly bent his head and looked at the ground. He seemed scared. I sensed this and tried to encourage him: "I don't think he would get angry or anything – he likes doing the same things we have been doing here!?"

While Morten continued to speak and walk around, Emil stood still and said in a low voice:
"I want to go!" I could hear him breathing and his very low voice saying: "I want to go to my mummy!"

I accepted his wish and started preparing him to leave: "What do you want to bring with you?" Then we heard someone outside the door and Morten said: "Maybe it is Emil from Lønneberga?"

I looked at Emil, afraid that he might get scared again, I said: "May be it is the other Emil from your preschool – maybe he is not sick any longer and has come back?!"
Emil took a deep breath – evidently relieved. He smiled and started to move his previously frozen body: "Maybe its Emil from the preschool… wants to come here to bind things with us…?!" When I reminded him that we were going to leave, he now said he wanted to stay and continue to play.

It was soon lunch time, but before we left to join the other children Emil approached the camera[249] for an intimate conversation. "Emil from Lønneberga will come later and see what we have been doing!" he said to the camera.

He also had a suggestion about what kind of sculpture I should make: "Make the daddy! Emil's daddy!... Make the mouth that

[249] The camera screen was placed in such a way that we could see ourselves while being filmed.

shouts... Daddy shouts Emiiiil!" That is when I understood that three year old Emil might have been afraid of Emil from the books' father.

Usually when I prepare for a lesson, I do not think about whether my students might get scared. However, this was no ordinary lesson, and Emil and Morten were no ordinary students. They were unique infants, who constantly challenged my understanding and taught me what it means to be fully attentive.

6.6.2 Discussion: Who is Afraid?

The vignette illustrates my experiences from being inside the contexts with the children. As a teacher and researcher I had my expectations: on the one hand, I hoped to provide conditions for the children to feel safe and competent in dealing with meaningful activities, and on the other, to "produce" the data needed for the study. I thought I was well prepared for the interactions, but from inside the context, when my expectations were challenged, I suddenly realized how many hidden agendas I had and that I had to "drop the agendas" in order to truly listen to the children.

My expectations and my different roles came into conflict, which I was not prepared for. I had to take quick decisions and sometimes felt I was losing control. The fact that one cannot prepare for everything, at least with imaginative and competent children, is an underlying theme of the vignette. The main theme of the vignette is related to fear. I have chosen to focus on fear in this section, because I experienced how my own and the children's fear functioned as signals that something was wrong, and demanded immediate actions in order to prevent possible damage.

Fear is a serious feeling and difficult to ignore. It is one of the feelings that humans easily recognize through each other's body language – infants can read their mothers' body language if something is dangerous (Stern, 2003). My empathy was strongly engaged when I experienced that Emil was scared. If construction of meaning is an inter-subjective process, fear appeared to be a powerful feeling that influenced our construction of meaning.

When the children showed excitement about the dangerous tools, I was afraid that they might hurt themselves. They were so motivated to use the tools, but had little control of their hands (at least to begin with). Still, in order to become competent tool-users they had to be given a chance to try. I was responsible for their safety, but as a teacher, also responsible to provide possibilities for them to develop skills. It was an ethical challenge to let them use the tools and I continually had to take decisions in order to stop the activity if it became too dangerous.

When the children left the camera range, I was worried about the quality of the data. During the contexts I had possibility to prevent the children from moving around, but from my role as a teacher, I felt it would be ethically wrong to give priority to the film quality rather than respecting the children's freedom to move.

Morten scared *me* when he tried to tie the camera tripod and was possibly intending to pull it around, as he did with the other things. This would of course damage the data, as well as the camera. I was also anxious when I felt that the children were not interested in the wood the way I had hoped they would be. Neither were they interested in the background story I had prepared to motivate them. This was bothering me, because at that point I thought that it was essential for the data quality. The same fear that the educational context was not taking the "right direction"[250] made me introduce Emil from Lønneberga - something I probably did with over exaggerated facial expressions. I intended to look surprised and engage the boys. That worked for Morten, but not for Emil.

When Emil earlier sensed that I was afraid of the knife, he probably also got scared, and this fear (as suggested in 6.4.2) initiated the activity of protecting his fingers. When I sensed that he was scared, I felt strong empathic connections with his feelings and wished to help him overcome them. However, since I did not know what exactly he was afraid of, I had to think really hard to find out how to calm him down. I remember so well how hundreds of thoughts went through my mind while I was desperately searching for an appropriate thing to say. In this sense, his fear functioned as motor force for my imagination – possibly in a similar way to the effect of my fears on his imagination.

When I was preparing the educational context, I thought it was a good idea to get closer to the children's imaginative ways of seeing the world. I therefore chose to use Astrid Lindgren's Emil as an inspiration. I could not consider all of the possible scenarios the children could interpret in connection with Emil from Lønneberga. Lindgren's book was written many years ago and children were treated differently at that time. I did not consider that the woodshed – or tool shed[251], was also a scary place:

> Emil went on crying. But only until his father had locked the door and gone away. Then he stopped. Actually it was pleasant in the tool shed. There were so many bits of wood and odds and ends of boards

[250] I use quotation marks here to indicate that this was what I felt at the time – and not what was really happening.
[251] As it was translated in the following quotation.

> to make things out of. Emil used to carve a funny little wooden man every time he was shut in the tool shed after getting up to mischief. He had already done fifty-four and it looked as if there were going to be still more (Lindgren, 2008, p. 39).

Could it have been the tool shed itself that was scary, because it was the place where naughty children were locked in? It was only when I watched the videos that I could get an impression of what it was that "my" Emil got scared of. The fact that Emil mentioned the father from the book and suggested that I should carve the father with a large open mouth shouting "Emil!", made me remember that the father from Lønneberga is an angry man, whom young boys (especially if they are called Emil) could be scared of.

My ability to prevent the children from being physically and emotionally hurt was dependent on my on-going attention and interpretations. To interpret means to make meanings about what was observable or possible to sense – for instance the children's feelings. Through the signals of their bodies, as well as verbal expressions, they were influencing my interpretations and choices of actions.

In interactions with young children, everyone's body language is essential for mutual understanding and negotiation of meaning. The younger the children are, the more important it is that

> …the teachers have finely developed interactive skills required for probing children's thinking and feelings and for soliciting information from them (Katz and Goffin, 1990, pp. 199-200).

Since one can never know what young children might come up with, through their attentive and imaginative way of being, teachers' and researchers' attention, flexibility and improvisation are necessary to respond and interpret appropriately[252].

6.7 Summary of the Sixth Chapter

The sixth chapter presents five vignettes from two different educational contexts. The vignettes illustrate the four issues of this study. One could ask if there were other reasons why only three year old boys are represented in the vignettes. It needs to be said that the educational contexts with three year old children (cases 1, 2, 3 and 7) were especially interesting, because the

[252] The question of improvisation and early childhood education will be further discussed in the seventh chapter.

youngest children seemed to be the most engaged in embodied explorations with 3D-materials, and showed most inner urge to act, to use imagination and express through embodied metaphors.

It would be wrong to say that the data from the cases with 4 and 5 year old children were not relevant. However, these older children appeared to have more conventional expectations of the educational contexts and appeared to be less free; as in case 9, that took place during Christmas preparations. There is no particular reason for only boys being represented in the vignettes, since gender was not an important issue in this study; I simply chose the most interesting examples. However, my choices were probably influenced by unconscious advocacies - since I have a son and no daughters, I probably felt more familiar and confident with interactions with boys and interpretations of their actions.

Four of the vignettes presented a child's process of meaning negotiation in relation to a problem initiated through experience with the 3D-materials. Each of the four vignettes is interpreted in relation to relevant theories, as well as in relation to the "model of negotiating grasp" presented in the fifth chapter. Additionally, the fifth vignette presented the process of social negotiation and illustrated my own fears and struggles to act appropriately in order to protect the children from harm and still allow them possibility to actively participate and develop their competences.

7. Learning and Negotiation of Meaning

This thesis has promoted the view that meanings are negotiated between individual's experiences, tangible materials and social contexts, as three merging dimensions. The following chapter makes an attempt to summarize and illustrate these phenomena and points towards some findings of the study. The chapter also schematizes tensions between individual and social sides of the phenomena 'learning', 'meaning making' and 'negotiation of meaning'. After an introduction (section 7.1), the topic will first be viewed under the perspective of its dependency on embodied experience, and then approached from the understanding that meaning making is a social phenomenon. The last part of this chapter will discuss consequences of this study's understanding of children's negotiation of meaning in relation to visual art- and early childhood education.

At this point of the thesis it is necessary to return to the objectives presented in the introduction. This chapter will address the two main objectives:

- To illustrate the necessity for respecting young children's experiential, embodied and holistic ways of learning/negotiation of meaning.
- To understand the interactions between 3D-materials and children in visual art educational contexts and generate knowledge how this contributes to their learning/ negotiation of meaning.

The first objective will be examined throughout the chapter and the second will be addressed in section 7.2.

7.1 Tensions between the Embodied and the Social

7.1.1 Why Focus on the Youngest Children?

The complexity of the human mind seems to be infinite. In order to comprehend it, people have defined and applied a variety of simplifying forms of understanding, for example comparing the human mind to computers and knowledge to "information processing" (Thelen and Smith, 1994). However, development does not evolve from pre-designed structures[253], but rather emerges from relations (Thelen and Smith, 1994).

[253] All technology has been "through someone's hands" and its functions can therefore be seen as pre-designed.

Furthermore, computers' ability to adapt to changing circumstances and interact inter-subjectively is very limited, while humans are capable of diverse sensing and emotionally loaded responding to constantly changing contexts. With our individual, biological, intellectual, embodied, emotional, social and cultural differences, each person is different. At the same time, we all have some things in common. The same can be said about the differences between young children and adults: These two groups, separated by age, are not homogenous, but at the same time they have much in common; they are different in one significant way in that young children have still not had time to socialize into the society they have been born into, whereas adults usually have.

There have been numerous discussions over the centuries about relations between biological and social conditions, between nature and culture, but these dichotomies have also often been avoided (Sanders, 1999). The following discussion builds on the symbolic interactionists' assumption that humans are a species in phylogenetic line with animals; biologically determined to survive and (to a certain degree) capable of adapting to the changing conditions around them. As Eisner writes: "Our biological system is designed to enable us to survive – with the help of others" (Eisner, 2002, p. 2). The reason for bringing up this issue is that childhood represents a phase of life when humans are rapidly learning (Egan, 1999) and constantly becoming competent before they are fully socialized.

From the nine cases, the cases with three year old children provided the most interesting data for the studied phenomenon of how meanings are negotiated. Some of the reasons for this are:

- Young children frequently expressed through embodied metaphors.
- They frequently used imagination and played with possibilities.
- They were highly attentive and engaged with here-and-now activities of exploring 3D-materials through a variety of senses and using their whole body.

The fact that young children frequently expressed experiences through their bodies is understandable when taking into account that they are not skilled users of verbal language. However, their use of imagination can only, from a reductionist perspective, be explained as compensation for something else – though imagination might be something that young children strongly need in order to connect their small number of life experiences. If imagination is necessary for the construction of meaning (Efland, 2002), it is fortunate that imaginative abilities are at a peak in early childhood, as Egan (1999) suggests.

The children's high level of attention, engagement and motivation to handle the 3D-materials was partly dependent on the social contexts, but some forms of inner motivation seemed to be present as well. Merleau-Ponty (1962) suggests that inner motivation is an immanent part of embodiment. I will return to this in section 7.2.2, but what is most relevant here is that children in the phase of learning to speak seem to relate to the world in a specific way. The examples from the study showed that five year old children were more likely to do what they were expected to do; their behaviour seemed to be guided by their knowledge about adult's expectations. Five year old children seemed to have already socialized into the behaviour-patterns, for example: what was suitable to do with clay, where one should sit or what one should make.

The three year old children in the study were less familiar with the 3D-materials and did not seem to know what to expect from the materials, from me or from the contexts. This state of not-knowing might sound like an insecure place to be, but meeting the situation without pre-conceptions also provided greater possibilities and few limitations. In this respect, the youngest children were less constrained by social norms, and had more space to act from their imagination. It is my opinion that this was precisely why the youngest children provided the best examples for the study of process of meaning making. A degree of openness to imagination and new possibilities was, though, also present with older children when they interacted in unfamiliar rooms and with unfamiliar materials[254].

The unfamiliarity with the materials and contexts provided possibilities for negotiating the rules, as well as opportunities for exploration, fun play, wild suggestions and (apparently) nonsensical expressions. Contexts where children's imaginative contributions were welcomed were also the contexts where most micro-discoveries took place. This meant that the youngest children, operating in the open-ended contexts, were most frequently acquiring new understandings, skills and competence. As a result, these educational contexts are the most interesting for the study.

Matthews (1999) presents children's drawing as universal, but with many individual and cultural variations. In a similar way this study suggests that children are born with some universal predispositions which assist them in adapting to their environments, but develop very differently at an individual level. How each child develops is highly dependent on the qualities of their physical and social environments.

[254] As for example in cases 5 and 6.

Johannesen and Sandvik (2008) fear that the Framework Plan's presentation of young children (0-3) as basically different from older children can be of more harm than help to them. From my point of view the youngest children have specific competences not because they are different from others, but because older children and adults have been socialized away from the competences they once had, while the youngest children possess unconstrained imagination and embodied knowledge. Young children's competences are "their capacity for engagement, their impulse towards creativity, and their drive to develop skills and become competent" (Stinson, 2002, p. 160).

Young children can inform adults about the capacities of embodiment, imagination and play - that schooling seems to alienate us from through socialization. In this sense, there is a tension between individual-embodied, experiential forms of knowing the world and social, linguistic, standardized knowledge about the world. A child's biological needs have to be negotiated with the social norms if the child is to become a well socialized individual (Hohr, 2005). However, the same process of being socialized into defined norms threatens to wipe out individual differences (Hohr, 2005). Better understanding of children's competences might relax the tensions between the individual and social forms of knowledge construction.

7.1.2 Between Vulnerability and Competence

There has been a growing interest in Norway in research about young children's competence. Much of this research has concluded that young children have their own opinions, intentions and will (Johannesen and Sandvik, 2008). The Norwegian National Framework Plan (Ministry of Education and Research, 2006) presents young children as competent, however it is unclear as to what such competences consist of (Johannesen and Sandvik, 2008). The plan claims that children are competent, but at the same time focuses on what they are not capable of, which maintains old prejudices and advocacies (Johannesen and Sandvik, 2008).

In the first chapter of this thesis, young children were presented as both vulnerable and competent, and a list of their vulnerabilities and competences was suggested. The youngest children are assumed to be the most vulnerable and those with the greatest need for protection. However, this study indicates that respecting children's competences is an important factor for making it possible for them to become more competent. Additionally, the growth of their competence often made them less vulnerable, because through their

experiences they often acquired new understandings and felt more self-confident[255].

Measuring children's development was not an intention of this study. Still it cannot be ignored that the children were becoming progressively competent in the educational contexts, even if the contexts lasted for only an hour. The youngest children showed the largest growth of diverse competences.

The study has shown that both competence and vulnerability have many different forms. Some competences and vulnerabilities were related to physical size or children's physical strength, others were dependent on their experiences or emotions. However, an increase in one type of competence could simultaneously contribute to a decrease of quite a different type of vulnerability. Here are four examples of such transitions from vulnerability to competence that were detected during the study:

- When the children did not have experience with using specific tools they were vulnerable because their movements were not coordinated and they could more easily hurt themselves. Owing to their lack of experience with dangerous tools, they did not know that they needed to be careful. However, when they were given the possibility to experience and train their motoric skills, they became more competent and the risk of hurting themselves was reduced[256]. An example of such transition from vulnerability to competence could be seen in Morten's use of the saw[257].
- When the children did not have developed verbal language, they were vulnerable, because they could not easily promote their needs, and were dependent on my ability to listen and interpret their expressions. For example, I had most problems understanding Tom and Eva and I often misunderstood their expressions, which led to other types of activities than those they wanted[258]. With their growing competence to express verbally they could become less vulnerable, because they would be able to promote what they wanted. An example of such growing competence can be seen in Tom's process of learning the word "stamp".

[255] Although a child's sudden wave of self-confidence was not always based on real acquiring of skills, but more on the child's emotions of pride of achievement (as in the sawing case); the child could become even more vulnerable, because s/he could feel like competent saw-user, but in fact be unaware of the possible dangers of using the tool.
[256] An extreme example, given in the third chapter, was the 11 month old baby competently cutting with a machete, presented in Barbara Rogoff's (2003) book.
[257] See section 5.4.1.
[258] This claim is based on my analysis of the video footage, which made it possible to understand what a child actually meant and observe the misunderstanding.

- When the children suddenly understood something, they seemed to experience this as a victory; they became proud and wanted others to recognise their competence. In this sense, their experiences of the moments of becoming aware (micro-discoveries), made them also understand that they were capable of finding things out on their own. This in itself was a big discovery that seemed to motivate their further intentions to explore more.
- When the children experienced that they could contribute and take decisions, they seemed to rebalance the power order, reducing my position of power and increasing their own. The same example of Morten and the saw can be used to illustrate this. When he felt more competent sawing, this gave him more self-confidence and he took this further by deciding when and how to use the saw.

The example of Morten and the saw illustrates how one type of competence could stimulate acquiring other types of competence. The link between the competences seemed to be established through the child's growing self-confidence. Such self-confidence, resulted from some form of acquired competence, functioned as a motivation to further physical exploring and negotiation of meaning. The child's new self-confidence also changed the social relations, because the child now required to be seen as competent.

If young children's competence building is seen as a vector moving away from vulnerability towards competence, it could be said that the youngest children were positioned somewhere in the middle of this progression; at the point of becoming competent. However, this metaphor becomes more complicated when considering that their competences have different forms. To divide them simply into two main groups one could say that: on the one hand there are competences dependent on children's physical abilities and interactions with material qualities, and on the other hand there are competences dependent on their ability to communicate with teachers and peers. Additionally, it was also significant that children's growing competence in using their bodies in relation to materials was dependent on whether a teacher facilitated the possibility for this exploration. In this sense, becoming more socially competent could hinder their physical competence.

An example that can illustrate such pulling of competence in opposite directions, could be a hypothetical situation where I told Tom that he could not step on the clay because he would get his feet dirty. In such a case, learning of "appropriate social behaviour" would prevent Tom's somatic experience, his joy and self-confidence. This example makes clear how essential the role of a teacher is. If, as presented in the first chapter, it is up to a teacher to act according to their own ethical judgements and personal

assumptions, the question of professionalism in teaching becomes more complex.

According to Habermas, as referred by Øverbø (2009), it is the listeners[259] ethical responsibility to attune her/his understanding to the person s/he listens to. Such ability to attune to each other depends on the trust between the teacher and a child, and trust is closely related to inter-subjective relations. A teacher's ability to support a child's process of becoming competent will depend on the teacher's "ontological attitude to accept this other person as a human being in a certain cultural specific context" (Øverbø, 2009, p. 176). For a teacher, to be able to truly respect a child depends on her/his personal assumptions, expectations, morality and rationality (Øverbø, 2009).

For Habermas, clarity of meaning is justified when one, through expression, bridges the subjective experience and the "intersubjective transparency that experience gains in being truthfully expressed" (Habermas 1984 quated in Øverbø, 2009, p. 184).

Further arguments about inter-subjective transparency could be applied to a context of interactions between a teacher and a child: when a child expresses her/his subjective experience, s/he will inter-subjectively grasp how the expression has been met by a teacher. The child could intuitively understand 1) if his/her subjective experience is welcomed, 2) if the expression has been transmitted in a way that it is interesting or valuable for the teacher, and 3) if the experience and the expression are suitable for the specific contexts. Such understanding can take place even without the teacher saying anything. This means that a teacher's body language can itself express her/his attitudes towards the child's expressions. Related to teacher's competence, this implies that it is not enough that a teacher owns professional knowledge and acts in pedagogically appropriate ways, if her/his personal attitudes are not in accordance with the professional knowledge[260].

Through the process of socializing a child learns about appropriate behaviour, cultivates actions and verbalizes thoughts. An intrinsic ambivalence embedded in the process of socialization, simultaneously allows and suppresses imagination - the same concerns somatic experience and embodied thought. This is more or less evident in all educational systems, however in some systems, for instance in Singapore, educational purposes are torn between on the one side practicing social control and conformity, and on the other exhorting their citizens to be more creative (Matthews, 1999). Such

[259] In this case teacher's listening to a child.
[260] The situation can, of course, be even worse if the professional knowledge is insufficient.

opposing educational objectives can contribute to the development of confused individuals, who are taught not to have individual opinions, but at the same time are required to (Matthews, 1999).

Johannesen and Sandvik (2008) express their fear, that the Framework Plan (Ministry of Education and Research, 2006) hinders ECEC education by presenting opposing views. They also claim that the Framework Plan draws a distinction between adults as thinking beings, and children as emotional beings (Johannesen and Sandvik, 2008)[261]. Presenting children as primarily emotional beings gives the impression that they are vulnerable and non-thinking beings. Johannesen and Sandvik doubt that such a perspective of children is possible to reconcile with regarding them as competent. Furthermore, if children are presented as non-thinking beings, welcoming their participation in ECEC curricula development sounds like a risky project (Johannesen and Sandvik, 2008).

7.1.3 Becoming Competent

When children use their senses and acquire experiences, they are both physically, cognitively and emotionally engaged. "Emotions are intimately involved in acts of perception and cognition; in object manipulation, tool-use and exploration" (Matthews, 1999, p. 17). This thesis shows examples of how children through their embodied experiences became familiar with new ways of using their bodies, affordances of the materials, and applying activities of perceiving. Such individual forms of learning[262] through micro-discoveries could take place more or less independently from the presence or influence of other people. A child is capable of learning during solitary play with materials or toys. However, it is a question of pedagogical approach as to whether a child will be given such opportunities in early childhood education settings. In educational settings, children's possibilities to negotiate meaning are not only dependent on the current educational ideology, pedagogical framework and local plans, but also on "common sense"; understanding what is appropriate, useful or wise to do in a certain culture.

The influence of common sense thinking on children's possibilities to learn through their bodies can be illustrated by some simple examples:

- If it is assumed that climbing trees is dangerous, one can cut the trees down or put fences around them;
- If it is assumed that sand is full of germs, one covers the playground with concrete;

[261] As if thought and feeling are disconnected (Dewey, 2009 [1909]).
[262] I deliberately use the concept learning here in order to make clear that I speak of more individual processes.

- If cleaners complain that playing with clay demands too much time to clean up afterwards, clay can be take away from the repertoire[263], and so on.

In such cases, the question of economy, the adult's efficiency (or own fears) come before children's needs to explore and experience. Absence of certain objects and materials prevents children from developing certain competences. This is what Nordin–Hultman (2004) takes as her main theme when she claims that materials for explorative play are absent in Swedish ECEC centers.

In positive learning conditions children are provided with tools and materials, and have the chance to experience and become competent. Children's processes of learning through experiences are not directly dependent on adults; however, adults decide what the children will have a chance to experience. In order to make it possible for a child to learn through experience, the teacher will have to face her/his own fears, release her/his own control and trust that the children will be able to carry out the given tasks. The teacher will have to accept that the child may not conduct the task in a way that the teacher assumes to be the most effective – the child will have to do it her/his own way in order to experience it as meaningful. However, the child will need support from adults to safely move from a vulnerable to a more competent position. A visual metaphor can be made with the process of walking across a seesaw[264]. If the process of becoming competent is seen as being like walking across a seesaw, a child needs courage to cross to the other side and especially needs support at the balancing point. Once the balance has tipped and the child is on the other side, the conducted task suddenly seems easy resulting in the child's feelings of pride and self-confidence.

The dynamic process of acquiring new understanding is a "fragile transitional period" (Ackermann, 2004). Knowledge under construction is flexible, contextual and fragile (Ackermann, 2004) because it is easily influenced by all kinds of factors. This means that children need support in order to develop new ideas and develop new understandings. The process of becoming competent is a fragile process that has to be handled with care by adults,

[263] The examples draw on events that have actually taken place in different schools and different countries.
[264] This possibly strange metaphor comes from my experience with dog-training where one of the difficult agility exercises requires that a dog runs across a seesaw, carefully balances in the middle, doesn't jump off when the seesaw hits the ground, but continues to run to the end of the seesaw.

because children in these moments both need protection, encouragement and, possibly most of all, recognition that they are competent.

Driven by the biological need to survive, humans are given predispositions to communicate in order to be accepted, loved and understood (Dissanayake, 2007). Since children strive from birth to become part of the group and become socialized into whichever society they happen to be born into (Rogoff, 2003), they are also flexible and easy to form. For this reason, they are especially vulnerable at the point of becoming competent, because they are dependent on adults' ways of practicing control and power.

The vignettes show how I had to release control and face my fears in order for Emil and Morten to fully experience using the tools. My embodied experience[265] made me aware of how great a responsibility it is to be a young children's teacher. It became very obvious to me what a huge influence teacher's norms, words, body language and (apparently invisible) attitudes have on children's possibilities to become more competent. The following section (7.2) identifies children's embodied competences and discusses them.

7.2 Negotiation of Meaning through Embodied Relations to the Physical Environment

In order to provide the best conditions for children's development, it is one of the teacher's responsibilities to learn which competences children bring to their environment (Thompson, 2009b). Yet, from the above mentioned discussion of the Norwegian Government documents, it appears to be unclear as to what young children's competences are. What kinds of competences do they bring to their ECEC centers and what kinds of competences do they need to develop during their ECEC years? The latter question is large and complex. I will mainly focus on the first question; identifying some of the competences that children bring to their environments. It is important to point out that it is the competences children already possess that need to be supported and preserved if children are to become self-confident, creative and socially responsible.

7.2.1 Children's Embodied Competences

It has already been mentioned that it was the youngest children in this study who seemed to be most curious to explore the possibilities of 3D-materials. They seemed to have some kind of inner motor that stimulated the engagement of their senses, embodied explorations, memory, imagination,

[265] I here refer to the necessity of using my insider-experience of the context.

body language and more or less developed verbal language. According to Dissanayake (2000), some competences are embedded in our embodiment. Similar to animals, we have certain predispositions given to us by nature in order to survive (Dissanayake, 2000). In socio-cultural understanding of learning, one sees knowledge as constructed through interactions between people and through culture. In support of Dissanayake's notion, I consider humans to have certain "natural" embodied capacities that allow them to learn by themselves from their own experiences, as well as being able to make meaning together with others.

Even though the starting point for this study was a socio-cultural framework, similar to the umbrella-project the study is a part of, a radical social constructionism framework [266] was not seen as an appropriate theoretical framework for this thesis. If we are to acknowledge that young infants are capable of learning, one has to consider that certain competences are biologically determined.

When Eisner (2002, p. 2) addresses learning through embodied experience, he says:

> We learn to see, to hear, to discern the qualitative complexities of what we taste and touch. We learn to differentiate and discriminate, to recognize and to recall.

By saying this, Eisner seems to assume that humans possess both ability to perceive and ability to recognize, discern and differentiate. However, these abilities cannot be activated without full use of the senses, attention and the complex process of cognition. The ability to perceive is one of the inherent competences of the human body (Dreyfus and Dreyfus, 1999a) and is closely related to knowledge (Merleau-Ponty, 1962), since it is perception that allows recognition, memory, differentiation and learning. Although new-born babies need to explore the possibilities of their senses and learn how to use them, it can be said that one of young children's competences is related to their natural predispositions to perceive, experience and learn.

This study has shown examples of how a perceiving child acts as a "perceiving subject [who] approaches the world as the scientist approaches his experiments" (Merleau-Ponty, 1962, p. 24). Merleau-Ponty considers the activity of perceiving to be the body's grasping of meaning (Dreyfus and Dreyfus, 1999a). Sensation, which is a result of perception and could be compared to the concept 'experience', is an element of knowledge (Merleau-Ponty, 1962):

[266] As it has been pointed out, the framework for this study is social constructivism and not constructionism – see section 2.7.

> A being capable of sense-experience (*sentir*)- in the sense of coinciding absolutely with an impression or a quality - could have no other mode of knowing (…) it exercises a cognitive function, and that its parts together make up a whole to which each is related without leaving its place (Merleau-Ponty, 1962, p. 13).

So, it can be said that one of young children's early competences is their ability to perceive. When we watch very young children, say six months old, we can observe that they are interested in toys and all kinds of things, especially if these things move and can be moved (Matthews, 1999). However, in order to become more competent perceivers, some form of motivation to further explorations is needed. We can suppose that such motivation can be provided by adults, but the basic motivation seems to come from the inside. A child's way of attending to the world seems to be constituted by unique forms of inner 'intentionality' (Danaher and Briod, 2005, p. 218).

Merleau-Ponty suggests that embodiment has two main components: the one is related to the physical body, with all its functions, and the other is motivation inherent in the body (Dreyfus and Dreyfus, 1999a). From this point of view, young children also own competence that can be called 'inner motivation to act, explore and find out' – their perception is dependent on their will to act because "perception and skill acquisition require an active body" (Dreyfus and Dreyfus, 1999a, p. 114).

Many examples from the study show how the children engaged with the 3D-materials and were motivated to do something with them. The first three findings of this study: 1) children's embodied activities in relation to 3D-materials, 2) the possibility to experience the materials' affordances and produce metaphors and 3) the possibility to resist materials constraints and solve problems, would not be possible without children actively taking part. If the children did not take initiative to respond to the materials in some way, the materials alone would not have possibility to influence their meaning making. Although the children's motivation to act might have come from social interactions and the contexts, it was possible to observe that much of their motivation was derived from their embodiment, under conditions that the physical contexts made the experience and activity possible[267].

[267] A friend told me a story from when she was practising as a doctor and had a chance to meet an infant in a hospital in a non-western country. The baby boy, whose mother had died when she gave birth, had been placed in a cot with solid walls. He was given food and a place in a ward, but no "mothering". When she met him, at four months old, he was unresponsive. He had barely seen anything else than the white ceiling. He was never given anything to play with or get curious about. He did not have any will to act or communicate. No one before her had helped

Children's actions unfold "from within the child and [according to] what is available in the environment" (Matthews, 1999, p. 18). Learning through the movement of bodies is a competence of young children. Dissanayake (Dissanayake, 2000, 2007) and Bamford (2006) call such competences 'artistic'.

Infants are first concerned by the identity of objects, their movement, location and shape, but are also motivated by exploring expressive possibilities of their own bodies (Matthews, 1999). Young children's activities, however disorganized they might appear for adult observers, are not meaningless, but have an essential role in children's cognitive and affective development (Matthews, 1999).

> Such actions are part of the formation of complex descriptions of a reality, which have visual, haptic, kinaesthetic and kinematic aspects (Matthews, 1999, p. 6).

To summarize, young children's somatic competences refer to their ability to perceive, and their inner motivation to act upon their environments. I make a connection between children's will to act and their play, because, as this study shows, children's activities are often expressed in forms of play. Children's play in this study took the shape of exploratory activity, as play often does (Eisner, 1990). When they played with the 3D-materials, the children seemed to be actively engaged in number of ways: physically, emotionally, socially and cognitively.

Stelter (2008a) writes about "body-anchored learning" which is an experiential, embodied way of acquiring knowledge about the world and oneself. He says that the basic premises for body-anchored learning are the orientation towards the here-and-now and the state of getting absorbed in one's own subjectivity (Stelter, 2008a). In my opinion young children often meet their world through such here-and-now situations, especially when they experience something new or unexpected. Further premises for body-anchored learning are the body's orientation to the world, and engagement in the process of meaning making as Stelter (2008a) points out. "The individual develops *meaning* by being in action in a specific socio-cultural context" (Stelter, 2008a, pp. 118-119, original emphasis) - as for instance in a context of play. Sutton-Smith (1997) suggests that the process of playing is the process of children's mind development.

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him to become aware of his competences. However, she arranged that he was placed in the corridor with people passing by and talking to him. She carried him, sang for him and talked with him for the following eight months and he managed to recover.

Children's play is partly an open-ended, self-motivated activity, which does not have any predefined goals (Monighan-Nourot, 1990). Dreyfus and Dreyfus (1999a) do not mention play, but I find similarities between play and what they call 'urge to act'; The urge to act does not come from intension to achieve some kind of final goal outside the present situation, but to achieve a state of equilibrium or flow (Dreyfus and Dreyfus, 1999a). Dreyfus and Dreyfus refer to Merleau-Ponty who claims that such equilibrium is achieved through the body's intention to *maximize the grip* in order to achieve the feeling of successful coping with the environment (Dreyfus and Dreyfus, 1999a).

When Piaget wrote about equilibrium, he left an unanswered question: "Why and how does the organism seek a stable relationship with its environment?" (Thelen and Smith, 1994, p. xx). It is possible to address this question if we consider that young children might act differently from adults. Unlike adult's activities, young children's activities do not have to have any other motivation than what the here-and-now activity provides them with. In this sense, a child does not need an external motivation in order to establish flow; the flow itself is both the reward and the source of motivation. This is similar to what Runco (2006) says about children's creativity - that is does not have any specific goals or tangible product.

I once observed and filmed my son when he, 10 months old, was struggling to put matches inside the outer casing of a matchbox for 15 minutes. His fingers were sticky and he invested much effort to place a single match inside the casing he could see through. The match immediately fell through it and onto his feet, but he still continued working, puffing and struggling with concentration and endurance. Similar concentration and motivation could be observed while Marit was cutting with scissors and Morten was taping the wooden ball. The activities themselves were desirable, motivating and could provide the children with a sense of mastery in coping with their physical environments.

This study has approached the question of how children negotiate meaning, assuming that children are competent, active individuals. Furthermore, the search for how meanings were made led to identifying the specific kinds of competence that could be related to the children's embodied interactions with 3D-materials. The competences identified so far are: 1) children's ability to sense, perceive and experience, 2) inner motivation to act upon their environment – to play. Further competences that will be described later in this chapter include: 3) children's competence to experience in a holistic way and hold embodied knowledge, 4) children's competence to "read" and

communicate through body language, 5) children's imaginative capacity and 6) children's competence to create new meanings through micro-discoveries.

7.2.2 Connections between Experiences

One tends to understand thought as something different from what is directly perceived (Dewey, 2009 [1909]). The examples from the study illustrate how the act of perception could directly influence the children's thoughts. The fact that Tom suggested stamping on clay before he was familiar with the word 'stamping' can imply that he was not thinking in terms of words, but in terms of embodied experience. He was thinking simultaneously with his hands, feet, senses and brain, as children often do (Vecchi, 2007), as if there were a constant oscillation between the thought, the word and the experience (Vygotskij and Kozulin, 2001).

Tom shared his experiences and thoughts through multimodal expression, during which an understanding of a new word was developed. It can be said that Tom, when he multimodally expressed his wish to stamp on the clay, conducted an "orchestration" of different sensory experience (touching, using muscles to press, feeling of body-weight) and expressive modes (spatial, linguistic and dance-like) (Matthews, 1999). Yet, already at the point when he expressed through movement that he wanted to get down from his chair, his experiential knowledge of stamping was "already pregnant with irreducible meaning (…) in spontaneous accord with intentions of the moment, as with earlier experience" (Merleau-Ponty, 1962, pp. 21-22).

Some scholars consider young children's early representation as "primitive" with "embryonic meaning" (Matthews, 1999). In his book "The Art of Childhood and Adolescence", Matthews presents an observation of painting activity, where an infant connects the sound of a wet brush being pressed on paper, with the sound of squeezing a raspberry (Matthews, 1999). Through this, the baby girl connected her earlier experience with raspberries to her present experience with the material exploration (Matthews, 1999). The present experience was associated with the past experience, however distant this connection appeared to be from an adult's point of view. I suppose that the girl in Matthews' example recognized the sound of raspberry squeezing as a part of the specific context where red paint was also present; it was her holistic experiences, including the sound that connected raspberries with the painting activity.

A similar conclusion can be made from the embodied metaphors children in my study produced: it was the hammering sound that probably led to expressing the metaphor of a heart beat (case 7) and singing the song with a specific rhythm (case 8); it was the smell, color and softness of yarn that

reminded the children of sheep (case 5) and the shape and size of a cardboard box that led to body movement that reminded the children of sitting in a cradle and a boat (case 6).

Even though a single sense could have initiated connections between past and present experiences, it seems that the moments of these connections also depended on other aspects of the contexts. According to Merleau-Ponty (1962) associative connections can be possible only because experiences are unities of many different qualities. It is only when one experiences phenomena as unities in specific contexts that her/his "analytical attitude can (then) discern likenesses or proximities" (Merleau-Ponty, 1962, p. 16). If children's experiences are holistic unities, this adds an additional dimension to the discussion in chapter five about how young children made embodied metaphors without making clear the ways in which their different experiences were related.

Merleau-Ponty (1962) says that perception is essential for memory; if we do not perceive, we have nothing to remember, thus he also claims that memory fills out our perception. Applied to the children, memories from their past experiences seemed to help them fill the gaps between the few experiences they had.

Memory functions to connect similar experiences, however

> …before any contribution by memory, what is seen must at the present moment so organize itself as to present a picture to me in which I can reorganize my former experiences (Merleau-Ponty, 1962, p. 19).

Merleau-Ponty implies here that some other processes accompany the process of remembering; that present experience has to be organized in order to later be reorganized in relation to past experiences. This complex process lies at the core of what I have described as micro-discoveries which are the moments when some forms of thought reorganization takes place, resulting in renewed understandings.

The connecting of past and present experiences plays an important role in this study. Though this is a question of psychological importance, and therefore outside my field of knowledge, it is also important in visual art education and more generally in pedagogy. The moments of establishing connections between past and present experiences are driven from inside and emotionally engaging moments, which is precisely what makes the connections meaningful for the person who experiences them "from the inside". However,

the moments of connections (micro-discoveries[268]) also seemed to release some kind of energy (Dewey, 2005 [1934]).

The connections between past and present experiences are the results of all processes that precede them. Meanings emerge from dynamic processes on the basis of personal experiences, and they integrate past, present and future (Stelter, 2008a). Both Dewey (2005 [1934]) and Eisner (2002) suggest that resistance from tangible materials has an essential role in the process of assimilation of new and past experiences. It is the resistance from an object that "calls out thought, generates curiosity and solicitous care" (Dewey, 2005 [1934], p. 62). In the study Negotiating Grasp materials' resistance has been shown to be a motivating force for children's actions through which the children pursued equilibrium with their environments.

Merleau-Ponty (1962) asserts that motivation for reorganization of thought can come from qualities of an object one interacts with. If

> …we admit that all these 'projections', all these 'associations', all these 'transferences' are based on some intrinsic characteristic of an object, the 'human world' ceases to be a metaphor and becomes once more what it really is, the seat and as it were the *homeland* of our thoughts (Merleau-Ponty, 1962, p. 24, original emphasis).

Children's play with objects and materials can lead to connections between on the one side perceived qualities of the objects, and on the other the children's "emotional qualities" (Matthews, 1999, p. 16). When Eglinton (2007) says that experience motivates more experience, it is reasonable to believe that it is also children's emotional engagement that motivates prolonged experiencing. Since experience, cognition and emotions seem to be tightly connected (at least in early childhood), it seems likely that also the motivation to "maximize the grip" is dependent on some kind of emotional attachment to the contexts (including environments, activities and other people).

Interactions between individuals and their physical environments, as well as inter-subjective relations between individuals, have been considered by symbolic interactionists as essential for the creation of meaning. However, they underestimated the importance of emotions (Alvesson and Sköldberg, 2009). In recent theories about emotions, there is a close connection between emotions, perception, cognition and social behaviour (Thelen and Smith, 1994). Emotions are important factors of experience and are also closely

[268] Dewey does not speak of micro-discoveries.

related to motivation and learning (Thelen and Smith, 1994). Emotional associations help infants to remember (Thelen and Smith, 1994).

> When the emotional stakes are high, children will learn effective strategies quickly – they will be more focused, more quickly recruited, and less able to be distracted or perturbed by internal or external factors (Thelen and Smith, 1994, p. 319).

When a child experiences something that s/he has managed to achieve for the first time (for example through a micro-discovery) this can lead to a positive feeling of achievement and mastering. Furthermore, it is pleasant to share one's feelings of mastering and success with others. However, a situation of sharing can in itself be related to past experiences of earlier sharing and memories from past responses from others. Motivation for sharing can be motivated by pleasant feelings from past experiences where the children's achievement had been acknowledged and the child experienced pride and joy of being accepted and respected. However, since "feelings and emotions are present in and color every action and relation in which we participate" (Herskind, 2008, p. 281), earlier negative responses can discourage one to share one's own experiences. This previous negative experience of sharing may also constitute a resistance that might be motivating in some way?

Dewey (2005 [1934], p. 63) suggests that assimilation of new and past experiences leads to "transformation of energy into thoughtful action"; the 'inner' materials, images, observations, memories and emotions are transformed into thoughtful action (Dewey, 2005 [1934]). He also says that thinking comes from meeting difficulty and reflecting about the ways to overcome it (Dewey, 1956b). However, in early childhood such thinking seems to be more embodied and immediate, and less linguistic and reflected through verbal explanations.

On the basis of the discussion in this section, I suggest that an additional competence of young children is their ability to establish quick connections between their present and past experiences. Children's reference points are not restricted by adult's logic. This is especially significant for the youngest children, possibly because their experiences are holistic unities of emotions, thoughts and senses; something Dewey defines as 'real experience' (Dewey, 2005 [1934]). There is experience before generalizing and systematic thinking, and there is "knowledgeful feeling and feeling knowledge" (Broudy, 1987, p. 11). From this point of view, children's experiences are more holistic as long as their embodied thinking has not been structured into systematic taxonomies that verbal language provides them with (Stern,

2003)[269]. In this way, children also have the competence to experience in holistic ways.

7.2.3 Micro-discoveries as Contextually Dependent

Micro-discoveries emerge from combinations of individual experiences in specific physical and social contexts. They are elucidating moments of children's creative process where personal connections between past and present experiences are established.

This section addresses the relation between material's qualities, children's experiences and the micro-contexts during which micro-discoveries emerged. As the discussion will show, such connections can probably be assigned to children's imaginative abilities, which constitute another of their competences.

All contexts are different. Constantly changing circumstances challenge human beings to respond in new ways in order to get a maximum grip of the emerging new situations (Dreyfus and Dreyfus, 1999a). During the process of finding new ways to grasp new circumstances, we are challenged and pushed to expand our horizons, refine our skills and enlarge the present zone of proximal development. Owing to such expansions, it is not only the contexts that are constantly changing, but also we ourselves; becoming more capable of dealing with new contexts (Dreyfus and Dreyfus, 1999a). Stables explains why each context is unique:

> How I respond to a sign(al) depends on my history and the context I am in, each of which is dependent on my relations with others, human and non-human. In simple terms: first, we learn through experience. Secondly, what we experience is real (…) our experiences are involvements in events. Thirdly, every experience – every event – is unique as the set of relations that determines it is unique (Stables, 2008, p. 93).

Applied to the young children in the study, establishing the maximum grip was always dependent on the specific features of the here-and-now situations. There was something with their here-and-now experiences that reminded them of some past experiences. Possibly because their experiences were holistic, they could make a number of different, more or less relevant, connections. During the process of experience-connecting the children seemed to use their unconstrained imagination. They acted impulsively, without intentions to achieve any goals outside the contexts, though, they sometimes laughed when they expressed their associations, possibly wanting

[269] Transition from somatic experience to verbal language will be discussed in section 7.2.4.

to achieve sympathy from their peers by being funny. In this sense, their "wild imagination" could have been motivated by the communication contexts.

New situations challenged the children's distinctive skills and motivated their small inventions (micro-discoveries). When they experienced new problems, they applied their embodied knowledge to the new challenges. By doing this, they combined something familiar from the past with the new situation. If it is a combination of what is known and what is still unknown that provokes a thought (Dewey, 2009 [1909]), the new and unknown contexts challenged them to make new meanings that could be applied to the present situations. When thought was provoked, and the system in imbalance, there was a need for equilibrium; the old knowledge had to be re-structured in order to make space for a renewed understanding. During the process of knowledge re-structuring, micro-discoveries took place.

The micro-discoveries observed in the study seemed to play different roles in the restructuring process. Sometimes they indicated that connections between past and present experiences were made. At other times it seemed that past knowledge was "provoked". And on other occasions they indicated a crystallization of a new understanding. However, micro-discoveries were not the final point in the process, even if they happened to indicate a new understanding. The new understanding was, from the moment it was expressed, undergoing a process of further negotiation in the physical and social contexts.

This implies that contexts constantly change challenges, which motivates constant renewal of individuals' understandings. Changes in children's conceptual understanding emerge as results of their 'action-in-the-world' (Ackermann, 2004). However, if one is not attentive to the changes - not aesthetically engaged with changing qualities of the environments - s/he will not be able, or interested, to respond to the changes. For example, if one "turns off" the senses, sitting on a bus on the way to work can appear the same day in day out, even if the weather and seasons are changing. It is through aesthetic attention that we can discover changing qualities that can enrich our lives; and it is attentiveness to the changes that can lead to our awareness that something has to be done in order to cope with new circumstances (as for example with pollution and other emerging ecological problems).

When writing about constant changing contexts, I find it relevant to mention that it is not only the local, micro-contexts that change, but also the larger and global contexts. I suggest that there are parallels between children's solving

of a small problem[270] and finding solutions for larger problems with wider significance. Children's engagement at a micro-level can lead to their micro-discoveries in order to solve problems earlier unknown to them. At a global level we are constantly facing big challenges that concern the future of our planet. In both cases children's and adults' attention, emotional engagement, open-mindedness and courage are necessary in order to imagine and propose new solutions. From my point of view, children's competence to achieve micro-discoveries is what provides them with ego strength[271] they will need to remain explorative, solution-oriented and to have the courage to face larger global problems when they grow older. In this context, Csikszentmihalyi's remark, that creative people had supportive parents, becomes significant. If the world needs people who are attentive, explorative, imaginative and solution-oriented towards challenges they are exposed to by change of global contexts, young children need parents and teachers who encourage their explorative attitude in childhood. This means that the competences children already have[272] do not need to be *developed,* but rather to be *preserved* if they are to become self-confident and creative adults.

Aesthetic attention provides us with fresh perspectives, "so that our old habits of mind do not dominate our reactions" (Eisner, 2008, p. 11). As already pointed out, young children are highly attentive to qualities of their environments[273]. They are curious, emotionally engaged, motivated to explore possibilities and face challenges. If they also have teachers who appreciate their embodied competences and respect their uniqueness, the children can be encouraged to use their unique experiences and views to solve problems in unconventional ways. "Through the arts, one learns that many problems (such as important life decisions) have no clear-cut solution, but that an awareness and exploration of possibilities is the first step in addressing them" (Dissanayake, 2000, p. 196). Each student's personal solutions[274] are encouraged in arts. That is why arts' teachers play an important role in helping young children develop confidence in personal competences and retain attentiveness and curiosity. Through arts we realize that attentiveness to the present contexts matters, and that the process itself is the purpose of life (Dissanayake, 2000).

[270] Like how to tear tape.
[271] See Runco (2006) in section 3.2.2.
[272] As presented in this chapter.
[273] Among ECEC teachers in Norway, there is a common understanding about "the dead mouse pedagogy". This saying refers to a story where teachers planned a trip with a group of young children, but did not get far, because some of the children found a dead mouse. The children got so interested and engaged with the mouse that their trip ended there, just a few meters from their ECEC center, and the teachers had to change their plans for the day.
[274] Personal signature, as Eisner (2002) calls it.

In this study, being creative means to remain attentive and engaged during one's own process of meaning negotiation. Micro-discoveries are small achievements in this process, but never final products. Being creative here means to allow oneself (and be allowed by others) to be attentive, to make imaginative connections between past and present experiences, to meet challenges and play with possibilities, to express playfully and to negotiate possible solutions in the specific social and physical contexts.

7.2.4 Embodied Thought

Relations between perception, senses, embodiment, cognition, thought and learning seem to be highly complex and difficult to understand. This thesis discusses how thought is connected to embodied experience. However, can embodied thought be even more holistic than children's early verbal language, as Stern (2003) suggests? The thesis suggests that tension between the embodied and the verbal in current educational systems can be related to the tension between the individual and the social, as introduced at the beginning of this chapter.

Writing about democracy, education and art, Villemain (1966) claims that sensing is a form of qualitative intelligence. Since cognitive processes depend on maintenance and ordering of those qualities, cognition also depends on qualitative intelligence (Villemain, 1966). This means that "without qualitative thinking, rational processes would not develop" (Villemain, 1966, p. 411). Relations between concept-formation and experience, as well as mutual relations between the development of verbal language and aesthetic attention, have been described in the third chapter. Villemain's claims go further to promote an understanding that embodied experience and qualitative thinking are the most essential forms of thinking without which no other thinking would be possible.

It is commonly accepted that expressions can have many forms, languages or modalities, and that communication is often multimodal. However, not everyone would agree that also thought has non-linguistic forms - that there are many 'modes of thought' and 'modes of understanding'[275].

Studying young children in the phase of emerging verbal language seems to make it possible to approach transitions between their embodied and verbal thinking. Stern (2003) shows a number of examples that indicate how much knowledge young children have before they can speak. Being aware of young children's competence to experience holistically, he says that verbal language threatens their holistic experience, because children's first words are not rich

[275] Eisner (2002) uses these concepts.

enough to be able to embrace the width and depth of their experiences (Stern, 2003). It is often frustrating for them that the gap between their personal knowledge and the knowledge they can verbally expressed is so large (Stern, 2003). Let me explain this through the earlier mentioned example of Eva's blanket (case 2): When Eva observed the specific movement of the pink textile, she suddenly said "blanket", even before she had had a chance to touch the textile. The moment of her expression seemed to be the moment of her micro-discovery, probably indicating the connection between her present and past experiences.

If we consider Merleau-Ponty's (1962) claim that only holistic experiences have potential to generate associations, it is irrelevant to wonder which part of Eva's present experience made her recall her past experiences and generated the association. Like in Matthew's example with the raspberry noise, Eva's experience seemed to be holistic, connecting her present and past experiences. Judging from her quick and joyful expression, as well as her tone of voice[276], I suggest that she had a specific blanket in mind when she said the word 'blanket'.

Eva's use of the word 'blanket' probably referred to her holistic experiences with one specific blanket, whereas an adult's use of the word blanket would refer to the category of blankets[277]. In this sense, Eva's word blanket was highly contextual and not a generalized category as adult's use of words often is. Stern (2003) says that verbal language is an ideal medium for generalizing and categorizing information. On the other hand, children's first words seem to refer to their holistic experiences with specific objects or people. In this sense, an embodied expression (including verbal language or not) – in this case Eva's laughter, body language and tone of voice at the moment she said 'blanket' - can be considered to be an embodied metaphor.

Embodied metaphors seem to maintain children's holistic experiences, at least to some degree. For example, when Marit danced with the measuring tape (case 2) and William made rocking movements while he was sitting in a cardboard box (case 6), such embodied metaphors did not need to be translated from embodied to verbal, but were expressed through the body. Thus, some expressions are not possible to explain with words:

> They are elegant orchestrations of image, dance, song, in which actions of the body, involving the movement of skeletal frame, the

[276] She used a similar tone of voice when she on another occasion referred to her cuddling cloth – which could be placed in the same category as a cuddling blanket; both types of textiles are usual for children to have, love and hold when they are going to sleep or need comfort.
[277] Used to refer to materials of varying shapes, sizes and qualities with the same 'blanket-functions'.

> musculature, facial expression, speech, and the act of seeing, interact with the transformational effects of media processes (Matthews, 1999, p. 155).

When the oldest children in the study verbally express their association, they mentioned objects or animals they connected their present experiences with. However, the youngest children usually told stories about something from their past experience, as for example Helge did when he told about his strong mother, cranes and helicopters. He possibly found it difficult to compress the present experience of weight into one word, as Stern (2003) suggests. Children's metaphoric stories seemed to make more space for their somatic experiences, embodied thoughts, memories, fantasies and feelings, than the space a single word could allow.

The process of acquiring verbal language competence, on one side, gives children possibilities to gain access to socially shared knowledge, but on the other, can lead to loss and suppression of the rich embodied knowledge they already possess (Stern, 2003). Such suppression would not have to take place if embodied and verbal expression were treated as equal. However, if verbal language and linguistic thought are assumed to be superior to embodied thought and experience in education (Egan, 1997; Stern, 2003), then education would threaten to deprive children of their holistic experience and 99 of their languages – as Loris Malaguzzi, the father of Reggio Emilia pedagogy, says in his poem about children's hundred languages (Jonstoij and Tolgraven, 2003).

7.2.5 Learning and Imagination

At the beginning of this text, a distinction was made between learning and meaning making; proposing that the term meaning making is better fitted to understanding knowledge as socially dependent. Thus, by emphasizing[278] that the study is framed within social constructivism, and not constructionism, it has been suggested that learning is both a social and individual achievement. Nevertheless, the relation between the individual and social processes of knowledge-acquiring have been examined during the study, concluding that learning (as an individual and embodied process) and meaning making (as a social, inter-subjective process) are mutually dependent. Both form part of the process of meaning negotiation, which has individual, material and social components. I hope that it has been made clear that "learning" here has nothing to do with one-way knowledge transmission. This thesis still uses all three concepts, because they are applied in different literature. It also has to be admitted that the term 'learning' is also used here, because it seems to be

[278] In section 2.7.

taken more seriously[279] by politicians and those who find 'meaning making' and 'negotiation of meaning' difficult to grasp as relevant concepts.

This section deals with the importance of imagination in children's processes of learning/meaning making. It is imagination that leads to micro-discoveries, which in themselves are the pure moments of creative discovery of personal knowledge. Even though both imagination and creativity can be considered as collective phenomena, the focus here is directed towards children's individual competences to acquire knowledge. Learning is an active process of self-realization that "involves reaching out of mind (…) starting from within" (Dewey, 1956a, p. 9). According to this quotation, learning is an individual process. The kinds of processes that motivate children's search for new meanings have been suggested; imagination can be viewed as the force behind those processes, as the power that enables the mind and body to reorganize and construct knowledge (Broudy, 1987). According to Efland (2002) it is imagination that plays the most important role in the process of connecting past and present experiences.

When children achieve a new understanding through a micro-discovery, the old understanding sometimes has to be reconstructed. I write 'sometimes', because it is not certain that they have to abandon an earlier theory in order to accept a new one, as is usually the case with adult theories.

In the world of children, different theories might exist side by side, because children's thinking is not convergent – in their thinking "there are no fixed boundaries between illusion and reality, between the visible and the invisible" (M. Greene, 2007, p. 660). This notion is based on the fact that the children in the study often suggested a large number of associations, none of them as final answers, but as a part of a process of developing a new idea. Such ideas or theories, as they would call them in Reggio Emilia (Vecchi, 2010) continued to be negotiated in the social contexts, switching from one theory to another.

There is a "mutual dependence between imagination and experience" (Vygotsky, 2004 [1930], p.17). Similarly, experience is essential for cognition (Villemain, 1966). This means that all three: experience, imagination and cognition, are mutually related. Their relationship is depicted in the ten-point " model of negotiating grasp". Some take place before in a sequence, some after, or all simultaneously with a micro-discovery. However, since creativity is defined here as a child's ability to discover new meanings and micro-discoveries are understood as moments of

[279] And have greater status than meaning making and negotiation of meaning.

such meaning discovery, creativity is also connected to experience, imagination and cognition.

If the "model of negotiating grasp" is compared to the creative process as described by Wallas (1945[1926]), the moment of micro-discovery could be considered as the moment of illumination. The phase before illumination could then be called incubation which is, according to Sawyer et al. (2003), one of the largest mysteries of creativity.

Adults' artistic process of expressing benefits from prolonged engagement with materials (Dewey, 2005 [1934]). However, the children in my study sometimes expressed about or because of materials shortly after they had experienced them. It could therefore be said that the incubation phase, where the ideas were reworked and negotiated, was very short. The children's associative connections between present and past experiences also seem immediate.

Egan describes the search for new meanings as a complex and chaotic process: "All kinds of associations curl around each new fact; there is endless blending and coalescing; and connections are made, broken, and remade" (Egan, 2007, p.13). Imagination can, on the one hand, be seen as the fuel behind the activity of associations and metaphors oscillating in the network of wires, and on the other, as a force that gives direction to thought, as Sutton-Smith (1988) suggests. In the children's process of making associations, it seemed to be both.

When creativity is related to adult's talents, it is often assumed that it is an advanced ability that only a few people possess. For instance, when Dreyfus and Dreyfus (2003) present an extended version of the skill model[280] the intuitive and creative abilities are placed at the most advanced levels. This means that intuition and creativity are the most difficult to achieve and only a few people can manage to develop such skills. The model looks like this:

1. Novice: The learner follows the rules.
2. Advanced beginner: The learner starts adding own experience to her/his understanding of the rules.
3. Competent: The learner realizes that it is impossible to be prepared for all situations by using the rules, and this becomes frightening.
4. Proficient: The learner assimilates theoretical and intuitive behavior.

[280] In most of their writings Dreyfus and Dreyfus (see Dreyfus and Dreyfus, 1999a) present five stages of the skill model - the model suggests levels and stages of skill acquisition. However in the video recording of a talk given by Hubert Dreyfus (Dreyfus and Dreyfus, 2003) in Oslo, he spoke about seven stages. It is not relevant to separate the sixth and seventh stages here.

5. Expertise: The learner acts immediately and intuitively (Dreyfus and Dreyfus, 1999a, p. 109).
6. Innovator, creator, inventor (Dreyfus and Dreyfus, 2003).

The skill model relates to adults. I suggest that children's skill model would look quite different. If the numbers in the model signify the chronology of time, and a three year old child was placed at the first stage, I suggest that the model would have to be turned upside-down. By turning the model the child's sixth stage in this model would fit, for example the fourth school grade[281]; where the child has already been through some years of "school-like-learning", has suppressed intuition and imagination, and has socialized into certain rules of the schooling system. A child's skill model might then look like this:

1. Innovator, creator, and inventor: The child responds imaginatively to the challenges of her/his environments. Inventions that take place are very small and on personal level, leading to the child's self-confidence that s/he is able to solve problems - leading to the child's optimistic attitude that every problem can be solved. This attitude motivates her/him to remain creative.
2. Expertise: The child acts immediately and intuitively using her/his embodied knowledge.
3. Proficient: The child acquires verbal language skills and combines verbal with embodied knowledge.
4. Competent: The child is pressed into the schooling system and is frustrated because s/he has to abandon the intuitive, creative, imaginative, playful forms of learning.
5. Advanced beginner: The child gives up the playful forms of learning and starts to socialize into the current rules of the schooling and the society.
6. Novice: The child grows into an adult who follows the rules.

The alternative model proposed here has ironic and tragic consequences. If the order of development of adult's and children's skills is opposite, this means that young children already possess many of the skills that are later desired in adulthood.

However provoking my playing with the skill model might appear to be, I find it relevant to illustrate young children's competences and to point out that acknowledging children's competences exposes the current educational system to some serious challenges. I agree with Egan (1997), who suggests

[281] The image of a fourth-grade classroom presented by Donmoyer (1979) responds to this suggestion.

that the best way to keep what we learn alive during life, would be to maintain and stimulate imagination. Before we are able to do this, the importance of imagination in childhood must be acknowledged.

7.2.6 Negotiation with 3D-material's Affordances

Through their interactions with materials, children acquire somatic experiences and individual forms of knowledge. It has earlier been suggested that materials' have advocacies and call for attention. In a sense they do, but it is only through children's activities that materials can be experienced and transformed. It was the children's activities that made it possible to discover the materials' diverse possibilities and resistances. How well the materials were "able to respond", was after all dependent on the children's curiosity and attentiveness to the materials' qualities.

At this point, it is relevant to sum up the possible advantages of children's explorative play with 3D-materials that result from the observations throughout the study:

- Materials offer different qualities, and through their specific qualities provide possibilities for diverse connections with children's past experiences.
- Children can have diverse experiences with materials' qualities. These experiences provide knowledge useful and necessary for later problem solving.
- Children experience the ways in which their bodies are important in acquiring experience and knowledge about their surrounding environments.
- Children experience that they have power to change existing things, leave traces in their environments, and transform them.
- Materials offer a large amount of possible forms and levels of resistance.
- Children experience that they can find out things, create things and solve problems.
- If children's activities are supported, acknowledged and respected, they learn that problem-solving activities with materials can mean something to other people.
- Children can experience how their memory and creativity work, and acquire self-confidence that they are able to solve present and future problems.
- Children learn that they can help each other with practical problems with materials they can unite around.
- Children can learn to respect natural materials and take care of nature and physical environments.

- Children learn that they can cultivate their feelings, thoughts and imagination in constructive ways.
- Each child can learn that s/he is unique and has something exceptional to contribute; as a citizen in a democracy.

Some of the materials used in the study, such as clay, wood and wool, can be called natural materials. However, both the wool and the clay were pre-fabricated. The 3D-materials, like cardboard boxes and yarn, were even less "natural". In this study, I was concerned that the materials should not be too structured[282], but rather open-ended; with possibilities for children to experience the diversity of their qualities and possible applications. It was precisely the materials open-endedness that made the children's experiences so diverse, and enabled many past experiences to be related to them. If meaning making is about making connections between past and present experiences, then the variety of materials for play has crucial importance in the process of achieving micro-discoveries.

3D-materials' resistance seem to invite children into the "zone of proximal development" (Vygotsky, 1978) where they themselves can search for an appropriate combination of scary and exciting, pleasure and danger, as Sandseter (2007) suggests. "Resistance that calls out thought generates curiosity and solicitous care, and, when it is overcome and utilized, eventuates in elation" (Dewey, 2005 [1934], p.62).

It would have been an advantage if more natural materials were used in this study, but the choices of materials were also guided by different ethical, practical and pedagogical choices, in addition to the research choices I had to make[283]. Nevertheless, the thesis intends to promote the importance of play with materials that are as natural as possible.

Natural materials are usually open-ended and they provide a large diversity of smells, sounds, textures, consistency, porosity, nuances, shapes and so on. Fabricated plastic toys cannot provide the same diversity of shapes, color, textures or lines[284]. Natural materials can offer possibilities for children to differentiate their attention, experience advantages of diversity and learn about relations between people and nature (Johansson, 2009). By handling natural materials, children can experience the richness of possibilities inherent in nature, and last, but not least, learn to appreciate and respect nature. Possibilities for the development of ecological consciousness, so

[282] According to Trageton's (1995) specification.
[283] As presented in the second chapter.
[284] Imagine, for instance, the diversity of shapes, colors, sizes and so on that leaves on a single tree provide, especially if one considers the changing seasons.

important in the present ecological crisis, are imbedded in interactions with natural materials (MacEachren, 2004). Using natural materials makes one recognize one's own connection to the environment (Dissanayake, 2000) and develop emotional connections and a caring attitude towards nature.

Children's play in natural environments and the joy of spending time outside involved in different kinds of activities has been an important part of Norwegian tradition. Children in Norwegian ECEC centers spend much time in natural environments in all types of weather and temperatures. Through this exposure, children are challenged by different types of affordances and constraints, which their natural environments provide. Some Norwegian ECEC centers are even organized as full-time outdoor centers.

In Reggio Emilia it is considered that there are three types of pedagogues: the teacher, the children, and the physical environment. Children are seen as co-constructors of knowledge, because their knowledge is negotiated with teachers and also because it is negotiated with their physical environments. If physical environments are seen as "the third pedagogue" (Vecchi, 2010), diversity of environments is important for children's learning/meaning making; Natural and human-made environments, indoor and outdoor environments, and the objects and materials in them, constitute "the third pedagogue"(Vecchi and Giudici, 2004).

> A teacher who chooses to set up the classroom environment as a third teacher, allows children to have open-ended explorations of materials with time to test their ideas. Teachers must also be willing to be co-learners in the learning process and the constructions of knowledge (Danko-McGhee and Slutsky, 2009, p. 182).

We are "biologically designed" to be sensitive to qualities that constitute our environment, (Eisner, 2002). When Tom and Emil were sensitive to their environments, they could experience how clay could change form and tape could be wrapped around something. Their attentiveness to the possibilities was significant for the resulting actions, but the fact that something was difficult in the given context seemed to be even more motivating.

Children find it seemingly interesting and exciting to take risks, especially when they are aware of the potential harm (Sandseter, 2007). In her study of young children's risky play Sandseter (2007) concludes that children, either when they played at great heights, high speeds or with dangerous tools, always preferred the types of play which were on the edge between dangerous and safe. I would further suggest that it is exactly the risk-taking

that makes it possible to expand one's horizons and get satisfaction from conquering the unknown and sometimes frightening.

The feeling of pride; that one is able to solve a problem, seems to feed the inner force to discover new meanings, and makes "learning by doing" meaningful. In turn, it could be precisely this experience of success that can motivate further actions in search for new discoveries.

In sloyd education, one deals with three-dimensional materials and tools that can be heavy, sharp and in other ways dangerous. It might be exactly the tension (and transition) between young children's physical vulnerability and competence that is the most challenging task for those who teach and research in sloyd. However, in order to provide possibilities for young children to become competent, teachers need to provide contexts for children to meet such dangers. Children need to negotiate with materials' affordances and constraints if they are to learn about the world and themselves, and develop courage to meet future challenges (Dewey, 1956b, 2005 [1934]; Eisner, 2002). If children are to learn through experience, teachers should not hinder children's opportunities to explore, as, according to Rogoff (2003), adults often do.

7.2.7 Aesthetic Learning Process

Aesthetic learning process is a recently developed term used in arts education: dance, music, visual art and drama. In this thesis the term is used to relate to young children's play with 3D-materials. The aim of this study has been to understand how such play can contribute to the negotiation of meaning. It is my understanding that all studies of aesthetic learning process have a similar vision; to deepen understanding of what is specific about learning in the arts and to promote an arts-based approach to learning. The term has three components - each of them will be discussed here, starting with the third word 'process'.

This study depended on an understanding that activities with 3D-materials did not have to lead to final products. Though, some of the children, especially the oldest, did engage in making products, my point was not that children should not make symbols and express themselves through materials, but rather that teachers should not decide what children should make. A learning process is first of all a continuous, non-linear process that consists of interactions, negotiations and various micro-discoveries. A process of making something can be such a process of continual discoveries of meanings[285], but only if the process of making does not explicitly consist of sequential

[285] Similar to an adult's art- or design process.

manufacturing as pre-defined by a teacher. When curricula is pre-fabricated, pre-cooked or pre-chewed, as Donmoyer (1979) presents Miss Hill's fourth-grade curricula, there might be nothing left for children to explore and get curious about – no risk to face and no resistance to conquer.

Exploring, play and experiencing are processes children often willingly engage in. It is the process of sensing and experimentation that bridges senses and concepts (Hohr, 2005), thoughts and feelings (N. R. Smith, 1982) and leads to constant discoveries of new possibilities. The process of children's explorative play with 3D-materials can be compared to a design process, constantly challenging new ways of seeing, understanding and transforming. Artists do not completely plan their artwork before they start making it, but they "remain alert to the way the medium itself affects the work as it evolves", waiting for the sudden surprise that can be evoked from the material (Parsons, 2005, p. 374). The materials' qualities can constitute what a child can happen to understand. For example, when a certain quality meets a child's unique imagination, feelings and past experiences, it also provides unique possibilities that this child[286] is capable of grasping.

When Dewey (2005 [1934]) claims that thought and training of senses arise from the need to meet a difficulty, this process of thinking and sense-training sounds like a continuing spiral process. Sensing a material leads to experience of a difficulty, the difficulty motivates reflection, 'thoughtful action' in order to solve the problem. This purposive process of material interaction (aiming to solve the problem) results in training of the senses to differentiate qualities (Eisner, 2002). Differentiated ability to experience nuances of materials' qualities leads to discovery of hidden levels of resistance that in turn further motivates the next circle in the spiral. The spiral process described here reminds me of my own experiences with engagement in creative processes of making. Dependent on the complexity of the problem, such processes can last for months or years, still accumulating enjoyment and motivating further actions.

Describing infant's development, starting from their first interactions with physical environments, Eisner says: "What first was a reflex response, a function of instinct, becomes a gradual search for stimulation, differentiation, exploration, and eventually for meaning" (Eisner, 2002, p. 2). I suggest that meanings emerge continually during the process of perceiving, experiencing and exploring. Through diverse experiences and attention to aesthetic qualities, children are constantly differentiating their attention and refining their understandings.

[286] On the basis of her/his specific past experiences.

Placed before 'learning process', the word 'aesthetic' mainly refers to the aesthetic activities; the school disciplines of drama, music, dance and visual art. These are the school disciplines that have been called aesthetic, implying that they are related to embodied forms of impressions and expressions.

Aesthetics form a large branch of philosophy and their philosophical implications are not discussed here. When the term aesthetics is applied in early childhood, it has little to do with adults' arts[287], and children's activities and products can hardly be evaluated by adults' aesthetic norms. The main value of a three year old child's sculpture or a painting is in the process undergone, rather than in the product's "aesthetic qualities". The product can be valuable for the child[288], but the richest values are imbedded in the child's lived, embodied experiences that can be vitalized through new experiences.

7.3 Negotiation of Meaning in Social-educational Contexts

Section 7.2 has dealt mostly with children's individual competences, but children's possibilities to acquire knowledge require a special kind of support from their teachers (Matthews, 1999). In order to be able to provide the needed support, it is necessary to understand in which ways children's thoughts and actions are shaped by the cultures that surround them (Thompson, 2009b). Social influence on children's negotiation of meaning in educational contexts will be discussed in this section.

Those who pedagogically interact with young children have obligations to understand them in specific ways, "not simply as generalized beings, but as living and situated individuals" (Thompson, 2009b, p. 28). Young children's uniqueness has to be acknowledged if they are to be viewed as competent. It has been claimed here that children's cognition is closely related to their embodied experiences, and is therefore seen as individually dependent.

Cognition can be seen as "distributed", or "situated", as called by Lave and Wegner (Daniels, 2001); Sullivan (2004) refers to "transcognition" which functions as a process where self and others, through interactions negotiate individual purpose in the specific situation. The section 7.3 deals with processes of social "distribution", "trans-portation", or rather negotiation of meanings between young children and their teachers, through inter-subjective relations.

[287] The fact that the word "arts" is used in early childhood and school education disciplines, as well as in adult's advantaged forms of activities, can be confusing.
[288] For example as reminders of the process or objects that can be shared with others.

7.3.1 Understanding Inter-subjectivity and Power

Adult's opinions have more power than children's (Johannesen and Sandvik, 2008), for among other reasons, because adults are competent users of verbal language, and it is verbal communication that has authority (Stern, 2003). Lenz Taguchi (2009) questions whether it is possible to somehow change this order of power and pedagogical authority. She suggests that early childhood needs new pedagogical order that can represent innovative and creative forces, where imagination and emotions have authority and power (Lenz Taguchi, 2009). Referring to Deleuze and Guattari[289], Lenz Taguchi suggests that early childhood pedagogy could take the form of rhizomatic "lines of flight" with space for re-negotiation of existing structures and orders (Lenz Taguchi, 2009). Such pedagogy would, however, require non-linear understanding of learning and curricula. Johannesen and Sandvik (2008) and Irwin (Irwin, et al., 2006) also refer to Deleuze and Guattari, when they suggest that educational complexity should be understood as non-linear and rhizomatic relations between people and physical environments. However, being aware of the complexity is in itself demanding, especially if one is taking part in the complex relations.

When we interact with young children it is easy to forget how our body language and actions influence them. Body language is essential in communication with young children and it is very confusing, even harmful, if there is a disaccord between what has been said and what is expressed in body language (Stern, 2003). In order to make sense of inter-subjectivity requires that one questions one's own advocacies and taken-for-granted attitudes. Furthermore, children's competences have to be acknowledged if they are to take an active role in co-construction of meanings. Below is a list of children's competences and skills a teacher needs to acknowledge.

A teacher needs to consider that:

- Each person is competent even though we do not know what her/his competences are. Respecting someone as competent is what makes their competences become visible.
- Children's communication and thoughts are embodied.
- Each child owns a unique combination of personal experiences and therefore has something unique to contribute.
- Contexts are constantly changing, constantly challenging participants' connections between past and present experiences.

[289] Deleuze and Guattari developed a philosophical concept "rhizome" that is based on a botanical term about root systems. Their concept "rhizome" refers to "connections between semiotic chains, organizations of power, and circumstances relative to the arts, science, and social struggles" (Wikipedia, 2011).

- We have to acknowledge the presence of power if we are to be able to identify it and to do something with it. The power difference between a child and an adult exists, because of age-difference, gender, amount of experiences, verbal skills, size and height of the body, and so on.
- Meaning making is not a linear process, but is constantly taking new directions through oscillations and negotiations between the participants (and between participants and physical environments). Inter-subjectivity is mutual, often intuitive "transmission" of participants' emotions, beliefs, attitudes, attention, empathy, intensions and ideas communicated in multimodal ways.

Inter-subjectivity is essential in the "development of meaning" (S. Greene and Hogan, 2005). Meanings are made, constructed and negotiated[290] between children and teacher, because their choices, actions and emotions influence each other. That is why children are both co-researchers in a research process, and co-constructors of meaning in educational settings[291].

From very early on, infants have the ability to detect visual changes in other people's faces (Dissanayake, 2007; Matthews, 1999), which allows them to sense emotional conditions. When an infant and her/his care-giver interact, the objects and actions they share become emotionally loaded and meaningful (Matthews, 1999). Inter-subjectivity is a two-way process that signifies mutual dependence during the constantly transforming processes (Bae, 2009).

According to Matthews (1999, p. 162) perfect pedagogical relationships do not exist, nor are they desirable. Optimal conditions are needed for a child to develop, but the "errors" are also important in the inter-subjective relations. What Matthews calls "errors" is to some extent similar to what I called "social resistance" in the section 5.5.4. Using Matthews' vocabulary, it could be said that the inter-subjective relations presented in fifth vignette were full of errors. However, the errors were also valuable resistance that made me aware of my choices and actions, and made it possible for me to reflect and learn[292].

The power difference between a young child and a teacher is highly significant for children's possibility to participate in negotiation of meaning. Since it is usually the teacher who decides what is to be done, it is also the

[290] The three verbs are used here as synonyms.
[291] As exemplified in the fifth and sixth chapters.
[292] Hopefully, reflection about my mistakes and miscalculations can also be useful for others to learn from.

teacher's understanding of values, goals and quality of education that are prevailing. For example, in the educational context with Emil and Morten, I chose the materials and tools, and placed the dangerous tools on high shelves in order to control the children's actions. When the boys sensed that they were allowed to use as much rope and tape as they wanted, they seem to take control. This was not an entirely pleasant experience for me – I felt helpless and lost, but the resistance they gave me made me aware of my position of power and made me reflect about children's democratic participation. Furthermore, when the boys felt respected and competent, they acted from their own intentions. For example, when Morten used the saw for the second time[293] he just reached for it and started to saw even if I asked him to wait. He seemed confident that this was something he could do by himself. When he suddenly had possibilities to contribute to the curricula, he seemed to take control and gain power – possibly assuming that this was his only chance[294].

7.3.2 The Teacher's Competence

Researching within the field of experiential education, Pascal and Bertram (2003) studied "effectiveness" of children's learning experience[295] and found that such effectiveness is directly dependent on the interaction between a child and a teacher. They identify three core elements in a teacher's style that are significant for the quality of interaction between a teacher and a student:

- A teacher's sensitivity to the feelings and emotional well-being of the child. Such sensitivity includes the teacher's sincerity, empathy, responsiveness and affection.
- A teacher's ability to stimulate the children's learning through forms and content of intervention.
- The degree of freedom which the teacher gives to a child to experiment, make own judgments, choose activities and express ideas. The degree of 'child's freedom' is regulated by the teacher's ability to apply rules and handle conflicts (Pascal and Bertram, 2003).

During my inter-subjective interactions with the children, I experienced how my actions, either guided by feelings or pedagogical choices, influenced the meanings that were made.

[293] He used it once with my help. Then when he cut my hand, I took the saw away, but did not place it on the highest shelves. I thought that Morten would not be able to reach it, but he did.
[294] Åberg (2006) describes a similar experience when children in a Swedish ECEC one morning suddenly had free access to visual art materials.
[295] They evaluated children's experiences in relation to conventional "learning"- e.g. measurable outcomes.

Teachers need to be sensitive to children's body language and movements, and to nuance their language when they communicate with children (Herskind, 2008). When they communicate with adults, children learn about many things apparently irrelevant to the content of the conversation (Gjems, 2007, 2009). Teachers should therefore take responsibility for their personal actions and choices, also those that do not directly concern her/his pedagogical role. A professional teacher[296] reflects before, during and after interactions with children, about her/his role, suitable closeness or distance to the children and about suitable moments to act (Kristiansen, 2001). However, it is not enough just to act according to her/his 'technical knowledge' and 'logical conclusions' – s/he has to engage in the situation and act spontaneously and genuinely, using a double set of eyes[297], in order to capture the children's experiences (Kristiansen, 2001). My interaction with Karin, the girl that took part in the additional activity with textile[298], provides a negative example, where I did not use a double set of eyes. I easily forgot about Karin's needs and wishes, I did not let her explore the materials or do something meaningful for her, since I was stressed with time, and worried about what the teachers would say if she was late for lunch. This example is embarrassing, because this study builds on my intention to be attentive to the children's needs. However, it also shows how easily I stopped being attentive and acted according to my assumptions[299] when I was stressed.

Children have to be truly listened to, if they are to be able to participate in ways that matter to them (Clark, 2005). However, during my interactions with the children, I experienced that listening was not enough. In addition to listening and struggling to understand, one also has to find ways to apply children's contributions to the present activities. The implementation of children's democratic participation demanded my full attention, ability to change directions and continuous ethical, pedagogical and practical choices. To be able to act immediately (like an expert in the original skill model (Dreyfus and Dreyfus, 1999a)), quick connections between my own past and present experiences from social interactions were probably required.

Continuous attention and listening to young children is demanding, possibly also because of their unexpected ideas and actions. When Egan (1999, p. 87) suggests that adults "tend to develop arteriosclerosis of the imagination", this could be the reason why adults find it strenuous to keep up with children's "wild imagination"?

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[296] Kristiansen (2001) refers to her research about experienced school teachers.
[297] Her own and the children's.
[298] See section 4.1.2.
[299] I assumed that she wanted a crown, which I made for her, and she was given very little possibility to contribute to the activity.

Efland and Eisner suggest that children's imagination needs to be "awakened" (Efland, 2004a) and that they need to be "invited" to use their imagination (Eisner, 2002). From my point of view, the youngest children already actively use their imagination – it is rather the teachers' imagination that needs to be awakened in order for them to see possibilities in the children's ideas, and not reject them (Runco, 2006). To become aware of their own imaginative and other competences, children need to be met with respect and open-mindedness. In pedagogical contexts open-mindedness is about respecting children's competences and letting them contribute – it is "the keystone of what we call a democratic culture" (Bruner, 1990, p. 30).

According to Dreyfus' and Dreyfus' (1999a) skill model, a teacher has to have much practice in order to act intuitively and appropriately in new, constantly emerging situations. A wide range of emotional experiences from the past is needed in order for a teacher to empathically connect with children's diverse emotional conditions. It is only through his/her own past experiences that a teacher would be able to recognize the specific emotions of a child and her/his ability to empathically connect is dependent on her/his aesthetic attention to qualities (Eisner, 2008). The teacher's embodied experience, imagination and attention are essential for understanding children's embodied experience, imagination and attention. "Empathy is a means to understanding, and strong empathic feelings may provide deep insight into what others are experiencing" (Eisner, 2008, p. 6).

To allow children's co-construction of meanings during a pedagogical process, the pedagogical goals should not be defined as final products, with qualities pre-determined by teachers. Over-defined pedagogical goals deprive children of the possibility to learn through the ongoing aesthetic learning process. Teachers need to consider that the process of meaning negotiation can take the form of "an uncertain, unpredictable and intensely creative activity, with new understandings created unexpectedly and shooting off in new directions" (Dahlberg and Moss, 2010, p. xviii). If teachers believe that curricula should be fully pre-determined, their attitudes could deprive children of both possibilities to learn and possibilities to participate. I therefore suggest that teacher's open-mindedness is a pre-condition for children's learning in arts, as well as for their democratic participation.

Educational philosopher Greene (2001), suggests that teachers should be oriented towards something which still is not, if they want their students to be imaginative; "My notions of teaching are much involved with notions of human relationship, inter-subjectivity, the pursuit of various kinds of meaning, and the sense of untapped possibility – of what might be, what

ought to be, what is not yet" (M. Greene, 2001, p. 82). Teaching should be a process related to past, present and, most of all, future conditions. This requires teachers' imagination and engagement, "not only emotionally but also cognitively, not only imaginatively but also analytically" (M. Greene, 2001, p. 85).

A teacher has to be conscious of how her/his own verbal and body language influences children. It is for example significant for outcomes of art education if a teachers uses differentiated language about aesthetic qualities (Colbert and Taunton, 2001). Verbal language can be understood as "tool for reflection", as Vygotsky (1995) suggests, however, how beneficial verbal reflection is for children depends on how language is used. The power of verbal language can, on the one hand, suppress children's embodied knowledge (Stern, 2003), but on the other hand, verbal language is valuable if it "cooperates" with the embodied and helps children to express their thoughts and feelings verbally.

According to Bresler (1994) it is usually a teacher with little or no education in visual art that practices an instructive, imitative teacher role; leaving no space for children's imaginative ideas. A teacher's insecurity[300] about what a pedagogical or visual art teacher role should be, can easily spoil or overrule the children's aesthetic practice (Vygotsky, 2004 [1930]). When a teacher feels incompetent, I assume it would be better if s/he was honest, instead of confusing the children with her/his insecure body language (Stern, 2003), or even worse misusing her/his power. When a teacher is honest, s/he can join the children in their explorative activities and construction of meaning instead of executing her/his power[301] and preventing the children's learning processes. "When we [adults] manage to be more humble and admit our faults and misunderstandings without renouncing our subjectivities and responsibilities, this can lead to a new view on what the adult-role is and make more space for children's democratic participation" (Bae, 2009, p. 15, my translation). To be good teachers we "need to question our beliefs, to recognize their limitations as well as their possibilities" (Stinson, 2002, p. 157).

Children's experiences and possible actions are influenced by the way learning contexts are arranged by a teacher (Stelter, 2008a). Matthews (1999) suggests that a teacher's attention and punctual supply with needed materials, in addition to her/his supportive body language, is enough to secure "the flow of play" in the stress-free, voluntary activity. Teachers' support is essential

[300] Or as in the mentioned case with Karin, where I was stressed and nervous about the (imagined) teachers' judgements.
[301] People sometimes think that showing power can protect them.

for a child's feeling of success and self-confidence that s/he can, through her/his own activity, manage to overcome emerging problems. Such self-confidence in our own power to solve unexpected problems is extremely valuable if we wish for self-motivated, joyful and autonomous learning to continue throughout life (Matthews, 1999).

7.3.3 Pedagogical Improvisation

Writing about forms of teaching school art, Bresler (1994, p. 101) describes the advanced, *expansive* teacher role, where a teacher applies "sophisticated adult knowledge while respecting the child's current experience and interpretations". In addition to the expansive role, other concepts with similar meanings point towards the role of a teacher who respects children's competences; Dewey (2007 [1938]) writes about flexible purposing, proposing that teachers need to be able to quickly shift directions when something emerges in a classroom. Rogoff (2003) uses the term guided participation, whereas Eisner suggest improvisation in teaching (Eisner, 2002).

'Scaffolding' is a term frequently used in relation to teacher's responsibilities in early childhood education. Though the metaphor directly refers to some kind of physical support, scaffolding in early childhood education usually

> …involves a psychological empathy with the child and an understanding of what he or she might be moving toward. (…) it is fluid, dynamic and often seemingly effortless dance between teacher and child (Matthews, 1999, p. 162).

Similar can be said about pedagogical improvisation, though such dancing between a child and a teacher can sometimes be experienced as challenging as learning a completely new dance to unfamiliar music[302].

Sawyer et al. (2003) claim that creativity is a phenomenon that takes place inside a context - that it is the entire context (or system) that creates. He further compares such social-creative-process with improvisation (Sawyer, et al., 2003). Eisner also writes about relations between improvisation and creativity, claiming that improvisation is a form of creative activity in art and science (Eisner, 1990).

In everyday speech, improvisation is considered to be an impulsive, more or less occasional action. However, "improvisation involves disciplined, knowledgeable, and highly attentive response to an emerging reality"

[302] This is at least how I felt much of the time when I "danced" with Emil and Morten, as the fifth vignette illustrates.

(Bresler, 2006a). To improvise means to respond quickly in adequate ways to the challenges from the environment. However, to be able to respond, a teacher will first have to listen to the children (Clark, 2005) and make immediate interpretations. The relevance of the response will depend on her/his attention and flexibility. Whatever s/he fails to hear or understand will influence her/his interpretations, and therefore also her/his responses. The fact that on-going interpretations and immediate responses take place almost simultaneously, can signify that the process of interpretation and reflection could hardly take place in a linear, verbalized manner, but rather in an inter-subjective, embodied and rhizomatic manner. The nature of inter-subjective relations requires that a teacher or a researcher "stands in the fullness of life, in the midst of the world of living relations and shared situations" (Van Manen, 1997, p. 32).

The educational contexts in this study were conducted with two children at time and it was not always easy to be attentive and responsive to both of them, also because their experiences were different. For example, what scared Emil, was exciting for Morten. I had to choose who to respond to[303]. I can imagine how challenging it can be to deal with a larger group of children (6, 8 or 18) and how complex such interactions might be.

Colbert and Taunton describe a good art teacher:

> The good teacher plays multiple roles and "orchestrates" complex events in classroom, and creates spaces, experience, and dialogues that entertain, challenge, frustrate, perplex, and engage their students as they teach and learn about art (Colbert and Taunton, 2001, p. 522).

Taking into consideration the fact that each child needs to be seen by an empathic teacher who neither underestimates not overestimates her/his competences (Bae, 2009), the "orchestration" according to children's different needs, competences and contributions adds an additional dimension to the complexity. Hopefully, both teachers' and children's involvement is not only challenging, but also generates energy and motivates their further actions (Laevers, 2003).

Leavers (2003) claims that intuition plays an essential role in professions that deal with relations between people. As presented in the Skill model (Dreyfus and Dreyfus, 1999a), intuition is not an occasional or superficial action, but deeply grounded in embodied experience. "Since action is only achieved

[303] Although, in this case, it would be unethical not to respond to Emil's fear, because I was responsible for his well-being.

through the body (…) the ability to act as we want to act – depends on somatic efficacy" (Shusterman, 1999, p. 303). This concerns both children and their teachers. To be able to improvise, teachers have to be able to act fast, and to be able to do that, they need to "stand in the fullness of life"[304] and have confidence in their somaesthetic experiences (Shusterman, 1999). Consequences of such confidence may contribute to establishing a curricula-as-lived, which will be discussed in the next section.

7.3.4 Living Curricula

The curricula concept is complex. Goodlad (1979), for example, suggests that curricula depends on many different people[305] and their responsibilities on the five curricula levels he presents. Rhedding-Jones (2007) defines curricula in early childhood education as everything pedagogical, educational, didactical and care-related that takes place during educational contexts. However, a need to simplify the concept seems to exist at the operational level. For example, if understanding of curricula is not discussed among ECEC teachers, the teachers might struggle to implement plans without being able to reflect about their own practices. Egan (1997, p. 205) explains that our present conception of curricula has inherited some old assumptions. He claims this is influenced by a conception of education as it developed after the mid-nineteenth century focusing on "what skills and knowledge are required to prepare the masses (…) for productive work, good citizenship, and satisfying leisure".

More recent, constructionist view on curricula acknowledges consequences of inter-subjectivity in the process of meaning negotiation. New ways of seeing curriculum reflect a shift from outcomes to process; emphasizing "curriculum as a dynamic entity, interpreted by different individuals involved in the process, including teachers, students, administrators, and researchers" (Bresler, 1994, p. 91). From this point of view, curricula are constructed between participants and their physical environments. (Lenz Taguchi, et al., 2009); curricula "live" and develop in the space between people, natural and cultural objects.

Presenting the example of interaction between the mother and child with the raspberry painting noises, Matthews concludes:

> Neither mother nor child has any idea about where the painting will go. This has implications for pedagogy. Simplistic 'aims and objectives' curriculum design is usually pitched at the most trivial level; it has neither the words nor the concepts to address and

[304] This refers to the quotation of Van Manen (1997) two paragraphs earlier.
[305] Policy makers, local politicians, ECEC leaders, teachers and so on.

> accommodate the deepest and profoundest level of teaching. Such a painting episode cannot be 'planned' in the usual way plans are conceived by contemporary governments obsessed with social and national control (Matthews, 1999, p. 161).

During my own inter-subjective interactions in these recent and earlier studies (Fredriksen, 2007a, 2007b, 2008a, 2010, 2011) I have also experienced how fluent and unpredictable negotiation of meaning can appear. Early childhood curricula can, in my view, be metaphorically compared to a shapeable mass (like clay), similarly to how Irwin and Chalmers (2007) present "curricula-as-lived". Curricula-as-lived is a type of curricula that is constantly being developed through inter-subjective processes of co-construction of knowledge. Irwin and Chalmers (2007) refer to Pinar's term "complicated conversation" as a relevant illustration of how curricula-as-lived can be practiced. According to Pinar (2004, p. 8), a complicated conversation in education *is* the curriculum, and to be able to conduct such a conversation "requires interdisciplinary intellectuality, erudition, and self-reflexivity".

Understanding curricula-as-lived is highly relevant in A/R/Tographic forms of research, where different roles merge, and where knowing, doing and making are integrated (Irwin, 2004). However, I find such an understanding of curricula also highly relevant in early childhood education where children impulsively and imaginatively are constantly influencing the contents and methods of current events. Additionally, viewing curricula-as-lived is especially relevant in the emerging trend of children's democratic participation. Both viewing children as competent and allowing their participation in curricula demands serious reconsiderations of the concept of curriculum.

Clark (2005) reports how teachers' realization that children are competent can give them confidence to follow up children's suggestions, rather than to predefine curricula. In this sense, allowing children's contribution at the outset is what makes it possible for them to convince their teachers that they are competent, and consequently generates new chances to contribute.

When teachers select materials, they also define how their students could be influenced and challenged to think (Eisner, 2002). Materials therefore play an important role in visual art curricula (Eisner, 2002). An art teacher's task is to plan space and materials, but not to plan "the learning" before an art lesson (Colbert and Taunton, 2001; Sutterby and Frost, 2006). Flexible curricula can be structured around inspiring objects and art materials (Fredriksen, 2010).

In the arts, one values individuality and personal signature of each of the students (Eisner, 2002). For the same reason, curricula in arts should be flexible in order to provide possibilities for children to apply their personal experiences, ideas, interests, feelings and solutions.

> Schooling (…) should not be a business of pushing predetermined curricula on students, but rather student's own interests and needs should be allowed to shape the curricula (Egan, 2005, pp. 46-47).

Eisner (2002, p. 206) invites art educators to "take advantage of unexpected developments in order to realize goals that were not a part of their original agenda". I suggest that the art teacher should embrace imaginative and surprising contributions from their students that can enrich the curricula and contribute with unique possibilities for mutual negotiation of meaning.

7.4 Implications for ECEC

The most important conclusion from this chapter is that certain premises need to be considered if one wants to allow children's contribution to the negotiation of meaning. These premises are:

1. Learning is both individual and social: individual, because it is dependent on physically separated bodies with personal senses, experiences and emotions; social, because it is dependent on inter-subjective interactions between individuals and their shared, contextual understandings.
2. Thought is also embodied.
3. Children are competent and are continually becoming more competent. Their competences are:
   - ability to sense and perceive
   - inner motivation to act upon their environment – to play
   - ability to experience in a holistic way
   - ability to "read" and communicate through body language
   - imaginative capacity
   - ability to negotiate new meanings (for instance through micro-discoveries).
4. Experience is a vital force in negotiation of meaning.
5. Resistance is an important motivating force in negotiation of meaning.
6. Discovery[306] of personal meanings is closely related to imagination and creativity.

[306] As micro-discovery.

Full respect for young children is difficult to practice if we do not know what their competences are and how they negotiate meanings. Moreover, it is difficult to define what teachers' tasks and responsibilities are especially when official documents are inconsistent about the quality of early childhood education (Jansen, 2009; Johannesen and Sandvik, 2008; Ropeid, 2011).

The premises presented above are relevant in discussions about *how* children negotiate meaning in early childhood education. Children's competences should be discussed and a renewed understanding should influence understanding of what quality in early childhood education means from a child's point of view. Such discussion would further raise questions about curricula, content and methods of ECEC education, as well as teachers' competences.

It has been suggested here that responsible teachers, who are able to respect, listen and provide possibilities for children's curiosity and explorations are needed (Dahlberg and Moss, 2005), as well as those who are able to improvise, acknowledge their own embodied knowledge and empathically connect with children.

I hope that discussions about ECEC quality will take into consideration the importance of children's embodied holistic experiences. Valuing experience also means that an arts-based approach to learning/negotiation of meaning should be considered as essential in education; not only as "glue" that keeps the interdisciplinary curricula together (Narey, 2009), but as an arena where each child's personal experiences are valued so that learning can become meaningful for them.

By their very nature, the arts value embodied knowledge (Davidson, 2004) and emotional engagement. If we want children to engage in meaningful processes of learning we have to provide opportunities for their emotional engagement (K. Freeman, 2010). Since creativity is fundamentally based on desire[307] (K. Freeman, 2010), human beings are inherently artful (Dissanayake, 2007) and emotions, senses and imagination are essential in arts, all forms of teaching should be linked to the arts (Egan, 2002). However, if visual art is to contribute to nourishing and developing children's competences, it should not be practiced as child craft or child art[308], but through an expansive[309] teacher role where teachers respect children's embodied experience, listen to and encourage children's own decisions and choices (Katz, 1998). This further means that ECEC teacher education should

[307] Desire is here understood as strong emotional engagement.
[308] See section 3.1.1 and Bresler's (1994) specifications of school art.
[309] See section 3.1.7 and Bresler's (1994) specifications art teacher roles.

take visual art, and the other arts, seriously, which requires that the arts should be repositioned in teacher education to attain a more central role.

7.5 Summary of the Seventh Chapter

This chapter continued the discussion from the fifth chapter with the intention to make some more generalized conclusions. The discussions in the chapter have referred to concrete episodes described in the previous chapters. The type of generalization applied here is "naturalistic", which according to Eisner (2002) is different from statistical generalizations, because naturalistic generalizations are related to specific contexts.

The chapter lifts the scope of the study by suggesting the existence of tensions between biological and social, and between embodied and linguistic forms of knowing. My new insights about embodiment and inter-subjectivity are discussed in relation to the emerging understanding of young children's processes of meaning negotiation. The chapter suggests possible implications for such understanding in relation to teacher's roles and curricula.

The following, and last, chapter aims to conclude and summarize the study's results and evaluate its contribution to knowledge.

8. Summary of the Thesis and Suggestions for Future Work

Chapter eight will sum up the important findings and the study's implications for education, aesthetics and child pedagogy. It further presents an approach for research and practice, in light of the presented arguments. Both visual art and other arts are addressed, and connections are made between early childhood education and school education.

8.1 Summary of the Thesis

The study has shown that young children are competent individuals, able to grasp and negotiate meanings though their embodied interactions with physical and social environments. Children's abilities to acquire knowledge through embodied activities, and the processes involved, have been presented.

Explorative play with 3D-materials, where children can experience diverse qualities of materials and apply their imagination, are seen as extremely valuable contexts for learning and developing one's capacity for creativity.

Inter-subjective relations with a teacher also play an essential role in children's negotiation of meaning. The roles of ECEC teachers, as well as curricula, are elaborated in the thesis. The study has proposed a specific understanding of learning/negotiation of meaning; suggesting that young children's learning is a combination of individual, biological predispositions of embodiment, and socialization to cultural norms. 3D-materials' resistances have been highlighted as a driving force behind children's self-motivated actions to search for problems and find solutions. Creation of new meanings happens at the core of these explorative actions.

The first chapter introduces the interdisciplinary landscape the study is situated in; that is visual art education in early childhood. Research questions and terminology are presented, and special focus is given to contemporary debates about early childhood education in the OECD countries, and how they relate to the Norwegian and Scandinavian contexts. Conflicting views about what the purpose of early childhood education should be are presented and problematic questions about children's rights, competences and participation are introduced as part of the historical framework for the study.

The first chapter's emphasis on ethics is directed towards an understanding of viewing young children as active participants in society, education and research.

The second chapter presents the methodological framework. The chapter starts with an introduction to the main question and explains the choices of methods to address it. The research design, which combines multiple case study and A/R/T-ographic approaches in the process of data collection, and arts-based methods in the process of analysis, is introduced chronologically and with a broad focus to provide context. This means that the chapter starts from the "epicentre" presenting 1) the practical, methodical approach to the research questions and ethical issues concerning it, 2) the methodology that the methods are situated in, 3) the theoretical framework and 4) the epistemology - as suggested by Crotty (1998). An additional circle, beyond epistemology, is added[310] posing a question about this study's position in traditional understanding of epistemology; focusing on teaching practice, ECEC art and young children's embodied knowledge (which is also "practical"). It has been suggested that the study might be difficult to place inside the conventional frameworks of knowledge production, especially where politics, and power in policymaking and research, are concerned.

The third chapter discusses the theoretical framework for studying interplay between young children and their explorative play with 3D-materials. Based on the pre-understanding that such play contributes to children's cognition (meaning making) the activity of 3D-play was expected to be connected with imagination, creativity, embodied experience, as well as physical and social conditions of educational settings. The chapter therefore presents a broad picture. This picture can be seen as a three-dimensional, three-sided pyramid form with the following planes: 1) visual art education, 2) early childhood education and 3) embodiment, multimodality and materiality. If the pyramid is envisaged as transparent[311], each of the sides would represent a window from outside toward the research problem placed inside the 3D-form. The pyramid metaphor illustrates how the theoretical framework was presented. Each of the planes presents a selection of disciplinary theories and studies found to be most relevant for the interdisciplinary study. Thus the theories, as well as the pyramid planes, are transparent[312] and not clearly separated from each other.

The fourth chapter identifies themes in the process of data gathering. The process is organized into nine cases. Each of the cases is presented according

[310] Far away from the epicentre.
[311] As for instance made of glass.
[312] Which also means that one can see the other two planes through the plane one is looking at.

to the organization of the A/R/T-ographer roles and related to different parts of the data gathering process: 1) inspiration for planning of the educational context, 2) the practical preparations, 3) the presentations of the educational context, and 4) the most significant occurrences. The chapter also presents the process of establishing data nodes and preparing for the activity of coding the video data across the cases.

The fifth chapter deals with the process of analyzing across the cases. It presents how the coded data was treated and how the emerging issues were identified. The following four most significant issues are extracted and elaborated on in the chapter: 1) using whole body in experiencing activities, 2) materials' affordances as a foundation for children's associations, 3) negotiation with materials' resistance and 4) inter-subjectivity. Each of the issues is presented in relation to relevant nodes and examples from the empirical study. The most relevant examples are interpreted and discussed. A "model of negotiating grasp" is proposed. The model attempts to explain how children's experiences of materials' affordances and resistance relate to their negotiation of meaning. This negotiation process is presented as dependent on children's embodiment and connections between experiences, material's qualities, and the inter-subjective relations between participants.

The sixth chapter presents five selected vignettes. Each vignette describes and interprets an empirical event. The purpose of the vignettes is to illustrate how the process of negotiating grasp can unfold in concrete situations and specific contexts. The vignettes also make visible how all of the four key issues simultaneously took place during the educational contexts. The fifth vignette is specifically selected to elicit understanding of the issue of inter-subjectivity; focusing on the practitioner-researcher's point of view and my own embodied experiences of interacting with two boys.

The seventh chapter brings together the findings from the fifth chapter and the further insights achieved from the vignette interpretations in the sixth chapter. Relations between experiential and linguistic forms of learning are analyzed, lifting the discussion to more general forms of understanding young children's negotiation of meaning, beyond the specific study context. Addressing the objectives of the study, this chapter presents tensions, possibilities and challenges that emerge from children's embodied ways of meaning negotiation.

This eighth chapter summarizes the thesis and evaluates its contribution to knowledge, its strengths and limitations. It also expresses concerns about future developments in early childhood education and the position of arts in

education, considering the present economic, political, historical and cultural advocacies embedded in the current educational system.

8.2 Conclusions

8.2.1 Interdisciplinary Discourse and a Holistic View on Learning

Academic interdisciplinarity and children's holistic experience

This thesis deals with children's holistic experiences, rather than with one school discipline. In Norwegian early childhood education, visual art is considered part of the interdisciplinary[313] subject area "Arts, culture and creativity". However, this does not mean that the different disciplines inside the subject area melt together; they are still practiced separately in ECEC teacher education[314], in primary schools and at all other levels of education. I therefore find it relevant to address the relation between the arts and other school disciplines, which has been puzzling for a long time. How is it possible that aesthetics are so little valued in education when our approach to life is essentially aesthetic, as amongst others Dissanayake (Dissanayake, 2000, 2007) and Shusterman (Shusterman, 1999, 2008) claim?

The position of arts in education seems to be even more threatened in recent times, with international competition and "intellectual armament"[315] and focus on certain achievements. When knowledge is highly valued globally, and countries compete about the educational levels of their citizens, education seems to become increasingly politicized, and at the same time, closely related to economics and political power.

Theorists of visual art education have been trying to justify art's vital position in education. However, the concepts used for this purpose effect the impact of the arguments (R. A. Smith, 2004). For instance *aesthetic* or *aesthetic experience* are concepts that seem to not have political relevance (R. A. Smith, 2004), possibly because they are seen as related to leisure and are not commonly considered as having anything to do with learning. Nevertheless,

[313] As described in the "Framework plan for the content and tasks of kindergartens" (Ministry of Education and Research, 2006)
[314] The Framework Plan for early childhood teacher education is at the time of writing undergoing a revision, where teacher education possibly also will be practiced according to subject areas and not school disciplines.
[315] Educational Philosopher Walter Feinberg used those words in our e-mail correspondence concerning his coming lecture at Vestfold University College. He titled his lecture "A Plea for International Educational Disarmament".

trying to only promote art education as cognitive and "non-aesthetic" would mean sacrificing art's inherent values (R. A. Smith, 2004).

During this study; through reading relevant literature and meetings with visual art teachers and researchers, I have observed that different strategies are used in order to emphasize the importance of art education and try to lift its status in education:

- Some highlight the uniqueness of the arts (both the ARTS[316] and school arts) aiming to justify arts' contribution to education and life, and fight for higher status of arts in society.
- Some use "scientific" methods in visual art research hoping to convince those in power that visual art is as important as science.
- Some approach arts education and research interdisciplinarly, assuming that different disciplines are equally valued.

Working for years in interdisciplinary ECEC teacher educations programs, I adopted the third strategy mentioned above. However, I have become aware that the attitudes of teacher educators are often influenced by certain historical and political power structures within their own disciplines which reflect those in the society at large. This means that even if interdisciplinarity seems to be a democratic way of practicing holistic views about teaching and learning processes, if power is unevenly distributed this can suppress the disciplines which are not in focus in the international testing race.

Young children's world is in itself "interdisciplinary"[317] - their experiences and cognition are holistic and can neither be divided in school disciplines or in different intelligences[318]. "[M]eaning lies in the whole" (Parsons, 2004, p. 778), and creativity itself comes from holistic thinking and interdisciplinarity (Robinson, 2006). However, since certain disciplines have a dominating influence on political decisions, children's holistic approach to the world can be difficult to acknowledge.

Both Efland (2002) and Eisner (Eisner, 2002) aim to answer the question of how art-based thinking can contribute to cognition, and try to identify the reasons for teaching arts. They have different suggestions as to how arts should be taught: as separate school disciplines or integrated into interdisciplinary curricula (Parsons, 2005). The intention of this study is not

[316] By ARTS I mean the arts that an artist deals with, and not the arts as practiced by children and in ECEC centers and schools.
[317] I put "interdisciplinary" in quotation marks here because interdisciplinarity implies that different disciplines exist, which they do not in children's lives.
[318] With due respect for Gardner's (2004 [1983]) work, I view children's "intelligence" holistically.

to suggest organization of ECEC disciplines, but to promote the importance of visual art by showing how engagement with it can contribute to children's negotiation of meaning. Children's negotiation of meaning and experiential knowledge have been shown to be complex, connecting different dimensions of their lives. For this reason, in order to embrace the complexity and grasp the children's experiences holistically, this study had to be interdisciplinary. Despite the fact that this study celebrates holistic ways of learning, I have realized that the interdisciplinary approach itself could become an obstacle for understanding the importance of visual art. Equality between disciplines, and acknowledgement of the under-privileged, is difficult when power differences are already established and supported at a political level. Verbal and the embodied ways of meaning making do not have to be viewed dualistically, but in the recent international turns where verbal language competences are most valued[319], favouring the verbal can lead to providing more space for language teaching (in this context Norwegian language) and consequently removing visual art from teacher education[320].

To be able to understand the position of arts in education, as well as young children's position in society, demands first of all that we acknowledge that power differences exists (Lenz Taguchi, 2009). Neither young children, nor the school/ECEC arts have much power in wider society, and it is those without power that best can feel it. It is only when we are conscious about how power is distributed that we can look for strategically appropriate actions that can have some kind of effect. The desired effect of this study is to demonstrate, and thereby justify, the critical importance of arts-based, experiential, embodied forms of negotiation of meaning. This can hopefully contribute to lift the status of visual arts in education which, in the next turn, can lead to making more space for arts in ECEC and school, and allow possibilities for students to acquire knowledge through experiences, and to develop imagination and self-confidence[321].

Learning about language and through language

The Norwegian Research Council financially supported[322] the umbrella-project "Learning about language and through language" the study Negotiating Grasp was a part of. The aim of the umbrella project was to develop knowledge about how language can contribute to learning in ECEC. The applied definition of 'language' has been similar to multimodal

[319] Because they are the focus of the international testing race.
[320] As it has recently been decided in my own teacher education institution.
[321] Achieving self-confidence through practical, experiential leaning is especially important for students (of all ages) who for some reason cannot achieve high self-confidence on the basis of traditional theoretical school disciplines.
[322] From 2007 to 2010.

understanding of language. Researchers that took part in the umbrella project were also teacher educators in different disciplines, and the project was interdisciplinary.
The study presented here shows how activities with 3D-materials can provide a valuable arena for acquiring verbal language competence, and how diverse forms of communication between children and teachers influence the process of meaning negotiation. However, the thesis raises questions about relations between different 'languages' within the multimodal and discusses the power imbalance between verbal and embodied forms of language and modes of thought.

The umbrella-project promotes the social and language-based interactions as essential for children's learning. The study presented here was also situated inside the sociocultural framework. However, the new insights about children's embodied competences demanded an expansion of the framework in order to, to larger extent, include embodiment's biological predispositions. In "integrated theory of cognition", presented by Efland (2002) there is a space for children's individual experiences, and acknowledgement of competences that cannot be assigned to their sociocultural influence alone. If the greatest importance for learning/meaning making is assigned to verbal communication, it would not be possible to detect pre-verbal children's competences, and it would consequently be difficult to treat young children as competent.

The study presented here acknowledges that the social and the individual are both integrated parts of the process of meaning negotiation. This study's specific approach to young children's 'languages' demanded an understanding that thought could be embodied and independent from linguistic forms of understanding. In this sense, the study Negotiating Grasp has contributed to a wider and more nuanced understanding of children's languages, and led to a widening of the concept of meaning making. The study's concept 'negotiation of meaning' includes a wide range of imaginative, emotional cognitive, physical, embodied activities and communication forms that take place inside a person, between a person's body and physical objects, and between people.

8.2.2 Research Activities

The empirical study was based on observations of children's activities with 3D-materials and interactions with them. Though the period of data gathering lasted four months, my presence in the ECEC started a year and a half before the data gathering. The prolonged contact with the same ECEC made it possible for the personnel, the children and me to become familiar with each other. During this period I also had the opportunity to conduct a number of

different research activities that helped me develop the research methods for the final data collection.
The process of gathering data was the most important research activity of this study. This was conducted through video documentation of nine educational contexts where I interacted with two children. The research activities that followed were different forms of analysing with the help of NVivo software.
The process of writing the thesis was an important research activity in itself. It stimulated my reflections through discussions with imagined readers. Reading literature in parallel with the research activities was essentially important for my own micro-discoveries and emerging of new understandings. In a similar way to the process of writing, the activity of reading made me recall and connect my own experiences. The texts I was reading were interpreted according to my own current interests and attention, and it sometimes felt as though meanings were negotiated between the author's and my own thoughts, as if we were present in the same room[323].

8.2.3 Answering the Research Questions

Armstrong's (2000) and Bresler's (2006a) model of perceptual contemplation was applied to the analysis of the data. When the five aspects of perceptual contemplation[324] were applied to the study, the first two were addressed in the process of creating nodes and coding[325] that constitutedthe activity of "seizing the whole as a whole" at the beginning of the fifth chapter. At this point, the four most significant issues across the cases are drawn out. The discussion that follows about the issues addresses the research question: Which kinds of interplay take place between 3D materials and children during their experiential play in educational contexts?

The sixth chapter presents a selection of vignettes used for contextual investigation of the four issues. An additional coding process helped identify places in the data (micro-contexts) that could be relevant as vignettes. The five vignettes presented in sixth chapter constitute the process of "lingering caress" and "mutual absorption"[326]. Through the narrative analysis of the vignettes the thesis addresses the research question: "How do materials' affordances and resistance influence children's process of meaning making?" This question is also considered in the fifth chapter[327] and further elaborated in the seventh chapter.

[323] Especially when I was reading Dewey's writings.
[324] 1) Noticing details, 2) Seeking relations between parts, 3) Seizing the whole as a whole, 4) Lingering caress and 5) Mutual absorption – see also section 2.4.2.
[325] See the first and second round of coding in the fourth chapter.
[326] See the fourth and fifth aspects of perceptual contemplation.
[327] Sections 5.3 and 5.4.

The central question "How do children make meaning about, because of and through 3D materials?" is indirectly addressed in the fifth and sixth chapters, and the main theme of the seventh chapter[328]. A succinct answer[329] to the main research question would be that children negotiate meanings through a process that combines experiential and social dimensions; This process happens through embodied, self-motivated activities in relation to 3D-materials' affordances and resistance; Micro-discoveries occur as results of children's imaginative combinations of past and present experiences and emerge in the form of creative acts – sudden moments of discovery of meaning; The expressions of these discovered meanings are further negotiated through inter-subjective relations between the child, the teacher and peers.

8.2.4 Other Conclusions – Inter-subjectivity and Democratic Participation

The study was situated in visual art education in early childhood. Although the study focused on children's experiences with 3D-materials, these experiences took place in social contexts and the social relations constantly influenced meanings that could be made[330]. Inter-subjectivity has been considered as important from the beginning of the study. However, my own embodied experience added an extra dimension to my earlier understanding of inter-subjectivity. Being able to experience how inter-subjectivity practically works challenged my reflection and helped me widen my understanding about roles of ECEC teachers, curricula development and children's participation.

This study presents examples of how respecting children's competence and allowing their participation provides conditions for meaningful play with 3D-materials. The examples also show how respectful listening to the children influenced their self-confidence, inner motivation and negotiation of meaning. Respecting the children's activities and expression contributed to their will to acquire more knowledge, solve more problems and contribute to others. A generalized conclusion from this would be that teachers' attitudes and subjectivities are essential for children's experience of their own participation.

Conflicting assumptions about quality of education and children's participation are discussed in the first and seventh chapters. It is demonstrated that these conflicting ideas in early childhood education (and

[328] Though 'meaning' is here addressed as 'negotiated' rather than as 'made'.
[329] The rest of this paragraph.
[330] This is precisely why meanings were negotiated rather than made.

education in general) are a global phenomenon (Egan, 1997). It could even be said that some school systems practice "child abuse" by, on the one hand demanding individual creativity, and on the other controlling and undermining people's independent thought (Matthews, 1999). The prerequisite that children are respected is a positive and important development in early childhood education in Norway. It is my opinion that respect is essential if we wish young children to develop as self-confident citizens, who continue to be curious and willing to learn throughout their lives - which is one of the most important tasks of education (Eisner, 2002).

The seventh chapter indicates the great need for political discussions about ECEC quality as well as consideration of the practical implications for ensuring children's participation in ECEC curricula. Since teacher's ability to empathetically connect with children seems to be essential for her/his skills to listen, further discussions about ECEC quality should address the role of ECEC teachers and their competence in pedagogical improvisation. ECEC curricula development should be seriously reconsidered at all political levels and educational levels[331] to make space for children's participation and their ways of meaning negotiation.

8.2.5 Methodological Contribution and Ethical Challenges

This study is an example of a practice-based, interactionist approach to research with young children where the researcher- and teacher role merged in an A/R/T-ography-like manner. The study is also an example of visual art educational research conducted through multiple case study design. None of these approaches are new; however, the specific combination of them and the fact that the study was conducted in early childhood education render the study methodologically innovative.

Arts-based educational research is not widely practised in Norway. When I happened to attend Bresler's course in Sweden, I learned that research can be empathic, narrative and embodied, and found these methods to be highly relevant for approaching young children. My plan was to study "how things work"[332] inside the specific educational contexts of children's 3D-play. To be able to do that, the access to such contexts was first of all needed, and the research design I chose[333] made it possible to gain access to children's experiences. However, when the decision was made to combine roles of visual art teacher, researcher and ECEC teacher, a number of pedagogical and ethical issues emerged.

[331] ECEC teacher educators', ECEC teacher education, and ECEC education.
[332] Robert Stake's book: "Qualitative Research: Studying How Things Work", deals with qualitative case study methods.
[333] Especially the selection of interactionist and A/R/T-ography approaches.

The methods of this study built on qualitative understanding of truth and knowledge, allowing the researcher's subjective engagement. Ethics are especially important in arts-based research; where the researcher is an "instrument for gaining personal knowledge" (Bresler, 1996, p. 136). Making the researcher's choices visible forms part of the ethics of qualitative research. In this thesis I have tried to make my steps, decisions and choices visible for the reader. By doing this I hoped to establish trustworthiness, which is essential for the validity of qualitative research (Cochran-Smith and Donnell, 2006). However, making the process visible also provides possibilities for others to learn from my reflections and mistakes.

Through the merging of my A/R/T-ographer roles, the ethics of teaching and of research came into question in the study. This was especially challenging during the educational contexts, since whatever was done or said could influence children's "creation of values" (Bresler, 1996, p. 136). The study presents and discusses a large number of ethical challenges concerning subjective engagement in the research process. However, it also makes visible how many ethical considerations had to be taken into account before, after and during inter-subjective interactions with young children. I hope my struggles can be of help to others, who conduct research with young children.

Through practice-based research this thesis addresses children's embodied activities and experiences, which might not be possible to approach in some theoretical way – since, "some things can be known only through the process of action" (Eisner, 2002). The study combines the practices of doing, making[334] and knowing, as A/R/T-ography does (Irwin and De Cosson, 2004). It is both practice-based, because it approaches the problem through teaching practice, and arts-based, because it is directed towards children's visual art practice. It can therefore be said that the study has elements of both 'techne' and 'phronesis', and that it differs from a conventional epistemological approach to knowledge production (Flyvbjerg, 1992).

Research in "making professions" differs from research about the theoretical production of knowledge (Dunin-Woyseth and Michl, 2001). Sloyd is a typical making profession, where one deals with materials, hand-craft and tools. One engages the whole body; using muscles and diverse senses. Materials' qualities, diverse experiences and embodied activities should therefore be essential areas of consideration in sloyd education research. To make practice-based research possible in sloyd education, forms of inquiry need to be developed that allow the researcher closeness to the

[334] Children's activities with materials can in these contexts be called "practice of making".

practitioners'[335] diverse experiences. I believe that arts-based educational research can provide such possibilities. I hope that the methods of this study can further inspire empathic, subjective forms of sloyd education research that is developing in Scandinavian countries and to research about 'aesthetic learning processes'.

8.2.6 Achieved Objectives

The introduction to the seventh chapter makes clear where the two main objectives of this study are addressed. The achievement of the objectives will be summarised here.

The first objective: To illustrate the necessity for respecting young children's experiential, embodied and holistic ways of learning/negotiation of meaning, has been presented in section 1.5.1 and elaborated throughout the seventh chapter. Children's experiences and views have been taken seriously in the development of the research design, which is demonstrated in the second chapter. The fourth chapter shows how the children's experiences influenced the process of planning and conducting educational contexts. The fifth and sixth chapters provide more detailed descriptions of such influence. The seventh chapter defines young children's competences and by so doing aims to foster an educational approach, which acknowledges children as competent and respects their competence. The seventh chapter also identifies possible hindrances for perceiving children's learning/negotiation of meaning in a holistic manner. The three suggested hindrances are: 1) Valuing verbal language as essential for learning, which makes it difficult to acknowledge children's embodied, non-verbal forms of learning; 2) Understanding children's learning as solely dependent on social interactions, and not considering that some competences are natural capacities of individuals and their human bodies, this has made it difficult to acknowledge the competences that cannot be assigned to social interaction; 3) The way power is distributed in society in many ways disempowers young children; because they are young, embodied, non-verbal, practical and emotional. The current power order makes it difficult to promote children's experiential, embodied and holistic ways of learning/negotiation of meaning.

The second objective: To understand the interactions between 3D-materials and children in visual art educational contexts and generate knowledge about how this contributes to their learning/ negotiation of meaning, is introduced in the section 1.5.2 and elaborated in the sections 5.2, 5.3, 5.4 and 7.2. Focusing on children's experiences as holistic and embodied extended the scope of the study from addressing exclusively visual art, to addressing the

[335] Children and students of different ages.

practice of other disciplines in ECEC education, for instance physical education and verbal language education (in the Norwegian context).

This study has presented empirical examples from visual art education that can help us better understand young children's process of exploring 3D-materials. By proposing a "model of negotiating grasp" the study can contribute to a better understanding of the complexity of children's negotiation of meaning. Uncovering the importance of 3D-materials' qualities, children's competences, embodied metaphors, imagination and micro-discoveries, the thesis can contribute to a better understanding of not only young children's processes of meaning negotiation, but also to understanding of learning/meaning making in general. Additionally, proposing that micro-discoveries are pure acts of creativity, adds a new dimension to understanding creativity and its importance for learning.

8.3 Contribution to Knowledge

8.3.1 Individual and Social Forms of Learning

By identifying tensions between individual and social aspects of learning at an early age, the study contributes to renewed understanding of young children's abilities to negotiate meanings. The tension between the individual-biological and the social, calls on complicated ontological and epistemological questions far outside the scope of this study. Symbolic interactionists have been concerned with this question - they considered thinking as emerging from both interactions between individuals, individuals and objects, and within an individual (Charon and Cahill, 2004)[336]. The study Negotiating Grasp searched to understand children's process of meaning negotiation in a holistic manner, concluding that meanings are negotiated through embodiment (i.e inside an individual), with physical environments (i.e. individual but visible for others) and with social environments (i.e. social). This conclusion is certainly not a novelty (see Efland, 2002; Wenger, 2003), but the specific contribution of this study is that it shows concrete examples of how processes of negotiation of meaning unfold, and presents contextual interpretations as to how individual and social dimensions can interact.

It has earlier been considered that pre-verbal children were neither able nor interested to communicate (Vygotskij and Kozulin, 2001). It was also assumed that verbal language was central for learning. These two assumptions have undermined the recognition of infant's pre-verbal

[336] As presented in section 2.6.

competences to acquire knowledge. Additionally, understanding mental development in strictly hierarchical terms, "as rising in stages towards full adult reasonableness" (Stables, 2008, p. 107), assumed that early childhood was not an important learning stage, but was just a transitional period on the way to a "verbal phase of life". From such perspectives, young children's forms of learning hardly could achieve any status. In contrast, when young children are treated as competent experiencing-beings, (even though not fully competent verbal-language-users) their embodied competences become visible.

The specific approach of this study; where the children's embodied competences were respected, made the tensions between non-linguistic and linguistic approaches to learning visible. Qualitative inquiry made it possible to empathetically connect with the children's experiences, getting a sense of their unique individual consciousness, and recognizing different forms of their competences embedded in their embodiment.

I will sum up, this thesis' understanding of the concepts 'learning', 'meaning making' and 'meaning negotiation': As previously discussed[337], Dewey suggested that there are two forms of learning: natural and formal (Dewey, 1916). Dewey's term 'formal learning' refers to school-like transmission of knowledge, while 'natural learning' refers to learning through one's own action and experience. Taking this distinction and building on Rogoff's (2003) claim that humans are biologically cultural, the forms of meaning construction addressed in this thesis would be defined as 'natural learning', which combines embodied (individual) and social (inter-subjective) components, rather than as 'formal learning'[338]. I find the term 'natural learning' relevant, because of its similarities with the term 'negotiation of meaning', but also because the word 'natural' alludes to humans' natural predispositions for learning.

If we don't focus on the differences between humans and the rest of the natural world, but rather view them as connected - as symbolic interactionists did (Blumer, 1969; Charon and Cahill, 2004; Crotty, 1998; Rock, 2001) - it is easy to acknowledge that humans, in line with animals, have biological, embodied predispositions to learn through interactions with the physical and social world. When humans are seen as "natural beings" it becomes obvious that they *have to* be competent before they can learn through verbal language. In addition to our competence to learn from affordances and resistances in

[337] See terminology 1.4.3.
[338] Which is not addressed in this thesis.

our environments (Gibson, 1979), the feeling of social belonging and acceptance are essential for human survival (Dissanayake, 2007).

8.3.2 Experience and Embodiment as Essential Conditions for Learning

This study contributes to a better understanding of how embodiment relates to personal "discovery of knowledge". The thesis promotes a perspective which merges the three concepts "body-mind-environment"[339] and takes a holistic understanding of the world. In this sense, there is no need to divide the natural and cultural world. Our experiences are simultaneously personal and cultural and "the relation between the two is inextricable" (Eisner, 2002, p. 1). However, compartmentalizing experiences was found necessary in the seventh chapter. The promotion of children's experiences as holistic can hardly be accepted as long as some sides of experience (i.e. verbally dependent) are assumed to be the most important. As earlier mentioned, the existing dominance (or power distribution) in understanding of knowledge are rooted so deeply that they fundamentally influence our ways of thinking and seeing the world. For instance, if we view ourselves as "languaged human beings" (Egan, 1997) our ability to think, feel and experience are limited to our linguistic understanding of the *concepts* of thinking, feeling and experiencing.

Our concepts and categories depend on our experiences (Lakoff and Johnson, 1999), and the other way around; categories and structures that verbal language provides us with help us organize and structure our experiences. When we structure something, we make it less complex and easier it to grasp. However, the problem is that reality *is* extremely complex and by extensive structuring, much can be left outside our reach. Categories, structures and rules are needed to help learners organize their holistic grasping of their world. Therefore, there should be a balance between complexity and structure. Education should provide children with possibilities to experience holistically, but also help them to develop concepts and categories that mirror their own experiences. Structure is helpful and necessary, but too much organizing[340], especially when possibilities to apply own experiences are absent, can destroy passion for learning.

Without experience, no memory is possible (Merleau-Ponty, 1962) and therefore no learning. Experience is a medium of education, but it does not come automatically; it requires an attentive and constructive mind (Eisner, 2002) and time for "slowing down perception so that efficiency is put on

[339] Introduced by Howes (2005).
[340] Like in Miss Hill's classroom, where there were rules for everything (Donmoyer, 1979).

back burner and the quest for experience is made dominant" (Eisner, 2002, p. 207). Rather than building on the model of manufacturing[341], early childhood education should build on the model of agriculture (Robinson, 2010)[342]; nourishing and encouraging, giving time to children to experience, explore and find out together with others, and feel the joy of their own finding own solutions.

Teachers should be open for learning from children (Trimis and Saava, 2009). Many Norwegian ECEC teachers from their embodied (expertise) knowledge know how competent children are and how much can be learned from young children (Johannesen and Sandvik, 2008). Still, as long as teachers cannot *explain* what children's competences are, they will not be heard in political debates. Just as young children cannot speak the language of power, we who wish to represent them, cannot be heard until we produce some valuable evidence about children's competences. I hope this thesis provides such evidence about children's competences and promotes how important it is that we take these competences seriously.

8.3.3 Sloyd and Materials' Resistance

Visual art education includes a wide range of activities and diverse materials. However, for some reason, there is not as much research which focuses on three-dimensional materials as research which focuses on drawing[343]. By promoting activities with 3D-materials this thesis suggests that visual art teachers should expose children to a diversity of materials and qualities so that opportunity for experiencing materials' advocacies and surprizing responses never ceases. Three-dimensional materials can provide students of all ages with diverse forms of resistance, and it is the resistance that becomes something they can "think with" (Eisner, 2002). Working against materials' resistance challenges students, engages them emotionally, gives them something to struggle against, and is therefore essential for many forms of negotiation of meaning and personal growth.

Work with 3D-materials engages a large number of senses among them touch, which is the most subjective sense we have (Stenslie, 2010). Knowing that skin is our largest organ, the importance of touch cannot be denied. When we observe very young children it is significant that their touching

[341] Effective production of future workers; according to Egan (1997), present forms of education have been derived from education of industrial workers, established in order to teach what they needed to do the work most effectively.
[342] Robinson's suggestion about agriculture is directed toward schooling, but I also find it relevant for ECEC education.
[343] I wonder what the reasons for such preferences are. Can this lack of interest be grounded in some hidden advocacies that are derived from the historical low status of physical work?

with hands and mouth (and tasting) are essential for their orienting in the world that is "inviting their exploration and discovery" (Danaher and Briod, 2005, p. 218). Children need to interact physically with their world if they are to learn about the world and themselves, and develop courage to meet future challenges (Dewey, 1956b, 2005 [1934]; Eisner, 2002).

Children need to experience the joy and pride of holding a hammer, hitting a nail and feeling how the wood yields to the nail. Sloyd education can provide such possibilities in schools. The thesis contributes to understanding that also younger children should have chances to explore, play and transform 3D-materials. Exploration of 3D-materials

> …calls into play alertness of the senses and acuteness of observation; (…) it requires ingenuity and invention in planning; it makes necessary concentrated attention and personal responsibility in execution (Dewey, 1956b, p. 128).

Dewey's quotation refers to the process of making, however, young children's 3D-play does not have to lead to the production of final objects or the achievement of large goals. For a young child each little achievement (like holding a saw) might be experienced as great and a process of play with materials and tools, can become an arena for constantly emerging new experiences and discoveries. Teachers should not underestimate the importance of children's aesthetic learning process. If these experiences are prevented, the chances to learn will be hindered.

Human beings have for ages used their hands and learned through embodied interactions with their environments. However, in the last few hundred years people have been displaced from their natural environments (Dissanayake, 2000). The use of advanced technology seems to make many of our muscles superfluous, however,

> using the natural world for raw material and for observation and eventually for make-believe and imagination is a tried and true source for emotions, cognitive, and manual satisfaction (Dissanayake, 2000, p. 192).

I propose that dealing with hand-craft can:

- provide us with possibilities to learn through experience
- contributes to understanding of our own body in relation to the world, to the achievement of mastering and an increase in self-confidence
- help us understand that creating and making demands time and effort, and teaches us to respect human work and natural materials, and treat products with care

- and, above all, provides us with courage to face the challenges of the present and future crisis[344] by creating environmentally friendly solutions.

This thesis is written with some optimism that traumatized harmony with nature can still be restored through greater focus on sloyd education and hand-craft. If coming generations are given possibilities to experience the struggles and joys of creating, they might start appreciating the power of their hands and embodiment. Through the challenges they can experience in direct contact with natural materials, young students might develop a caring attitude towards the natural world; reflect about their attitudes, and help reversing the ecological and human crisis.

8.3.4 The Role of Aesthetics

The concept 'aesthetics' that has been referred to in this thesis is understood as rooted in embodiment. As Dewey's 'somatic naturalism', which was "dedicated to rooting aesthetics in the natural needs, constitution, and activities of the human organism" (Shusterman, 2000, p. 6), and as Shusterman's 'somaesthetics' emphasizes, there seems to be a need to understand aesthetics as an integral part of human life.

Young children are competent users of their senses when they act upon their environments (Merleau-Ponty, 1962). Through diverse explorative activities they accumulate experiences in their bodies. Their possibilities to think and make decisions depend on the capital found in all their accumulated past experiences (Dewey, 2009 [1909]). However, the way in which young children may come to understand the concept of aesthetics depends on their experiences and how they are treated in social contexts[345]. ECEC teachers' attitudes toward children's experiences are therefore decisive for the children's future understanding of arts and aesthetics. It should not be difficult to appreciate aesthetics, since it is the essential part of human life; "if we want to take the arts seriously, it is necessary to take life seriously" (Dissanayake, 2000, p. 199).

In her global research on the impact of arts education, Branford (2006) presents contrasting views of arts in schools and in modern societies. While arts are often given minor importance in education, they flourish in the commercial, consumer and social sectors (Bamford, 2006).

[344] Robinson (2010) speaks about two equally large emerging crises: the ecological and the human crisis.

[345] For instance, if a child has a teacher with the attitude that embodied experiences should be supressed, the child might become ignorant towards her/his own experiences, and possibly develop specific understanding of aesthetics that ignores embodiment.

As Mathew's succinctly states: "In the age in which education has been hijacked by consumerist interests" (Matthews, 1999, p. 163), our focus on production and efficiency has limited our possibilities for deeper understanding. Also in visual art education, teachers' focus on products can limit their possibility to see that many valuable achievements take place during the process itself. Focusing on children's play with 3D-materials, where the process between experiencing and expressing is often long and demanding, might help teachers become aware and support their student's struggles, practical mastering and creative achievements. It is through an engaging process[346] that we can "capture and embody meanings that bridge thought and feeling" (N. R. Smith, 1982, p. 299).

This thesis aims to initiate discussions about how visual art should be practiced in ECEC centers. One possible theme for discussion is the relation between product and process, presented in section 3.1.4. Even though children's visual art achievements are not systematically assessed in Norwegian ECEC centers, children can inter-subjectively sense what teachers think about their products. I suggest that teachers should not decide what children should make, or evaluate the products according to their appearance, but appreciate children's own solutions. Arne Trageton (1995) presents an example where a preschool girl made a baby-machine of cardboard packaging and buttons, telling that when one pushes the button, a baby would come out. It later came out that her mother had just given birth and when the girl went to the hospital to meet her, she pushed an elevator button, and her mother came out from an elevator with a baby in her arms. In this case, the girl did not intend to make something pretty, but the materials helped her to organize her experiences and present a theory about where babies come from. Hence, if the girl was told what she should make, she would not have a chance to organize her experiences. Also if the teacher evaluated the girl's product by the colors she had used, the girl would sense that the teacher preferred that she had made something else. In this sense, the teacher's understanding of visual art teaching and aesthetics would affect the girl's emerging understanding of aesthetics, and the girl's understanding of aesthetics would be "cultivated" away from her holistic embodied experience, in order to adopt the teacher's understanding of aesthetics.

Efland (2002, p. 2) argues that engagement with art education can widen young children's "power of understanding". Villemain (1966) speaks of "qualitative intelligence" as an ability to organize our experiences, and suggests that arts should be central in education. Parsons (2005) argues that the relation between aesthetics and cognition should be central in art

[346] Of both students and teachers.

education. The study presented here suggests that somaesthetics is essential in young children's lives. It also argues that appropriate art education can help children maintain their aesthetic approach to the world during their life. This is necessary because aesthetics are essential for negotiation meaning throughout the life.

The transition between the pre-verbal to the verbal phase of life seems to be critical for children's somaesthetics. By the time of becoming verbally competent, children's bodies have already acquired certain "capital" of past experiences and they possess embodied knowledge about diverse qualities. However, simple categories of verbal language can threaten the breadth and depth of their experiences (Stern, 2003). Fortunately, if they are given possibilities to express through media other than verbal language, they would still have a chance to capture the holistic experiences in their metaphoric expressions. Still, if teachers do not appreciate children's metaphoric expressions (e.g. the baby-machine), children's personal experiences could remain suppressed. Experiencing that their creative expressions and personal choices do not matter can destroy children's joy and will to contribute[347] and "kill" their creativity (Robinson, 2006).

> It is simply the most dramatic instance of one puzzle in human learning – the facility with which young humans learn to carry out certain performances that scholars themselves have not yet come to understand (Gardner, 1991, p. 2).

When Gardner says "that scholars themselves have not yet come to understand" he does not seem to consider that what adult scholars can come to understand is not a result of linear development that follows aging (e.g. that children can less, and adults more), but that young children's embodiment makes them more competent to grasp things adults might never be able to grasp again – because we have socialized and learned to forget our embodied competences. This thesis promotes young children's competences as rooted in their embodiment and somaesthetic approach to the world. By doing this, the thesis also suggests that each of us used to own such competences, and we still do, but we are often deprived of abilities to use these competences, after the years of suppressing them. We can therefore all benefit from listening to young children and learning from them.

[347] The will to contribute is here seen as the basis of democracy.

8.4 Strengths and Limitations of the Thesis

Many of the strengths of this thesis are also its weaknesses. Subjectivity is a strength and necessity of qualitative research (Bresler, 1996, 2006a; Eisner, 1991; Stake, 2010) and infusion between research contents and methods is a quality of arts-based educational research (Barone & Eisner, 2006). The subjective, empathic approach is valuable for the study, because it made it possible to empathetically connect with the children's experiences. The interactionist approach made it possible to take part in the inter-subjective process of meaning negotiation, and to experience the process from the inside. The specific ART-ographer role made it possible to get insights about the role of a teacher and to experience the complexity of inter-subjectivity. On the other hand, it was precisely this closeness that was ethically, methodically and pedagogically challenging. There were too many possibilities for mistaking; being trapped into the "socially derived constructions of the world" I co-constructed (Brown and Jones, 2001, p. 6). I am probably still not aware of all mistakes I have made[348].

The fact that I was personally engaged also raises critical questions about the study's validity (or applicability). Validity of a qualitative study does not depend on randomisation. The children were chosen specifically for the study and this could create problems if one wished to "transfer effects" to other situations (Eisner, 2002). However, this study did not aim to measure conditions that could depend on geographical, social or teacher-related conditions, but aimed to explore what could happen in specific visual art contexts. From this point of view, the question of randomization is irrelevant. Generalization should be mentioned in this context. This study is contextual, which means that each of the educational contexts is unique and not possible to repeat. It can still be said that some features of each educational context/case – for example how the children played with 3D-materials when they were allowed to explore – have a more general character. Since "the function of a case study is to learn about more than that popular case, for a case is always a case of something" (Eisner, 2002, p. 213), I suggest that results from this study can be applied to similar situations where children play with 3D-materials. In this sense, I do not speak of statistical generalizations, but about a form of "naturalistic generalizations" Donmoyer wrote about (Eisner, 2002).

[348] As mentioned in the second chapter, two meetings were held with my colleagues where video cuts were discussed. The intention of this was to take a step back and view the study from the outside. Still it can be said that my subjectivity has been both a strength and a limitation for this study.

During the writing of this thesis I realized how the choice of tense could have big implications for contextuality versus generalization; descriptions written in past tense retained the specific context, while writing in present tense made the text more general and current. One weakness of this thesis probably lies in its inconsistent use of tense[349].

In qualitative studies, the question of applicability is more relevant than the question of validity. Applicability is about the possibility to apply the study to other similar situations. It was my responsibility to make clear descriptions so that the reader could evaluate if the study was applicable to a similar context. As trustworthiness is about validity of a qualitative study (Cochran-Smith and Donnell, 2006), the strength of the thesis depends on my ability to inform the reader thoroughly so that s/he can find this writing trustworthy. Aiming to achieve trustworthiness can also be negative if a researcher writes with the intention to convince the reader, but does not make it obvious that her/his writing is a piece of "virtual reality" (Bresler, 1996). In that case, the writer appears as dishonest and the texts speculative or persuasive.

The process of data gathering could be considered as problematic, because of the strict structure of the educational contexts. It has already been explained[350] why the educational contexts had to take place in closed rooms. Still someone might question the naturalness of such contexts, and possibly compare them to quasi-experiments. This may be considered a weakness of this thesis, however, what happened inside the closed rooms could be regarded as more "natural" than "experimental" because the uniqueness of each of the contexts was treated as essential for the outcomes. The complexity of the educational contexts and the bricolage of ways to study them, imply that the outcomes consist rather of indications and idiosyncrasies than general findings and testable results.

Interdisciplinarity has been another big challenge of this study. Figure 1 shows how this study touches on broad disciplines such as psychology and linguistics. Interdisciplinarity is especially challenging when it is performed by a single person during a limited time, because it is not possible to be thoroughly informed, and therefore also easy to appear as an amateur. However, if the study was not approached in an interdisciplinary manner, it may not be possible to grasp the totality of children's experiences.

With the intention to promote young children's experiences and views, I have tried to be cautious in order not to harm them. Robert Stake (2010) teaches

[349] It is important to remark the fact that most of quotations are written in the present tense, which also challenges the tense use in my own sentences.
[350] See chapter 2.

that a researcher that deals with the less privileged and powerless has to be especially careful not to harm them even more. However, I was not warned that a qualitative, empathic approach could be harmful for *me*. The research process has been a journey of my deepening understanding, connecting more and more with the research subjects - the young co-researchers who I got "mutually absorbed" with. It now seems difficult to disconnect. There may be a need for an additional, final aspect in the model of perceptual contemplation; some kind of process that disconnects the researcher from mutual absorption and releases her/him from the phenomenon s/he has been studying.

8.5 Application of This Work and Future Developments

8.5.1 Application of This Work

This work is relevant for gaining better insights into children's experiences and ways they acquire knowledge about themselves and their world. Apart from its significance for ECEC teachers, teacher students and those who teach and research in visual art, the thesis is also relevant for politicians and educational policymakers in Norway, Scandinavia and possibly other countries.

There is a large variation in the levels of regulating children's play in different countries, especially concerning safety (Moser, 2010). Norway seems to be one of the countries where children are given more opportunities to learn through risky, embodied forms of play (Moser, 2010). Even though the developments represented in the Norwegian government's official documents concerning quality in ECEC have in the last few years threatened the "Nordic tradition", Norwegian ECEC centers have traditionally[351] appreciated play and nature. Additionally, the government has introduced requirements relating to respect for young children's competences. For all these reasons, I express my optimism that Norway is the country where young children's voices still can be heard despite the fact that their embodied competences are not exactly the "weapons" desired in the present international arming competition[352].

This work raises many questions about position and competences of young children. It questions the existing regulations, the practice of respecting

[351] Influenced by Froebel (Flanagan, 2006; Röthle, 2007).
[352] With this strong metaphor, borrowed from Walter Feinberg, I here refer to international comparative testing of children's basic skills in verbal language and mathematics.

young children, curricular development, and the understanding of ECEC quality. The thesis can contribute to discussions about visual art education, early childhood education, as well as wider discussions about the significance of embodiment and experience in education in general. I therefore believe that this work can be of interest for everyone who deals with arts education, education of young children, or education in general, including politicians and policy makers.

8.5.2 Recommendations for Future Research

The study has touched upon many important issues to be further studied. Some of the issues concern early childhood education, some concern visual art and arts education, and another is research methods.

Little research has been done in visual art in early childhood education in Scandinavia, almost none concerning visual art with 3D-materials, and a very few studies concerning 'aesthetic learning process'. However, it is precisely research with the youngest that can help us understand the core of experience, embodiment and somaesthetics. I suggest that more research about children's imagination and experiences is needed. Although I feel it is my real responsibility to suggest further areas for potential research, I cannot emphasise enough the importance of conducting this research with full respect for children.

More research is needed to explore aesthetic learning process and arts-based approach to learning/negotiation of meaning in early childhood, as well as with older children. Such research is necessary to produce more knowledge about how holistic, embodied experiences can contribute to cognition. Additionally, relations between different embodied forms of learning are needed in order to re-position the arts as valuable in relation to other school/ECEC disciplines.

Interest for physical environments and materiality for ECEC learning is currently significant in Norway. However, more studies about children's explorations and manipulations of 3D-materials are needed in order to better understand the significance of materials' qualities and resistances for problem solving, creativity and metaphoric expressions. We also need to know more about the importance of tactility for in the process of meaning negotiation.

Taking into consideration the request made by the "United Nations Convention on the Rights of the Child", much more research should be conducted in order to understand what is demanded in order to practically implement child's rights in education. Also in countries like Norway, where the ECEC is seen as the first democratic institution a child has the

opportunity to influence, more research is needed in order to understand the relations between children's participation, teacher competence and curricula development. However, if curricula are considered as flexible, the relations between children and their teachers should be studied, especially in terms of inter-subjectivity and improvisation.

Considering children's embodied forms of thinking, communicating and acquiring knowledge, I suggest that qualitative, empathic forms of research are necessary in order to capture children's experiences in ways that are not threatening to their integrity and harming to their self-confidence. For this purpose, I found an arts-based qualitative approach to be especially applicable. Such qualitative methodology allows researchers to integrate their subjectivities, desires and beliefs in the research process. Understanding of complex processes can become possible only when researchers' interpretations are enriched by their personal experiences (Stake, 2006).

There is a need for much more research in order to understand how arts contribute to cognition and can provide possibilities for embodiment to become significant in education. However challenging this seems to be, we must not stop struggling against the resistance and knowing in which direction we are heading. We constantly have to question what education should be about, what we can do for future generations - what life is about, as Bresler puts it:

> And so, we examine our dreams. What do we value mostly in ourselves? What do we want to become? We try to have a glimpse of riches that life has to offer us: to hear more, see more, perceive more, feel more – an aesthetic experience which touches the subtleties and beauty beyond the simple boxes of numbers and other useful categories (Bresler, 1991, p. 93).

Young children can teach us how to look beyond letters, boxes and numbers, and grasp the world holistically.

Appendix

Table of Figures

Filed Video-cuts

Case 1: Woodcut
Names and length of video-cuts (together 52 minutes and 23 seconds):
Woodcut 1: 4 min 58 sec
Woodcut 2: 6 min 27 sec
Woodcut 3: 2 min 58 sec
Woodcut 4: 4 min 58 sec
Woodcut 5: 1 min 52 sec
Woodcut 6: 3 min 28 sec
Woodcut 7: 4 min 30 sec
Woodcut 8: 4 min 14 sec

Case 2: Pink Textiles
Names and length of video-cuts (together 58 minutes and 23 seconds):
Additional video from activity with Karin is 1 minutes and 40 second long.
Pink Textiles 1: 6 min 42 sec
Pink Textiles 2: 5 min 56 sec
Pink Textiles 3: 5 min 45 sec
Pink Textiles 4: 5 min 4 sec
Pink Textiles 5: 5 min 39 sec
Pink Textiles 6: 6 min 10 sec
Pink Textiles 7: 5 min 40 sec
Pink Textiles 8: 5 min 38 sec
Pink Textiles 9: 5 min 36 sec
Pink Textiles 10: 4 min 58 sec
Pink textiles Extra: 1 min 40 sec

Case 3: Clay Play
Names and length of video-cuts (together 61 minutes and 31 seconds):
Clay Play 1: 5 min 57 sec
Clay Play 2: 5 min 52 sec
Clay Play 3: 3 min 31 sec
Clay Play 4: 6 min 18 sec
Clay Play 5: 6 min 15 sec
Clay Play 6: 6 min 32 sec
Clay Play 7: 5 min 52 sec
Clay Play 8: 6 min 20 sec

Case 4: Yarn and Clay

Names and length of video-cuts (together 57 minutes):
Clay Yarn 1: 5 min 42 sec
Clay Yarn 2: 5 min 33 sec
Clay Yarn 3: 5 min 56 sec
Clay Yarn 4: 2 min 24 sec
Clay Yarn 5: 5 min 42 sec
Clay Yarn 6: 4 min 4 sec
Clay Yarn 7: 2 min 20 sec
Clay Yarn 8: 4 min 39 sec
Clay Yarn 9: 5 min 43 sec
Clay Yarn 10: 4 min 54 sec

Case 5: Yarn Balls
Names and length of video-cuts (together 59 minutes and 15 seconds):
White Yarn 1: 7 min 47 sec
White Yarn 2: 5 min 7 sec
White Yarn 3: 5 min 54 sec
White Yarn 4: 5 min 2 sec
White Yarn 5: 5 min 18 sec
White Yarn 6: 4 min
White Yarn 7: 5 min 20 sec
White Yarn 8: 5 min 8 sec
White Yarn 9: 5 min
White Yarn 10: 5 min 19 sec
White Yarn 11: 5 min 38 sec

Case 6: Cardboard Boxes
Names and length of video-cuts (together 43 minutes and 20 seconds):
Boxes 1: 6 min 8 sec
Boxes 2: 5 min 42 sec
Boxes 3: 5 min 12 sec
Boxes 4: 5 min 48 sec
Boxes 5: 4 min 36 sec
Boxes 6: 5 min 57 sec
Boxes 7: 8 min 16 sec
Boxes 8: 7 min 8 sec

Case 7: White Sand
Names and length of video-cuts (together 50 minutes and 40 seconds):
White Sand 1: 5 min 9 sec
White Sand 2: 5 min 5 sec
White Sand 3: 5 min

White Sand 4: 4 min 14 sec
White Sand 5: 4 min 50 sec
White Sand 6: 5 min
White Sand 7: 4 min 51 sec
White Sand 8: 4 min 8 sec

Case 8: Building with Wood
Names and length of video-cuts (together 60 minutes and 4 seconds):
Wood Construction 1: 6 min 6 sec
Wood Construction 2: 4 min 12 sec
Wood Construction 3: 5 min 24 sec
Wood Construction 4: 3 min 10 sec
Wood Construction 5: 5 min 32 sec
Wood Construction 6: 5 min 32 sec
Wood Construction 7: 5 min 43 sec
Wood Construction 8: 5 min 29 sec
Wood Construction 9: 5 min 32 sec
Wood Construction 10: 4 min 32 sec
Wood Construction 11: 4 min 46 sec
Wood Construction 12: 5 min 1 sec

Case 9: Blue Wool
Names and length of video-cuts (together 43 minutes and 15 seconds):
Blue Wool 1: 4 min 55 sec
Blue Wool 2: 5 min 54 sec
Blue Wool 3: 5 min 16 sec
Blue Wool 4: 5 min 17 sec
Blue Wool 5: 4 min 42 sec
Blue Wool 6: 6 min 28 sec
Blue Wool 7: 5 min 44 sec
Blue Wool 8: 4 min 3 sec

The First Letter to the Parents

Xxxxxx, november 2007

Til foreldre med barn i Xxxxxx barnehage

Forespørsel om deltakelse i forskningsprosjekt

Kjære foreldre
Vi skriver til dere for å be om ditt/ deres samtykke til å foreta en observasjonsstudie i ditt barns barnehage.

Liv Gjems er leder for et prosjekt om barns læring om språk og gjennom språk i barnehagen. I prosjektet inngår flere medarbeidere fra Høgskolen i Vestfold som underviser i ulike fag og som ønsker å studere faglige samtaler som personalet inviterer barn til å delta i. Biljana C. Fredriksen er en av prosjektmedarbeidere og hun kommer til å gjennomføre prosjektet i deres barnehage. Formålet er å observere hvordan voksne inviterer barn til å delta i samtaler om ulike tema. Det er barnehagens voksne som er prosjektets mest sentrale personer, og deres samtaler med barn vil bli videofilmet eller tatt opp på lydbånd og skrevet ut.

Det er selvfølgelig helt frivillig å delta i prosjektet, og dere kan når som helst i løpet av perioden trekke barnet ut av prosjektet uten begrunnelse. Vi har selvsagt taushetsplikt overfor all informasjon som vil komme frem under observasjonene og lydopptakene, og alle data blir behandlet konfidensielt. Prosjektet skal avsluttes høsten 2010, og da vil alle video-lydbåndopptak bli slettet. Når resultatene fra prosjektet presenteres vil ingen enkeltpersoner kunne gjenkjennes. Prosjektet er meldt til Personvernombudet for forskning, Norsk Samfunnsvitenskapelig Datatjeneste, (NSD).

Barnehagepersonalet har stilt seg velvillige til prosjektet. Vi kommer til å besøke barnehagen flere ganger i løpet av høsten og vinteren 2007 og 2008. Vi vil da være tilgjengelig for spørsmål fra dere. Dersom dere har spørsmål til oss om datainnsamlingen, så ta gjerne kontakt med prosjektleder Liv Gjems 33 03 14 26, e-mail: Liv.Gjems@hive.no, eller prosjektmedarbeider Biljana C. Fredriksen, mob: 92615984, e-mail Biljana.C.Fredriksen@hive.no.

Med vennlig hilsen

Liv Gjems og Biljana C. Fredriksen
Høgskolen i Vestfold, Avdeling for lærerutdanning
Postboks 2243
3303 Tønsberg

Barnets navn_____

JA Vi/ jeg gir tillatelse til at mitt barn deltar i undersøkelsen

Jeg er kjent med at deltakelse i prosjektet er frivillig, og at jeg når som helst kan trekke mitt barn ut.

The Second Letter to the Parents

Xxxxxxx, juni 2009

Til foreldre med barn i Xxxxxxx barnehage

Deltakelse i forskningsprosjektet: "Lek med materiale som kontekst for læring i barnehagen".

Kjære foreldre,
Dere har tidligere gitt deres samtykke til at jeg skal foreta en observasjonsstudie i ditt/deres barns barnehage. Med dette brevet ønsker jeg å informere om noen endringer i forhold til min forskningsmetode, som kan angå deres barn.

Vi er flere lærere/forskere fra Høgskolen i Vestfold som underviser i ulike fag, som studerer faglige samtaler i ulike barnehager. Prosjektet vårt heter "Barns læring om språk og gjennom språk i barnehagen", er finansiert av Norges Forskningsråd og ledes av Liv Gjems. Under dette paraplyprosjektet er jeg en av prosjektmedarbeidere. Jeg er i utgangspunktet formingslærer som ønsker å lære om forholdet mellom barns verbale uttrykk og deres eksperimenterende lek med tredimensjonale materialer (som for eksempel leire eller klosser). Jeg leder altså mitt eget doktorgradsprosjekt som heter "Lek med materiale som kontekst for læring i barnehagen".

Jeg vil i løpet av høsten 2009 og våren 2010 gjennomføre faglige formingsopplegg i barnehagen. Disse oppleggene vil bli videofilmet. Jeg har selvsagt taushetsplikt overfor all informasjon som vil komme frem under observasjonene og opptakene, og har ansvar for at alle data blir behandlet konfidensielt. Alle video- og lydbåndopptak vil bli slettet våren 2012. Når resultatene fra prosjektet presenteres vil ingen enkeltpersoner kunne gjenkjennes. Prosjektet er meldt til Personvernombudet for forskning, Norsk Samfunnsvitenskapelig Datatjeneste, (NSD).

Endringene i forskningsmetoden gjelder følgende: Siden mitt forrige brev til dere, har mitt prosjekt blitt utvidet til et doktorgradsstudie. Derfor ønsker jeg å gjennomføre en mer grundig analyse av videoobservasjonene. Dette medfører et behov for at mine nærmeste medarbeidere (medforskere fra Høgskolen i Vestfold og eventuelt andre nære medarbeidere) ser på deler av opptakene sammen med meg. Videoopptakene vil aldri sendes fra meg og vil alltid oppbevares utilgjengelig for andre når jeg ikke er tilstede.

Jeg takker for at dere gjør det mulig å utvikle mer kunnskap om forholdene mellom barns eksperimenterende lek, språkutvikling og læring! Jeg minner om at det er helt frivillig å delta i prosjektet - dere kan når som helst i løpet av perioden trekke deres barn ut av prosjektet uten begrunnelse! Vennligst si fra hvis dere ikke ønsker at deres barn er med på prosjektet!

Barnehagepersonalet har stilt seg velvillige til prosjektet. Dersom dere har spørsmål om datainnsamlingen, ta gjerne kontakt med prosjektleder Biljana C. Fredriksen, mob: 92615984, e-mail Biljana.C.Fredriksen@hive.no.

Med vennlig hilsen
Biljana C. Fredriksen
Høgskolen i Vestfold, Avdeling for lærerutdanning
Postboks 2243, 3303 Tønsberg

The Third Letter to the Parents

Xxxxxxx, 12.03.2010

Til foreldre av barn som bidrar i mitt doktorgradsprosjekt

Først vil jeg takke deres fantastiske barn som har gjort det mulig for meg å studere hva som kan skje når barn leker med tredimensjonale materialer! Jeg må selvklart også takke dere som har gjort dette mulig ved å gi deres tillatelse!

Høsten 2009 var jeg stadig innom barnehagen for å observere hvem og hva barna deres likte å leke med. Så "skreddersydde" jeg formingsopplegg hvor to barn av gangen sammen med meg fikk leke med tredimensjonale materialer. Det var for eksempel leire, garn, tre, pappesker og lignende - Jeg tipper dere har hørt om dette fra barna deres (?) Mans vi tre lekte, sto et kamera på og filmet oss. Det er disse videofilmene som er forskningsmaterialet jeg nå analyserer.

Det jeg ser etter i forskningsmaterialet er hvordan barnas nye erfaringer med 3D-materialer igangsetter barnas aktivitet. Slik aktivitet blir ofte rettet mot en form for problemløsning hvor barnet selv undersøker, tenker, prøver ut, eksperimenterer og forklarer. I min forskning er jeg oppatt av læringspotensialet som ligger i 3D-materialene og utløses når et barn møter det med all sin nysgjerrighet, fantasi, trang til å skape og vilje til å lære. Jeg har erfart at disse egenskapene er ingen mangelvære hos deres barn, men jeg må understreke at min forskning på ingen måte vurderer eller kartlegger deres barn – Barna har vært medforskere med uvurderlig betydning for dette prosjektet!

I forbindelse med doktorgradsstudiet skal jeg denne våren oppholde meg i USA hvor jeg skal holde en del foredrag om mine studier. I forbindelse med dette lurer jeg på om dere har noe imot at bilder, og eventuelt korte filmklipp, blir vist på internasjonale konferanser under mine foredrag? Hvis dere ønsker å se hvilke bilder/filmklipp som kan være aktuelle for meg å bruke, kan jeg gjerne vise dem til dere for deres godkjenning! I så fall kan dere ta kontakt med meg så kan vi avtale et tidspunkt vi kan møtes – jeg kan ikke sende filmene fra meg da jeg er forpliktet meg (også via Norsks samfunnsvitenskapelig datatjeneste) til å ha full kontroll over filmene og slette dem i 2012.

Jeg ber dere vennligst ta kontakt med meg på tlf. 92615984 eller på mail Biljana.C.Fredriksen@hive.no hvis:

- Hvis dere ikke ønsker at jeg skal bruke bilder eller film av deres barn mens jeg holder foredrag
- Hvis dere ønsker å se på bildene og filmene for å godkjenne dem til bruk. Jeg har mulighet å vise dem før 11. april 2010 (da jeg reiser til USA)
- Hvis det er noe annet dere lurer på

På blogsiden http://sculpturingwords.blogspot.com/ kan dere lese om prosjektet.

Vennlig hilsen Biljana C. Fredriksen
Høgskolelektor ved Høgskolen i Vestfold
PhD-student ved Arkitektur- og designhøgskolen i Oslo

Letter to One of the Children

Biljana C. Fredriksen
Høgskolen i Vestfold
Mob: 92615984
E-mai: Biljana.C.Fredriksen@hive.no

Xxxxxxx, 30.08.2010

Til foreldrene til Emil,

Jeg har de siste årene drevet med barnehageforskning for å lære mer om hvordan barn lærer mens de leker med tredimensjonale materialer. Jeg har vært så helding å ha mulighet å lære av barna fra Tuften barnehage, som har vært mine medforskere i dette prosjektet. Nå er jeg i den siste fasen av min doktorgradsavhandling hvor jeg skriver artikler. Mesteparten blir skrevet på engelsk (bort sette for et bokkapittel som skal skrives på norsk). Uansett, blir det aldri nevnt hvor i Norge undersøkelsen er gjennomført eller hva barnehagen heter. I mine tekster er alderen på barna riktig, men navnene er endret.

Emils bidrag til min avhandlig er meget verdifulle. Fra de vedlagte utdragene kan dere se hvordan barnet deres omtales i en artikkel som er på vei til publisering.

Denne henvendelsen til dere gjelder et spesielt tilfelle hvor det ville vært ønskelig at Emils navn ikke blir anonymisert. I en av artiklene (som planlagges publisert i tidsskriftet Qualitative Inquiry i USA), ønsker å beskrive hvordan jeg kom på ideen å endre sykkelboden til snekkebua den dagen for ett år siden da Emil var med på snekring. Det var nemlig deres Emil som ga meg denne ideen da han, noen dager tidligere, nevnte Emil i Lønneberga – og han virket nysgjerrig på dette med spikking. Dessuten, virket det motiverende for ham at han selv heter det samme som en gutt fra bøker og film. Hvis jeg fikk tillatelse av dere å kalle Emil for Emil, vil jeg kunne få til flere dimensjoner i artikkelen. Men hvis dere ikke ønsker at hans ekte havn blir brukt, vil dette absolutt ikke medfører noen problemer for meg eller avhandlingen!

Vennligst si fra (på telefon, sms eller mail) hva dere tenker om dette forslaget!
Helt ærlig må jeg også fortelle at jeg ikke har vurdert hvilke konsekvenser det å bruke Emils ekte havn i en av artiklene vil ha for hans anonymisering i resten av avhandlingen: jeg har kalt ham Espen andre steder, man lesere av hele avhandlingen vil fra beskrivelsene kanskje kunne forstå at det dreier seg om den samme gutten. Dette betyr i praksis at hvis dere sier "ja" til mitt spørsmål, vil mine beskrivelser av Emils handlinger kunne knyttes til navnet Emil, men på ingen måte vil de kunne knyttes til hans etternavn, barnehage eller sted i Norge.

Her er en beskrivelse hvor Emil har "hovedrollen", og er kalt Espen. I dette eksempel er selve navnet uvesentlig, da det jeg vil frem til ikke er knyttet til Astrid Lindgrens Emil.

4.2 Finger protection

> Two boys and I are in a small bicycle-garage just outside the early childhood centre: the bicycles have been removed, other things brought in, and the room now looks more like a workshop for wood carving. There are large branches and roots on the floor, and some wooden sculptures, planks, tools, rope and paper tape on the shelves.

During the hour we have already spent here the boys have been cutting with a saw, whittling with a knife, talking to the video camera, and binding and taping different things in the room.

When Espen (3 years, 4 months and 25 days old) is holding the knife, I stand behind his back and cover his left hand which is holding the small plank (in order to protect his hand from being cut), and with my right hand I help him press the knife down in order to cut small pieces of the wood. The moment I look what the other boy is doing, the knife slips and cuts a finger on my left hand. It is just a little cut, but I react surprised: "Oh, that hurts!" I put the knife on a high shelf and suggest that we should do something else.

Some time later, Espen finds a wooden knife (which was actually an example of something that has been whittled). He suggests that he could whittle with it and he does that for ten minutes or so. He is working hard, holding the wooden knife just in the right position and whittling in different directions, but this does not work the same way it did with the real knife. "There is just dust coming out", he says and laughs. He leaves the knife and the plank and looks for something else to do.

He finds a roll of paper tape, and both of the boys get very interested in tearing the tape and taping things. But the tape is not so easy to tear. Sometimes it crumples up and sticks together. They cooperate, ask me for help, and they teach each other how to tear. While I am busy with the other boy, Espen shows me suddenly his index finger. There are thick layers of tape around the finger:
Espen: "A..a..a… I pretend.... Made a plaster!"
I look at him and say with surprise, "Ow!.. Around you finger!" and laugh.
He shows me his finger proudly: "Look at it!"
I: "Now you have protection on you finger... You cannot cut yourself... Your finger is protected..."
Espen: "I have like this.... Like Eva's grandfather!"
I: "Eva's grandfather?"
Espen: "Yes."
B: "Does he have something like that?"
Espen: "That's plaster."
I: "Oh… (affirmatively). Does Eva's grandfather have a plaster on his finger?"
Espen: "Because he injured himself."
B: "How did he hurt himself?"
Espen: "In the mountain."
And I confirm: "In the mountain..."

A little later, Espen approaches the other boy, Morten, and bends his head so that his face almost gets between Morten's face and his busy hands.
Espen: "Then I cannot cut myself!"
once again proudly with laugher: "Morten, now I cannot cut my finger, Morten!!"

Og her er at annet utdrag fra artikkelen, hvor jeg analyserer den beskrevne situasjonen:

5.3 Espen's discovery

In Espen's case, the relationship between his new and old experiences seems to be more complex. His new experiences – gained from the activities of whittling and experimenting with the paper tape – were connected to his earlier experience of bandages on someone's hand. The complexity of his case was also greater because Espen made a few different attempts to solve his problems.

Espen was interested in tools and enjoyed using the knife. When he experienced the injury of my finger and that I took the knife away, he was slightly frightened. However, he did not want to give up whittling; he did not ask about the knife (until later), but found the wooden knife and continued to whittle the same piece of wood with it. When he remarked that whittling with the wooden knife resulted in much dust, I did not assume that he was complaining (he was laughing), but this remark could also mean that whittling with the wooden knife was not effective –This resistance in the tool and the materials was probably what he experienced during the dialogue between him, the material and the tool (Illum & Johansson, 2009). The fact that he still continued with the activity tells me about his motivation for whittling. His desire to use the knife and his fear of it together seem to be a source of his motivation to solve two self-defined problems: "How to use the knife without cutting one's own fingers?" and "How to get permission to use the knife again?"

The experience with the activity, with the hardness of the wood (even if it was soft balsa wood) and the sharpness of the knife were his new experiences. When he apparently gave up the whittling, and started to play with the paper tape, he also gained new experiences with the tape's qualities.

Tape is usually not seen as a three-dimensional material for construction play, but rather as an additional remedy in work with two-dimensional materials. Because children's experimenting with materials can be considered as waste, I suppose that Espen did not have the opportunity to experiment with this type of tape earlier. Christina Thompson (2007) says that children create new meanings when they are given the possibility of improvising with materials. Espen tested the tape's properties and improvised with it for a long time before he came up with the idea to protect his finger. The tape was off-white, sticky on one side, and paper-textured on the other. It was about 2 cm broad and could be torn in chosen lengths. The specific qualities of the tape seemed to remind him of bandages and his conversation with Eva's grandfather who had bandages on his hand. (He used the word "plaster", but I am quite sure that the grandfather's hand was in bandages because this made such an impression on Espen, whereas plasters are seen much more frequently, especially on children's knees). Some kind of internal negotiating of meaning took place in his mind in the moment of his old experiences merging with his new experiences and with his desire to use the knife. Vygotsky suggests that in such moments of internal connections, our brain "creatively reworks elements of this past experience and uses them to generate new propositions and new behavior" (Vygotsky, 2004, p. 9).

I do not know when Espen got the idea to protect the finger. Perhaps the idea came first, or perhaps he accidentally got some tape on his finger and this gave him the idea? Since experience and imagination are mutually dependent (Vygotsky, 2004) either suggestion is possible. The video shows that wrapping the tape around the finger did not take long (only 20 seconds) and that the wrapping was done with his full attention and competence. Possibly, the competence was also a result of his improvisation, experimenting and experience of how careful one has to be to prevent the tape from curling.

Espen's meaning making was a continuous process in which new experiences, thoughts, feelings and memories interacted with each other during the negotiation of meaning.

The new experiences with the knife and the tape seemed to revive his memories about the man with a plaster/bandages. His testing the wooden knife and wrapping his finger, which were attempts to solve problems, also led to new experiences. According to Eglinton (2004), children experience, discover and create during "artistic processes". The experience leads to more experience and motivates further investigation. During this process, the children undergo *personal transformations*, construct new concepts, acquire skills and develop aesthetic competence (Eglinton, 2004).

> "The junction of the new and the old is not a mere composition of forces, but is a re-creation in which the present impulsion gets form and solidity while the old, the "stored", material is literally revived, given new life and soul through having to meet a new situation" (Dewey, 2005, p.63).

The "stored material" – earlier understanding that bandages can be used if one is injured – has been re-created into a new meaning in the situation which required protection from the sharp knife. The new meaning that Espen assigned to bandages was that they could be applied *before* one gets hurt. And the paper tape was given new meaning when it was used to represent bandages.

The mutual influence between Espen's experiences was established through his imaginative, associative thinking. According to Egan (2007), imagination plays an essential role in learning (meaning making) because it allows flexibility of mind. It is the imagination that enabled Espen to make connections between a broad spectrum of experiences, but imagination was also necessary for him to express: to be able to produce something new, he first had to imagine possible solutions. Imagination is the basis of all creative activity (Vygotsky, 2004).

Imagination is a form of thinking that has an important cognitive function: it enables us to imagine possible ways of doing things in our "mind's eye" (Eisner, 2002). When preschool children enjoy "sheer explorations of sensory potential of the materials they use" (Eisner, 2002, p. 5), their experience with materials can stimulate their imagination, as Tom imagined he could flatten the clay by stomping and Espen imagined he could protect his fingers. Unfortunately, imagination is usually not seen as an important part of the process of meaning making. Brian Sutton-Smith (1988, p.7) asks an important question: "What if the imagination is primarily not mere fancy or imitation, but is itself thought's direction?"

The wrapping of the finger was a three-dimensional product of Espen's meaning making. It was his personal solution for the problems he was facing. The motivation was not given externally in a form of an assignment telling him what to make, but it came from his desire to use the knife again, and to use it safely.

> "There is no expression, unless there is urge from within outwards, the welling up must be clarified and ordered by taking into itself the values of prior experiences before it can be an act of expression" (Dewey, 2005, p. 64).

In addition to his expression through the material, Espen also expressed himself verbally. His voice was proud and he had a large smile on his face when he addressed me: "I made a plaster!" and later told his friend the wonderful news: "Morten, now I cannot cut my finger, Morten!!"

Eventually he wrapped the index finger on the other hand as well. And when he asked me to use the knife, his fingers were safe.

Vennlig hilsen Biljana

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