Children's agentive perception uncovered
Research plan

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1 Introduction

The tradition of education and child development looks at the child as learning and developing, but the real growth of the relationship between children and environment happen in processes in which the environment also changes. Children exercise agency in shaping the life of others too. Children's concentration on the very ideas they are about to change, are at the heart of their personal growth and they have the ingredients of the future society with them. A balanced amount of openness is needed to allow educators, children and families to take part in the development of their community, that is, without losing the delicate existing structures that have been built up through the years.

In this research plan, a theoretical model of agentive perception is presented. For the sake of both of their familiarity and their brilliance, Piaget and Vygotsky have been chosen as examples. Piaget got interested in the agency of perception only later in the 1970s (cf. Piaget 1978). Unfortunately that interest did not have time to affect his theory built in the preceding decades (cf. Piaget 1970). In chapter 2.1 the idea of agentive perception is interwoven to Piaget's ideas to complete the picture. Vygotsky's most famous works "Thought and language" (1962) or "Mind in society" (1978) have no trace of agency in childhood, which is strange, as agency is a central part of his early writings which have been become available only recently (cf. Vygotsky 2004). In chapter 2.2 Vygotsky's central ideas are seen through the agentive lens.

In the model, it is the interaction between the organism(s) and the environment which is studied. When the organism (child) is changing, the interaction with the environment is about to change too, which, in turn, changes the environment further. Here openness and change do not have any absolute value. When the agency of children's views is taken seriously it has deep consequences for the childhood research and everyday education. The research on which this plan is based on is presented in chapter three. There are a lot of practical applications of the model, which can not be covered in this short research plan, but one aim of the research is to advance also with the practical tools. The model has been thoroughly tested and is constantly applied in Helsinki both in the planning and conducting interaction. The model has been well received also internationally (cf. Reunamo 2007). Now it is time to advance further: How does agency manifest in different cultures? How is children's agentive perception connected to other central parts of their personality and environmental change?

The research team is a mixture of different disciplines and committed for the advances and further understanding of early childhood. Finland and Taiwan hold the number one position in all the categories of the Pisa results (2006) which shows some aspects of the quality of the

educational values and effective practices conduced in Finland and Taiwan, but we aim higher than passing some tests in flying colours. We hope we are on the road of unleashing the potential of human mind. On that road we have to be humble. We know we have to patient, bold and well-aimed. Please read on.

2 Theoretic background

The agentive nature of children's actions and views has been discussed at length (see James & Prout 1997, p. 4-5 and Corsaro 1997). Nevertheless, the relationship between agentive perception and environmental change has been rarely studied (cf. Reunamo 2007a).

2.1 Piaget and agency

In this presentation, the relationship with the environment is divided into two continuums. Firstly, the child and the environment are examined on the continuum of accommodation-assimilation. The central theoretician of this continuum is Piaget. Do the experiences require changes in the structure of the mental outlook (accommodation)? Or are they processed as fitting in with the existing mental structure (assimilation)? Other theoreticians have similar characteristics in their division of the processing of thinking. Heidegger for example (1966) talks about calculative (Piaget's assimilation) and meditative (Piaget's accommodation) thinking. The second continuum is characterized as that of adaptation-agency. On this continuum, change is central. But, is the change caused by action seen as happening through internalization, where the environmental change is not considered? Further, is perception accompanied by the seeds for environmental change?

<div align="center">Accommodation</div>

Accommodation is defined along the lines of Piaget with the added perspective of agency. Accommodation is hardly ever manifested alone as such, but it is always paired with assimilation. According to Piaget, accommodation is compensation for discrepancy between the mental image and the object. (cf. Gruber and Vonèche 1995, 216). In accommodation, the views of humans change, in order to better correspond with the environment. The environment has some element or elements that cannot be grasped by the perceiver. The idea in accommodation is that the environmental structures are absorbed during active interaction in a way that changes the perceiver's schemas and their relations. Accommodation is the process of changing one's mental outlook during the process.

In Piaget's accommodation, only people's mental outlook changes – not the environment. However, we can also consider people's views as changing the structures of the environment, which means that both people's views and the environment change at the same time.

For mutual change to occur, constant contact is needed to enable two changing systems (one's mental outlook and the environment) to affect each other. Under these circumstances, children and adults must test the accuracy of their own standpoint continuously in order to persist in the change. Children and adults alike need to assess the functionality of the properties of the changing environment.

We can consider accommodation also from the environment's point of view: The ecosystem on the large scale, for example, must adapt to the pressures for change caused by the existence of civilization. If the natural ecosystem does not accommodate, that is, if it does not include human civilization as part of the ecosystem, the ecosystem as we know it can collapse or change unexpectedly. On a smaller scale, environmental change can occur from the children's perspective in adults' behavior; adults can accommodate their view to better suit the children's views, in order to make better contact with children. We thus acquire a joint map with children to orientate in the environment together.

In any case, accommodation refers to realism, although it is not synonymous. The environment is seen as primary and it exists irrespective of our outlooks and our observations. Accommodation is characteristic of the physicist's working method. To the physicist the conformity to law and phenomena of the environment are the value indicators of theories and applications. The physicist tries to understand the world (cf. Lines 2000, 15), and since the physicist is in doubt about its underlying nature, he/she therefore performs tests. By studying the effects of his/her tests the physicist acquires support or hints for either the acceptance or rejection of his/her theory. If certainty is secured and other scientists of the same field strengthen the matter through consensus, the new conformity of law in physics has seen daylight. The physicist aims at the concordance of his theory in similar fashion as a mathematician, but his criterion of a good theory is not in the consistency of deduction. It is above all in the agreement and consistency of observations. If a physicist notices a repeated deviation, which is not suitable for the theory, it is a sign of the need to revise the theory.

Not even the physicist is able to look at reality as such, but he/she is forced to anchor the observations in some kind of mental (often mathematical) structure. However, the direction is clear; the physicist often considers the feedback from the environment as the ultimate criterion for the value of schemas. Accommodation is probably not dependent merely on the detector. Let us consider art. Expressionism for example represents the trend in art in which reality, the art object itself, can have the effect of opening itself up to the perceiver (often emotionally). In expressionism, the work contains embedded within the paint itself the meanings which the detector can experience strongly. The contents are found by going into the work and by considering the work

empathetically. In expressionism, the communication is often emotional and it has an exposed element, which characterizes it as an art form connecting to live situations. It is the spectator's task to find a similar enough experience to make a connection for understanding and feeling.

Accommodation is also related to perception. Heidegger (1966, 46-56) refers to a similar phenomenon in thinking, which he defines as meditative thinking. Heidegger describes it as a question of thinking about the nearest matters connected to us, that is, to ourselves at this historical moment and, in particular, to this place. Looking so closely can be difficult. It is not putting another layer on the structure. In meditative thinking, according to Heidegger, we are freeing ourselves in relation to things and allowing ourselves the possibility of mystery. Reorientation towards things produces new and often creative processes, which enhances the production of new roots. Piaget is also interested in the development of thought, but not in its productive nature. In his genetic epistemology, Piaget primarily considers (cf. Piaget 1970) the developmental and historical nature of schema-production, not the schemas' production-history. Heidegger, on the other hand, refers to the possibility in which thinking can be used to create new contents. In that case accommodation is not a one-way process towards assimilation. Rather, one can produce previously unheard of and unparalleled outlooks, which have previously unseen effects in the environment.

Assimilation

Assimilation is the integration of external objects into parts of oneself (Gruber & Vonèche 1995, 216). Piaget is not very specific in his definition about assimilation, but at least we can say that in assimilation environmental actions are absorbed in such a fashion that they do not alter the already existing schemas. In assimilation we can use our schemas during interaction with the environment. We try to fit the environment into our own mental outlook. Children and adults acquire much new information by assimilating new knowledge from the environment. This information will remain unconnected or it will fit into a known structure like a piece in a jigsaw puzzle. Assimilation means the application of schemas in the course of events.

Structuralism and poststructuralism relate to each other in much the same way as do accommodation and assimilation. The structuralist sees, at one level or another, the underlying structure of the whole and its relations. The structuralist is actively creating a scheme of the environment as the interaction unfolds (accommodation). The product of working with the experiences is successful accommodation; we might have a more accurate or profound idea of the environmental phenomenon. When a model is wholly or partially finished, we might be satisfied with it for a while and we consume it, where appropriate (assimilation). Soon enough, however, the

model will prove incomplete, controversial and insufficient. New ideas emerge, competing with each other. We enter the complicated and scattered world of poststructuralism. If we want to reach mutual understanding again, we have to open up to a dialogue with other actors. The idea of equilibrium is brought to the fore in Figure 1, below.
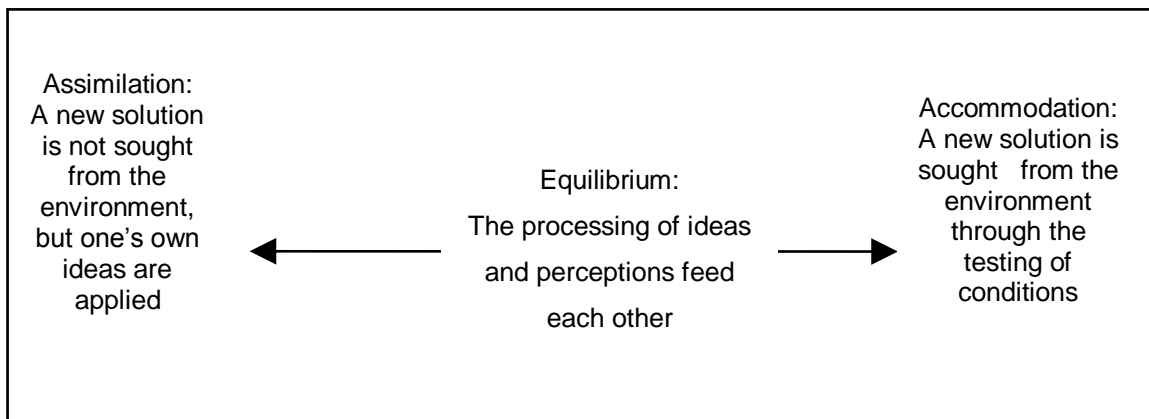
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┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                              │
│  Assimilation:                                          Accommodation:       │
│  A new solution                                         A new solution is    │
│  is not sought              Equilibrium:                sought  from the     │
│    from the                                             environment          │
│  environment,          The processing of ideas          through the          │
│  but one's own   ←──      and perceptions feed   ──→    testing of           │
│  ideas are                                              conditions           │
│  applied                     each other                                      │
│                                                                              │
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Figure 1. The relationship of assimilation and accommodation

The ideas in our minds do not always fit in with each other, which means we have two or more views with contradicting relationships. All these contradicting views are part of our way of seeing things, but depending on the situation and our own interests, we use only one view at a time. If we use two views at the same time, it looks like two different things are happening at the same time. The two conflicting things happening in the same situation, however, remain separated during assimilation.

However, assimilation is not just about incorporating environmental elements and interaction into our existing mental structures, because assimilation also means that we use the environment in ways that our outlooks suggest. A child can use the idea of a stick to substitute that of a branch of a tree or a Lego brick. We relate to things according to our views and thus our views have an effect on our actions. When we hold on to our views and beliefs during the process, we work with the aspects of the environment that we see and that affects the course of events. As we use the environment through our visions of it, the environment is challenged by our visions. If a machine is seen as expendable, it may be destroyed more easily. If the machine is not familiar (thus not fitting into any of our ideas about reality), we may not see the machine at all. If we look at the machine with the eyes of a museum conservator, the historical value of the machine may be considered and the machine can be conserved. The same object or entity can be seen in many ways, which may lead to environmental change, in this case regarding the future of the machine.

Assimilation refers to idealism. As our main channel to reality, we have only our impressions. Reality cannot be perceived as such. Theoretical mathematics is a good example of a way of thinking not directly exposed to physical reality. In mathematics we can define the truth by deductive thinking, if only our axioms on which our thinking rests, is truthful (whereby the existence of truthful axioms is questionable). The same goes for logical thinking to a lesser degree. Kant, for example, described Euclidean geometry as an example of an idea that is necessarily true in spite of our perceptions (cf. Barrow 1999, 28). In mathematics, the axioms do not need to have correspondence in the real world. For some basic assumptions, huge mathematical systems can be produced, without any new feedback from the environment. In that sense, it is astonishing that these abstract ideas, which seem to be independent of all experience, seem to be so applicable to phenomena in the real world. The indifference shown by many specialized mathematicians for these environmental requirements has, nevertheless, produced many usable tools for solving problems in the real world. Which is then the right path, idealism or realism?

Pure assimilation discards the constraints of reality. In assimilation the mental outlooks are adapted as needed, and sometimes they help us in our endeavours. Different views can exclude each other; they can exist without interfering. They may seem to have nothing in common, because they may develop separately, and still they can be used within the same situation. Ideas seem to have an independent character. On the one hand, we are locked into the situation we are in right now. The pure development of ideas without practical work alienates us. Indeed, we can build thinking systems, which manifest the brilliance and power of thought, but through concentration and refinement, our ideas lose their relevance to everyday functions. Assimilation thus also means using the ideas in practice as well. When we see a person assimilating (using) a different reference system, his/her actions seem peculiar to us, even though the system may be highly refined and even though he/she is acting consistently.

Heidegger (1966, 45-46) describes the same kind of thinking when he talks about calculative thinking. In calculative thinking we can have far-reaching plans and aspirations in different fields of life and these undertakings are tied to predefined suppositions. In this way, thinking remains calculative even though it does not consider numbers. When we have reliable presuppositions, we can count on them. And when we can count on our presuppositions, we can be sure to achieve our goals.

Adaptation

According to Kitchener (1986, 54-61), adaptation serves as the equilibrium (balance) between assimilation and accommodation. Accommodation is the moulding of the presuppositions of our

outlooks to make them ready to be used in the incorporation of new objects and in new projects. Assimilation is the use of accommodated mental (or psycho-motoric for that matter) representations. Adaptation is here conceived as the dialogue between internal outlooks and our perceptions. Figure 2 clarifies the idea of accommodation and assimilation working together to open up new possibilities for the actor.

Assimilation:
A new solution
is not sought
from the
environment,
but one's own
ideas are
applied

Equilibrium:
The processing of ideas
and perceptions feed
each other

Accommodation:
A new solution is
sought from the
environment
through the
testing of
conditions

Adaptation:
Better fulfillment of needs
and more possibilities to
enhance life
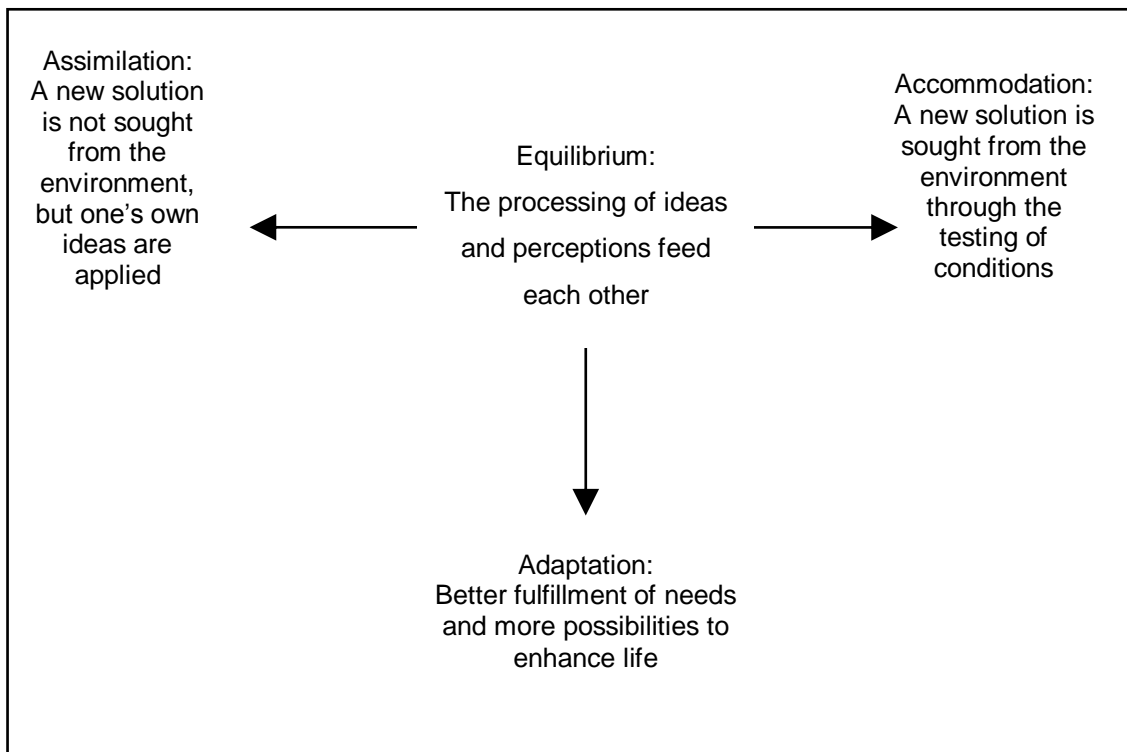
Figure 2. Adaptation

Piaget is interested in the formation of knowledge in the course of interaction. Thus, Piaget's interest lies heavily in knowledge formation through accommodation and assimilation. Nevertheless, as we discussed, in assimilation (mathematics), the pure deduction of ideas can be very efficient. Some models are applicable in many situations.

According to Kitchener (1986, 8-9), to adapt is to seek equilibrium between the organism and the environment. As the equilibrium is the balance between ideas and perceptions, we can perceive only those kinds of things that our ideas permit. The mental images can remain separate and yield to data overload, if they are not actively connected. If knowledge has no equivalent that has been lived through, it cannot be applied consciously. Equilibrium here means that mental images and stimulus cannot operate without each other for long; indeed, they feed into

each other. We find an internal dissonance or an external deficiency, which requires either our internal change or an environmental change.

In Piagetian adaptation, thinking becomes reversible in the end. Although perceptions are not reversible (because time is not reversible), ideas can be seen as being reversible. Reversibility presumes the internalization of perception to thoughts, those inner models of perceptions, which have been worked on. When our thinking system is ready, and when we have gathered experience enough, and worked on the idea, we can establish an inner resemblance of the action or the underlying principles. Only then are we ready (according to Piaget) to use the principles in our thinking operations, group and combine them, and make these operations reversible. One plus one is two. Two minus one is again one. As we do not consider the environment changing, the perceptions and images can sharpen endlessly. Because Piaget was interested in the internalization of permanent structures, the agentive and dynamic nature of mental images must be considered separately.

<center>Agency</center>

In the real world, knowledge is relational (cf. Heidegger 1988, 14). Knowledge must always be evaluated in relation to something else, which means that separate absolute knowledge cannot be found. Our knowledge presupposes some background information. In addition, entropy is part of this background experience, such as when we spill porridge on the floor; the porridge will not fly back to our plate. We can fuse separate pieces of clay together into a single lump, but without work these cannot be separated again. When we work with clay, one plus one can be one. With enthusiasm and work a piece of clay can be almost anything. When we do something, our actions often have an effect on those things, and we might even see the consequences of our actions.

Agency refers to action that has an effect on something. When we in the real world influence environmental change, it does not self-evidently restore itself. However, as we are restoring the thing we have changed; our interaction causes further changes in the environment, because we do not act in an endless vacuum. To get things back as they were requires our resources, time, and energy. In a broad sense, agency involves the real world consequences of actions in the environment. Figure 3 clarifies the distinction between adaptation and agency.

```
Agency:
Environmental change
gives opportunities to
produce new content

        ↑

Assimilation:                                          Accommodation:
A new solution is                                      A new solution is
not sought from          Equilibrium:                  sought from the
the environment,      The processing of ideas          environment
but one's own     ←   and perceptions feed    →        through the
ideas are                  each other                  testing of
applied                                                conditions

        ↓

Adaptation:
Better fulfillment of needs
and more possibilities to
enhance life
```

Figure 3. Adaptation and agency

Change is something other than doing more of the same. Change refers to the conditions of actions. When something changes, the presuppositions of the action change. The effective causes of the action alter. We can say that the motive or motives of action re-orientate. As we look at things adaptively, the action looks symmetrical; the effects of the action are apparently reversible. In agency, however, the effects alter even the conditions of the course of events, which means that the process is not reversible. In agentive perception, things are connected to each other in such a way that changing one alters the others. In the real world, working on things results in a new composition, and the course of events is guided by probability.

The shaping of things acquires a direction. When things move according to our liking, we can talk about development. Sometimes we talk about development also when we talk about the organizational process of complication and hierarchy. According to Piaget (1978, 159) there are two kinds of evolution, an organizing evolution and a modifying evolution, which means that actions, in this case, can get more organized or differentiated. Piaget is interested mostly in this type of

organizing evolution. We must also consider the possibility that the complexity of things may lead to the disorganization of these things. There is no unanimity, as to the underlying cause or direction of change, but for our purposes in this paper, it is enough to say that agency induces change through actions. To anticipate the effects of action we need some familiarity with the actions at hand. The further ahead we anticipate agency, the more likely it will be that the turbulence of the environment will bring forward unfamiliar surprises and thus prohibit the realisation of our visions.

<div align="center">Adaptive accommodation (Piaget)</div>

Adaptive accommodation is a central point of reference in current theoretical and practical discussion about childhood and the development of children's thinking. The pivotal theoretician in this regard is Piaget, whose ideas originate in biology (cf. Gruber and Vonéche 1995). Piaget studied the variation between species and their ability to adapt in different environments. It is typical in Piaget's thinking, that species and individuals develop as they adapt to the environment through active and self-regulating processes. The Piagetian idea of evolution originates in his study of the development of species. (Cf. Gruber and Vonéche 1995, 3-52.)

Piaget sees us as self-regulating systems, which use mental images as tools in adaptation. We experience our tools sometimes as being inadequate, which leads to disequilibrium. After such a discrepancy we need to reshape and actively reorganize our mental images. Thus our equilibrium between learning and applying improves. (Cf. Gruber and Vonéche 1995, 865-866). Equilibrium means that both accommodation and assimilation are present in our orientation. In accommodation, better equilibrium means the successful reshaping of our structures in a given environment.

When we concentrate our attention in the organism's change, the environment looks stable. The theory of child development has examples of the consequences of this type of concentration. Because the environment exists, the task is to become acquainted with it and to cope with it better. Further on, Piaget confines his attention to genetic epistemology, which crystallizes the question: How do the representations of environmental operations become internalized? Figure 4 describes this point of view.
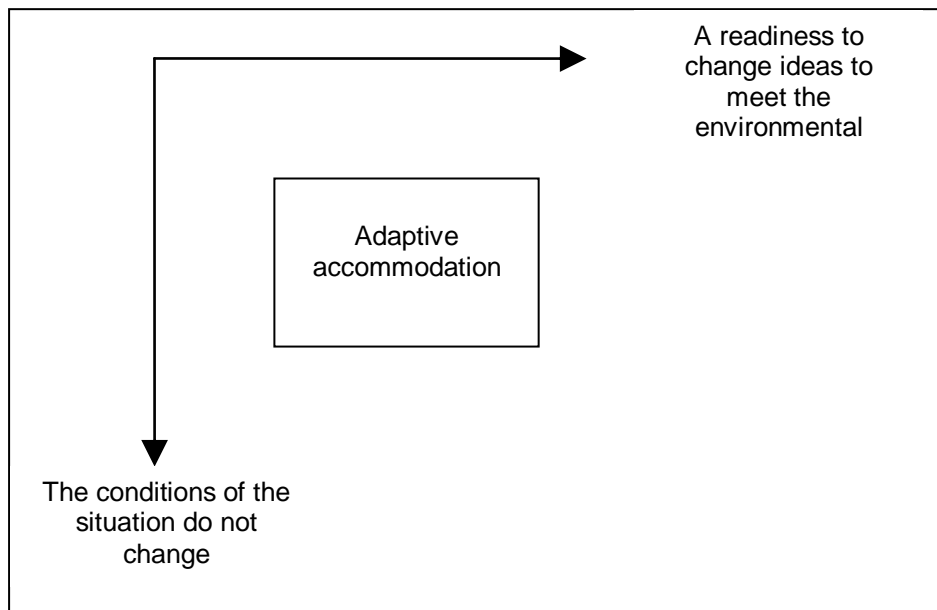
Figure 4. Adaptive accommodation

In Piagetian structuralism it is central to look at the emergence of the mental structure, which eventually also reveals the important relations within structures. Although Piaget acknowledges that when the relationship between organism and environment change both actors in the interaction, his tenacious interest in the development of thought leaves the environment as it is, which makes it look static. When we can look at the structures of an organism through static laws, we do not need to remake our cognitive structures every time we encounter a new situation. This is especially important when the structures become more complicated. In a given environment, we succeed the best when we adapt to the pressures it produces. We need to understand the static environment. We look at the environment through the images matched by the meanings produced during the course of our lives.

Phenomenology originates from a different philosophical tradition, but it ends up having a similar view of reality as that of Piagetian structuralism. The essence of phenomenology is not to discover the developmental history of knowledge, but rather the phenomenologist is also interested in the developments during the interpretative processes. The phenomenologist is not interested in the environmental change, but in the interpretations which have emerged during the course of events. In this sense, we can say that the phenomenologist studies the accommodative process of interpreting the experiences presented to us. When we study language, meaning, interpretation, and understanding in phenomenology (cf. Castle 2006), different interpretations

usually refer to different modes of understanding, not to a different reality produced by that understanding. The experience is important; the experience is interpreted and observed.

<center>Adaptive assimilation</center>

Adaptive assimilation is here discussed in accordance with a Piagetian interpretation. When discussing assimilation as the fitting of environmental experiences to personal mental structures, and adaptation as the interchange of personal and environmental meanings, adaptive assimilation refers to the application of one's own images in the given environment. The adaptation of the organism is never perfect, which means that the mental images are deficient.

Because Piaget does not discuss the environmental change, adaptive assimilation refers to the use of our own mental images and tools, as best we can in this existing world. Assimilation represents our way of looking at things, not for the factual moulding of the environment. In assimilation, we simply use our mental images as they are. The schemas are closed; they do not change during interaction. Because (in Piaget's view) the environment does not change, our use of two mental images means that we act in two different ways. The purpose of Figure 5 is to capture the essence of adaptive assimilation.
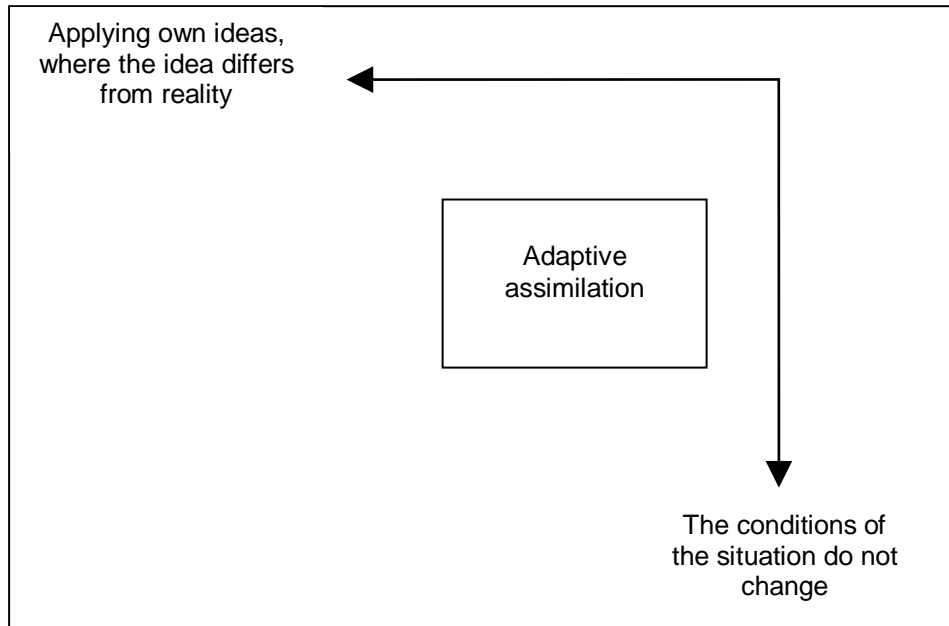

Figure 5. Adaptive assimilation

According to Piaget, it is possible to assimilate new knowledge into the existing knowledge structures without changing the existing structures. Thus, we can have information that is not

related in any way and we can acquire new information without changes during the process. As the relations of this knowledge remain unclear, the knowledge is often restricted for use within the specific situation or the specific context within which it was acquired. As fragmented knowledge has different points of reference, so too the relations of knowledge in this configuration do not integrate.

Piaget was more interested in the construction of knowledge, that is, accommodation. As the information accumulates, the schemas can include more and more accurate information on an increasingly specified situation, but as the information accumulates its scope decreases. When there is no pressure to integrate knowledge, the amount of accumulated information can proliferate as long as memory allows. There is no criterion for more relevant or more important knowledge. A human being that has acquired a lot of knowledge through assimilation can have an exact and strict view of the environment, but it would be alienated, as wise decision-making needs the possibility to compare ideas.

As the old knowledge remains in force, new revolutionary views do not result in change but in chaos. In assimilative adaptation, the human view of reality starts to resemble that of poststructuralism (cf. Peters 2001), where the event is on a complicated crossroads of preferences, discourse, needs and social forces. When the whole is not integrated within itself, moral judgements cannot be made across situations. The feeling for good and bad weakens. When something happens, the result is not synthesis but different alternatives and more differentiation. Therefore, evolution does not look like development but merely becoming different.

When we think of Piaget's ideas of development, adaptation and self-regulation, they are different from that of Darwinian natural selection. Piaget did not see himself studying only change, but more specifically development. Development means direction; it has rationality and reason beyond chance. In this sense, we can say that the Piagetian approach differs from the established view of evolution. Thus the answer to the fundamental question, Is change a rational (e.g. adaptive) or Is change based on chance (e.g. natural selection), is still waiting for an affirmation at least on Piaget's behalf. In this context, it is important to notice that Piaget's adaptation and equilibrium as the central points of development rule out chance and chaos. This theoretical observation might sound distant from the everyday reality of the practical educator, but it has direct consequences for praxis, for example: for the curriculum. When we concentrate only on the child, the dissimilar and chaotic elements of education are not processed and thus, subsequently, are not integrated into the situation, which leaves the child as an autonomous self-regulating entity without cultural footprints.

Agentive assimilation

Agentive indicates the human impact on something and assimilation is the application of ideas without changing them. Thus agentive assimilation here indicates an environmental change according to a certain view. According to Aristotle, nature adapts to the intention, not on the contrary. Kitchener (1986, 29-36), for example, sees that Piaget's theory, while producing the natural development towards the mastery of reversibility, includes a teleological model. Although Piaget's theory as a whole can be considered teleological, whereby Piaget agrees with the idea that the perceiver has an effect on the course of events, Piaget does not study children's perception as the motor of change, which means that only Piaget's theory is teleological, not his interpretation of human adaptation. According to Piaget, development has a motive, an even more balanced adaptation, but he does not study the production of environmentally effective motives. That is why Piaget is not considered in this case a teleological theoretician. In Figure 6 a simplified model of agentive assimilation is presented.
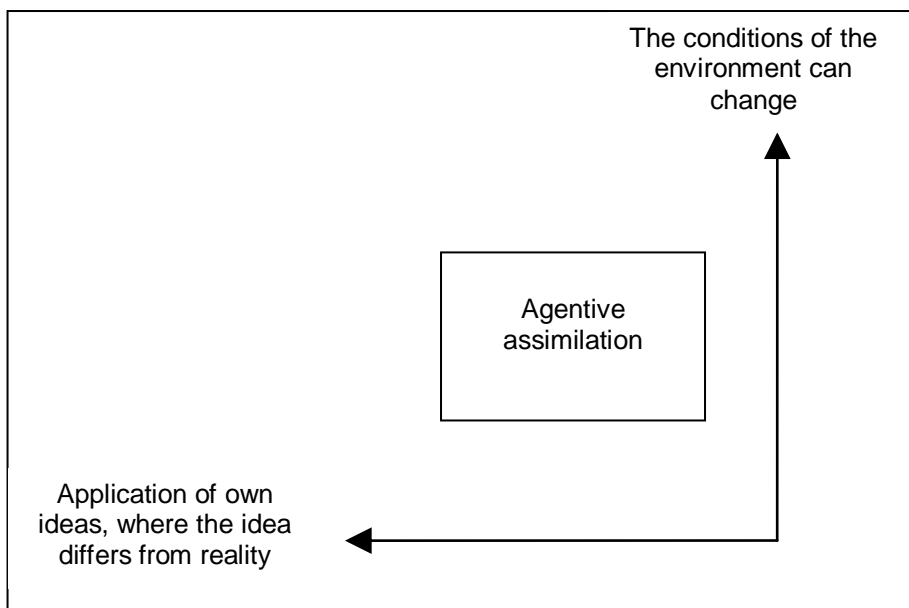
Figure 6. Agentive assimilation

As Vogel (2001, 40) describes, although evolution is based on natural selection, nature often seems to follow a purposeful course of development. The same kind of development or function can manifest itself although there is no interchange of genes. Thick, thorny, leafless plants were developed in the deserts of the old world. They belonged to the same class of the euphorbia, but equivalent plants developed in American deserts into a very different class constituting that of the

cactuses. The common ancestor for the euphorbia and the cactus was not thick, thorny, and leafless. In addition, the human eye and the octopus's eye look alike and they function in a similar way, but their genetic heritage is different. (Vogel 2001, 40.) In this sense, we can say that modern genetic research confirms the old Aristotelian view of nature adapting to an intention, motive, or function.

Teleological (Aristotelian) examination and anticipation of the future is important (see Bulajeva, Duoblienè, and Targamadzè 2004, 24). Hegel's dialectics is also teleological. In Hegel's dialectical model (thesis-antithesis-synthesis), human conscience changes during interaction with a conflicting idea, and the result of two ideas (phenomenon, systems) is synthesis, which gives people opportunity to redirect their lives more effectively than before. In the Hegelian tradition, both the environmental systems and people's ideas have an effect on the course of events. Engels describes the model: The basic idea is that the world should not be examined as a finished product, nor our mental images about them, but both are under a process of continuous change. (Cf. Vygotsky 1978.) Vygotsky's situation is much the same as Piaget's. Vygotsky's theoretic orientation (dialectic materialism) includes a teleological model of human ideas as tools for producing new environmental substance, but Vygotsky also centers his attention on the child changing, not on the changes that children's thoughts produce. In his model of proximal development, Vygotsky describes children's learning with the support of a more advanced peer or adult. By working together with others, a child is able to act in a more advanced manner and the child's development is quicker; but for some reason, Vygotsky restrains himself from examining the children's effect on the other, e.g. on the interacting adult.

The innermost truth-value of the teleological point of view is not unanimous. However, that does not mean that it does not have an effect on the conclusions grounded on the basic assumptions of the theory. When teleological thinking is interpreted in such a way that the ideas' real value or nature is situated in the future, things happening right now seem to be inadequately developed. Important things are not located here and now, but exist in the forthcoming future. In a teleological model, events are easily located on a timeline one after the other, from the past into the future. The meaning of the action flourishes fully only later. This emphasizes the importance of human intentions and motives. Our perception organizes the environmental systems, in a way which assists in their planning, organization and control in such an order that facilitates in fulfilling the desired outcomes.

In pure agentive assimilation, the ideas have an obligatory or intimidating effect. The human being that perceives things through agentive assimilation is an engineer, who uses the environment for anticipated results or products. However, intentionality should not be considered too mechanically. As Breuer (1985, 71) puts it, intentionality is a concept, that not only has an

effect on development, but also has a genetic nature of its own. In this way, human intentional action can be examined more broadly. As Galperin (1979, 160) observes, the basic method for studying human orientation is to look at the development of that orientation.

<p style="text-align:center">Agentive accommodation</p>

Accommodation refers to the openness and change in symbolic representations. Agentive here refers to the effects of action. Agentive accommodation refers to the change of both the environment and the mental representations of it. While in assimilation, the representation and action can exist independently, or the image is applied; accommodation refers always to the relatedness of action and the image of that action. The image is not just applied here, but it is open for environmental feedback, that is, it is open to change. In accommodation, there is a mutual contact between persons and the environment. Agentive accommodation is a process, which also results in perceptible changes caused by symbolic representations. Figure 7 clarifies the idea of agentive accommodation.
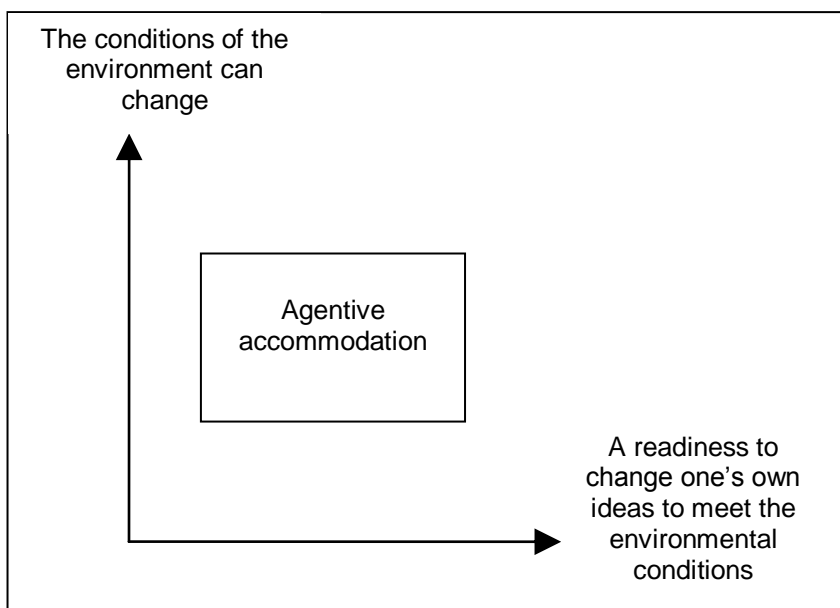
Figure 7. Agentive accommodation

As Vogel (2001, 31) observes, biological nature must follow the inherited plan. Nevertheless, planning humans can use tools invented by other planners. In this sense, culture and ideas can become the agents of change. It is true that our ideas and perceptions cannot, of course, determine the laws of nature. In accommodation, however, the ideas do not come across as such. When we test

our ideas, it causes an environmental change, which can to some extent be anticipated, but as the environment changes, it must be monitored constantly in order to keep up with the changes. Agentive accommodation thus begins to resemble that existentialist spirit of a constant re-evaluation of self in the flow of events. Here, we are approaching the ecological way of seeing nature, wherein it is the change in the relations among all participants which is important. Not only species change, but their relationships with others change (cf. Costall 1986, 11). The whole ecosystem can be triggered in a cycle of change when one part of it changes. The tighter the integration between ideas and actions, the more conscious the change is. In the end, we can say that reality is becoming more conscious of itself. We could draw an analogy to Hegel's idea of subject and object sublimating together as a result of a historical process.

Karl Popper was interested in the interaction of mental and physical events (cf. Popper and Eccles 1984). According to Popper, by testing our hypotheses and evaluating the effects of this testing we can arrive at an increasingly valid picture of reality. As the perceptions are related to the effects, the actual phenomenon and the truthfulness of it remain unclear. We can get a closer look at the environmental systems by persistent processing. We make new experiments, design new ways to work, and thus our ideas and reality become increasingly more congruent with one another. An important idea in Popper's thinking is that of falsification. According to Popper, we can eliminate wrong ideas as we test them. Still, in fact, there is no fundamental difference between verification and falsification, as the falsification can later also be proved to be as false as any other hypothesis. Therefore, what is left of Popper's idea is the tireless activity of testing, which more clearly manifests the deeper problems embedded in their tightly woven details. The continuation of testing does not eliminate the possibility of mistakes, but rather promotes the interchange between ideas and the environment thereby opening it up for potentially modifying feedback.

According to Popper, the perception of our unending test results is not a mere copy of the environment, but an outcome of a creative action (Popper and Eccles 1984). In Popper's view, theory is always situation-specific and it is related to the historical and cultural process. When we test the properties of new things, our conception has an effect on the tests we carry out. We can, for example, think that the era of steam engines affects our thinking, wherein the focus is on pressure, power, and force. In the era of the information society, conversely, we might rather test our beliefs through the lenses of information processing. Focus on knowledge produces many results concerning knowledge. When we look at people as data processors, our perceptions are selective. As we work with and elaborate creatively different types of information technology, this focus escalates the cultural changes as well as our ideas. Thus, when our views and environment integrate simultaneously, we accommodate agentively.

Popper (Popper and Eccles 1984, 210) defines cultural evolution as a possible result of the emergence of mind through natural selection. Experimentation and testing produce new content. Sometimes the perceptions remain inconsistent; sometimes they integrate into a larger whole. A small thing gets more complicated and the content becomes richer. Testing, in this light, requires creative new ways to look at things, which further escalates the diverse and abundant interaction. Thus, a simple thing can reveal itself as an endless source of potential. Creative processes are often inductive and cumulative.

Fröbel tightly interwove the aspects of perception and process. Both Fröbel's and Piaget's thinking have been influenced by the evolution of nature. When Piaget looks at the development of knowledge processes in the environment, Fröbel sees the knowledge processes changing the environmental development process itself. According to Fröbel, life is an evolutionary process, and education enriches this evolution. Human beings thus discover a more profound idea of their own evolution and, in such a manner, the idea can become an evolutional property itself. (cf. Curtis & Boultwood 1958, 374-375.) Figure 8 summarizes the basic suppositions here presented.

Agentive assimilation

- Aristotle (nature adapts to the purpose, not the other way around). Teleology, Hegel, Marx, motives, goals, plans, production, organization, control, management, results.

- The events happen on a timeline from the past to the future. Because now is a fleeting moment, the important things are situated in the future. The event is related to the image in the future and is now unsatisfactory.

Agentive accommodation

- Popper. Suppositions can be tested only indirectly by examining the effects of the experiment. Through persistent testing we can reduce badly working inferences.

- Experimentation and tests produce new content. From a small seed, complex and rich processes can be created. Ecology, creativity, feedback. The event relates to its own potential, which is almost endless.

The environment changes

Idea differs from action

Idea is influenced by action

Adaptive assimilation

- The event is on a complicated crossroads of tastes, discourse, needs and social forces, without a shared whole. Situations reflect different ideas. Using the same idea in a different situation creates a different event

- Poststructuralism, postmodernism, evolution theory, difference, coincidental, probability. The event is related to different alternatives. The events are not necessarily related.

Adaptative accommodation

- As reality exists, it is reasonable to understand it. A good way to relate to the environment is to adapt to it. The mind is open to the occurring events. In the environment as a whole, everything is connected.

- Structuralism, constructivism, Heidegger, hermeneutics, integration, synergy, rearrangement. An event is related to the whole.

The environment does not change

Figure 8. Different views of the relationships between perception and environmental change.

The four different views described earlier have direct consequences for learning and educational practice. For some reason the constructivist view of learning has domineered the discussion on learning, but we need to consider the relative openness and change of the learning.

In adaptive accommodation understanding is essential. Children process the conditions of environmental and cultural evolution and get acquainted with it better and better. Children start to process the task at hand to see what is valuable and what can be learned. Along the process children get deeper and deeper understanding. Children's ideas and environmental processes are intertwined in many ways. Children's views change during the learning in order to better cope with development. Learning happens through scaffolding and cooperation. In the end

children are better equipped to work for a sustainable future. Adaptively accommodative learning produces synchrony and joint understanding, which helps us to work on sustainable development together.

In the learning that concerns adaptive assimilation children's own knowledge and skills are important. Children learn about different views. Development can be seen as an endless and controversial discussion. Facts are not learned as such but memorized and elaborated further. Learning can be autonomous and self-regulating and happens often in separate learning environments. Adaptively assimilative learning produces a lot of new knowledge and perspectives. Rote learning is important too.

In the learning concerning agentive assimilation children practice their skills on using their knowledge as a tool. Children try to control and organize environment with their knowledge and skills. Children work for the goal they see appropriate. Children see the better future and try to reach it. Learning is a struggle for successful work and more skilful action.

When learning can be characterized as agentively accommodative, there is an air of creativity and testing. Children try out new models and work on them with other children and adults. As new tools for producing sustainable development emerge, they are tested further. Thus children learn things that did not exist before the learning started. Learning is in the vanguard of things to come. Learning happens through mutual planning and designing and often in a creative group which is active in innovation and application of new ideas and techniques. Agentively accommodative learning in SD should include producing and testing new practices together with children. The more used the children are to participating in the processes of his/her surroundings, the more prepared they will be for participating also as adults. (See Reunamo 2004.)

On the whole, development can be seen as ways of regarding change. This chapter has been about openness and change, but the two constructs are relative. Openness and change have no absolute value.

2.2. Vygotsky and agency

This presentation is organized according to similar principles as the previous chapter, but because of differences between Piaget and Vygotsky producing a somewhat different outcome. First there is the continuum from interpsychological to intrapsychological (Vygotsky 1962, Vygotsky 1978). Secondly, there is the continuum from acting within the existing reality to creating the future and altering the present (Vygotsky 2004, pp. 7-8). First the continuums are studied shortly and then a fourfold table is made of the two continuums, resulting in four different functions phases of interaction.

Interpsychological vs. intrapsychological

Vygotsky (1978) describes the first continuum from interpsychological to intrapsycholigical: An operation that initially represents an external activity is reconstructed and begins to occur internally … An interpersonal process is transformed into an intrapersonal one. Every function in the child's cultural development appears twice. first, on the social level, and later, on the individual level; first, between people (interpsychological), and then inside the child (intrapsychological). All the higher functions originate as actual relations between human individuals. Aspects of external or communicative speech as well as egocentric speech turn "inward" to become the basis of inner speech. (Vygotsky 1978, pp. 56-57.) Vygotsky describes the development of the language functions starting between people and only after that inside the child. According to Vygotsky (2004), this applies also to imagination. "Everything the imagination creates is always based on elements taken from reality, from a person's previous experience ... Imagination always builds using materials supplied by reality. It is true … that imagination may create more and more new levels of combination, combining first the initial elements of reality (cat, chain, oak), then secondarily combining fantastic elements (mermaid, wood sprite), and so forth, and so on. But the ultimate elements, from which the most fantastic images, those that are most remote from reality, are constructed, these terminal elements will always be impressions made by the real world (Vygotsky 2004, pp. 13-14). The interpsychology vs. intrapsycholgy differences are condensed in Figure 9. The arrow points the direction of the relationship.

←——

Intrapsychological	Interpsychological
1. Individual level 2. The child begins to master his attention, freeing him to reconstruct perceptive field 3. External stimuli can be used as an instrument for organizing the task 4. The content of memory recollections is guided by the thinking process, e.g. logical relations 5. The activity is turning inward, gradually becoming inner functions S 6. cientific concepts organized into a system of generalized relations	1. Social level 2. The attention is guided by external stimuli 3. External signs needed for thinking and language tools 4. The content of thinking act is determined by concrete memory recollections 5. The signs are presented or attached as external forms of activity 6. Concrete spontaneous concepts have no distance from the immediate experience

Figure 9. The interpsychological vs. intrapsychological activities (cf. Vygotsky 1978, pp. 31-57; Vygotsky, 1962, pp. 116-117; Reunamo & Nurmilaakso, 2007, p. 315)

Vygotsky (1978) describes: "The internalization of cultural forms of behaviour involves the reconstruction if psychological activity on the basis of sign operations. Psychological processes as they appear in animals actually cease to exist; they are incorporated into this system of behaviour and are culturally reconstituted and developed to form a new psychological entity. The use of external signs is also radically reconstructed. The developmental changes in sign operations are akin to those that occur in language. Aspects of external or communicative speech as well as egocentric speech turn "inward to become the basis of inner speech." (Vygotsky 1978, p. 57.)

Cultural products vs. cultural production

The other important continuum for Vygotsky is from using cultural products to producing culture. The idea of perception piercing through matter is already manifested in his early writings (first published in English 1971) presenting Vygotsky's works in the years1915 to 1922. Although not in very cohesive way but still clearly Vygotsky sees the central point of dialectic equilibrium as he describes the role of art in children's lives: "The art is the supreme method for finding an equilibrium between man and his world, in the most critical and important stages if his life" (Vygotsky 1971, p. 259). It is important to see the difference between Vygotsky and Piaget. Piaget studies the equilibrium between accommodation and assimilation, processes embedded within the child (cf. Kitchener 1986, pp. 54-61). Already in the early 1920s Vygotsky looked at the equilibrium between inner and environmental changes.

Even though Vygotsky was an early discoverer of the agentive role of children's thoughts and action, we must acknowledge, that he was not the first one. The father of early childhood education, Friedrich Froebel, was influenced by Hegel's dialectic nature of evolution. As Curtis & Boultwood (1958) describe, Froebel saw the knowledge processes changing the environmental development process itself. According to Froebel, life is an evolutionary process, and education enriches this evolution. Human beings can thus discover a more profound idea of their own evolution and, in such a manner; the idea can become an evolutionary property in itself. (cf. Curtis & Boultwood 1958, pp. 374-375.)

Marx and Engels were influenced by Hegel's dialectics too. Then again, Vygotsky's study of human development was deeply influenced by Friedrich Engels, who stressed the critical role of labor and tools in transforming the relation between human beings and their environment (cf. John-Steiner and Souberman 1978, pp. 132). In his book "Thought and language" (1962, first published posthumously 1934) Vygotsky is not anymore interested in the cultural productive nature of communication. Rather, he concentrates on the inner workings of thought and language and also in the developmental history of language, not language as history producer. In the collection "Mind in society" (1979, edited from original writings in 1930s) the idea of culture production is included occasionally. Nevertheless, most clearly Vygotsky discusses the process of history production in his book "Imagination and Creativity in Childhood" (2004), originally published in 1930. The book was long obscured by later writings in west. It was first translated in Italian in 1972 and in Swedish in 1998 (cf. Lindqvist 1998, p. 7).

The later compiled more famous books omit the central idea of children's agency. The reader starts to wonder the role of censorship in the later works, because it is hard to understand the sudden absence of a central idea deeply rooted in Vygotsky's background. Nevertheless, in "Imagination and Creativity in Childhood" Vygotsky description is clear: "All human activity … that results not in the reproduction of previously experienced impression or actions but in the creation of new images or actions is an example of … creative or combinatorial behaviour. The brain is not only the organ that stores and retrieves our previous experience, it is also the organ that combines and creatively reworks elements of this past experience and uses them to generate new propositions and new behaviour. If human activity were limited to reproduction of the old, then the human being would be a creature oriented only to the past and would only be able to adapt to the future to the extent that it reproduced the past. It is precisely human creative activity that makes the human being a creature oriented toward the future, creating the future and thus altering his own present." (Vygotsky 2004, p. 9.) In Figure 10 the central differences between working with culture

products and producing culture, which Vygotsky describes at length throughout the book, are described. The arrow shows the direction of the relationship.

Creating new content
1. Combinatorial or creative behavior
2. Generating new propositions and new behavior
3. Culture as the product of human imagination and creation
4. Individual creativity combined to humanity
5. Productive imagination
6. Imagination becomes a way to broaden experience
7. Imagination becomes reality, creating the future

Culture products
1. Activity is reproductive
2. Activity is linked to memory
3. Resurrecting traces of earlier impressions
4. Following a specific model
5. Something that already exists
6. Facilitates the adaptation to the world
7. Habits repeated under a particular set of conditions

Figure 10. Activities with culture products and activity in producing culture (Vygotsky 2004)

According to Mayall (2002), a social actor does something, perhaps something arising from a subjective wish. The term agent suggests a further dimension: negotiation with others, with the effect that the interaction makes a difference – to a relationship or to a decision, to the workings of a set of social assumptions or constraints. When children are seen as agents, they are seen as contributors to the social order (Mayall, 2002, 21, 178). Even withdrawing children may find their personal channels for impacting others (Reunamo 2005). It is not only the matter what children can do, it is more how effectively they can apply their skills when needed (Reunamo & Nurmilaakso 2006).

As Galperin observes (cf. Arievitch and Haenen, 2005), the ability of looking ahead (orientation) is a precondition to and even a prime aspect of learning. Bodrova and Leong (2006) discuss the impact of Vygotsky's ideas on pedagogy. They point out that to develop self-regulation children need to engage in regulating others too. By discussing and planning, children engage in high levels of both "self-" and "other-regulation" (Bodrova and Leong 2006, pp. 206-220). The more accustomed the children are to participating in the processes of their surroundings, the more prepared they will be for participating also as adults (cf. Reunamo 2004.)

Now we are ready to unite Vygotsky's ideas about language development according to his two central theoretical continuums, which have often been described separately. In Figure 3 a fourway table of the two continuums is formed (Reunamo, 2007a). The theoretical aspects of

(3) Instrumental tools	Language as a tool for personal, social and cultural production	**(4) Producing tools**
• The language is the connection between child's objectives and reality. Different language produces different interaction and different outcomes. • The child's personal way to express and influence. The impact is not wholly restricted by the language deficiencies. • Child's will shape up according to the experiences. Language is a tool for influencing environmental changes.		• Child's contribution to the social content. Child tests the limits of language, stretches the limits of language and remolds it. • Dialogue produces a common language. This synthesis reaches out to the experiments of the others thus enhancing the content of both partners. Creative expression with play. • Participative language learning is producing new communication and cultural contents, producing new tools.

Intrapsychological, language development inside the child

Interpsychological, language development starts between people

(2) Actual development	Language as cultural product, as signs, semiocis and meaning	**(1) Proximal development**
• The language the child has learned and can use without help from others. The developmental phase of the child. • The internalized language tools and restrictions for processing things • The language of the child tells about child's feelings, imagination, orientation, inner images and skills. • Learning is adding elements to own language and inventing new elements.		• Child's open and involved contact to social, advanced language helps the child in produing more advanced language. The child learns the uses and cont • nts of language to better correspond to the "correct" language, the socially shared language with others. • Accommodative language learning is reaching for even more skilful language use that can appreciated and benefited by others too.

Figure 11. Vygotsky's ideas of language development arranged according to social and agentive continuums (Vygotsky, 1962; Vygotsky, 1978; Vygotsky, 2004; Reunamo & Nurmilaakso, 2007, p. 317)

Proximal development

In the first type of development presented in the south-east corner of the Figure 3, the developmental aspects are interpsychological and they do not concentrate on the culture production; rather, cuture is seen as something that can be can be learned with the assistance of others.

Vygotsky (1988, p. 268) emphasised the contexts of learning, social interaction. He demonstrated the social and cultural nature of the development of the higher functions, i.e. its dependence on cooperation with adults and on instruction. The zone of proximal development is perhaps Vygotsky's (1978) most famous idea. In his description Vygotsky concentrates on the child's development, not on the culture produces by the interaction. The zone of proximal development is defined as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. The zone of proximal development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. The zone of proximal development characterizes mental development prospectively and permits us to delineate the child's immediate future and his dynamic developmental state, allowing for what is in the course of maturing. We can predict what will happen to these children between five and seven, provided the same developmental conditions are maintained.

According to Vygotsky (1978) by using imitation, children are capable of doing much more in collective activity or under the guidance of adults. The only "good learning" is that which is in advance of development. The acquisition of language can provide a paradigm for the entire problem of the relation between learning and development. Language arises initially as a means of communication between the child and the people in his environment. Only subsequently, upon conversion to internal speech, does it start to organize the child's thought, that is, becomes an internal mental function. Vygotsky 1978, pp. 88-89.)

Vygotsky (1978) acknowledges that communication produces the need for checking and confirming thoughts, a process that is characteristic of adult thought. In the same way that internal speech and reflective thought arise from the interactions between the child and persons in her environment, these interactions provide the source of development of a child's voluntary behaviour. A child first becomes able to subordinate her behaviour to rule in group play and only later does voluntary self-regulation of behaviour arise as an internal function.

According to Vygotsky (1978), 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. Once these processes are internalized, they become part of the child's independent developmental achievement. Learning is not development; however, properly organized learning results in mental development and sets in motion a variety of developmental processes that would be impossible apart from learning. Thus, learning is a necessary and universal aspect of the process of developing culturally organized, specifically human, psychological

functions. The developmental process lags behind the learning process. Learning turns into development, but the complex processes cannot be encompassed by unchanging presuppositions. The teacher should have a contact in the mental processes stimulated by the course of school learning and carried through inside the head of each individual child. (Vygotsky 1978, pp. 90-91.)

According to Reunamo (2007a), child's different language skills are not just deficient, they express child's personal orientation, motifs and strategies to deal with the world. In the perspective of the educator it is important to get in contact with child's ways of using language as skills, not insufficiency. Child's own language is a mirror to child's abilities and personality and important thing to him, the educator gets familiar with the territory of world according to the individual child (Reunamo, 2007a, pp. 89-98).

Vygotsky restrains himself from examining the children's effect on the other, e.g. on the interacting adult. As Hakkarainen (2002) describes, the zone of proximal development is different, when there is a new creative task at hand, in which even the adult does not have a readymade solution. The zone of proximal development is clearly meant for reproductive problems, in which the other knows the answer in advance or can solve it along the lines of previous experience. Some actions produce novel artifacts, which can be used as a tool in the next action. Culture-historical development is not a cumulative process; it is rather a new organization of systems both between and within systems (cf. Hakkarainen 2002).

In proximal development there is also a side that Vygotsky did not elaborate on and that is children's ability to help adults for better communication (Reunamo, 2007a, p. 93). We need to only look at a small baby in interaction with his grandfather. The grandfather may usually be quite proper and verbally accurate person. If another adult asks him to babble and gurgle he maybe could not or would not do it. But in a matter of seconds a small baby can turn a stiff grandfather into an eloquent and mobile mime artist full of emotional expression and tacit communication. That is the level of proximal development for the grandfather. The child helps grandfather to get in contact with, and to express, his feelings better. The grandfather maybe thinks that he is just playing, but the truth is he would not reach the same emotional and personal expressions without the child. Maybe it would be more proper to redefine the level of proximal development as a zone of mutual experience and contact (Reunamo, 2007a, p. 93).

<div align="center">Actual development</div>

The second type of development described here is intrapsychological. The developmental aspects of this type of development do not concentrate on the culture production; rather, language is seen as cultural product, as signs, semiotics and meaning. According to Vygotsky (1978) the first level can

be called the actual developmental level, that is, "the level of development of a child's mental functions that has been established as a result of certain already completed developmental cycles. When we determine a child's mental age by using tests, we are almost always dealing with the actual developmental level. In studies of children's mental development it is generally assumed that only those things that children can do on their own are indicative of mental abilities (Vygotsky 1978, pp. 85).

A child's actual developmental level (cf. Vygotsky 1978) defines functions that have already matured, that is, the end products of development. If a child can do such-and-such independently, it means that the functions for such-and-such have matured in her. The actual developmental level characterizes mental development retrospectively it is about developmental cycles already completed and a summary of them (Vygotsky 1978, pp. 86).

According to Gullo (2005) the evaluation and concern of children's actual development level is important. The tests inform curriculum and instruction. The developmental screening tests can be used to measure children's potential for learning. They are suited for comparing an individual child's score with those of other children of similar age. The skills related to communication and thinking include language comprehension and expression, reasoning, counting and recalling sequences from auditory stimuli. With diagnostic test it is possible to identify the existence of a disability or specific areas of academic weaknesses as well as to suggest potential remediation strategies. Many early childhood programs use achievement tests to assess children's progress or level of attainment, which measures that extent to which an individual has achieved certain information or attained skills that are identified within curricular objectives (Gullo 2005, pp. 45-47).

Concentrating on the actual development and on tests have disadvantages too (Gullo 2005). Norm-referenced assessments do not reflect curriculum sensitivity. They are often based on skill development approaches and reflect a theoretical perspective that is more behavioural than constructivist. They assess specific skills or knowledge learned rather than the process of learning. This often leads to teachers teaching to the test, and thus the norm-reference assessment has the effect of narrowing the curriculum. The tests can inadvertently reinforce developmental difference and solidify student status. The tests may segregate children, they ignore children's experiences and they present a narrow picture of children (Gullo 2005, pp. 66-73).

Vygotsky (1978) criticises further the concentration on the level of actual development. In evaluating mental development, consideration is given to only those solutions which the child reaches without the assistance of others, without demonstrations, and without leading questions. The implication to solve a variety of more advanced problems is not studied. By

using tests, we determine the mental development level with which education should reckon and whose limits it should not exceed. It can result not only in a failure to help children in their development but also by reinforcing their handicaps by accustoming children to the forms of earlier development and suppressing the rudiments of advancing. Vygotsky limits the level of children's actual language learning to assimilating new words or mastering operations such as addition or written language. (Vygotsky 1978, pp. 88-90.)

We can see that the actual development fits within the south-west corner of the model presented in Figure 3. Nevertheless, we must further on acknowledge that also intrapsychological development can be creative and productive. The richer the experience the child has acquired, the richer and more productive the act of imagination can be (Vygotsky 2004, pp. 15-16). As long as the child keeps his imagination to herself, the products (tales, play etc.) are unreal. Intrapsychological creativity can enrich and produce new content in children's experiences. According to Vygotsky (2004), even if an imaginative construct does not in itself correspond to reality, the feeling it evokes are real. A musical composition can induce a whole complex world of experiences and feelings in a person listening to the music. This expansion and deepening of feelings, their creative restructuring constitutes the psychological basis for the art of music (Vygotsky 2004, pp. 20). The child recreates music. Creativity can also lead away from reality (Vygotsky 2004). Children can for example retreat into dreaminess, escape into an imagined world, withdraw or isolate themselves (Vygotsky 2004, p. 37). We can say that this kind of imagination is intrapsychological and is not directed towards environmental change.

According to Reunamo (2007c, p. 90), this kind of language development can be described as closed and adaptive. The language is seen as child's abilities or skills. When the child's use of language is different from the legitimate language use, it is often interpreted as erroneous expression or a mistake. Children's use of language seems deficient. But the language is still important and legitimate for the child, because it is a tool for communication. Child's actual language skills are like a toolbox for child's own tools, which child uses for his own purposes and his own personal ways.

Child produces also a lot of language that is not correct (Reunamo, 2007c, p. 90-93). The younger the children the more they communicate non-verbally. Baby's communication is very different from the proper use of adult speaking. Nevertheless, the young child is capable of efficient, even interactive communication without words and grammar. He communicates with the whole of his body actively seeking for contact. The secret for the effective communication is the integration of the whole personality with all the emotions and aspirations mixed within. We should not consider child's contact to his feelings, needs and motifs for orientation as something primitive

or undeveloped. Children's ability to express themselves directly, emotionally, unrestrained and right to the point should be cultivated to ensure that the ability is not lost in the course of development. The more important the message, e.g. hunger, fear or need for affection, the more effective the child's communication. In the perspective of the early childhood educator this means that we should not only be interested in developing children's language skills to be more correct or perfect. Correct is not a synonym for effective. Children's communication is a path to the heart of their being. That is valuable in itself. (Reunamo, 2007c, p. 91) Podmore, Sauvao and Mapa (2003, p. 35) emphasize that when young children move from one educational setting to another it is important to understand the cultural context of their prior experiences, given that children's culture-specific experiences, that their development of language and literacy skills, are interconnected.

In Finland Karlsson and Riihelä (Karlsson 2004) have developed a method of writing down children's stories (sadutus). The child produces a story, the adult writes it down exactly as the child tells it. In the end the adult reads the child's story aloud and checks that it is the child meant it to be. This kind of language production helps adults to get in contact with children's language and inner world and also helps in children's participation as bringing children's ideas forward as interesting and worth processing further (Karlsson 2004).

Instrumental tools

The third type of development described here is intrapsychological and the focus of the development is on the culture production, language is seen as a tool for personal, social and cultural production. According to Vygotsky (2005), while at a year and a half, the child makes a discovery – everything has a name. Later, in play, the child discovers that each thing has its meaning; each word has its meaning, which can replace the concrete object. Internalization is based on emancipation of the word from the thing in play. But the child needs concrete other things to support the emancipation of words from concrete objects. To separate the meaning of horse from the real horse the child still needs another concrete object to support the image for example using a stick as a horse. The same applies to goals. First the child's goals are inseparable from the real things. Voluntary intention and motives associated with the will arise in play. Play gives the child a new form of desire, that is, teaches him to want. The child desires and fulfils his desire, passes the main categories of reality through his experience. The will, an internal process, becomes to external action. The route from separating meaning from the thing is similar to the route of becoming conscious of desires and motifs. Voluntary choice, decisions, conflicting motives, and other processes start to separate from implementation. The route to will is the route to thinking. In fact, random performance becomes more difficult (because it is blind) than conscious choice (Vygotsky

2005). Thus, the goals, signs and language start to function as tools and instruments for environmental change.

According to Vygotsky (2004), a child's play is not simply a reproduction of what he has experienced, but a creative reworking of the impressions he has acquired. The child combines impressions and uses them to construct a new reality, one that conforms to his own needs and desires. We have a situation that the child has created. All known elements from previous experience are combined into something new that belongs to the child himself. It is this ability to combine elements to produce new structure, to combine the old in new ways that is the basis of creativity. Vygotsky states that a construct of fantasy may represent something substantially new, never encountered before in human experience and without correspondence to any object that actually exists in reality: however, once it has been externally embodied, that is, has been given material form, this crystallized imagination that has become an object begins to actually exist in the real world, to affect other things. In this way imagination becomes reality (Vygotsky 2004, pp. 11-20).

Vygotsky (2004) sees us using our imagination and constructs as tools or instruments for change. If the life surrounding does not present challenges to children, if the usual and inherent reactions are in complete equilibrium with the world around him, then there will be no basis for him to exercise creativity. A creature that is perfectly adapted to its environment, would not want anything, would not have anything to strive for, and, of course, would not be able to create anything. Creation gives rise to needs, motives and desires. Moreover, a product of the imagination, which has arisen in response to our drive and inspiration, shows a tendency to be embodied in real life. The imagination tends to become creative, that is, to actively transform whatever it has been directed at (Vygotsky 2004, p. 29, p. 41). Language becomes a tool and an instrument for an individual for environmental change.

A small child as a comprehensive being participates with his/her whole body, seeking contact and finding the effects of his or her actions. It is the task of the education to recognize the expressions concerning child's needs, motifs and well-being. In perceiving agency on the adult the children's expression can advance and the world can take a personal shape for the child. Sometimes a small child is seen as incompetent or defiant communicator, but we need to only look at the family that the baby is born into. Suddenly the parents' life is changed irreversibly. The baby effectively changes the family dynamics to suit his/her needs and aspirations and there is nothing the parents can do about it.

To complement children's story telling (sadutus) we could establish a tradition of "action telling" ("todetus"). In it children could describe what they would like to happen for

example in the gymnastic exercises, the adult would write children's ideas down and checks that it is according to children's meaning and then children's ideas would be realized to the letter. That makes a great workout for the problematic relationship between reality and imagination.

<div align="center">Producing new cultural tools</div>

The fourth type of development, described in north-east corner of Figure 3, is interpsychological and the focus is on producing cultural tools. This means that language is not only used as a tool, but new forms of communication and language are developed. When interpersonal, these new developments become new cultural tools. Vygotsky (2004) describes the process of intrapersonal becoming interpersonal: Creativity is present, in actuality, not only when great historical works are born but also whenever a person imagines, combines, alters, and creates something new, no matter how small a drop in the bucket this new thing appears compared to the works of geniuses. When we consider the phenomenon of collective creativity, which combines all these drops of individual creativity that frequently are insignificant in themselves, we readily understand what an enormous percentage of what has been created by humanity is a product of the anonymous collective creative work of unknown inventors. (Vygotsky 2004, pp. 10-11.)

The collective work depends on cultural conditions. According to Vygotsky (2004), imagination can produce experiences. We can imagine what we have not seen and conceptualize something that we ourselves have never directly experienced. The historical or social experience allows us to venture far beyond our own experiences and share. Every inventor, even a genius, is also a product of his time and his environment. His creations arise from needs that were created before him and rely on capacities that also exist outside of him. No invention or scientific discovery can occur before the material and psychological conditions necessary for it to occur have appeared. (Vygotsky 2004, p. 17; p. 30.)

The collective cultural creation concerns also children and the best way for children to become culturally productive and participative adults is to be culturally productive as children. Vygotsky (2004) states: The product of creative imagination is an ideal that is only manifest with true and living force when it guides human actions and activities in its drive to be realized or embodied. The shaping of the imagination is reflected in the child's behaviour. Thus the development of imagination is no less important for the future than it is for the present. The development of a creative individual, one who strives for the future, is enabled by creative imagination embodied in the present (Vygotsky 2004, pp. 41-42; pp. 88).

When the child is small, the adult and the child make an original language that would not exist without the other. The ability of the small child to change adult behaviour is substantial.

Playing on words, a new kind of humour and the meaning tied directly in the unfolding action enrich both the child's and adults communication. When a child gets used to producing communication with others, children learn to participate and produce cultural products together with others. As the child's attention is focused on the adult's language, the interpretation merges with meaning. We as educators have to hold ourselves back though. As Amabile (1987, pp. 242-252) states, creative interaction requires a relaxing atmosphere. By stressing hard on teaching children to learn "good" language, the creativity gets harder and our attention is lured away from the process itself.

In a research with kindergarten teacher students (Reunamo & Nurmilaakso, 2007) the model (Figure 3) produced different teaching orientations, which are presented in Figure 12.

(3) Instrumental tools
- Children's motives are important for understanding the purpose of the talk. The purpose is the key to the content and dynamics of children's talk.
- Even the same expressions words carry different meanings and outcomes. The teacher needs to help the child to express himself or herself.
- The teacher discusses the children's needs, opportunities and strategies with children and helps in their realization.

Language as a tool for personal, social and cultural production

(4) Producing tools
- Children say something and it results in new action. The teacher observes the process and partakes in it.
- When new things happen, the teacher gets into a new position with new things to learn.
- The teacher needs to keep in contact with the evolving process to keep in contact with the new content. There is an air of making cultural development together.

Intrapsychological, language development inside the child

Interpsychological, language development starts between people

(2) Actual development
- The teacher needs to see and find out about the deficiencies and advances in children's language.
- Teacher concentrates on semantics, morphology, vocabulary, understanding, expression, grammar and syntax.
- Teacher tests, listens and analyses children's use and acquisition of language.
- Teacher teaches children "good" language.

Language as cultural product, as signs and meaning

(1) Proximal development
- The teacher engages the child in processing language.
- Children's thoughts, emotions and opinions are important and they should be brought into contact with better content and understanding.
- Teacher helps the child to get in contact with both his or her own feelings and provides new content for integration.

Figure 12. The teacher orientations resulting from the Vygotskian models of language development.

Different views on learning have different consequences for teaching. Different views on child participation produce different roles for teachers. The teacher looking at children's *actual development* is parallel to that of the "traditional" teacher. Looking at children's language as *instrumental tools* seems to be encourage child-centred teaching.

Concentration on *tools production* seems to evoke teaching along the lines of Reggio Emilia. The process can take the form of narration, where every phase is important and not possible without the former. For example the Reggio Emilia style documentation helps teachers to bring forward children's ideas, keep them alive and work on them further together with the child (cf. Gandini & Goldhaber 2001, 124-145). The connection between Vygotsky and Reggio Emilia is clear.

3 Previous research, articles and reports

In this chapter is a description of a research project that is the foundation and stepping stone for the new and advanced research project. The research project described here was conducted in Finnish day care centers. The new advanced research is to be conducted in Taiwanese day care centers. Although this description is mainly describing the quantitative aspects of the research, also qualitative methods were often applied (cf. Reunamo 2007a). According to Kerlinger and Lee (2000, pp. 47-49) the most common dependent variable in quantitative educational research is children's achievement or learning. The dependent variables can, for example, be cognitive and functional measures. Dependent variables are the condition or conditions to be explained. According to Miller (2007, p. 11) dependent variables are outcome variables, those measures whose values constitute the results of the study. For example in educational evaluation, students' performance is studied. Children's knowledge, attitudes, understanding and skill are usually considered as dependent variables. When learning is considered as a dependant variable, we study the amount or quality of learning, or the change in learning. Education is studied as a process that may result in learning. When children's views are considered as dependent variables, we study the change in children's views, or we study children's views as outcomes of the process. The very idea of child development seems to include the presupposition that it is the child and his/her views that are about to change.

If we study children's actions or learning as dependent variables, their dynamic properties are not considered. Thus in quantitative methods the agency of children's views are out of reach. Children's views and learning become our objects of inquiry. Children's views and learning become subordinate in relation to their environment. Some researchers consider that qualitative research methods are a better alternate methodology for studying the agency in children's views. According to Johnson & Christensen (2004, p. 32) it is characteristic of qualitative research to focus on dynamic processes, in which either individuals, organizations or cultures are seen in the middle of ongoing and evolving processes. Furthermore, Hatch and Barclay-McLaughlin (2006, p. 498) describe that it is the responsibility of the qualitative researcher to monitor the influences of their research subjects.

However, it is quite possible also in quantitative research to study children's views as agentive by using children's views as independent variables that contribute to environmental change. This change of perspective is at the heart of this article. Independent variables are variables that are controlled through manipulation or selection in order to examine effects on the dependent

variable (Miller, 2007, pp. 12-13). According to Kerlinger and Lee (2000, pp. 47-49) independent variables produce the changes in the dependent variables. Independent variables determine the outcomes; they are the antecedents of action. A dependent variable is measured in response to variation in the independent variable. Children's age and gender are usually considered as independent variables that children's views depend on (cf. Miller, 2007, pp. 12-13; Kerlinger and Lee, 2000, 47-49).

To study children's views as independent variables means that children's views are considered to be the causes of the research results. In educational evaluation it means that the consequences of children's views should be studied. When children's views are considered as independent variables, the educational content produced by children's views must be in focus. Thus, children's views are considered constant across situations and the differences produced by different ideas of children are studied. When we change children's learning from that of a dependent to an independent variable, the environmental changes produced by learning are studied. The variations in the environment caused by learning are then the results of the research.

To use children's views as independent variables, two procedures was applied in the research. Children were interviewed once to find out about children's views across educational settings. Then children's action and the environmental change they produce was collected over repeated observations. When the interview and observation data were combined it was possible to get the effects of children's views in the educational setting. At the same time two eminent variables usually considered as independent variables, namely children's gender and age, were controlled by partial correlations. As a result we have educational content that would have been non-existent without children's views. In the research, Reunamo's model of agentive perception was applied (see Figures 8 and 11).

The research sought to expose the agentive nature of children's way of looking at things: How do children view the educational settings according to the continuums of accommodation-assimilation and adaptation-agency? Are children ready to open up the conditions of the given situations or do they apply their own ideas? Do the children's views leave the conditions of the given situations intact or do they see the conditions as possibly changing? And what are the consequences for the interaction which these children's views about the conditions of change carry with them? From these speculations two research problems was formed:

1. How do the children see the educational setting in relation to accommodative and agentive aspects of action?
2. What kind of environmental change are the children's different views connected to?

Research methods and tools

Altogether 73 children from 4 randomly selected kindergartens took part in the research. The children were aged 3-7 years and lived in the Helsinki region. In an interview the children were presented fifteen different kindergarten situations and then asked what they would do in that situation. Altogether there were 1005 answers.

In the observation, systematic sampling was used. The children were observed in their normal kindergarten setting between the hours 8.00 and 12.00. Each child was observed in turn every three minutes (later on every two minutes, as with practice the coding became quicker). Altogether there were 1679 observations. In each observation there were several things to observe. For a detailed view of the observations items, see Reunamo (2007c, pp. 167-169; Reunamo, 2003, pp. 1-6).

The third part of the inquiry was the teachers' and parents' evaluation of the children. The evaluated items were the same for both teachers and parents. In the pre-study it was found that the parents were unsure of some of the evaluated items. Therefore a form with more simple language for parents was prepared. The evaluation scale was made from 1 (does not describe the child at all) to 6 (describes the child very well).

All three parts of the inquiry were done independently. Teachers and parents evaluated children separately and did not know of each others' evaluations. The observation and interviews were done by one person (the writer of this article), who did not know about the teachers' and parents' evaluations.

At the analysis stage, all 1005 of the children's answers were classified into four categories:

1. Accommodative and adaptive answers, in which children considered the presented environmental condition as an independent variable and accommodated to it.

2. Assimilative and adaptive answers, in which children reported no change in the presented environmental condition but applied their own idea.

3. Assimilative and agentive answers, in which children applied their own idea which overruled the given environmental condition.

4. Accommodative and agentive answers, in which children consider an interactive relation to the presented condition resulting in intermediate variables.

Examples of children's answers in different categories can be seen in Figure 13. Classification of the answers was not always possible and 126 answers had to be left with no classification at all. To ensure independence between observation and interviews, the classification was done question by question and the classifier did not know the identity of the one who answered.

Children's answers in each category were counted. The distribution of answers in different categories describes the child's typical way of seeing kindergarten situations. Also children's actions during observation were tallied. The distribution of the child's different action in different kindergarten situations describes the child's typical way of acting in the kindergarten setting and the environmental change that takes place.

While observing, the child's nearest child contact was written down. At the time of data input the average of all the nearest child contacts' variables was added. This way a profile of a typical child contact was provided.

The data of children's views and the environmental change were merged into the same data sheet. Thus it was possible to study the correlations between the children's views and environmental change.

Results

As an example children's answers to question number six is presented in Figure 13. Question number six was: "*Let's think that you are playing a game with somebody and the other does not follow the rules. What do you do then?*".

Agentive assimilation	The environment changes, agency	Agentive accommodation
• I play with somebody else. (2) • I play with the one who follows rules. • We quit playing. • I can take a friend who knows the rules. • I stop the whole game. • It has happened in the yard, I don't take her with me. • I take a friend who wants to play with me.		• I tell him/her the rules. (8) • I tell a teacher. (7) • I say to him/her to follow the rules. (5) • I tell him. (2) • I stop them. • I ask the teacher to come over, we obey the teacher. • I ask the teacher.

Idea differs from action, assimilation ← → Idea is influenced by action, accommodation

Adaptive assimilation	The environment does not change, adaptation	Adaptative accommodation
• I play alone. (2) • No. I don't know. I go away. • I can not play with him. • I go into rules, I leave the game. • Then I don't play with her. • I go to another room. • I play with Johnny. • I can play ice hockey. • I take another game. • I play by myself.		• I do what he says (the one who does not follow the rules). • We can play without rules. • We play another way, I don't care. • Then I just play. • I play along, we don't have to follow the rules. • I play with him/her. • Then I play, first one game and then another.

Figure 13. Children's answers classified in a situation where the other breaks the

rules of the game.

Children's answers are rich and they evoke and include many kinds of ideas. In the research the operationalized criterions of classifications could not grasp the wealth of information in children's views. On the plus side, if the operationalization is clear and uniform, we should get reliable results. Children's answers are categorized in relation to the given condition; in this case "*the other does not follow the rules"*. Firstly, the answers were divided on the continuum accommodation-assimilation. If the answer is related to the given condition, the answer was categorized as

accommodative (the right side of Figure 2). If the child applied his/her own idea the answer was categorized as assimilative (the left side of Figure 2). Secondly, if the contents of the answer did not change the condition presented to the child, the answer was categorized as adaptive (the lower part of Figure 2). If the answer implied the condition of the situation as changing the answer was categorized as agentive (the upper part of Figure 2).

A strategy with agentive accommodation was reported by 27 children in the rule breaking situation, which means that often children see themselves in the rule-breaking situation as acting interactively and they saw the situation as changeable. Altogether 12 children considered the situation through adaptive assimilation, which means that children did not see themselves as interacting in the situation or relating to it. Rather, the children applied another condition describing their own action. The given condition could remain intact (the other could keep on breaking rules). An answer that was categorized as agentive and assimilative was provided by 8 children. This means that children applied their own strategy instead of relating to the breaking of the rules. These children also saw the situation as changing (children offered a solution that overruled the breaking of rules). An answer that was categorized as adapting to the situation without indicating any change in the given conditions was provided by 7 children (one child could keep on breaking rules while the other child accommodated to it).

Although the classification rules were designed to be as uniform as possible the classification was often difficult. The classification had to be done twice due to inconsistencies. Even after corrections the categorization remains ambiguous. In Figure 2 we can see, for example, that the answers *"I play with Johnny"* and *"I can take a friend who knows the rules"* are categorized differently but their difference is questionable. Altogether there were also 126 answers (12,5 % of the total amount of answers) that could not be classified at all. In the rule breaking situation these unclassified answers were:

> *I don't know.* (7)
> *A small girl at home.*
> *I don't know. I go..*
> *I don't remember. I propose a game.*
> *Samuel comes with me.*
> *I tell him if I break the rule.*

One child refused to say anything at all. Children's answers were classified for all the fifteen questions. In question number one (somebody takes your toy) there were fifteen answers that could not be classified at all (e.g. *"I don't know, I want three castles).* Maybe the reason for children's uncertainty was not the situation itself, but rather, considering that it was the first question, the

children may have been just warming up for the interview. On the whole no trend could be found in the number of answers in each category or in the amount of classified answers. The easiest situation to classify was situation number four (Your friend does not play with you), in which all given answers could be classified, although one child refused to answer at all. Examples of children's answers and classifications to other questions can be seen in Figure 3.

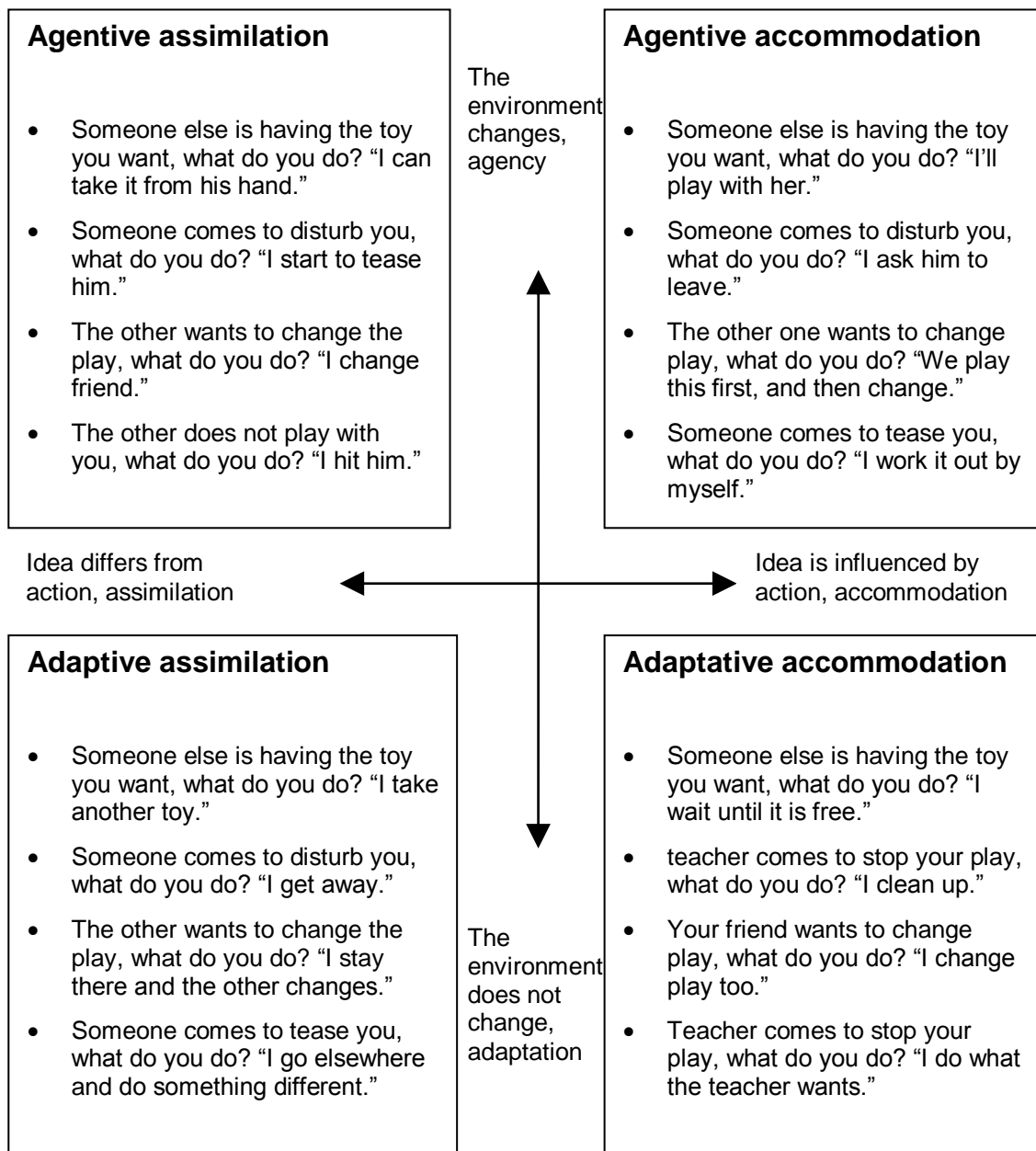| Agentive assimilation		Agentive accommodation
• Someone else is having the toy you want, what do you do? "I can take it from his hand." • Someone comes to disturb you, what do you do? "I start to tease him." • The other wants to change the play, what do you do? "I change friend." • The other does not play with you, what do you do? "I hit him."	The environment changes, agency	• Someone else is having the toy you want, what do you do? "I'll play with her." • Someone comes to disturb you, what do you do? "I ask him to leave." • The other one wants to change play, what do you do? "We play this first, and then change." • Someone comes to tease you, what do you do? "I work it out by myself."
Idea differs from action, assimilation		Idea is influenced by action, accommodation
Adaptive assimilation		Adaptative accommodation
• Someone else is having the toy you want, what do you do? "I take another toy." • Someone comes to disturb you, what do you do? "I get away." • The other wants to change the play, what do you do? "I stay there and the other changes." • Someone comes to tease you, what do you do? "I go elsewhere and do something different."	The environment does not change, adaptation	• Someone else is having the toy you want, what do you do? "I wait until it is free." • teacher comes to stop your play, what do you do? "I clean up." • Your friend wants to change play, what do you do? "I change play too." • Teacher comes to stop your play, what do you do? "I do what the teacher wants."

Figure 14. Children's differing views in different educational settings.

In answers that were classified as *adaptive and accommodative*, children were considering the given situation openly but did not try to change it. In the answers that were classified as *adaptive and*

assimilative, the children did not consider the situation openly. Instead they saw themselves as doing something else or withdrawing from the situation. In answers that were classified as *agentive and assimilative*, the children did not open up to consider the situation. Instead they saw themselves as doing something that changed the conditions of the situation. In answers that were classified as *agentive and accommodative*, children considered the situation openly but added a new element to the conditions of the situation.

When have the profiles of children's way of seeing situations it was possible to combine children's views with the data on environmental change. For a detailed description of the results see Reunamo 2007c. Unfortunately the book is in Finnish. For condenced description of the results in English, see Reunamo 2007a and 2007b. It was possible to eliminate the impact of children's development by controlling children's age and gender by partial correlations. After the children's views are introduced, it is time to look at the partial correlations of children's views and environmental change. First we have the correlations of the adaptively accommodative answers and the other items of the research in Figure 15.

Adaptive accommodation

- The child adds elements to the action (for example talks while eating, B), .346. The child acts more interactively (C), .341, is more involved in the action at hand (H), .485 and is oriented more towards one other child (D), .341

- The nearest adult is in a clearer situation (F, -.370), just observes children more often (F), .446 and adapts to children's action more often (F), .317, but gets less attention than other children (G), -.262

- The observed nearest child contact (E) plays more with toys and material (B), .314, hangs out with friend (B), .257, orientates towards unsocial objects (D), .382 and towards another child more (D), .433. The observed nearest child contact (E) seldom has agentic views in various situations (-.315) and is according to teachers' evaluations, less of an influential force (leader, Table 3), -.317

Idea is influenced by the situation
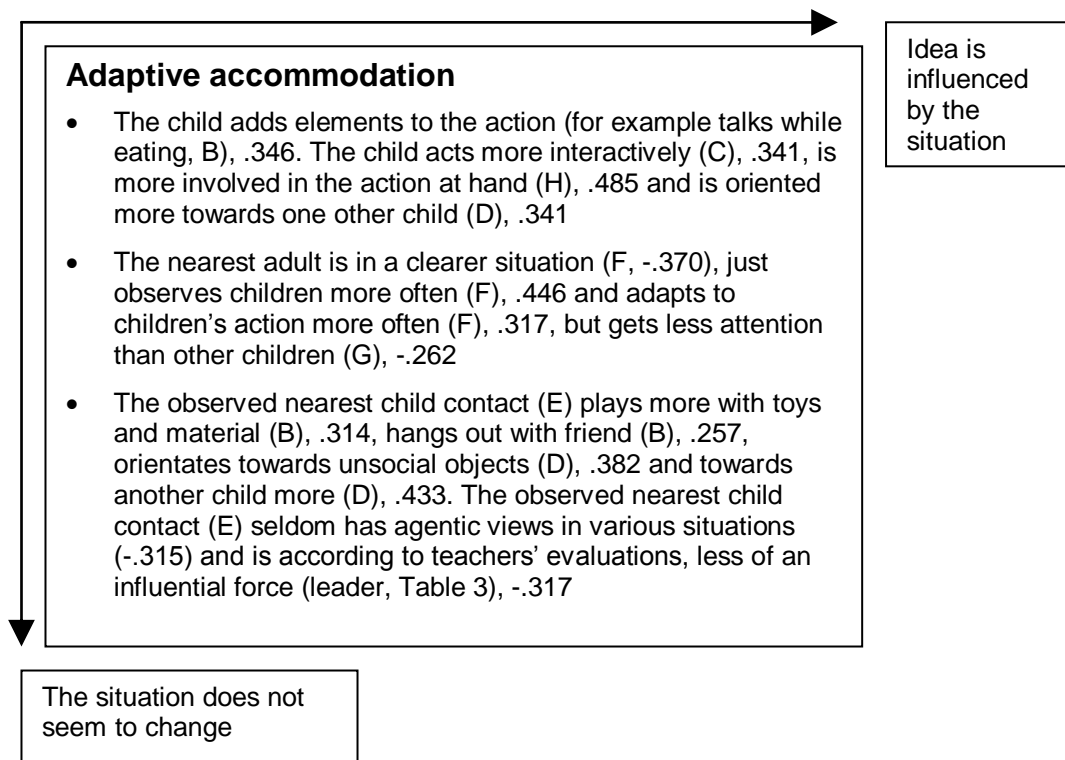
The situation does not seem to change

Figure 15. The correlations between children's adaptively accommodating views and the educational settings.

The child's open and adaptive way of looking at the situation is related to contact orientation and the abundance of interaction. The child is actively involved in his/her action and orientates a lot

towards one child at a time. The nearest adult adapts her/his behaviour to the children's behaviour, the adult's situation is clear and the adult uses more time to observe children. The openly and adaptively orientating child, on the other hand, gets less attention from the adult.

The child's friends play with toys and material more, orientates towards non-social objects more and concentrates more often on one other child too. The nearest child contact sees situations less agentively and more seldom holds the role of a leader in a group. Altogether open and adaptive views produce intimate, active and involved interaction with other children as well as with adults. This view produces many different effects on the educational setting. The effects are not forceful; rather, they are synchronizing and harmonizing. Presented in Figure 16 are the adaptively assimilating views' correlations with kindergarten situations.
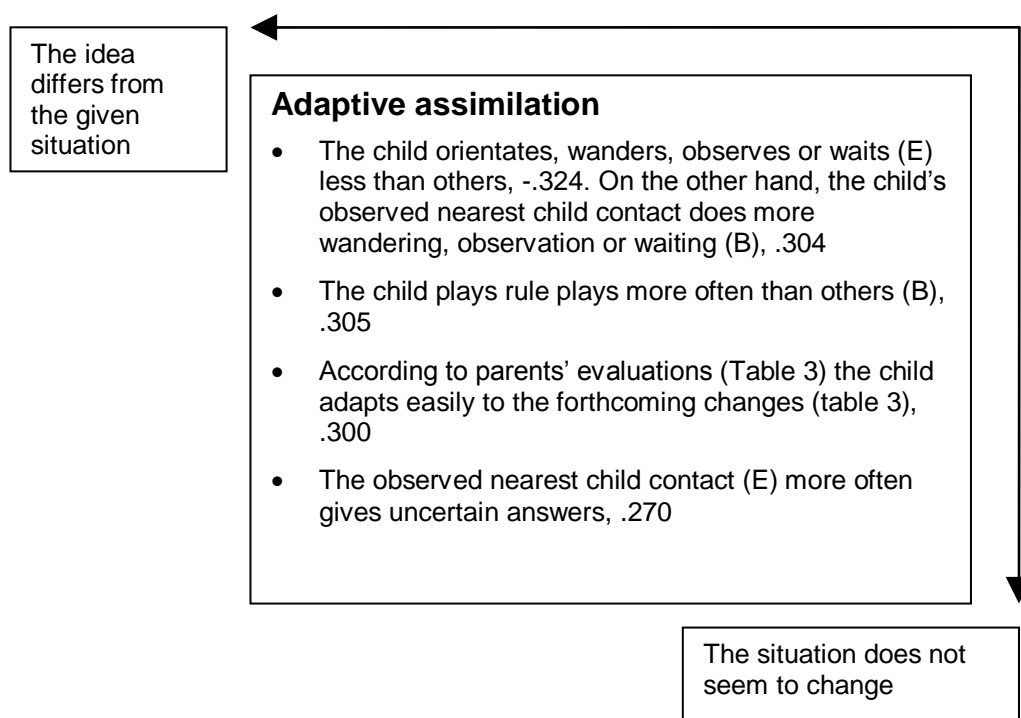
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┌──────────────┐      ◄─────────────────────────────────────┐
│ The idea     │                                            │
│ differs from │   ┌──────────────────────────────────┐     │
│ the given    │   │ Adaptive assimilation            │     │
│ situation    │   │                                  │     │
└──────────────┘   │ • The child orientates, wanders, │     │
                   │   observes or waits (E)          │     │
                   │   less than others, -.324. On    │     │
                   │   the other hand, the child's    │     │
                   │   observed nearest child contact │     │
                   │   does more                      │     │
                   │   wandering, observation or      │     │
                   │   waiting (B), .304              │     │
                   │                                  │     │
                   │ • The child plays rule plays     │     │
                   │   more often than others (B),    │     │
                   │   .305                           │     │
                   │                                  │     │
                   │ • According to parents'          │     │
                   │   evaluations (Table 3) the child│     │
                   │   adapts easily to the forthcoming│    │
                   │   changes (table 3),             │     │
                   │   .300                           │     │
                   │                                  │     │
                   │ • The observed nearest child     │     │
                   │   contact (E) more often         │     │
                   │   gives uncertain answers, .270  │     │
                   │                                  │     ▼
                   └──────────────────────────────────┘
                              ┌────────────────────────┐
                              │ The situation does not │
                              │ seem to change         │
                              └────────────────────────┘
```

Figure 16. The correlation between children's adaptively assimilating views and

the educational settings.

Adaptive and assimilative views among children seem to be related to separateness. The child searches for his/her place (wanders around, observes or waits) less than others. The child does not seem to actively search for new things. It is interesting that the child's nearest contacts act just the opposite: She/he searches (wanders, orientates etc.) more than other children. A separate view means less searching but on the other hand, it means relatively more fluctuation on child contacts.

These children seek contacts less, but the contacts they get are fluctuating more. Children with separating views more often have a friend who gives more uncertain answers in the interview, which means that the child does not know how to act in different kindergarten situations. A wandering and uncertain friend perhaps describes the loose contact between children.

A child with separate views more often engages in rule plays. This is perhaps related to the child's way of applying existing ways of acting and is not creating new ones. Or, on the other hand, by following rules the child expresses his/her orientation; there is an existing structure to which the child sees herself/himself adapting. Altogether there emerges a picture of a child who is withdrawn, passive and weakly connected to other children and the child finds a point of reference in rule play. The connections between children's agentively assimilating views and different situations can be seen in Figure 17.

The given situation seems to change

Agentive assimilation
- The child is often busy with toys and material (material play B), .255
- The child is seen more rarely just hanging with friends (talking and wandering around, B), -.379
- According to teachers' evaluations (table 3) the child is socially brave, fear does not inhibit the action, .307
- The nearest adult uses more time for observing children (the adult does not participate, F), .273
- The observed nearest child contact (E) does more work and different tasks (eg. assists, does independent school work, B), .264

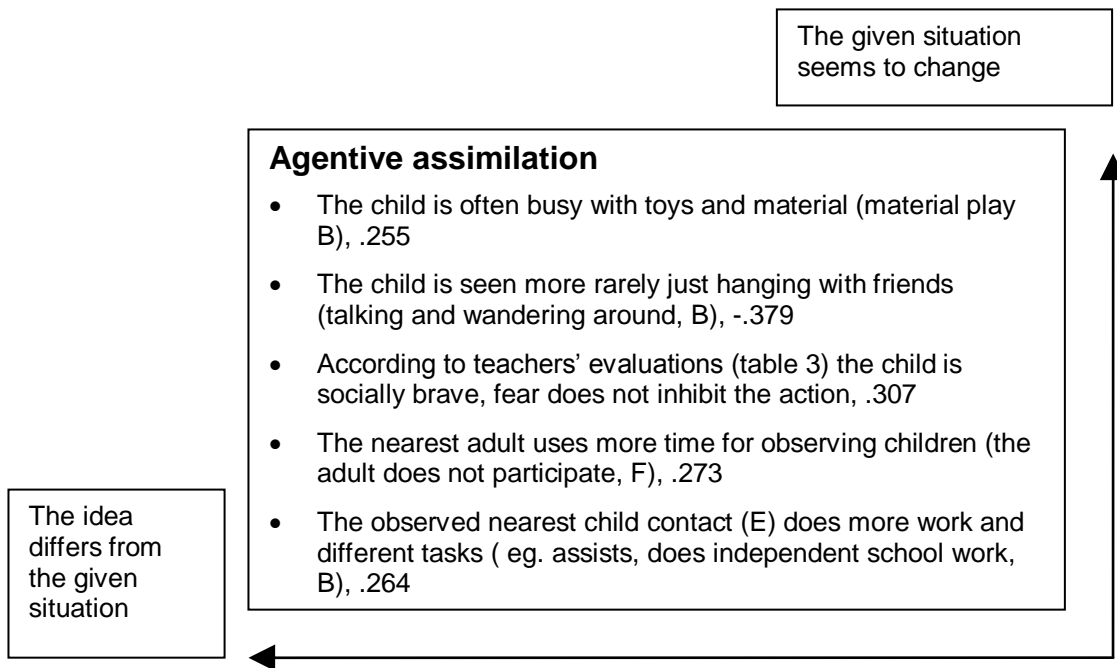The idea differs from the given situation

Figure 17. The correlation between children's agentively assimilating views and the educational settings.

A child with agentive and assimilating views plays more with toys and material and spends less time by hanging around with friends. On the other hand, teachers evaluate the child as being socially bold. Fear does not prohibit the action, but the child is not socially oriented. Closed and agentive views are connected with changes in adult's behavior too: The adult observes children nearer to this child. This means that the adult gives attention to the children but does not interfere. The child's friends do more work (e.g. act as assistants or do independent studying), contrasting

with the child who holds more open agentive views (see Figure 7). Working may perhaps describe the child's way of doing things. The child has quite a clear and stable conception of what he/she wants to acquire. The child knows what he/she wants and is not distracted. The social matters interest these children altogether less although he/she is socially bold. Among friends, the work at hand gives direction to the action and the adult follows children's actions more. It is important to notice that this orientation results in fewer environmental effects than for example open and adaptive orientation. Concentration on one's own objectives may lead to separation from others. The correlations between agentively accommodating views and the kindergarten situations can be seen in Figure 18.
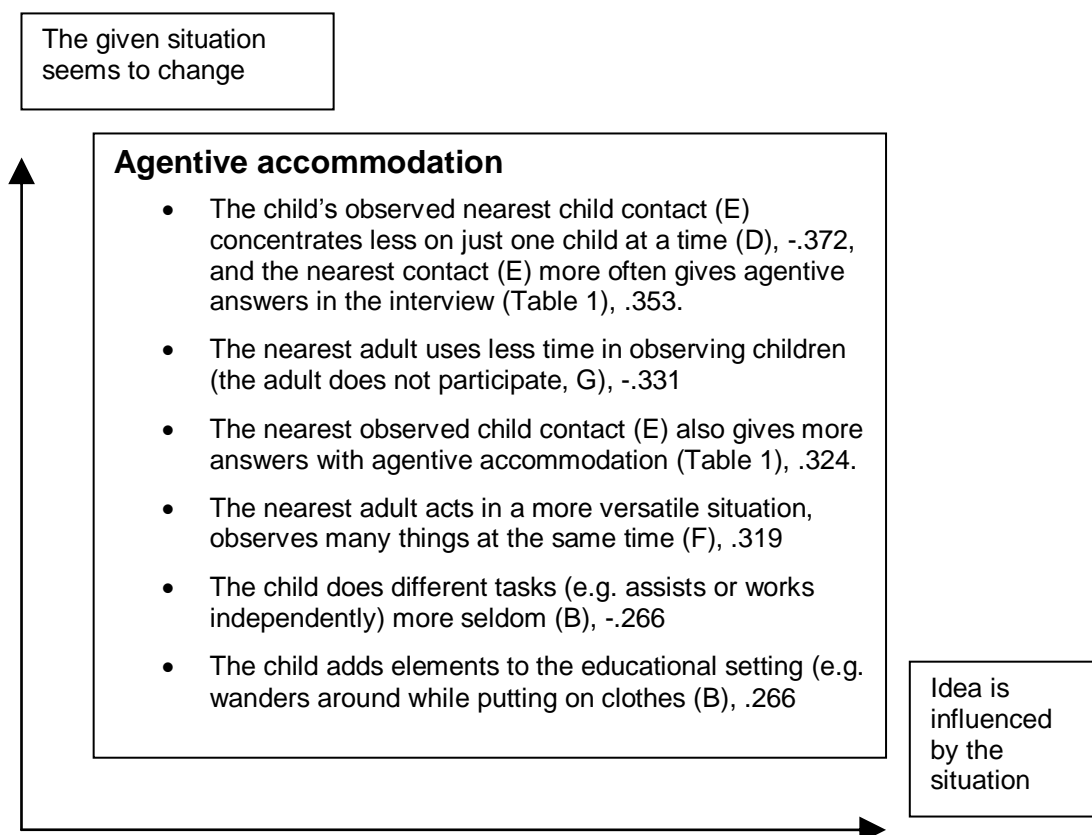

	The given situation seems to change

Agentive accommodation

- The child's observed nearest child contact (E) concentrates less on just one child at a time (D), -.372, and the nearest contact (E) more often gives agentive answers in the interview (Table 1), .353.

- The nearest adult uses less time in observing children (the adult does not participate, G), -.331

- The nearest observed child contact (E) also gives more answers with agentive accommodation (Table 1), .324.

- The nearest adult acts in a more versatile situation, observes many things at the same time (F), .319

- The child does different tasks (e.g. assists or works independently) more seldom (B), -.266

- The child adds elements to the educational setting (e.g. wanders around while putting on clothes (B), .266

Idea is influenced by the situation

Figure 18. The correlation between children's agentively accommodating views and

the educational settings.

The child who looks at situations openly and with agency does less work in the kindergarten. He/she produces a lot of new content for the educational setting. The child seems to avoid fixed rules of action and seeks interaction. The adults near this child find themselves in a more dynamic kindergarten setting, which has a lot of changing elements. The adults use less time in just observing children.

The open and agentive point of view calls for orientation toward many children at the same time instead of just one. His/her friends also orientate more towards a group of children. The child's friends share the same open and agentive view of situations. Children and their friends orientate further among friends and more often look at situations as changeable. What follows from this is much new content in the educational setting from both adults' and other children's' points of view. In Figure 19 the essence of the research results is arranged according to the theory presented.
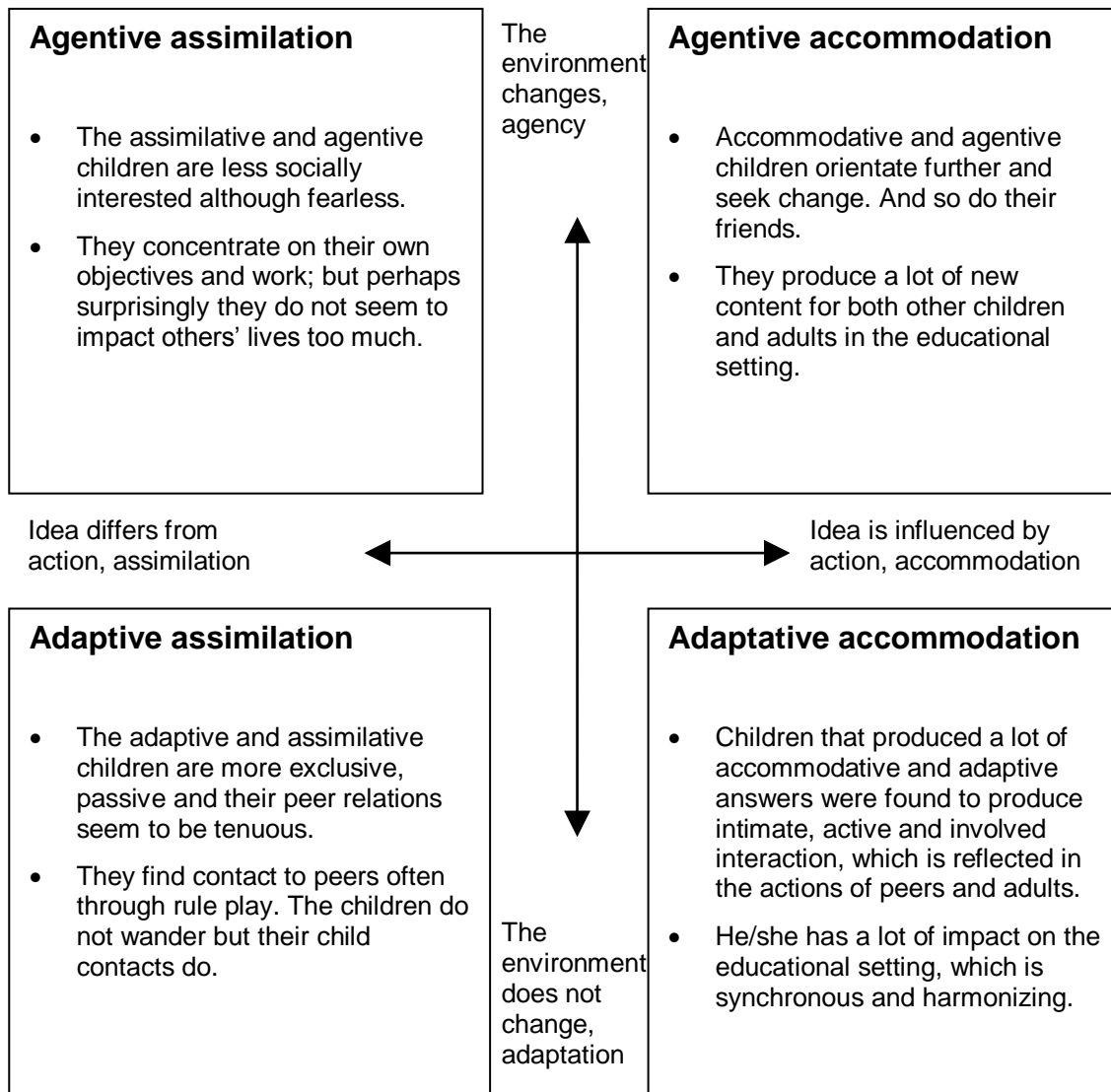
Agentive assimilation • The assimilative and agentive children are less socially interested although fearless. • They concentrate on their own objectives and work; but perhaps surprisingly they do not seem to impact others' lives too much.	The environment changes, agency ↑	**Agentive accommodation** • Accommodative and agentive children orientate further and seek change. And so do their friends. • They produce a lot of new content for both other children and adults in the educational setting.
Idea differs from action, assimilation ←	——→	Idea is influenced by action, accommodation
Adaptive assimilation • The adaptive and assimilative children are more exclusive, passive and their peer relations seem to be tenuous. • They find contact to peers often through rule play. The children do not wander but their child contacts do.	↓ The environment does not change, adaptation	**Adaptative accommodation** • Children that produced a lot of accommodative and adaptive answers were found to produce intimate, active and involved interaction, which is reflected in the actions of peers and adults. • He/she has a lot of impact on the educational setting, which is synchronous and harmonizing.

Figure 19. The agency of children's views in the educational setting.

Discussion

There are some limitations and properties in the conducting of the research. The reliability of the research is questionable. The classification of the interview answers and observations were conducted by only one person, the writer of this article. Thus the personal effect on the

categorization of the interview answers cannot be evaluated by comparing observations. Furthermore, the observation was also conducted by the writer of this article. Without another observer it is not possible to evaluate the reliability of the observation tool or the observer. To overcome the reliability problems of the research four independent research tools were used. The evaluator of one tool could not know the evaluations made in the other tools. In this case when separate tools support each other and contribute to the whole, it can be regarded as an indication for reliable tools and results. These deficiences will hopefully be eliminated in the new research project.

While discussing the results it must be kept in mind that children's age and gender are controlled by partial correlations. As children orientate freely in kindergarten, the main factors in their orientation are gender and age (Reunamo, 2004), meaning simply that girls tend to play with girls and boys tend to play with boys. Children of the same age attract each other. The importance of children's orientation among other children is highlighted by the fact that children give much more attention to children than to adults in kindergarten (Reunamo, 2000).

In kindergarten there are many children of the same gender and many children of the same age. It is not the purpose of this article to claim that children's age or development have no research value. Correlations between children's views and situational change are different when children's age is not controlled. Children's views do change when they get older, although they are not considered in this study. These developments are interesting but are out of the scope of this article and should be reported in a different article.

Children's gender also plays a major role in children's views and situational factors. By studying gender differences, valuable cultural patterns and social roles could be studied. By including both age and gender as factors in studying the connections between children's views and situational change, the process of the view formation could be studied.

To really study children's personal orientation-formation is important. The existing knowledge – like language, information or symbols – can be separated from its bearer. But tacit knowledge is embedded within a person. By studying children's orientation in the formation process we can study the building of cultural artifacts and we thereby get beyond the curriculum. In this research, the results are all connected to the children's views. These connections have intervening variables, but we can say that without children's views the situational elements that were discovered would not be visible at all. We get in touch with results that did not exist or could not be anticipated before children looked at the situation. Children's views carry within them content that contributes towards new cultural artifacts for both children and adults alike.

To study the participative elements of becoming human we need to study the ways our orientation builds up. We need to study childhood as designers of the educational setting in order to help them become participative adults and help them to become able to shape their own situation. It is worth noting that the traditional evaluation of children's knowledge is concentrated on existing knowledge where children's answers can be right or wrong. Here children themselves are taking part in the production of the content of the knowledge and the knowledge itself depends on children's views. In the field emerging from the results of this research, different criteria for the educational evaluation arise: Instead of curricular or developmental advancements of children, we can evaluate the refinement of the tools for knowledge production (Reunamo and Nurmilaakso 2006).

In different situations children orientate differently. For example when someone comes to tease the child, he/she can act in many different ways, thus provoking different kinds of interaction. One child may try to please the teaser. Another child tries to persuade the teaser to stop teasing. A third child might become angry at the teaser and chase him/her away. A fourth child perhaps just wants to get away.

When the situation has more than one option, the child is at the crossroads of different solutions. When someone breaks the rules of the game, does the child allow it? Or does he/she try to guide the other to play according to the rules? Or does the child abandon the rule breaker from the play? Or does he/she just quit playing? The child does not behave in or look at situations the same way. Different situations awake different elements. For example, situation number 15 in Table 1 did not increase the reliability among children's answers. When the child is left alone among others in the kindergarten, the conditions of the situation are not in reach of the child. The situation does not apply to the general picture presented here. Nonetheless there seems to be something that unites many situations. The child does not only perceive agency, but the very perception performs agency.

Children that perceive change differently, live differently. They also live in a different world. Even the adults behave differently with children who look at situations in different ways. An important thing to note is that the *adaptive and accommodative* way of seeing things was most influential with most of the correlations reflecting children's action and environmental change. Children's ideas do not have to be forceful to be effective. Even the *adaptive and assimilative* way of seeing showed up in the kindergarten situations. Withdrawing from the situation has its effect as well.

The results bring forward children's ideas as creators of educational material. Children learn things they themselves have been developing. The learning is effective when children see that their ideas have something to do with reality. Children get used to working on their ideas and the ideas

corresponding to real phenomena and environmental change. Children's learning esperiences are attached to personal relevance and the children can practice their skills to keep the cultural bindings alive (Reunamo & Nurmilaakso 2007). This enhances learning further.

The borders of the social world are drawn in concrete historical situations (cf. Lindemann, 2005, p. 70). For example, Karlsson (2000) describes, how children's real participation and possibilities for interaction in practical planning and action increase, when adults connect with children's ideas. But as we have seen here, the impact of children's ideas is not just a pedagogical choice; rather, the impact is embedded within the ideas themselves. It is necessary to follow children's views in order to keep up with the elements of the changing situation (Reunamo 2007c).

When we look at children as producers of educational content, it does not mean that we should surrender to it or always encourage it. The educator also needs to lead, control and organize the educational setting (Reunamo 2007c). The adult is important too. For example, the child needs possibilities to withdraw and be on his/her own. On the other hand, the child can be too withdrawn and need opportunities for participation (Reunamo 2005). To study children's agentive perception does not necessarily mean that we have to accept the forthcoming changes. That would lead to a child-centered education which is one-sided. But the study of children's agentive perception can mean that we are better equipped to confront the dynamics of the educational setting. Figure 1 has interesting connections to the vision of the field of the childhood research presented by James, Jenks & Prout (2001, p. 206), who urge researchers and educators to view children's *actions* as agentive.

Sometimes a child can play a game in a new way only when he/she sees the opportunity to do that. This means that the child can consciously interact with a phenomenon only after seeing the possibility. Sometimes the child plays differently just because he/she could not do it correctly. This gives new meaning to the Piagetian equilibrium, the balance of things. Equilibrium is not just a process, in which the child works out his/her ideas to maximize the adaptation. A balance is also needed in the process of realizing ideas in the environment and adapting in it (Reunamo & Nurmilaakso 2006). The basic question is not just about perception of agency, it is more a question about the agency of perception.

It would be illuminating to study school children's views also. It can be presumed that children essentially learn in school the things that they themselves orientate towards and the process in which production they take part. Obviously also school children's views must carry agency. The role of curriculum is not a static reference point in children's personal orientation.

It must be acknowledged that the independent character of children's views is questionable and certainly not true in the research described here. The connections which have been found to

exist are correlations and they imply only the interdependence of the variables, but it can at least be said that children's views have some characteristics of independent variables in this research. When age is controlled for, the time dependant aspects of children's views are absent. By controlling gender a large amount of the cultural effects on children's views are absent. Therefore, children's views can be viewed as static variables measured only once by the interview. The change in children's views is not considered across situations. In real situations children's views probably change from situation to situation, but in this research this change was not regarded. The relation of children's static views is related to the variation of consecutive observed behavioural and environmental change. In the four different operationalized views, all four views were found to have effective connections with the situational change.

In the end, it may be that there are no pure independent or dependent variables in reality, or at least, they are out of our reach. In the real world only things that change each other can be perceived; the purely dependent or independent factors leave no trace. Nevertheless, independent and dependent variables can be valuable tools for researchers to organize the research task and to become aware of the interdependent effect and directions of interaction.

The research data is rich and offers opportunities for many kinds of analysis. For example the observation data gives reliable data based on systematic sampling of what children really do in the educational setting (Reunamo 2000). By combining children's views and actions with their peer relations children's peer orientations can be studied (Reunamo 2004). By qualitative analysis of children's views on different situations valuable insight in children's understanding of the social production can be studied.The new research project is not meant to merely imitate the research project described here in a different culture, but to enhance the methods and add necessary elements for a more wholesome picture. The conducting of the new research project is described in chapters four and five.

The research project and the results have also generated a lot of practical applications and tools for practical work (cf. Reunamo 2007c). The model has been applied successfully also in other fields of research, such as history research (Muszynski and Reunamo 2007) and social exclusion (Reunamo and Kalliokoski 2007).

4 Research questions

The first and second research questions describe the impact of children's views. Research problem three describes the intention of acquiring a more in depth understanding of the processes connected with the agentive nature of children's views. A central research problem is the last one: are the phenomenon found with Finnish children the same as in a different culture like Taiwan?

1. How do the children see the educational setting in relation to accommodative and agentive aspects of action?
2. What kind of environmental change are the children's different views connected to?
3. What kind of peer relations, personal orientation and adult behaviour children's views produce?
4. What are the similarities and differencies in agency between Finnish and Taiwanese children? Does agentive perception have elements that can be generalized to all children? What is the role of culture in children's developing relation with the environment?

5 Research methods

5.1. Research tools and data collection

All the children in two day care centers take part in the research. This makes it possible to study also children's peer relations. All the children will be between three and seven years of age. Permission for the study will be obtained from the parents.

- January – June 2010 data collection (observation, interview, teachers and parents evaluation)
- Data input and data integration (meeting in Taiwan August 2010).
- Work on research report, articles, data considerations. Meeting in Finland in January 2011.
- Presenting preliminary results at the EECERA conference in September 2011.
- Preparation or articles and a book. Plans for dissemination in Taiwan and Finland. Conference in Taiwan in 2013.

5.1.1 Interview

In an interview the children will be presented eighteen different situations and then asked what they would do in that situation (see Appendix D). The interviewers are trained to interview children and use the question outline. The interview is done in a separate room where the interview can be conducted in private and in no hurry. The interviewers write down children's responses down during the interview. There can be an assisting adult with the child at the interview, e.g. a translator with immigrant children or a familiar adult with extremely shy children. After the interview the children should get a lot of positive feedback of their thoughtful in important contribution. During the interview the positive feedback should not include the content of answers, because children might interpret that there are "correct" answers of interviewer likes certain kind of answers. The interviewer must make it clear from the start that she/he is interested in children's own point of view and there are no right or wrong answers.

Only after writing down children's answer next question is asked. After the interviews the answers are classified in the four categories as described in Figure 8.

1. Accommodative and adaptive answers, in which children considered the presented environmental condition as an independent variable and accommodated to it.
2. Assimilative and adaptive answers, in which children reported no change in the presented environmental condition but applied their own idea.
3. Assimilative and agentive answers, in which children applied their own idea which overruled the given environmental condition.
4. Accommodative and agentive answers, in which children consider an interactive relation to the presented condition resulting in intermediate variables.

The key will be in the style of example answers in the four categories described e.g. in Figure 14. The amount of answers in each category is counted. That way a profile of children's way of looking at situations can be acquired.

5.1.2 Observation

Each observer will observe all children in the group. In the observation, systematic sampling will be used. The children will be observed in their normal day care center setting between the hours 8.00 and 12.00. Each of the children will be observed in turn every five minutes. This means that each child is observed approximately three times a day. Two minutes is reserved for finding the child and getting accustomed to the child's situation. The actual observation time is only one minute. After the observation there is two minutes time for the observer to fill in a row in the observation table. The observation lasts for seven days which makes a total of 420 observations. The observers have been trained for the observation during four training sessions, two hours each. In the training the

observers observe video samples of children doing their normal everyday actions in kindergarten. The reliability of the observations is checked after each training session and the problem areas con be focused on in the next training session. In each observation there is several things to observe. The observation items are presented in the observation table in Appendix B. For illustrative purposes two examples of coding is presented:

> In the first example John is having lunch with other children (A2). He talks with Mia while eating (B2). John is distracted and his attention wanders around the room (C5). The nearest contact is Mia (D15). The activity level is low (E1). John changes his action and focus repeatedly (F2).The distance to the nearest adult is two meters (G2). The adult is busy organizing the dishes (H1) and does not look at John (I2).

> In the second example it is time for free play (A1) at the day care centre. Carrie is with three other girls pretending to train her puppies (B7). Carrie concentrates with equal intensity to each girl (C4) so to pick up just one nearest contact is impossible (D-). The activity level is intermediate with a lot of whole body movements. (E2). Carrie is involved from head to toe in her role to train her puppies with her friends (F5). The distance to the nearest adult is ten meters (G10). The adult is drawing with another child (H4) and does not look at Carrie (I2). (The example coding can be seen in Appendix 2, in the first two rows of the form.)

The observation should be done in such fashion that the child is not aware of being the special object of observation. The observer has the observed items (Table 2) and a separate paper with a grid. Only one option is selected in each observed category. If there is a situation with a mixture of several classes (e.g. plays superman while playing with cars) the observant tries to select the closest option. The grid has 30 rows and 9 columns. For illustrative purposes the examples are filled as examples in Appendix 2. The observers will transfer the data in a preformatted Excel table after the observation. While merging all of the data together the average of all the nearest child contacts' variables will be added. This way a profile of a typical child contact can be provided.

5.1.3 Teachers' evaluations

The third part of the inquiry is the teachers' evaluation of the children. The evaluation scale is from 1 (does not describe the child at all) to 5 (describes the child very well). The evaluation form is presented in Appendix 4. The evaluations are done in Excel sheets for easy coding. The evaluations include background information of the child.

5.2. Data analysis

The data of the tools (interview, observation and teachers' evaluations) will be merged in the same data file. The percentages of children's action in each observed category will be counted and added to the data. Thus a profile of each child's typical behaviour can be attained. After the merging the data is ready for analysis.

The interview material is also a rich source for qualitative analysis. The predefined tools and categories can not reach the wealth of information hidden in children's views. The qualitative analysis can be used as a material for separate articles. The quantitative and qualitative material may be also combined: By content analysis new ways to categorize children's answers may emerge which can be further merged with the quantitative data.

For the sake of reliability, it would be important that two people categorize at least part of children's answers. For international comparison a random part of children's answers need to be translated in English.

5.3. Research ethics

In the research the ethical aspects of research are considered. The purpose of the research is to study children's views as agents of social and environmental change. This aim helps to consider children as subjects and help to increase the potential of children's participation. This helps the educators to take part in developing processes initiated by children.

The child does not participate in the research without parents' agreement, which is secured with parents' signature. The parents will be given information about the results of the research.

The research helps the teachers in their teaching skills by observation and interview training. The teachers are also informed about the research results. There are also practical tools to work with children agentive views introduced after the research in the feedback phase of the project. These tools include planning models, pedagogical tools to interact with agentive views together with children and evaluate them. When the teachers can perceive the impact of children's view they are able to work with children's powerful views better. The purpose of the research is empower both children and adults.

Children's names, birthdays, social security numbers, parents' identification data or other identification data is not gathered. In the data each child has a number code, which allows to connect children's interview and observation data. Children's identity and personal information is not known to the researchers. The teachers' and educators' personal information is not collected. There will be no identification register. After the data collection each team gets their own data for

comparison with the general data. Thus the teams get feedback of the processes of their educational environment. The feedback is solely for the teams themselves. The general obligations to maintain secrecy are applied here also.
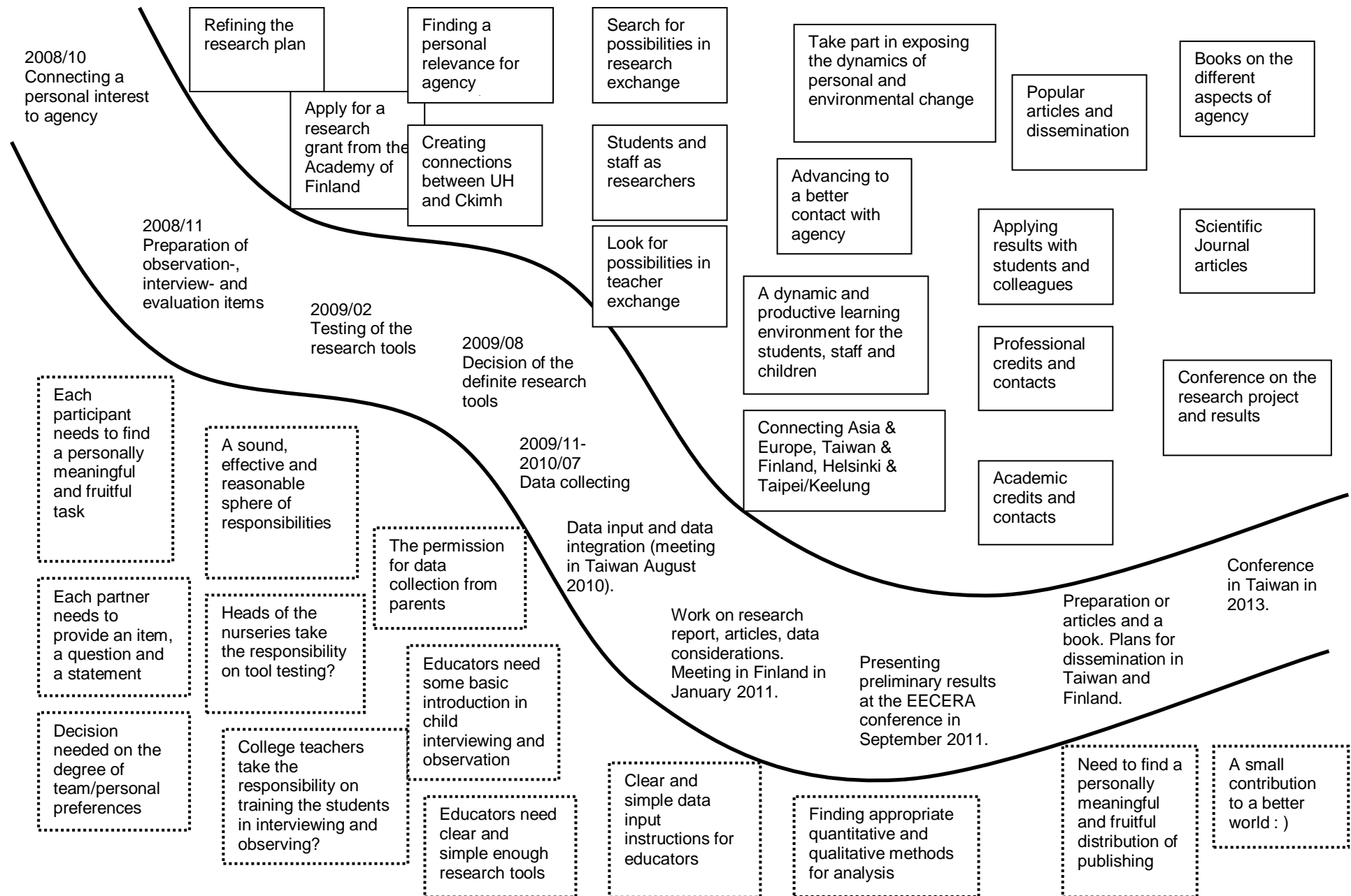
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Appendix: A "River" plan of the research project

2008/10 Connecting a personal interest to agency

Refining the research plan

Finding a personal relevance for agency

Apply for a research grant from the Academy of Finland

Creating connections between UH and Ckimh

Search for possibilities in research exchange

Take part in exposing the dynamics of personal and environmental change

Popular articles and dissemination

Books on the different aspects of agency

Students and staff as researchers

Advancing to a better contact with agency

Applying results with students and colleagues

Scientific Journal articles

Look for possibilities in teacher exchange

2008/11 Preparation of observation-, interview- and evaluation items

2009/02 Testing of the research tools

2009/08 Decision of the definite research tools

A dynamic and productive learning environment for the students, staff and children

Professional credits and contacts

Conference on the research project and results

Each participant needs to find a personally meaningful and fruitful task

A sound, effective and reasonable sphere of responsibilities

2009/11-2010/07 Data collecting

Connecting Asia & Europe, Taiwan & Finland, Helsinki & Taipei/Keelung

Academic credits and contacts

The permission for data collection from parents

Data input and data integration (meeting in Taiwan August 2010).

Conference in Taiwan in 2013.

Each partner needs to provide an item, a question and a statement

Heads of the nurseries take the responsibility on tool testing?

Work on research report, articles, data considerations. Meeting in Finland in January 2011.

Preparation or articles and a book. Plans for dissemination in Taiwan and Finland.

Educators need some basic introduction in child interviewing and observation

Presenting preliminary results at the EECERA conference in September 2011.

Decision needed on the degree of team/personal preferences

College teachers take the responsibility on training the students in interviewing and observing?

Clear and simple data input instructions for educators

Need to find a personally meaningful and fruitful distribution of publishing

A small contribution to a better world :)

Educators need clear and simple enough research tools

Finding appropriate quantitative and qualitative methods for analysis

Appendix B Observed items, forms and instructions

Instructions for observation:

- A list is made of the children in the observed group. In the list is also the number of each child (e.g. 12).
- An observer does not observe their own group of children. Two randomly chosen observers observe each other's groups. To get to know the names of the children and the group the two observers change places for one day (if necessary for two days). In Finland there are altogether seven randomly selected days for the observation between January and June 2010. In Taiwan there is altogether 8 observations between December 2009 and July 2010.
- The children are observed systemically in the order determined by the list. If a child is missing the next child in the list is observed. Children who are absent or arrive later will be included in the observation when they arrive. If it is impossible to observe the whole group, e.g. half of the group is at the park and the other half is at the day care center, the observer observes the biggest group available. To prevent systematical bias the observer starts each day with a different (random) child in the list.
- The observation is done between 8.00-12.00 hours (in Taiwan the schedule may vary) at five minutes intervals: the actual observation lasts only one minute and happens at the same time of interval each time. The additional four minutes is for coding and preparing for the next observation., There are altogether 49 observations in one day. If the observer needs to go to the restroom etc., the observation continues after the pause as usual. The absent observations are just left empty in the observation data form.
- After practicing the observer may find it possible to do the observation accurately even at four minutes intervals. The four minute interval is encouraged as it allows for more observations, however, if the observer finds it difficult, he/she should go back to five minute intervals.
- If the child changes action during the observation, the m is used to determine the child's action. If it is still impossible to determine child's action the action can for example be coded as other action (b10) or if the child does not have a nearest contact for coding, the space is left empty.
- The observer has a book in which the observer has three papers enclosed: the list of children with their numbers, the list of observed items and the observation form. The coding is done separately from the observation and the observer does not look at the children while coding.
- The observer does not seek interaction or eye contact with the children but answers to their questions if necessary. For example: What are you doing here? "I study the work here". What are you writing? "I write codes." Why? "I'll do research for the day care center." Experience shows that children very soon ignore the observer.
- It should not be emphasized that the children are observed and the observed child should not be aware of being observed. The observer need not to be close to the child, it is enough that the observer understands the situation. The observer can move around as needed.

Time (e.g. 08.16)
Child's number
A. The general activity frame of the child (what the child needs to do)
1. Direct Education inside. (Planned action by adult or action that the adult participates and guides by bringing an educational element to it, teaching, instruction, group get-together, story telling, performance)
2. Scaffolded play indoors. (Teacher scaffolds children's play to enrich children's own processes)
3. Indoor free play . (The child can choose what, for how long and with whom to play)
4. Outdoor activity with teacher scaffold (e.g. play, trip, teaching).
5. Outdoor free play. (Often in the kindergarten yard or park.)
6. Basic care. (Dressing/undressing, toilet, hygiene, rest, also waiting)
7. Eating. (Breakfast and lunch. Also the waiting for the food, the service of the food and other action before, during and after eating.)

B. The main action of the child (what the child does)
1. Orientation. (E.g. walking around, observing others without participating, searching or waiting)
2. Hanging about together with others. (E.g. chatting and/or walking with others, chatting at the climbing frame.)
3 Play or exploring with toys, materials and physical setting (e.g. at the sandbox, swinging, with paper)
4. Role play or imaginary play (using a toy or having a role to play)
5. Reading, watching video, watching performance etc.
6. Rule play. (E.g. ball games, chess, games with fixed rules, competition)
7. Task or seatwork (homework, pen and paper exercise, practice dressing , memorizing nursery rhyme, refining a skill, work)
8. Action not allowed (e.g., not following orders, teasing, disruptive to others).
9. Acting according to the general frame, which does not include the above behaviours (B1-B8). (E.g. child eats at eating situation, dresses at dressing situation)
10. Other action. (Action that does not fit in other categories, confusion, a lot of changes, no structure, difficult to pinpoint).

C The child's main object of attention
1. Non-social object. (E.g. focus on toys, sand, cars, blocks, water, or self.)
2. Adult. (E.g. follows adult's narrative, discusses with adult. If the child also gave attention to children in the situation, the code is C5 for The whole situation.)
3. A child. (Child's attention is focused on another child. The focus can include toys etc. or any non-social object in the child's hand.)
4. A group of children. (Attention is focused on 2 or more children. The focus can include toys etc. or any non-social object in the child's hand)

5. The whole situation. (The situation has so many elements that one object of attention could not be defined. E.g. children, adults, materials and different kinds of actions, usually a dynamic situation.)

D Closest social peer contact (if one can be found)
Write down the Code Number of the child that the observed child is most involved with.
If the closest contact is a child from another class, code Δ
If nearest contact cannot be found, enter X .

E. The physical activity level of children
1. Low (sitting, using pen, eating etc.)
2. Intermediate (walking, whole body movements)
3. High (includes at least some running, romping, physical exertion etc.)

F. Child's involvement
1. Simple, stereotypic, repetitive, passive, no energy, no cognitive demand
2. Frequently interrupted activity and engagement
3. Mainly continuous activity, easily distracted, mental engagement is lacking.
4. Continuous activity with intense moments, child not easily distracted.
5. Sustained intense activity, concentration, creativity, mental engagement, and persistence

G The average distance between the child and the nearest adult educator in meters.

H. The nearest adult's main action
1. No child contact e.g. arranges things, discusses with another adult.
2. Observes children (can be arranging and organizing things at the same time).
3. Interaction with one child only.
4. Interacts with a group of children (with open-ended results created during interaction).
5. Teaching (teacher already has a pre-defined goal, and knows what should be learned,).
6. Undefined situation (cannot separate elements of the adult's main action in a dynamic situation).

I. An adult focuses on the child at least some time of the observation
1 Yes, at least a few seconds concentration on the child
2 No focusing, or just sweeping gaze/gazes.

Date_____ Day care center/group _____

Time	Child's number	General action (1-7)	Child's action (1-12)	Attention (1-5)	Near. contact (Code)	Phys. activity. (1-3)	Child's involv (1-5)	Dist to adult (Meters)	Adult's action (1-6)	Adult focus on child
9.20	5	2	2	5	d15	1	2	2	1	2
9.24	6	1	7	4	--	2	5	10	4	2

Time	Child's number	General action (1-5)	Child's action (1-12)	Attention (1-5)	Near contact (Code)	Phys. activity. (1-3)	Child's involv (1-5)	Dist to adult (Meters)	Adult's action (1-6)	Adult focus on child

Appendix C. Teachers' evaluation of the child

Child's code (e.g. 8D):_____

Gender: Male □ Female □

Age (in months): _____ Months the child has been in this day care center _____

Child's best friend (code of one child only):_____

Child is qualified as having special needs: __ yes __no Special need: _____

The amount of brothers and sisters: _____

Child is: first born □, born between siblings □, child is the youngest □

The child	Does not describe the child at all	Describes poorly	Describes somewhat	Describes the child well	Describes very well
Adapts easily in new situations and with other children.					
Needs a lot of support in fine motor skills.					
Participates and initiates eagerly in activities.					
Needs a lot of support in gross motor development.					
Is trusting and confident in day care center					
Needs a lot of support in learning and metacognitive (learning to learn) skills.					
Recognizes own feelings and copes with them.					
Is independent and self-directive.					
Recognizes the feelings of others and interacts sensitively.					
Is creative in pretend play .					
Needs support in language communication skills					
Has good social skills in a group of children.					
Copes appropriately in new challenging situations.					
Can concentrate easily					
Withdraws easily, contacts with other children are often weak.					
Has willpower and uses it with other children (can dominate)					

Appendix D. Interview instructions and outline

Instructions:

- The interviewer should practice the interview with two other children from the other group which is not participating in this research.

- The interview questions and pictures are in a book prepared for the interview. Before the interviews the interviewer shows the book to the group of children. The interviewer tells beforehand to the group of children that they will be invited individually to read the story together with the teacher. (Only children over three years of age are being interviewed.)

- The interview is done in a separate room where they will not be interrupted.

- Do consider the child's age, language ability and personality, for example, some children may need more time or different way of expression to understand and answer the question.

- The interviewer and the child can sit side by side at the table and look at the book together. *"I would like to read a book which is about you. This book is unfinished and I need your help in completing the story. Could you help me?"*

- *"In the book the yellow child is you and I would like you to tell me what you will do in each page and I will write it down for you. Are you ready to start?"*

- There can be an assisting adult with the child at the interview, e.g. a translator with immigrant children.

- The interviewer accepts or answers without moral judgment. During the interview the feedback should not include the content of answers, because child might interpret that there are "correct" answers or the interviewer likes certain kind of answers. The interviewer must make it clear from the start that she/he is interested in children's own point of view and there are no right or wrong answers. For example, if the child answers *"I hit him"* the interviewer accepts child's answer and writes it down. The Interviewer should show her/his interests and open-mindedness to all kinds of strategies, as long the child describes her/his action in that particular situation.

- The approximate time for the interview is usually between seven and fifteen minutes. The child cannot concentrate much more. Child's first answer describing his/her action should be written down immediately. If the child elaborates long sentences after that, these comments should be omitted and not encouraged. The reason for this is that the first vision seems to best describe the child's real situation. Also the categorizing will be more difficult later on, since especially older children start to give other options too.

- If the child does not describe his/her action, the interviewer asks him/her again, e.g. if the child says "*the teacher is angry*", the interviewer can say "*ok the teacher is angry, what do **you** do then?"*

- If the child's answer does not relate to the picture/situation, the interviewer can ask again. After that, if the child still does not answer the question, the interviewer can ask: *"Has this ever happened to you?"* If the child admits, the interviewer can say *"what did you do then?"* If the child says that the situation is unfamiliar to him/her, the interviewer might ask: *"What would you do if this happened to you?"* It is always important to find out the child's strategy; what the child describes doing in that particular situation.

- If the child does not give an understandable answer of, the situation should be described again or in different words and asked again.

- If the child does not understand the situation, the interviewer and the child can discuss the picture. When the interviewer is sure that the child understands the situation, the interviewer asks again: *"What do you do?"* The interviewer should always concentrate on child's description of his/her own action/strategy.

- The interviewer should not provide examples or otherwise maybe leading questions. Never try to guess what the child means or give children options what to do. Never complete children's answers into a sentence. If the child e.g. answers with one word or the answer is incomplete, ask again "*what will you do?*" or "*tell me more of what you are doing?*" or "*what happens next?*"

- Here is an example of accepted encouragement:

  > Think of a situation that your work is ruined and you fail. What do you do then?
  > Child: (Says nothing at all)
  > Adult: What do you do when you fail?
  > Child: Train…
  > Adult: Have you ever failed?
  > Child: Yes.
  > Adult: What did you do?
  > Child: I went to play with train.
  > Adult writes down: "I went to play with train."

- Some children need some encouragement to answer. For example, if the child says "*I don't know*" the situation can be described in other words. In the end, if the child still after encouragement says e.g. "*I don't know*", that too is an acceptable answer and is written down.

Interview outline

Child's code (e.g. 12U): _____

- *Introduction: We will read a book. The book is unfinished and I need your help in completing the story. Could you help me? In the book the yellow child is you and I would like you to tell me what you will do in each page and I will write it down for you. Are you ready to start?*

1. Let's think that <u>another child has the toy</u> you want. What do you do?
2. What if you don't want to <u>tidy up when the time is up</u>? What do you do then?
3. Let's think that you are playing with someone and your <u>friend wants to change play</u>. What do you do?
4. Think of a situation in which you disagree with <u>the teacher</u>. What do you do?
5. What if a <u>friend will not play with you</u>? What do you do?
6. Let's think about a situation where another <u>child comes to tease you</u>. What do you do?
7. When the <u>teacher suggests</u> what you want to do, what do you do?
8. When there comes up a situation that a <u>teacher comes to stop your play</u>, what do you do then?
9. Let's think that you are playing with a friend and you would like to change play, but <u>your friend does not</u>. What do you do?
10. What if you don't like the <u>activity arranged by teacher</u>, what do you do?
11. What if you are seeing some <u>children quarreling with each other</u>? What do you do?
12. Let's think that you are playing a game with somebody and <u>the other does not follow the rules</u>. What do you do then?
13. Think that the <u>teacher does not agree</u> with what you do. What do you do then?
14. What if you are doing an important work and <u>somebody comes to disturb you</u>, what do you do then?
15. Think of a situation that your work is ruined and <u>you fail</u>. What do you do then?
16. What if <u>somebody takes your toy</u>, what do you do?
17. What if <u>someone praises what you have done</u>, what do you do?
18. With whom do you want to play most? (write down child's number)
19. With whom do you want to play the least? (write down child's number)

Thank you very much of important and fine answers. I now understand your situation better. You helped me a lot. Thank you.

Appendix E Evaluation of the educational setting

Day care center _____ Group _____

The amount of children in the day care center _____ The amount of children in the group _____

The age of the youngest child in the group _____ The age of the oldest child in the group _____

Description of pedagogy	Does not describe	Describes poorly	Describes somewhat	Describes fairly well	Describes very well
Education happens mostly in small groups and is differentiated					
Learning and activity environments are emphasized and are versatile					
Children's action is documented and observed a lot					
The educators of the group have been perpetually short of time and short of resources					
The planning concerns more planning action for a group of children than planning for individual children					
The educators have at least once a week a planning and evaluation meeting					
The children take responsibility in their personal daily routines					
Different projects and themes are often developed together with the children					
Children have a lot of opportunity to self-directive, autonomous play					
The whole group is having a meeting every day					
The conditions, the environment and the tools are versatile for physical activities					
Children participate a lot in the planning and development of the activities					
There are several immigrant children or children from different cultural backgrounds					
For some reason joy, humor and well-being does not describe our group of children very well recently					
For some reason emotional expression is not so rich or accepted in our group of children					
The controversies of the children are processed and examined together with children					
There is a strong togetherness and consideration between children					
The leadership of the pedagogical work in the day care center and the educational culture development should be strengthened					
The turnover of the staff is small					
Time, warmth and a hug is always available for the children when they need it					
Basic care situations, clothing and transition situations are peaceful					
Music (songs, playing, performances and listening) is very important in our group					
The outside playground encourages many kinds of activities					
The amount, placing and use of materials and tools are thoughtfully considered and good					
We do a lot of excursions and utilize neighborhood					
Children's plays last and develop often for weeks					

There are possibilities for versatile building and playing with material					
The educators spend a lot of time by participating in children's play					
Every play has a clear distinctive place					
The division of children in smaller groups and play groups is done for pedagogical reasons by educators, not by children themselves					
There is a lot of visual expression (drawing, painting and art) in the group					
There is a lot of drama play (puppet theater, performances, plays) in the group					
There is a lot of handwork (pottering, baking, technical work) in the group					
There is a lot of role play in the group					
A lot of fairy tales, stories, rhymes and books are used in the group					
We work a lot with information technology (computers, tools and digital media)					
Religious-philosophical orientation is important in the educational activities					
Historical-societal orientation is important in the educational activities					
Natural sciences orientation is important in the educational activities					
Ethical orientation is important in the educational activities					
Esthetic orientation is important in the educational activities					
Mathematical orientation is important in the educational activities					
The educational content orientations (subjects) are not worked on separately					
Educational content orientations (subjects) raise from everyday action, not from beforehand decided content or themes					
The education happens as common interaction, not as separate lessons					
The children obey rules without adult supervision					
Children are encouraged and their success is supported a lot					
The creativity and self-expression of the children are on the minds of the educators constantly					
Children's confidence and identity construction is considered a lot in educational discussions					
Children's emotional needs are often the main part in pedagogical discussions					
The support of children's curiosity and exploration is considered a lot in the planning of activities					
Peer relations are central topics in our pedagogic discussions					
We talk a lot about our curriculum in our pedagogic discussions					
The work in the day care center is natural, sustaining and harmonic					
The work in the day care center is fragmented, uncontrolled and chaotic					
The work in the day care center is effective, planned and well aimed					
The work in the day care center is experimental, creative and full of possibilities					