1. Direct Education inside

In Finland there was 19.3 % of direct education and in Taiwan 29.6 % of the time (**Virhe. Viitteen lähdettä ei löytynyt.**, altogether 6812 observation, describing 454 hours of children being in direct education). Direct education was defined in the observation instruments in the following way: *A1. 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).* The difference between direct education and scaffolded play is very difficult to pinpoint. In the observation instructions the definition of scaffolded play is: *A2. The teacher supports children's own processes*. However, that is what the teaching is all about, supporting children's processes, isn't it? In the observation instrument teaching was defined as follows: *H5. Teacher already has a pre-defined goal, and knows what should be learned.* In direct education the role of curriculum and educational objectives is more predefined than in scaffolded play. The keys for teaching are the educational objectives and teacher's actions.

In scaffolded play educators role is to participate in children's action and enrich it if needed. In teaching there is already a plan, a curriculum or predefined objective. We can say that good teaching can be measured by how well the predefined objectives have been realized. In scaffolded play often the educator participates in a process that is open-ended. In scaffolded play it is impossible to define objectives before the activity is over. And if the objectives can be defined only after the activity, they are not really objectives. They are the perceived motives of the activity, the impact of children's and adults agentive perception.

Children's involvement in direct education was second highest when comparing different general activities, right behind the scaffolded play (**Virhe. Viitteen lähdettä ei löytynyt.**). In Finland the mean value of involvement was 3.3 and in Taiwan 3.1 (the difference between countries may depend more on the fact that Taiwanese observers for some reason gave less highest scores for the involvement). Thus we can say that direct education is a valuable tool for education.

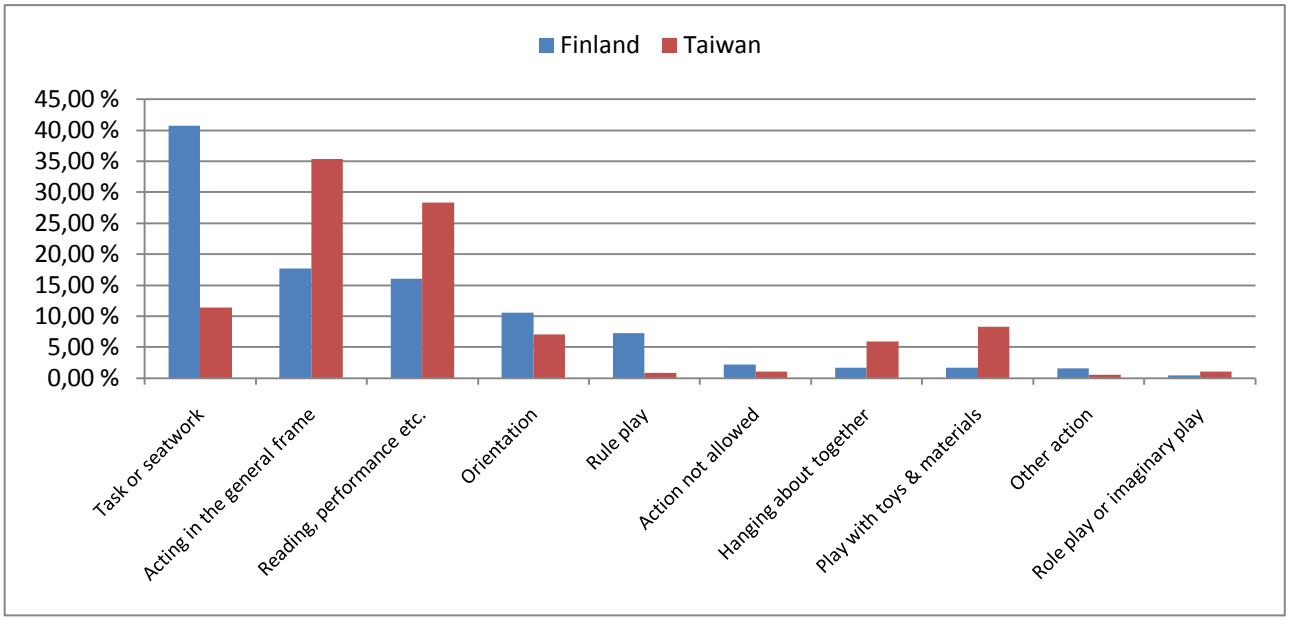

Figure 1. Children's activities during direct education in Finland and Taiwan

In Finland the most frequent activity is task or seatwork (41 %). It can be seen that in Taiwan task or seatwork covers only 12 % of the activity. It is possible that the some of the differences between countries are based on the differences of the observers defining the situation. As has been seen, in Taiwan children do a lot of play with toys and materials during scaffolded play (**Virhe. Viitteen lähdettä ei löytynyt.**). It is possible that some observations in Finland categorized as task or seatwork in direct education, would have been categorized as play with toys and materials in scaffolded play. However, the difference here concerns tasks or seatworks, defined in the observation instructions as *B7. Task or seatwork (homework, pen and paper exercise, practice dressing, memorizing nursery rhyme, refining a skill, work).* The difference seems clear enough for a meaningful difference.

In Taiwan educators seem to be giving more specific tasks that cannot be categorized in predefined categories (35 %) than Finland (18 %). Also reading or other performances seem to be used more in Taiwan (28 %) than in Finland (16 %). According to the researcher's personal observations, the Taiwanese educators seem to be doing more reading in transition situations like waiting for the lunch, daily nap arrangements etc. In Finland there seems to be more orientation (11 % of the time, including e.g. walking around, observing others without participating, searching or waiting) than in Taiwan (7 %). In Finland teaching includes rule play 7 % of the time, while in Taiwan it is almost non-existent (0.8 %). Action not allowed is not usual in either of the countries. In Taiwan direct education includes more hanging about together with others (5.9 %) than in Finland (1.7 %), which fits well with the researchers' own observations, that in the Taiwanese day care centers observed the teaching consists more of situations, where the group discusses together what they have been doing and what they will be doing in the future. Taiwanese style of including educational content into play with toys and materials also shows in direct education. The small amount of role play during direct education in Finland (0.5 %) and Taiwan (1.1 %) raises questions. Role play could engage children to the activities in a more holistic way and give a meaningful framework for the learning content. For some reason this possibility is not utilized. The role play cannot be lurking in scaffold play, where role play happens also rarely (**Virhe. Viitteen lähdettä ei löytynyt.**).

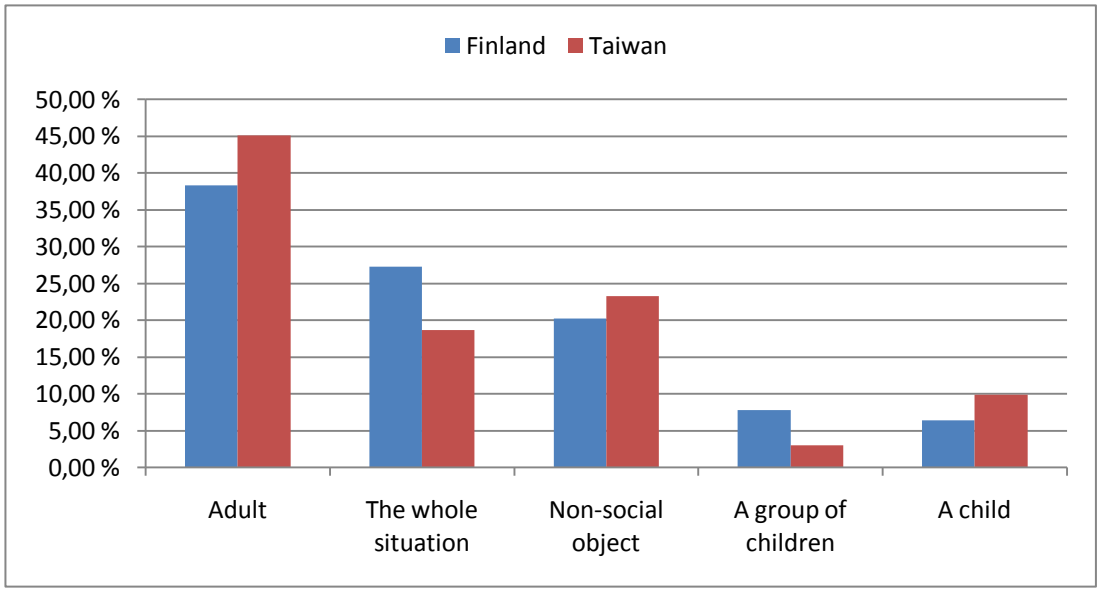

Figure 2. Children's object of attention during direct education in Finland and Taiwan

Children' main object of attention during direct education is the adult educator both in Finland (38 %) and Taiwan (45 %). In Finland direct education includes more undefined situations (29 %) than in Taiwan (19 %).

According to the observation instructions 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) and it is usually a dynamic situation. About one fifth of the direct education seems to be concerned mainly with non-social objects. Children's main attention towards other children or another child is small.

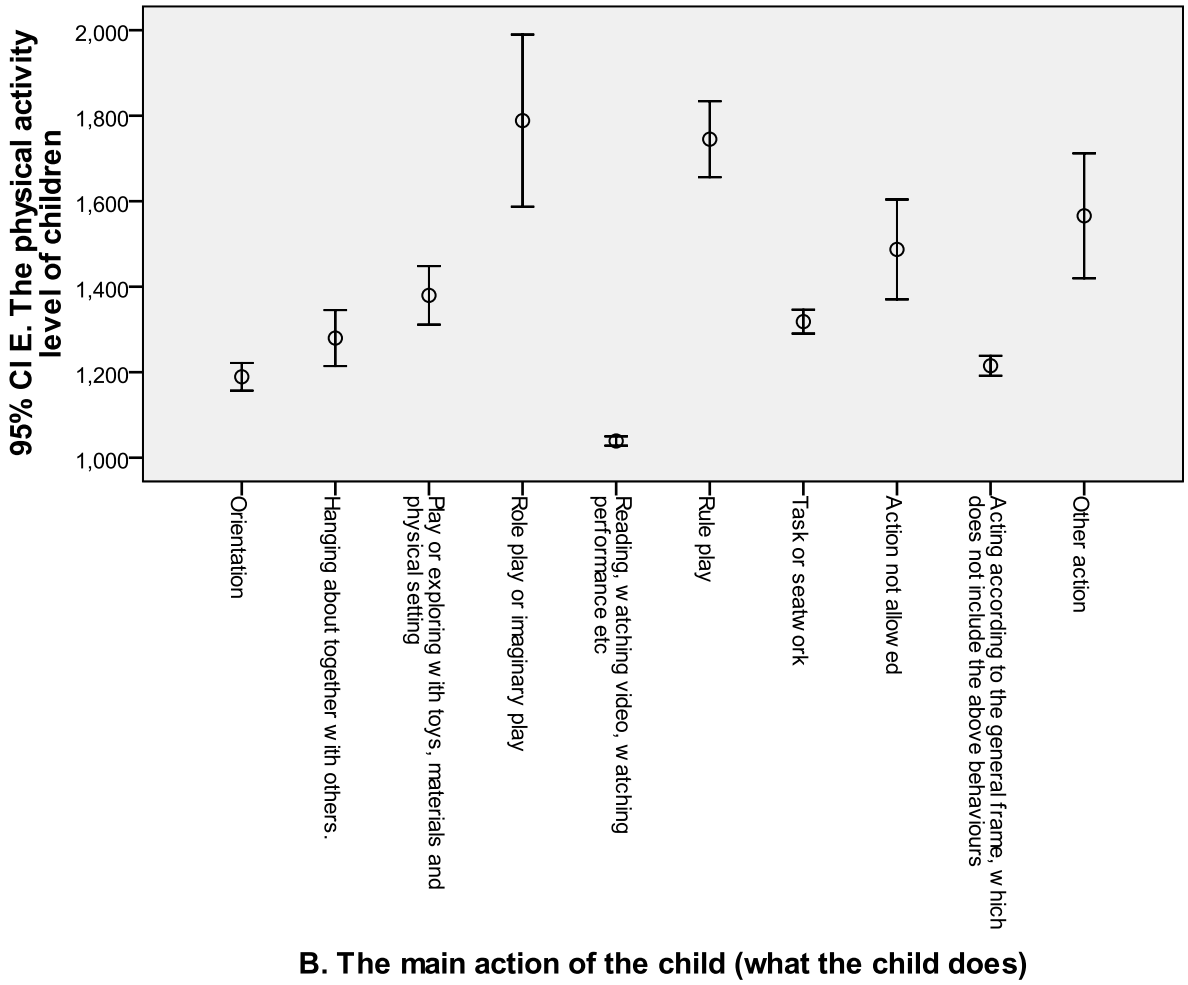

Figure 3. The confidence levels of physical activity in different children's activities during direct education

In direct education children's physical activity is very low both in Finland (*M* = 1.29) and Taiwan (*M* = 1.20). The differences between the countries are not presented here because the levels in different activities tend to be similar across activities, with Taiwan with even smaller amounts of physical exertion throughout the activities. Only eating is less physically active than direct education in both countries. Nevertheless, the physical activity level varies greatly in different children's actions as can be seen in (Figure 3). Role play (*M* = 1.8) and rule play (*M* = 1.7) are most active physically. Next come *other action* and *action not allowed* which perhaps should not be considered here, because of the small amount of activity observed (Figure 1) and the fact that those children are probably not doing what the educator has planned. All other activities are usually low in physical activity.

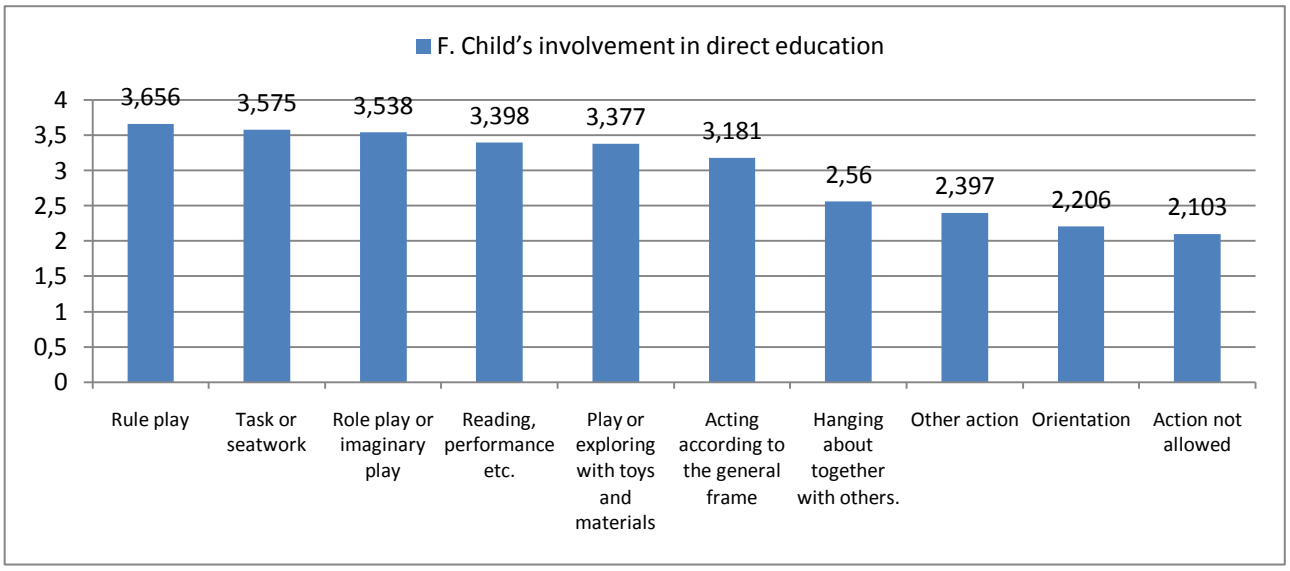

Figure 4. Children's mean involvement in different activities during direct education

Because Finland and Taiwan follow similar patterns in involvement in different activities, they can be presented together. Rule play is the most involved activity, making it a promising tool for direct education. Unfortunately it happens not very often (especially in Taiwan, see Figure 1). Children are highly involved also in task or seatwork, and it is a regular activity in direct education both in Finland and Taiwan (Figure 1). Role play seems to be also a good way to introduce learning content. However, there is very little role play during direct education (Figure 1), which makes role play as more a potential tool for direct education than a real one. Reading and playing with toys involve children also quite a lot, but in and activity defined specifically by the educator the involvement clearly drops. The drop needs attention, because children spend a lot of time doing things according to the general frame.

What is acting according to the general frame actually? We can tell by the observations done during children doing things according to the general frame (n = 1737), that children were more than usual (55 % of the time) attending to a teacher and the teacher was more than in other activities doing teaching (62 %). Thus we can assume that teaching does not engage children as effectively as play or taskwork. Teaching is practiced a lot (especially in Taiwan), which makes it an important tool for direct education. The results suggest that either more engaging teaching activities should be applied or the amount of teaching should be dropped. The distance between educator and the child is smallest considering all the activities (*M* = 1.6m). Thus, more teaching and adult's nearness do not guarantee children's engagement in the activity.

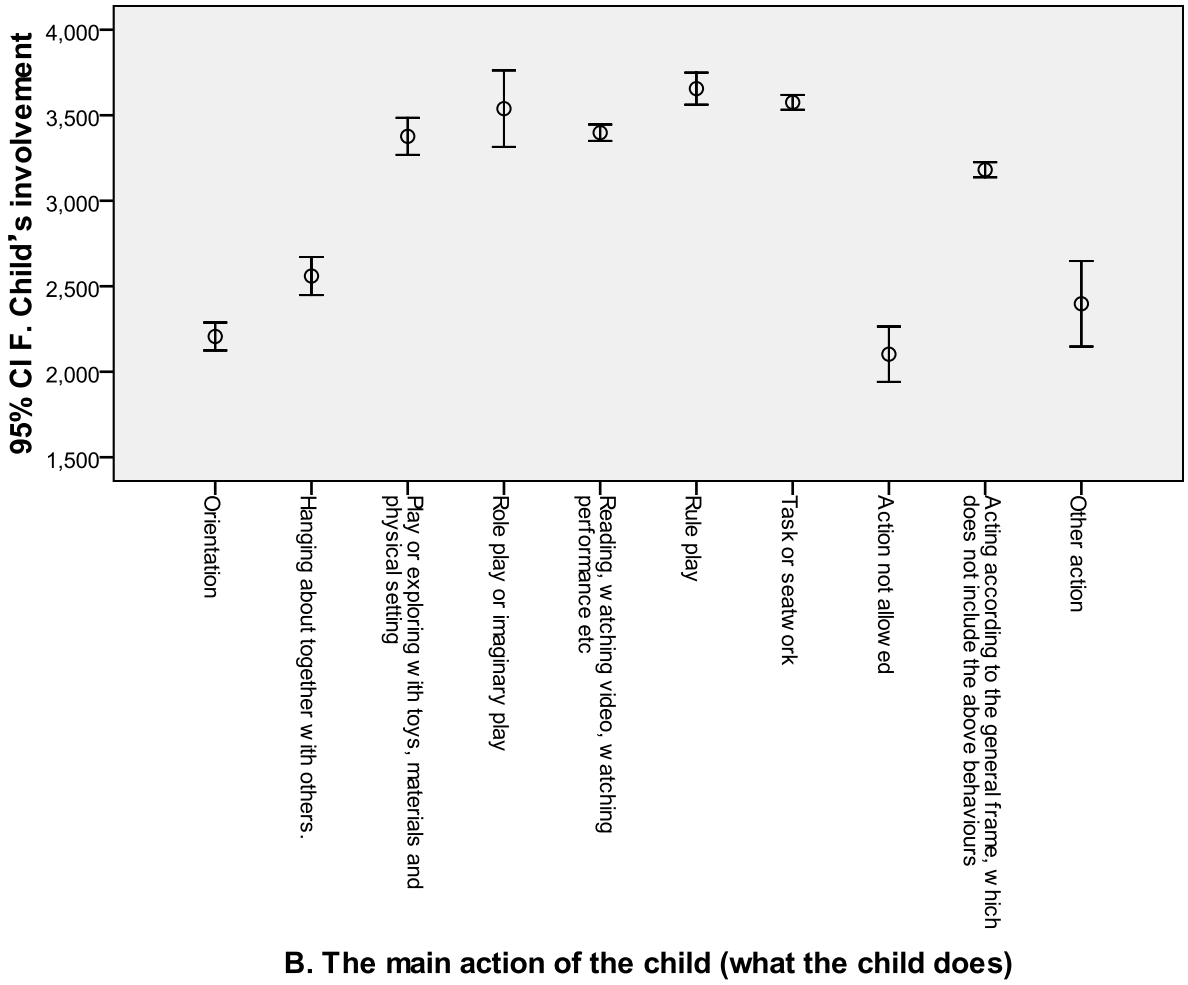

Figure 5. 95 % CI for children's involvement mean in different children's activities during direct education

In the Figure 5 can be seen that different plays and taskwork are statistically significantly more involving activities than acting according to the general frame (teaching). On the other hand, orientation, action not allowed, other action and hanging about together are statistically significantly below the other activities.

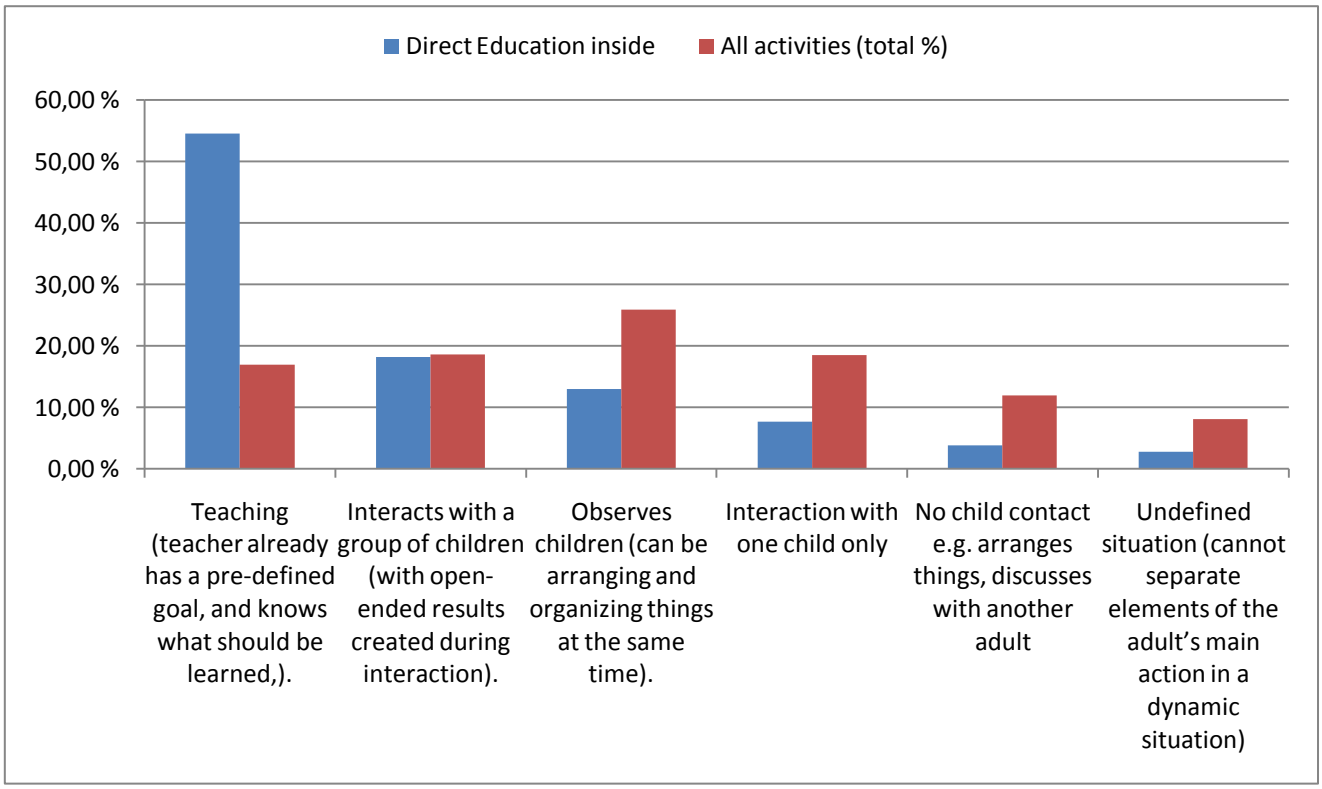

Figure 6. The activities of the nearest educator during direct education

It may be no surprise that most of the direct education is teaching (55 % of the time) and the amount of other activities is smaller than other types of general activity, with the exception that in interaction with a group of children (with open-ended results) the average is the same as with other general activities.

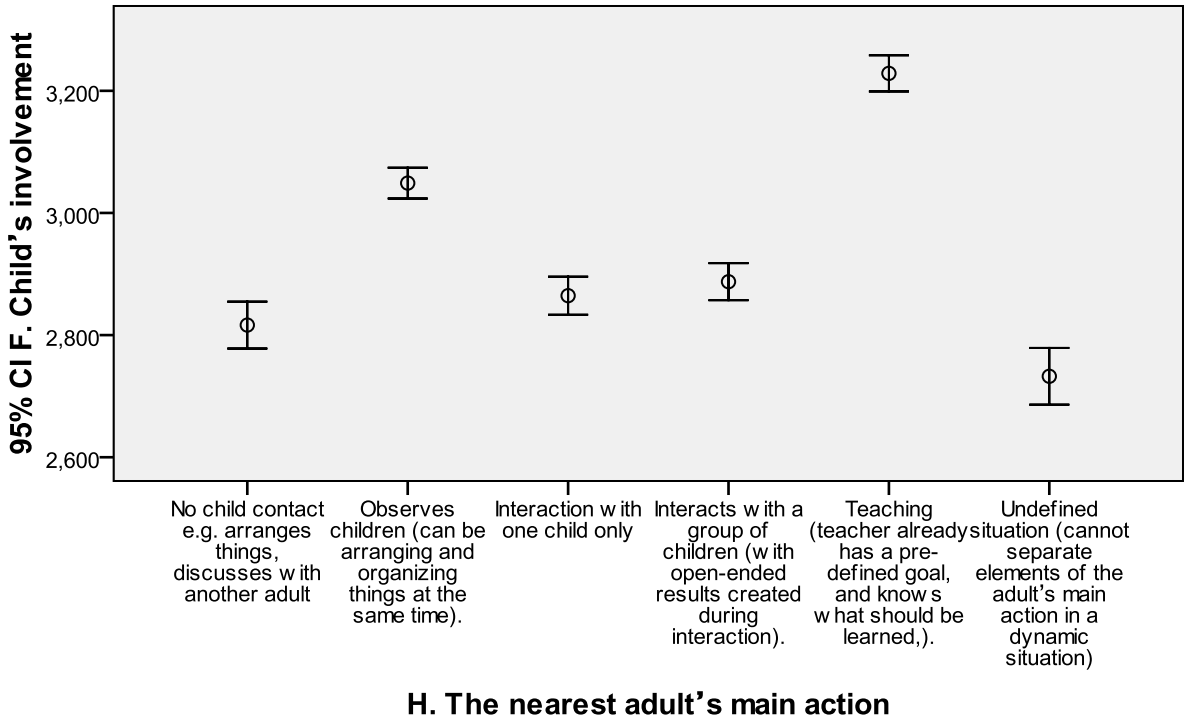

Figure 7. The 95 % CI for children's involvement during direct education

Educators' activities give a different perspective on the involvement than children's activities. During direct education children are generally more involved (*M* = 3.32) than in other activities. Observing children probably describes that the direct education is advancing as teacher intended and is related to children's clearly second highest score on involvement (*M* = 3.29). Interaction seems not to heighten the involvement during direct education. During direct education the adult needs to also to interact with disturbances and unclear situations (*M* = 2.71) and sometimes needs to organize things, which drops the involvement even further (*M* = 2.61). Children's participation and deviations from the plan can make teaching less engaging. In direct education the process needs to be led by the educator, otherwise the involvement drops.

The results seem to indicate that direct education (teaching) is a good method for education, when the things that need to be learned are precise enough. Teaching seems to be a relevant method for learning when the preferred results already exist in the teachers mind. Nevertheless, direct education is vulnerable to distractions as children's inner processes need directing and children cannot guide their learning towards the right target, because they do not yet posses the knowledge that needs to be learned. Although direct education (teaching) has elements (objectives) that are directed on impacting the child, also teaching is an interactive process, in which the teacher can also add elements for child participation as the following example from Taiwan shows.

Figure 8. Direct education: Engaging children for the task

The example of direct education has as an objective that children have some agency on the task production. The task is to make a necklace. Children in the group are three and four-year-olds. Teacher's objectives are: 1) The children design their own products, children practice their designing skills; 2) The children become aware what things are needed in a designing process; 3) Children can express themselves; 4) Children act in a concentrated and sensible way in relation to the task: their metacognitive skills develop; 5) Children get practice in fine motor skills like drawing, using scissors, threading beads to a string;6) Children get a sense of a pattern; and 7) Children experience the feeling of success and joy in completing the task.

The teacher has engaged the children in a discussion for different uses of thread. One use is a necklace. The teacher draws a picture on the white-board of a necklace. What can you thread to a string? What kind of object would we thread first? What is the color and shape of the first bead? What is the color/shape/material/feel of the next bead? Teacher draws the necklace one bead at a time according to the discussion with the children (you can see the example on the white-board). Teacher helps the children to find a shape (a consecutive order) in the shapes. There can be different kinds of necklaces. What kind of necklaces there are. Children give examples: A princess necklace! A police necklace! A bracelet!

Figure 9. Direct education: Children planning for their task

Children are given a piece of paper and colored pencils. Children are given a task of planning their own necklace. In the picture you can see children planning a design for their own necklace. Teacher keeps on discussing of the different aspects of the designing process on the white-board with the children to keep the different aspects of design process in children's minds. Children discuss, compare and ideate each other's plans. Some children produce plans, which show the awareness of a pattern, like the girl in the front. Others, like the boy's next to the girl, the plan does not look very much like an ordered necklace from the adult's perspective. Children's plans are influenced by others and children's plans change. It is a pity the colored pencils cannot be erased. For some children the necklace starts to look like a mess, but the teacher has no resources to look after every child's plan.

Figure 10. Direct education: Children work for realizing their design process

Children have different materials at their disposal, elastic bands, beads of different colours, straws of different colours and paper. Some children follow their plan: they look at the drawing they made and follow the pattern planned. Some children do not have resources to think about the design; the boy on the left needs all his concentration on the cutting of straw and it still is difficult. The girls seem to be often more skilful in their task and follow better their plan than boys, whose plans is often more messy and seems to have less relation to the emerging necklace. All children are motivated to do the necklace and the teacher helps children in each table as much her resources allow. For the quicker girl the teacher may give an additional task; does the necklace need something blue in the middle? Children which have started according to the plan, make changes to the plan and unravel their work and redo them.

Figure 11. Direct education: The task must be accomplished

In this case it would not be a good idea that every child would make a similar necklace. The children with less skills would be discouraged and not learn to master the task. Maybe the ready-made model would be also too easy for a child with advanced skills. The teacher keeps on pointing on children's plan and following it, but most of the children deviate from the plan at some point, which is ok for the teacher. Sometimes the teacher is surprised by child's new invention on the necklace.

Figure 12. Direct education: The evaluation of the design process

Children accomplish their task at different times. Those who are ready earlier get more paper and start to draw. One boy's almost ready necklace slips out of his hands and all the different beads fall to the floor. Teacher needs to concentrate on the boy's necklace and the teacher is tempted to do the necklace for the boy. When everyone is ready, children present their necklaces, bracelets and crowns to others. The finished works are discussed and the teacher takes a picture of each item.

The example shows some advantages and pitfalls of direct education. It is a good tool for engaging children in specific tasks, which the teacher finds important for children to learn. With a specific thing to learn or do the teacher has clear criterions in evaluating children's skills. In direct teaching -- if the children can participate in the planning, remodeling and evaluating the product – children can practice their skills of design and metacognition. If the learning task is introduced as a design process, the children are able to include their interests and preferences to the task, thus deepening their personal level of engagement. On the other hand, it is often hard to teach directly and in the same time to cater for each child's specific educational needs. Sometimes the teacher just does not have enough resources to guide each child through a diverse jungle of orientations. It can happen that the children, who do not have the needed skills to accomplish the task, learn very little. It can also happen that children that are very skilful learn also very little, because they already master the task at hand.

Direct education with Finnish childminders

With Finnish childminders there was only 9.5 % (n = 118) cases of direct education observed. However, the children were very involved (M = 3.63, SD =.98). The differences between types of day care means are statistically significant. (The mean for children with childminders was 3.63 (SD = .98), in Finnish day care centers 3.31 (SD =1.13) and in Taiwanese day care centers 3.13 (SD = .92). According to univariate test F (2, 6812) = 33.99, p < .0005. Post hoc test with Tukey correction showed that the differences were significant both for Finnish day care centers (p = .003, 95 % CI (.093, .548) and Taiwanese day care centers (p > .0005, CI (.273, .730).

With childminders the children were mostly doing tasks or seat work (40 % of the time), listening to a story (23 %) or playing rule play (17 % of the time spent in direct education). In those activities children's involvement was remarkable, in tasks or seatwork the mean was 3.83 (SD = .94), in reading etc. 3.78 (SD = .51) and in rule play 3.90 (SD =.79).

During direct education children main object of attention were non-social objects in 37 % of the cases, the whole situation in 28 % of the cases and the educator in 21 % of the cases. An important ingredient in the high involvement seems to be the concentrated and non-disturbing small group atmosphere, because children's involvement mean dropped during attention towards the whole situation to 3.15 (SD = 1.15). Chilren's physical activity and involvement were not connected with each other (r = -.023, n = 118, p = .808).

The childminders were teaching (teacher already had a pre-defined goal and knew what should be learned) in 62 % of the cases and interacting with a group of children (with open-ended results created during interaction) in 23 % of the cases. The remarkable thing is that during the open-ended interaction children's involvement was higher (M = 3.96, SD = .76) than during teaching with pre-defined objectives (M = 3.60, SD = 1.04). Open-ended interaction leave more room for children's participation in personal involvement. Small group makes these opportunities frequent.

The childminder concentrated on the children at least a few seconds during direct education a lot, on average 81 % of the time. The childminders attention was connected with higher mean involvement 3.69 (*SD* = .96) than childminder not attending towards the child (*M* = 3.36, *SD* = 1.05). The combination of non-disturbing environment, open-ended interaction and attending to children make the direct education with childminders the most potential environment for children's learning.

1. How to save preparing time in direct education?

Teaching is often adult-initiated and planned activity. Preparing good teaching may take resources from preparing other activities, which are potentially important for children's well-being too. Could the daycare center educators specialize in their teaching field, the division of labour thought over or could the children themselves take part in the preparation of teaching? Could a well prepared and effective lesson be adapted to several groups of children?

2. How to change the objectives of direct education from defining specific skills and towards metacognitive skills?

If the objectives of the direct education are concentrated on a particular objective that should be attained, children's initiatives of change or children impacting the educational may disturb the reaching of the objectives. However, if the objectives include children learning to steer their personal and shared skill acquisition, children's participation can be seen as a positive initiative. Examples of metacognitive objectives in different orientations could help.

3. How to include role play into direct education?

Role play is nearly non-existent in direct education. Nevertheless, it is a promising means of direct education both for high involvement and physical activity. An additional bonus is the possibility for children to explore their own motives and experiences in a flexible make-believe situation. How to include role play in different orientations?

4. How to add the peer impact in direct education?

Direct education seems to be quite heavily a teacher-centered activity. Other child or children are rarely child's central objects of attention(Figure 2). However, children are a huge resource for educational content. With other children there is more room for influence and personal feedback. By letting the children participate in the progression of the activities the teacher could get a better grip on children's orientation and the children could experiment with their orientation, eventually becoming more aware and skilful in confronting different tasks.

5. How to include rule play in direct education?

Children were most involved in their activities during rule play and their physical activity level was also high compared to other activities in direct education, which makes it a very potent tool for effective learning. Still the rule play was used seldom. Is it possible to connect a meaningful learning content and the appealing attraction of a game?

6. How to raise the physical activity level in task work during direct education?

Task work during direct education seems to be a low activity physically, containing work at the table, using the pen and paper and doing the task in one place. Because task work (especially in Finland) is a central aspect of direct education, raising the physical activity level considerably would make a difference.

According to the analysis, physical activity and mental involvement do not rule each other out. In fact they are mildly positively correlated (r = .066 n = 29804, p < ,0005).

7. How to raise the physical activity level during reading, performance etc.?

Children activity level during reading is physically lowest of all activities (M = 1.077, SD = .286). Of the 2261 observations an astonishing amount of 2099 (92,5 %) was low physical activity. How could we change the self-evident fact that in the reading sessions children do not move to a self-evident fact that the children get all-round physical activities during reading?

8. How to raise the physical activity in teaching sessions?

Children's physical activity was the second lowest (M = 1.309, SD = .504), when children were acting according to the general frame of direct education. This action included more teaching and adult-orientation than other activities. There is no good reason why teaching should be related to low physical activity. Is there a general principle how to raise the level of physical activity during teaching? It is possible that the effectiveness of teaching increases when whole body is included in the process.

9. How to engage children in the planning process of the direct education?

It takes time for children to get practice to participate in the production of the processes (see chapters **Virhe. Viitteen lähdettä ei löytynyt.** and **Virhe. Viitteen lähdettä ei löytynyt.**). Children's participating in the planning process does not necessarily mean that children decide what is done. In direct education the teacher can make it a habit to leave certain aspects of the activity open and children can train themselves in the production of learning content. Is there a general principle of doing this? How could we increase children's participation in determining the content of the direct education?

10. How to make the interaction during direct education more open-ended in small groups?

Educator's open enden interaction increases children's involvement in small groups. For bigger groups open interaction does not have the same effect. Probably open-ended interaction during direct education results in too diverse situation for effective learning. In small groups children's initiations are easier to incorporate into the whole. Educators can make a conscious choise to invest on open interaction during small group interaction. What could this mean in practice?

11. When to raise the amount of small group activity in direct education?

Direct education in small groups is more focused and the teacher has a better possibility to attend to each child's personal situation. Children also have better possibilities for participation. However, the educators resources are limited. if all the activites are conducted in small groups the overall amount of direct education gets smaller. In the end, probably both big and small groups have something valuable to offer to children. In big groups it is easier to give information and to work on the ready-made educational objectives. Ins smaller groups the content of the education is done during the interaction. To raise the consciousness of the different pre-requisities would make more meaningful direct education. Try to make concrete examples where big and small group direct educations could be applied.

12. How to raise children's personal input in learning content?

Children's personal input raises children's involvement and helps children to see the impact of their views thus becoming more aware of their choises. There is simple mathematics for raising children's input: 1) The more open-ended the planning and actual direct education is, the more children have room for input. 2) The smaller the group, the more personal room children have for personal input. 3) The more the activity is

concentrated on peer to peer relationships, the less hierarchical is the input process thus giving room for direct impact. On the other hand, not every activity needs to have children's personal input. Where should children have more input in the educational content and how should the situation be arranged concretely. Give examples.