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# Cooking and Hammering: Primary School Pupils' Concepts of their Craft Skills

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**Abstract**

The aim of the study is to clear the significance of craft skills for the pupils in age nine and twelve years. More than 200 pupils were asked to define, what are the most important skills for the pupils of their age. The results bring out that category of the skills related to craft subject is of the most presented categories in pupils' self description. Thus the primary school pupils essentially defined themselves by the activities they could do practically (building, cooking, repairing of things). The most undefined relation to craft activities is reflected in the answer of smaller boys in our study. A suspicion arisen from the analysis of pupils' sayings, that the craft lessons in the 1st school stage tend to be organized kind of poorly was asserted by the teachers who pointed out the need for special rooms and materials to implement different techniques.

**Keywords:** Craft Skills, Curriculum Development, Ideal Standard, Primary Education, Self-Concept.

## Introduction

The title is inspired by an interview in a scientific journal, where the editor asked a famous physician a question about conditions supporting his pursuits in science. The physician reminded an episode when he was three years old hammering a nail, and also later in his childhood when he was often given different materials and tools to knock up technical widgets (Akadeemik 2008). He pointed out the significance of craft activities as a tool of scientific thinking.

This paper focuses on problems of technology teaching in primary school. The empirical study covered the abilities that pupils themselves elicit as necessary, in other words, their ideal self-concept on the level of their skills. Skills related to craft subject have gained an important place in pupils' answers. Questions evolved from that: what kind of skills is

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important for different age and gender groups? What kind of information might be gathered from pupils to improve technology teaching?

The study about valuing craft skills by pupils is placed in the theoretical frame of curriculum development and technology teaching (Alamäki 1999; Illum 2005; Lind 2009, 2010; Lindfors 2007; Lindström 2011; Kikkull 2012). Nordic craft syllabuses prioritize pupils' self-confidence and coping with everyday life. Consequently it should be significant for curriculum development what the pupils themselves think about the subject of craft in the context of their activities and needs. Estonian National Curriculum experiences a paradigmatic shift along the lines of Nordic curricula, to support the forming of pupils' general competences in craft lessons (Lind 2009; Kikkull 2012). At the same time the problem of overemphasizing the so-called academic (core) subjects at expense of creative and practical subjects is real in our country as well as in the world at large (Adams 2011; Alexander 2009; Erwin, Fedewa & Ahn 2012; Russell-Bowie 2009). The article is written with certitude that skills acquired and trained in craft are important for pupils' general development and coping with everyday life.

*Theoretical argumentation*

*Craft skills: interpretation of the notion in the context of general development.* There is a subject called 'craft' in the curriculum of some countries, but the topic would also be included in the subjects 'technology', 'arts and design' and 'technology' in other countries (Alamäki 1999; Lindström 2011; Lind 2009; Sløjd 2004; Kikkull 2012). Implementation of the notion of 'craft skills' depends on the field of research and on cultural context. The notion of 'craft' is defined by skills in planning, making or executing, or activity that involves making something in a skilful way by using your hands (Free Merriam Webster Dictionary), 'craft' as a number of separate skills (Cambridge Dictionaries Online); 'craft' as a skill, trade or occupation, especially requiring use of hands, an activity involving skills in making things by hand (Oxford Dictionaries). Skill is an ability to use one's knowledge effectively and readily in execution or performance (Free Merriam Webster Dictionary).

Analysing pupils' ideas about their craft skills, the article concentrates on skills related to different areas of craft; these are the skills acquired and trained in craft subject.

There is a certain agreement between the notions 'craft skills' and 'manual skills', although craft work demands both mental and manual input: as expressed in Latin, things are done "mente et manu" - with mind and hand... Manual skills will be defined as the ability to use one's hands efficiently in performing a specific task or operation. The notion of motor skills is also important in the context of craft skills. The child will develop fine and gross motor skills through directed activities and periods of free and independent play. In primary school age children's gross motor skills will develop more rapidly than their fine motor skills which require more concentration. There are a number of manual and physical abilities based on fine motor skills like managing tools for craft (pencil, scissors, brush, needle, awl, fork and knife), carrying different things, and coordinating movements, which are considered necessary in kindergarten programme as indicators of school readiness (Alushariduse 2006). The physical and motor dimension is related to functional performance of personal skills; however, there is data from all over the world that the amount of children's everyday physical activity has decreased during recent decades (Hakala 2009). Researchers dealing with parents' attitudes towards preschoolers' physical and personal competences confirm that parents overestimate children's intellectual abilities and underestimate physical development as a part of school readiness (Hakala 2009; Palm 2009).

Although instructions on assessing school readiness usually point out certain motor skills which have to be acquired before school, each child is different and many children need

special attention at school because they have poor development in fine motor skills. Poor motor competence may interfere with daily life activities, resulting in a less active lifestyle in primary school aged children (Juul-Kristensen 2009). There are activities and materials allowing active movement of entire body that is necessary in primary school – like building from big details (blocks, constructors, stones, snow...) or composing collective works like oversized paintings (Põhikooli 2010).

Statements have been made that because of the influence of globalisation and scientific development, manual work skills would lose their significance in the context of education, while the labour market needs not so much craft skills any more but knowledge and skills of information technology instead (Waks 2003). As a counterpoint to such pragmatic logic, craft skills would be treated as a personal treasure for pupils and a factor of general personal development. Conscious work on development of craft skills related to fine and gross motor movements is as important in preschool age as later, also in adolescence. For a long time the dominant belief in education was that the brain develops only until end of childhood. Only in the last decade neuroscientists have pointed out new knowledge about adolescent brain development. There are areas of brain functioning that depend on activity of fine and gross motor movements. Speaking about the adolescent brain, the skills of impulse control, appreciation of cause and effect, and planning and decision making are mentioned as important skills that rely on numerous interconnecting cognitive components that emerge as the brain develops during adolescence (Weinberger, Elvevåg & Giedd 2005; The Secrets 2011).

The list of general competences of National Curriculum for the first stage includes abilities related to craft skills (to some extent), such as 'uses tools for measuring', 'uses technical equipment at home and in school', 'enjoys moving and creative self-expression', 'keeps order and cleanliness'. The list of later general competences includes abilities like 'expressing oneself through art', 'having a general understanding about the world of work' (Põhikooli 2010).

Competences and qualities of a pupil may be expressed diversely, but they always reflect the concept of a child as harboured by the curriculum's compilers. Thus, the compilers of the National Curriculum for Basic School see a child at age nine/ten years using technical equipment, enjoying moving, keeping order and cleanliness, and a pupil at age 12/13 years having a general understanding about the world of work (Põhikooli... 2010).

Certainly, craft skills are included not only in the general part of the curriculum. There is an area called 'Technology' which includes subjects like 'manual training', 'handicraft/domestic science' and 'technology'. For a long time the subject of 'craft' has been interpreted on the level of polytechnical instruction in our syllabus; teaching specific technologies of treating different materials has been its most important goal. Today's demand for teamwork skills, innovative thinking and creativity has influenced certain changes in the craft syllabus (Alamäki 1999; Illum 2005; Kikkull 2012).

When comparing the goals of craft teaching in neighbouring countries, the differences are remarkable (Kikkull 2012). The most important aim of craft teaching in the Nordic syllabi is pupils' all-round development (Crafts 2000; National 2004; Slojd 2004; Education 2007). Craft is treated as a combination of manual and mental work, improving creativity, curiosity, responsibility, independence and problem solving skills (Crafts 2000, Kikkull 2012). Purposeful work with different materials empowers pupils' self-confidence and faith in their skills, and these are the conditions necessary to solve problems anywhere.

*Self-concept: explanations, measurement and relation to skills.* Treatment of different interpretations of the notion 'self-concept' in the article here is based on implementation of a research method related to assessment of self-concept. Self-concept, broadly defined, is a person's perception of him or herself (Shavelson and Bolus 1982). Theorists emphasise the multiplicity and multidimensionality of self-concept phenomena (Shavelson and Bolus 1982; Gage and Berliner 1998; Lee 2005; Marsh 1989; Sailkind 2008; Wentzel and Wigfield 2009).

Results of studies show that specific components of self-concept may be different depending on age and gender, for example boys may have higher physical self-concept than girls, but lower self-concept in e.g. sociability. Marsh (1989) has warned against simplification of gender differences in treatment of self-concept, as these might be influenced by traditional gender stereotypes.

Reflecting on research of younger children, Marsh pointed out a problem that younger children may have difficulties responding to psychometric measurement on a five-point response scale; they also tend to be egocentric and have consistently high, less differentiated self-concepts in all areas. As children become older, their self-perceptions become more correlated with performance, performance feedback and other external criteria (ibid). Younger children's self-perception is more concrete, meaning they define themselves in terms of their physical characteristics, but later their self-concept becomes more abstract as a result of better understanding of their abilities (Schunk, cited by Lee 2005).

In the context of the current study it is important to discuss the social essence of self-concept. Relationship with adults and peers within school setting is a factor that affects pupils' self-concept (Gilman, Scott Huebner & Furlong 2008; Lee 2005; Wentzel & Wigfield 2009).

Whereas the current research aims to explain the significance of craft skills for pupils in primary school, relevant sub-categories of self-concept have to be included in the discussion as well. In research, the notion of academic self-concept by Shavelson and followers (1982) has been tied with “more academic” subjects like math, science and language, as if it was not possible to include that ability in the craft subject. There is obviously an attitude of general undervaluing of art and craft education in academic research. Craft skills may be treated only conditionally, in the framework of physical abilities (like fine motor skills) and problem-solving ability (Marsh 1989). Therefore, the idea of hybrid self-concept (Gilman et al, 2008) seems to be fruitful in research of abilities like craft skills, integrating mental, manual, creative and aesthetical aspects of person's abilities.

According to Gilman et al (2008), information about sub-domains of self-concept will be evaluated by four evaluation standards – 'absolute', 'comparative', 'ipsative' and 'ideal'. The category of 'ideal standard' will be employed in empirical research below, according to the definition by theorists that an ideal level of accomplishment would be used as a standard of comparison by a student or by others.

The competences in National Curriculum are verbalized from pupils' point of view, like 'a pupil values..., uses..., is able to...' (Põhikooli 2002; Põhikooli 2010). There is reason to compare an adult's understanding with responses of pupils concerning their abilities.

*Why speak about pupils' participation in development of curriculum?.* Contemporary primary education research is supported by childhood studies where a child is seen as a reflective, independent and active participant in his or her life course (Hill 2006; Alexander 2009; Karlsson 2009; Lindström 2011). However, the present National Curriculum reflects certain stagnation. During the last 20 years the idea of child-centeredness has been accentuated as a

leading principle of Estonian school reforms (Veenpere 1999; Kreitzberg 2000); however, the primary stage would be interpreted dominantly as a preparation for next school stages and not as a specific developmental stage in itself (Põhikooli 2002; Arenev 2006; Põhikooli 2010). Critics of National Curriculum point out a disagreement between the general part and the subject syllabi: ideas expressed in the general part are not reflected in subject teaching (Läänemets 2010). While constructivist ideas of learning raised already by John Dewey (orig 1916, newly edited 2011) are followed on the general level, subject areas need to develop specific strategies to include pupils' opinion and their reflection of their life experience. The idea of pupils' activity in curriculum development is included in the National Curriculum's text. Therefore the study here proves a practical opportunity to involve pupils in discussion about educational ideals.

On the one hand, primary school is a very traditional phenomenon, and on the other hand it is a meeting place for a new generation of children coming from the rapidly changing childhood of today, which means also a conflict between traditions and change in many aspects of teaching. Children's experience is an important source to get the ideas for school improvement (Baytak, Tarman & Ayas 2011; Boylan 2008). The problems of our curriculum development are not exceptional, as discussions concerning curriculum-related topics are in focus in many countries, especially in light of international comparison (Alexander 2009; Rose 2009; Läänemets 2010; Richards 2010).

## Method

*Participants*

We gathered two sets of drawings and accompanying written descriptions which respectively focused on prospective teachers' past mathematics learning experiences as students and their future plans as teachers. These samples were taken from 100 prospective teachers who enrolled in one of five sections of an elementary mathematics methods course over two semesters. This elementary mathematics methods course is a 4-credit, required course for all elementary education majors at a Midwestern United States university and is typically taken prior to student teaching. All of the prospective teachers had successfully completed their mathematics content courses prior to this methods course. Participants consisted of 84 female and 16 male teacher candidates.

Throughout the semester, participants engaged in various modes of instruction, including lectures, large and small group discussions on theories and educational trends or issues, and hands-on activities that involved technology tools and manipulatives. In addition, participants were asked to complete several course assignments in their field setting while they interacted with actual students. Those assignments included developing and implementing a mathematics lesson and assessment for their field students.

*Data source*

Prospective teachers' reflections upon their past mathematics experiences and plans for future teaching were identified through the drawings and corresponding descriptions that they completed on two separate occasions during the semester. The first set of drawings and descriptions (Set 1) was collected at the second class meeting. Participants were asked to draw a picture that portrayed their past math teachers or other memorable mathematics learning experiences on a standard sheet of paper. Participants were also asked to include a written paragraph that described their picture and clarified the meaning embedded in their drawing, as suggested in other similar studies using drawings as research methods (Mitchell et al., 2011). These were shared in a small group discussion and a few volunteers even presented their drawings to the class. The second set of drawings and descriptions (Set 2)

was collected on the last day class. This time, participants were asked to draw a picture that portrayed their own elementary mathematics classes in five years. Participants' drawings were presented in various formats including hand-drawings, computer clip arts, and collages. Some drawings contained realistic descriptions of classroom settings or people while others used metaphorical objects or words. In order to encourage participants to respond honestly, it was promised that the quality of their artwork and writing would not be assessed and students would earn full credits by simply completing their work. These two sets of drawings were worth approximately 5 percent of the total course assignment points.

*Data analysis*

Participants' drawings and written descriptions were examined based on aspects of open-ended coding and a double-coding procedure (Miles & Huberman, 1994; Strauss & Corbin, 1998). This study was not intended to utilize the pre/post design that asks the same question to compare changes. Instead, the sets of drawings and written descriptions were analyzed separately highlighting participants' views on teaching and learning mathematics when they positioned themselves in different roles (i.e., as a student or as a teacher).

We created a text translation of the drawings by listing specific items or settings depicted in each (e.g., "a crying face in the middle surrounded by numbers and signs of operations"). We then noted specific words and phrases in the corresponding written descriptions. The text translations and notes made from the written descriptions were used together as data and categorized into several themes. Initially, we reviewed the data independently to identify recurring themes and intentions. We then revised and refined the identified themes together through comparison and discussion and then coded our findings. Doing this together allowed us to resolve coding discrepancies immediately. After the completion of coding, frequencies of coded themes were identified. In the results section, selected excerpts and examples of drawings were used to illustrate the common themes identified.

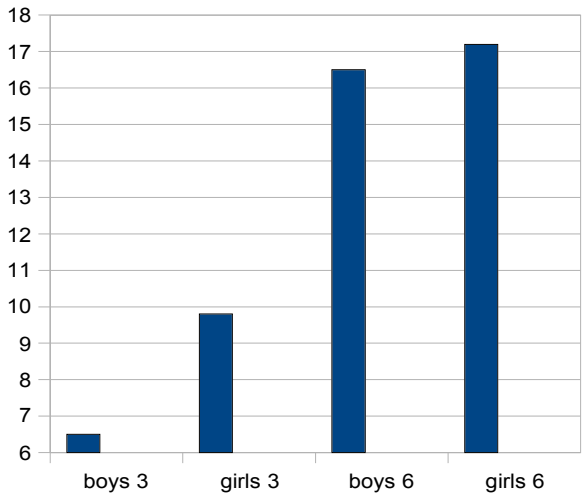


**Figure 1.** *Proportion of mentioning craft skills in the answers of each group (the number indicates the percentage; grade 3 - 9 years old pupils, grade 6 - 12 years old pupils)*

*Gender differences in defining necessary competences*

Each respondent could attribute a specific skill either to a boy, a girl or both. The biggest number of common outcomes independent of gender was in the category of moral values. For the most part, respondents shared the opinion that both boys and girls have to respect old people, peers, home, family, parents, people in general, but also animals, nature, homeland.

The gender-independent component was also considerable in case of social skills: all children must know how to behave; they have to be friendly and helpful.

Regarding the hypothetical 'fine boy' and 'fine girl', the biggest differences in any respondent groups were in the category of craft skills. Figure 2 shows the number of answers which attribute a specific skill only to girls and only to boys. In all respondent groups, the number of craft skills attributed to girls is nearly twice as big as that of boys. In other words, both boys and girls thought that girls have to be able to do more different works than boys.

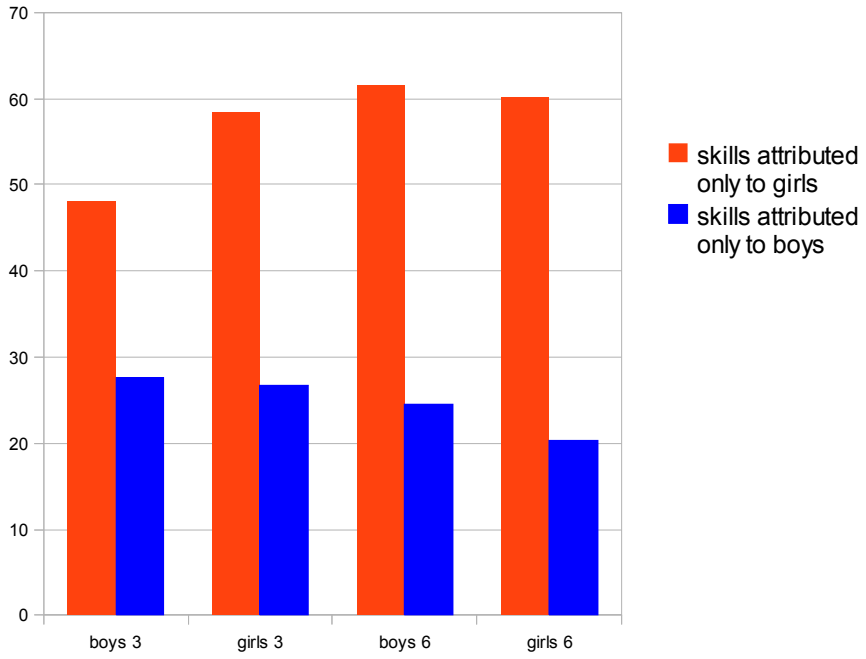


**Figure 2.** Proportion of sayings about skills attributed to girls and boys in answers of each group (the number indicates the percentage of answers)

While boys and girls are rather equivalent in naming craft skills (Fig 1), a considerable difference can be seen in comparison of skills attributed to boys and girls. Gender stereotypes are especially noticeable in assessments provided by younger boys. Grade 3 boys believe that a boy of their age should be able to build, construct, fix things, and girls of their age should know how to cook, do the washing up and sew, knit, and crochet. They attribute drawing skills also primarily to girls. Grade 3 girls believe that independently of gender, children of their age should know how to cook and tidy up. Grade 6 pupils consider cooking, baking, and tidying up as skills necessary for both genders; gender stereotypes are apparent in case of other skills – men build things, 'do things that require strength', use heavy and sharp tools, whereas women knit, crochet, and take care of their clothing in other ways.

Expressions with more generality, regarding more complex coping qualities that might contain a craft skill, are 'knows what to do when in trouble/in a difficult situation/can cope in different situations', 'knows things that are necessary for life', 'can cope independently', 'is able to look after himself/herself', 'knows how to do something useful', 'is able to help others', 'is able to use acquired skills in everyday life', 'knows how to cope in the nature', 'is able to solve problems independently', 'is able to do things within his/her powers'. More

complex coping qualities are usually gender-neutral – these are important both for boys and girls. Similarly to the need to 'know everything/a lot/about everything', pupils expect their ideal to be able to cope universally in case of practical skills, which in turn should mean mastering various skills. In pupils' opinion, craft skills are also related to interest in technical problems and research in the field: in grade 6, pupils have mentioned that a boy 'is able to construct complex inventions to perform simple tasks', 'knows how mechanisms function, e.g. a carburettor'.

**Discussion**

Three questions are discussed here: What kind of knowledge would be obtained from the study introduced in previous parts of the article? How to interpret the sayings gathered from grade 3 and grade 6 pupils? How could the results and conclusions be used in curriculum development and technology teaching? The study's results will be analyzed in the context of general competences of the National Curriculum and in the light of comments of the expert group.

According to the results, the skills of cooking, doing textile works and building are comparable in their significance for pupils to the so called 'core' abilities which are measured by national and international tests (mathematics, language). As theorists of curriculum propose that technology should be taught for pupils' everyday needs, the pupils' answers – especially in grade 6 – confirm that pupils need and respect the skills trained in craft lessons. Skills related to craft are significant in pupils' description of their ideal self.

Although the general part of the curriculum mentions the ability to use technical equipment as necessary for pupils of age 9-10 years, none of the pupils – not in that age nor older – wrote about this kind of skills. Different explanations may be given to the absence of the idea of technical equipment use in pupils' answers. Of course, special research of tools and equipment use by pupils in everyday school activities and at home might be a part of both technology teaching and academic research work. Maybe pupils who are using different tools like mobile telephones, iPads, washing machines and other devices do not see any special skill in switching these on and off. Rather, piling of logs and tying a tie are mentioned as complicated activities. Children do not see a problem in using things by which they are surrounded. Oppositely, there are projects relevant in education where children teach computer use to elderly people (Tambaum 2009). Presumably, attention of teachers should be directed to not only the use of equipment but also to integration of pupils' experience in information technology with different themes of handicraft and homework and design.

When presenting the results to a wider audience of educators, specific features of children's language development should be remembered. As generally known in primary education, speech of younger pupils is very concrete, influenced by their most recent experiences. Younger pupils' ability to generalize is relatively weak and for that reason their sayings should be analyzed in the context of specific situation. Words and sentences about the 'ideal self' in the study here are the results of only a certain sample, although from different schools. These convey the manner of pupils' thinking and may inspire to compile worksheets, copybooks or other materials to support technology teaching and to study specific pupils in specific schools in order to improve teaching in those schools.

The study was introduced to a group of primary school teachers participating in a summer school. They appreciated highly the pupils' sayings about skills and abilities and found those to be a true reflection of conditions where primary teachers work. According to teachers' opinion, craft skills are significant for pupils due to the fact that children use practical performance to assess that they are able to do something. They see the result of

their plans and working processes. With more intellectual and abstract school tasks, they are not very capable of assessing their performance and the assessment is generally done by a teacher.

The ability to cook was mentioned by pupils the most among all practical activities, when comparing to other skills and abilities concerned with craft (handicraft or rather homemaking). The new version of the National Curriculum is up-to-date in the aspect of homemaking in primary school: while earlier the outcome for pupils of grade 3 was only to do dishes and tidy up, the new syllabus includes the ability to cook simple food (Põhikooli 2010). At the same time a big mistake has happened in technology syllabus. As an innovation, there are chapters of learning environment in the syllabus, specifying the conditions which have to be provided by school owners (mostly local governments). The environment for craft in the first school stage is described only as tools and materials for individual work. However, some works demand special rooms and equipment – like cooking for example. Unfortunately, the requirement for special rooms and equipment is noted in the syllabus only beginning from the second stage (age 10-12 years), not for the younger age.

A distressing result in the study is that younger boys – pupils of grade 3 – have answered only very modestly in reference to craft skills. A typical description is that a boy in grade 3 has to run or realize another physical task and a girl has to perform handicraft. How to join boys' attachment to gross motor movement with subjects of craft and art? The answers given by boys in the first stage of study barely reflect the content intended for the first stage of study by the National Curriculum. The notion of 'constructing, building' is mentioned only sometimes in the whole material collected from boys of the first stage. However, the syllabus itemises activities such as processing metal and wood, making objects using wire, constructing and building models, as being included in the first stage. This leads to the conclusion that in reality teachers prefer working with paper and cardboard and do the so-called traditional handicraft work which is mostly attributed to women (sewing, knitting, crocheting), because most probably such activities are easier in respect to getting the necessary materials, storing the finished objects, and probably agree more with the utility possibilities offered by classrooms. The fact that smaller boys identify themselves less through craft skills could be related to factors which are due to boys' poorer coping in many aspects (Pinker 2008).

In general, gender differences came out concerning pupils' attitude towards craft skills. As a comment it has to be said that there is a new version of the syllabus since 2010, intended tominimise gender segregation in the subject of technology. The traditional distribution – handicraft for girls and technology (manual training first of all) for boys – is replaced with the principle that pupils can choose different technology courses independent of their gender. In relation with this, gender differences should be studied a few years later, to see possible changes in pupils' views.

A self-critical remark has to be made with regard to research methodology in the current study. According to a warning by Marsh (1989), there is a possibility that gender stereotypes could be stressed by researchers themselves. When one asks about differences between boys and girls, the respondent seems to be programmed into an answer.

Nowadays, in the light of theories of multiple masculinity and femininity, research in education could well disengage from gender based thinking. (Müürsepp & Uusen 2012). Maybe the lifestyle and living conditions of pupils' families should be taken into account rather than gender issues, to clarify the skills necessary from pupils' viewpoint. The fact that younger children mention craft skills less frequently when compared to their older peers – and boys in particular – could also be associated with their speech development. Children

find it easier to name procedures and principles which have been phrased or verbalised more intensively for them. In respect to craft skills, one aspect of the problem may precisely be the fact that activities such as 'placing', 'cutting', 'gluing' and others are not clearly named in lessons. Teachers rather say: 'Today we are making a cat. What did we make today? We made a cat.' For the sake of children's language development as well as to give meaning to their work, it is important to use all verbs labelling the different activities in all stages of the work: planning, making, assessing the results, and discussions in a later stage.

The social essence of self-concept noted by many authors (Gilman 2008; Lee 2005; Wentzel & Wigfield 2009) has to be referenced here. Defining their ideal self, children would mention characteristics about which they have spoken with their fellows and teachers.

**Conclusions**

Summarizing the analysis and the discussion, the most significant conclusions seem to be the following: 1) pupils' attitudes towards the abilities and skills trained in craft are important to share, because these provide support to teachers in organizing work processes and environment; teachers appreciate pupils' thoughts; 2) the most undefined relation to craft activities is reflected in answers of smaller boys in our study, i.e. boys in grade 3; what to do in order to teach craft according to boys' necessities and potential is a question for further research; 3) the suspicion raised by analysis of pupils' sayings, i.e. that craft tends to be organized somewhat poorly in the first school stage, was confirmed by teachers who pointed out the need for special rooms and materials to implement different techniques.

To interpret pupils' attitudes in an international study and more deeply in a wider cultural and social context, the following questions have to be considered: What are education-related values in both schools and families? What are the functions of different institutions in education and how do they cooperate? Priorities mentioned by children in other countries are similar to our study: children expected school to prepare them for life, to develop relationship skills and life skills, etc. (Primary Review 2007).

According to the study's results, we can confirm that pupils in grade 3 and 6 see the abilities and skills trained in craft lessons as being part of their general ideal self. Primary grade teachers understand that pupils' craft skills are the basis of learning at school. Whilst the new craft syllabus has taken many steps towards contemporary craft teaching (Lind 2010), researchers and developers of the curriculum and leadership of schools have to understand that development of craft skills as a part of general development cannot be left in background and in fact merits a lot more attention.

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