Technology in pre-school and primary school analyzed in a degree project perspective

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Introduction

Today, technology is a very important part of our society; furthermore it has become apparent that an early start with this subject is important to arouse young people’s interest. Therefore, also preschool educators and teachers for the early years of primary school need knowledge in technology. In that sense it is worrying to read the report on the new syllabus for teacher education in Sweden (SOU 2008:109), since the subject syllabus for technology has been strongly reduced for these categories of teachers.

An early inspiration for parts of the Swedish school system was the ideas of Dewey (Hartman, S., Lundgren, U. P. & Hartman R. M., 2004). One early paper by Dewey was published in Swedish already year 1902. In 1907 some of Dewey’s ideas were presented at a Swedish meeting for elementary school teachers and in the first half of the twentieth century most of Dewey’s articles were translated into Swedish. During this period the centre for progressive education in Sweden was Gothenburg and especially Gothenburg University (ibid). In the end of the nineteen-sixties a commission on the Swedish pre-school started and in year 1973 a law for a general Swedish pre-school came. Many of the pedagogical ideas for the pre-school in this commission emanate from Dewey’s ideas for a progressive education. Also the Swedish nine-year compulsory school and the Swedish upper secondary school were reformed during this period (ibid). The idea was to form “a school for all”, that means giving all children from the early childhood the possibility to attend pre-school and that all pupils should be offered a place in upper secondary school. It also means that all pupils have to attend the nine-year compulsory school (ibid).

In 1994 the school curriculum was once again radically changed in Sweden (Utbildningsdepartementet, 1994a). The schools earlier governed by the Swedish state now became locally governed and also the curriculum was changed so that the schools were directed by national goals that should be evaluated (nationally and by the local authority). There were two types of goals, “goals to strive towards” and “goals to achieve”. At the same time technology, a relatively young school subject in Sweden that became compulsory in the Swedish curriculum 1980 (Skolöverstyrelsen, 1980), also got its own syllabus (Utbildningsdepartementet, 1994b). Therefore, some of the teachers teaching the subject today lack experience of being taught technology themselves. In addition, many of them have only little or no background education in the subject at all (Bjurulf, 2005; Teknikföretagen, 2005). In the first Swedish curriculum for preschool, technology is mentioned only once: Develop their ability to build, create and design using different materials and techniques (Utbildningsdepartementet, 2006, p 9). This
raises questions about how technology in preschool and school settings is presented to the children.

Already in the beginning of the last century, Dewey (1998) discussed the importance of using the students own experiences when teaching. This is especially important when teaching young students. He also meant that one should start in an everyday life situation and that the object and the great challenge for the educators are to lead the student from these situations toward a more scientific view of the subject. The same ideas are expressed by Vygotsky (Crain, W., 2005, p. 236-241), in his discussion of the so-called zone of proximal development and that it is important to meet the children’s spontaneous concepts with scientific concepts, in order to develop the child’s understanding and knowledge. Dewey (1998) also meant that in contrast with the traditional education, in progressive education “there is an intimate and necessary relation between the processes of actual experience and education.” (ibid, p. 7) It is also important that “the teacher loses the position of external boss or dictator but takes on that of the leader of the group activities.” (ibid, p. 66)

The purpose of the study is to find out how technology in the Swedish preschools and primary schools, is construed in degree projects in the frame of the teacher training programme at Karlstad University (2007-2009). In the degree projects, we specially were looking for answers to the following questions:

- What factors are needed for the educators to be able to work with technology in the Swedish pre-school and primary school?
- Are there any gender differences when children work with technology?

Method

We have read through all approved degree projects in the area of technology at the teacher training programme at Karlstad University during the period from 2007 until May 2009, in all 17 projects. Out of these 17 projects, 14 were of interest for this study. The other three projects were researching the secondary school. Five of these 14 projects were concentrated on preschool, eight on primary school and one project compared both type of schools. These 14 degree projects have been perused and analyzed, starting from the above mentioned questions. For the methods used by the authors of the degree projects see Appendix 2.

Results

Factors needed for the educators to be able to work with technology.

In project P1 and P4 (see Appendix 1) many of the educators mention a lack of technology education and a need for skill development in technology (seven to eight out of ten). Also in project P5 and P6 the inquiries show that 35 out of 45 and four out of nine respectively, lacks technology education. In project P5, also 35 out of 45 answer that they are not working concisely with technology. One question in P4 asks the educators if
they make a thoughtful planning of the technology, the answers show that such a planning is usually not made.

For the primary school the inquiries in project P6 and P8 show that five out of nine and 23 out of 36 educators respectively, lack technology education. However, project 10 shows that if a local authority invest in technology education, in this case something called NTA (“Naturvetenskap och Teknik för Alla”, which means Science and technology for all), only one out of 11 needs further skill development.

In project P6 none of the two invested primary schools had any local curriculum in technology. In P11 the curriculum was missing in 7 out of 13 schools and in project P8, 23 out of 36 educators answer that there is no local curriculum in technology at their school.

For the pre-schools, in project P5, 41 out of 45 educators answer that they do not have any local curriculum, while in P6 both of the two pre-schools investigated have a local curriculum.

Project P1, P2 and P3 mention three factors that hamper the construction play at pre-schools, namely lack of time, lack of personnel and the increased need for cleaning.

Gender differences

The author in project P2 has shown that, in the pre-schools investigated, depending of the names of the room, gender neutral or not, boys and girls tend to play in a different way. In this project, also the author finds that toys for boys seem to be more of “construction type”, while girl’s toys often are completed tools, e.g. imitations of kitchen utensils.

In project P3 the author finds differences in how girls and boys are building their constructions. Boys tend to focus more on function while girls tend to decorate more, but these tendencies are not very pronounced.

For the primary school, due to project P6 and P10, when dividing the pupils into work groups, many of the educators in these investigations are thinking of forming groups consisting of only girls. The idea is that this should help the girls to strengthen their self-confidence.

Conclusions and discussion

There is a great need of skill development by educators both in pre- and primary school, concerning technology. This seems to be one of the most important issues for many educators. In this study approximately 75% of the pre-school educators and 50% of the primary school educators mention this as a need. This result corresponds to earlier research (see for example Bjurulf, 2005 and Teknikföretagen, 2005). This lack of technology education also means that most of the teachers, at least in pre-schools, are not
having a thoughtful planning in technology. This is a problem since an activity even for young children should have a meaning, or as Dewey (1998) expresses:

> That the more immature the learner is, the simpler must be the ends held in view and the more rudimentary the means employed, is obvious. But the principle of organization of activity in terms of some perception of the relation of consequences to means applies even with the very young. Otherwise an activity ceases to be educative because it is blind. (p. 106)

The educators’ lack of education and in some cases lack of thoughtful planning, may be the reason why the trainee teachers themselves carry through exercises in technology, in the frame of their degree projects. Some local authorities have invested in technology education for their educators. In these parts of the country, technology education seems to function in a proper way. For example the NTA project have given many teacher new ideas about how to teach technology in a structured way (Kungliga Vetenskapsakademien, 2009).

Earlier studies have shown that schools do not have recorded local curriculums in technology (Bjurulf, 2008; Teknikföretagen, 2005). In this study more than half of the investigated primary schools have no local curriculum in technology, even though this subject has been compulsory for more than 25 years in the Swedish school system. This indicates that many schools are not taking the subject technology seriously, and might therefore give more time devoted to teaching for other subjects at the expense of technology. Also many of the investigated pre-schools have no local curriculum, but since the subject is not compulsory this finding is not as important.

For the pre-schools in this study three factors seems to hinder the educators in their work to develop the children’s ability to “build, create and design” (Utbildningsdepartementet, 2006, p 9). These factors are lack of time, lack of personnel and the need for increased cleaning, which means that different building materials often have to be stowed away before the constructions are completed. The problem with lack of time and personnel means that it is hard to organize the work in smaller groups for enough time. This can be compared to Bjurulfs’ (2008) study where the size of the school class was of crucial importance when the teachers chose subject matter. Fewer pupils in the groups made it possible to work with tasks of practical character, while working with whole classes drove the teachers to choose tasks of theoretical character.

The results also indicate differences between boys and girls, where the boys seem to focus more on functional aspects during their construction work, while the girls seem to focus more on the appearance of the artifacts. Preschools that are organized from a gender perspective encourage children to play in a more varying way. When the preschools are organized in a traditional way, with “dolls rooms” and “building rooms”, the girls often misses the chance to play with construction toys.

We think that this small investigation, based on degree projects at the teacher training programme at Karlstad University, indicates a need for more and better technology
education both for the educators who are going to work, and those who are working in the Swedish pre- and primary schools. Therefore, we think that, the proposed reductions of the subject syllabus for technology in the new commission report on the Swedish teacher education (SOU 2008:109) is not so well-reasoned.

References


Appendix 1

This paper is based on the following degree projects which are referred to as P1 to P14 in the text.


P2 Irving Jenny (2008) *Technology in preschools indoor environment from a gender perspective*

P3 Holm Susann (2008) *Technology in preschool, on both girls and boys conditions*

P4 Lidman Birgitta (2009) *Technology in preschool, how are the activities planned and what kind of educational material is used?*

P5 Thörnblom Elisabeth (2009) *Technology - is there an intentional work with technology? A survey of educators technology work in preschool.*

P6 Löwenthal Gerdin Ann-Charlotte (2007) *Technology in the preschool and the compulsory school. A study about how the pedagogues work with technology in the early ages.*


P8 Lindmark Emma (2009) *Technology - is there a conscious work with technology? A survey of pedagogues work with technology in elementary school, preschool-fifth grade.*

P9 Nilsson Sofia (2007) *Student’s conceptions of technology - in relation to the teacher’s conceptions.*

P10 Svensson Ann-Christin (2007) *Technology education according to NTA.*

P11 Jacobsson Maria (2007) *Local syllabus for technology – do we have one?*

P12 Skoglund Rickard (2008) *An attempt to create interest for technology in grade 2-3*

P13 Götmar Camilla (2008) *Basic technological competence, a study in the 5th grade.*

P14 Mollmyr Ester (2009) “Fifth graders” approach to technology, a study of girls’ and boys’ ideas about technology and if they differ

The full text of all degree projects are in Swedish, completed with and English abstract.
### Appendix 2
Methods used in the analyzed degree project (a brief summary)

#### Table 1. Projects in pre-school

<table>
<thead>
<tr>
<th>Project</th>
<th>Observation</th>
<th>Inquiry</th>
<th>Interview (educator)</th>
<th>Interview (children)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>3/3</td>
<td></td>
<td>5/3</td>
<td></td>
<td>Observation of pre-school environment and interview with 5 educators at 3 pre-schools</td>
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<tr>
<td>P2</td>
<td>4/4</td>
<td></td>
<td>4/4</td>
<td></td>
<td>Observation of pre-school environment and interview with 4 educators at 4 pre-schools</td>
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<tr>
<td>P3</td>
<td>6+6</td>
<td></td>
<td></td>
<td>6+6</td>
<td>Observation and interview with 6 girls and 6 boys (all children, age 4-5 years) at one pre-school</td>
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<tr>
<td>P4</td>
<td>1</td>
<td></td>
<td>5</td>
<td></td>
<td>Observation of pre-school environment and interview with 5 educators at one pre-school</td>
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<td>P5</td>
<td></td>
<td></td>
<td></td>
<td>45/12</td>
<td>Inquiry answered by 45 educators at 12 pre-schools</td>
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<td>P6</td>
<td></td>
<td></td>
<td></td>
<td>9/2</td>
<td>Inquiry answered by 9 educators at 2 pre-schools</td>
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</tbody>
</table>

#### Table 2. Projects in primary school

<table>
<thead>
<tr>
<th>Projects</th>
<th>Observation</th>
<th>Inquiry</th>
<th>Interview (educator)</th>
<th>Interview (children)</th>
<th>Comment</th>
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<tbody>
<tr>
<td>P6</td>
<td></td>
<td>9/2</td>
<td></td>
<td></td>
<td>Inquiry answered by 9 educators on 2 primary schools</td>
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<tr>
<td>P7</td>
<td></td>
<td>2</td>
<td></td>
<td>6+6</td>
<td>Inquiry to educators, interview with 6 girls and 6 boys (all children, age 6 years) at one primary school</td>
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<td>P8</td>
<td></td>
<td>36/12</td>
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<td>Inquiry answered by 36 educators on 12 primary schools</td>
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<td>P9</td>
<td></td>
<td></td>
<td>24/2 (4+4,4+4,4+4)</td>
<td></td>
<td>Interview with 4 girls and 4 boys, in year 1, 4 and 6, at 2 primary schools</td>
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<tr>
<td>P10</td>
<td></td>
<td>11/6</td>
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<td></td>
<td>Interview with 11</td>
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<tr>
<td>P11</td>
<td>13/13</td>
<td>Interview with educators working in year 1-6, at 13 primary schools</td>
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<tr>
<td>P12</td>
<td>11+18</td>
<td>Observation and inquiry of 11 girls and 8 boys in year 2-3, at one primary school</td>
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<tr>
<td>P13</td>
<td>(19+22)/2</td>
<td>(19+22)/2</td>
<td>Observation and inquiry with 19 girls and 12 boys in year 5, at 2 primary schools</td>
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<tr>
<td>P14</td>
<td>(22+17)/2</td>
<td>(22+17)/2</td>
<td>Observation and inquiry with 22 girls and 17 boys in year 5, at 2 primary schools</td>
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In Table 1 and 2 above, the different methods used in the degree projects are briefly summarized. All the degree projects are available at Karlstad University (in Swedish).