GPS-PERFORMANCE IN TECHNOLOGY EDUCATION
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ABSTRACT
In my research I am interested in identifying and describing the process that now takes
place, around evaluations, follow ups and assessment in educational practice in Sweden
from a teacher’s perspective. Article 28 of the UN Convention of the Rights of the Child,
specifies that, each and every child is entitled to education. In Sweden, each school can
decide on how, when, and by whom, the pupil will get tutored in a subject. However,
every pupil is expected and entitled to reach, at the very minimum, the level of
knowledge stipulated in the goals to attain in grade 5 and grade 9, in the national
curriculum. Despite this several reports have highlighted the alarming situation of
neglect of the follow-up of the pupils’ knowledge development as well as the school’s
neglect of Technology education. This raises many questions about underlying factors.
This paper provides a description of the process of assessment in Technology education
with the focus on teachers’ views on the possibilities for follow-up, and assessment.

Keywords: UN Convention of the Rights of the Child, Technology education,
assessment, follow-up, documentation of assessment, Global Positioning System (GPS)-
performance in education, teachers’ educational practice

Introduction
Learning is a journey with the teacher as a guide. (Kimbell, 2007)

There is an unbreakable connection between successful teaching and formative
assessment and learning. In order to pursue the journey you need to know where your
starting point is (Kimbell, 2007). Assessment can have many purposes and one purpose
is for the teacher to acquire that information in order to plan the students’ progress on
their learning journey. Working as a teacher is like working as a guide for a group of
people on a journey towards a destination. Assessment is like a Global Positioning
System (GPS) device. It can tell you where the students (or you) are right now, the
position. It can give a description on the path taken so far, and more interesting, where
to go next in order to reach the goal. This paper provides a description of a study that
explores the process of assessment in Technology education with the focus on teachers’
views on the possibilities for follow-up and assessment.

Main Question
The question of how teachers make sure children in the Swedish compulsory school
system reach the knowledge level they are entitled to, according to the syllabus of the
national curriculum, (LpO-94, 1994). This has been an issue of mine in my capacity as a
teacher in compulsory school, for many years. But it is not just a private, professional
issue. Assessment in general and Technology education in particular, is a national issue
since previous results are rare. Based on this interest the following research question is
put:
How is assessment in Technology education in primary school organized and performed
(1) by teachers in classroom (teacher level) and (2) by local school organizers (school
level)?
How do teachers, at schools and in the classrooms, work with assessment in Technology education in order to make sure pupils reach the level of knowledge they are entitled to in grade 5, according to the syllabus of the national curriculum? One of the questions in my study is how teachers actually keep record of all this information.

I am, as stated above, interested in studying how teachers follow up/assess early year’s pupil’s cognitive processes and development in Technology. This raises many research design questions. How many written assessments does a teacher produce each semester in different subject matters? In which subject matters do teachers actually produce written assessments? Has any in-service training about the official document the Individual Development Plan, the IUP, with written assessments been offered to teachers? Do the teachers have any common discussions with colleagues within the schools? Do they get instructions from the school management on how to produce a written assessment for the IUP. Or is it up to the teacher to make up their own system?

My research is designed to explore how teachers work with the IUP in Technology. Based on the results, I will provide answers to some of the issues raised above.

In this paper I am going to present the research project I am currently working with, for my PhD. Before going in to this a brief update on the background for my project is required. I will start with a short description of the situation for the subject matter Technology education in Sweden.

**Technology Education- a Subject Area with Problems**

Sweden has nine years of compulsory school and a national curriculum. Each mandatory subject has a goal and achievement referenced criterion based syllabus with goals to attain which define the minimum knowledge to be attained by all pupils by the end of the fifth and ninth year of school. Each school can decide how, when, and by whom, the pupil will get tutored in a subject. We have a monitoring system based on individual teacher assessments and marks are given from year eight. However, every pupil is expected and entitled to reach, at the very minimum, the level of knowledge stipulated in the goals to attain in grade 5 and grade 9, in the national curriculum.

Technology education was introduced as a mandatory subject matter in the Swedish compulsory school, in 1980 and received a national syllabus of its own in 1994. There are goals to aim for and goals to attain in grade five and nine. The national minimum time table for Technology education and Natural Sciences is 800 h; from grade one and all the way through to grade nine. In schools the subject area of Technology often end up in the shadow of the Natural sciences. Hence Technology is taught together with Physics, Chemistry and Biology which have individual syllabuses but are often mixed with Technology.

Despite the fact that Technology education has been a mandatory subject for thirty years, Technology education is still lacking a strong teaching tradition and roots in the Swedish compulsory school. Numerous supervision reports of different municipalities conducted by the Swedish Schools Inspectorate (2009) confirm that. They also state that the teaching of Technology (and Science) is not even accomplished enough (in quantity) to give the pupils the opportunity to reach the goals. Note that they talk about quantity not quality. The supervision reports are in agreement with the report by the Association of Swedish Engineering Industries (Teknikföretagen, 2005), that concludes that the situation is most alarming in the younger years of schooling, where there is not much going on at all. In addition the teachers feel insecure and are not content with their practice.
No Guide Lines for Teachers’ Assessment

Marks are not given to pupils in Sweden, until grade eight (14-15 years old) and formal educational follow-up of assessment, do not have a strong tradition in the early years of schooling. We have national tests in the three core subjects of Swedish, English and Mathematics, in year five and nine. In year nine the tests have been mandatory from the start. The test results are supposed to help the teachers in grading but it is the teacher who makes the final assessment and the decision for the grade. There is however, a discrepancy between the scores on these tests and the final grade which is given by the teacher (Forsberg& Lindberg, 2010). About two years ago, national tests in Swedish and Mathematics were introduced in year three, and they were made mandatory along with the tests in year five, which used to be optional. In 2009, national test in Biology, Physics and Chemistry were introduced on trial in year nine. The three tests are scattered statistically over the country and each student get one test out of the three. They are also supposed to provide help to the teacher in grading the students (Skolverket, 2010).

The formal requirements like national tests or grading are a small section of the journey of the assessment process, which a student goes through on the learning journey. The important issue is what Black, Wiliam, Hattie and Timperley (1998, 2007), among others, argue of the power of feedback and formative assessment for learning. According to Kimbell (2007), teachers assess every minute of the teaching day by asking questions, looking for a glimpse of understanding in the students eyes and so on. They want to make it easier for the learners to take the next step on the journey (Kimbell, 2007). Lindström concludes that a teacher who fails to assess what the students do cannot conclude if she is contributing or impeding their process (Lindström, 2006).

Lindström argues that creative work can, and should be valued and assessed. Refusing to assess is really a concession to those who argue that no learning takes place. If the child always, no matter what, gets the respond -How nice, can you tell me more about it? She will soon come to the conclusion that it is not important what she is doing. A child will respect well thought criticism, since it shows that the teacher is taking them and their work seriously. Assessment is an important part of the knowledge development. Lindström also argues for the importance for the student of reflecting upon his own doings but also about his peers. In order to pursue the journey you need to know where your starting point is. This is one purpose for assessment for the teachers since the teacher need that information in order to pursue the students’ progress further on their learning journey since there is an unbreakable connection between successful teaching and formative assessment. But the teachers lack training in assessment (Lundahl, 2009).

Introduction of the IUP

As a way of dealing with this lack of information about pupils’ development, the Swedish Government introduced the document individual development plan (IUP) in the end of the 1990s. Regulations require that this IUP is stipulated in writing by the teacher together, in cooperation, with the pupil and his/her parents, in dialogue at the parent teacher meeting every semester. The National Agency for Education has given limited guidance to teachers about what a written assessment should look like, other than they were not allowed to be similar to marks in the beginning. However the new governmental instructions, from 2008, imply that the assessments can be similar to regular grades (Skolverket, 2009). Every school head decides how this document (IUP)
should be formulated; this obviously makes comparisons between different schools problematic.

However, some instructions have been presented by the Swedish National Agency for Education. The IUP should be (1) closely linked to the local work plan, which, in turn, is based on the goals to strive for in the Swedish syllabus. The local work plan, which, in this paper, can be described as a tour map, is recommended but not mandatory. The IUP shall also contain written assessments (2) describing the knowledge development of the pupil in all subjects given, and (3) a description of how the pupil can be supported and stimulated to future development (Skolverket, 2008). In other words, the IUP should describe the educational position right now, but, more importantly, also provide a description of where to go next towards the goals to aim for. Allegorically the IUP should work like a pedagogical Global Positioning System device (a GPS). The assessment of the pupil shall be summative, formative, and even ipsative. This shall be done by the teacher for each curricular subject given and each student respectively. So a written assessment is expected for each subject in the curriculum, but according to many reports the subject matter Technology education is severely neglected. A consequence is that the teacher writes many written assessments. As a consequence one might suspect that the information in the written assessments regarding Technology education in particular, would be rudimentary or even non-existing, which is confirmed in those IUPs that I have studied so far.

The possibility of investigating written assessments is relatively new in Sweden. This means that previous research results are rare but according to the School Inspectorate most of the supervised schools did not make assessment with respect to the goals in a satisfactory way (Swedish School Inspectorate, 2010). Some previous research about the IUPs has been done and the conclusion they came to is that IUP’s are primarily designed as a checklist and that they are focused on what students should do, and not on what the school should do. The student must be fixed, i.e. it does not fill its purpose (Lindberg, 2005, Vallberg-Roth, 2010). The regulation says that it shall not contain any sensitive information which can harm the student. Previous results show that there are examples of classified information about the students which should not be there and especially since it is a public document. This is also in agreement with the conclusions from the report made by the National Agency for Education (2010).

Teachers make summative and formative assessments all the time, and most of them are made for the purpose of gaining knowledge of where the student’s current position is. The assessment can also be planned formative assessment, where they plan their teaching (Kimbell, 2007). Black and Wiliam describe the effectiveness of formative assessment to enhance the students’ learning (Black & Wiliam, 1998). They also give examples of the power of feedback. When working with effective feedback there are three questions to keep in mind (1.) Where am I going? (2) How am I going? and (3) Where to next? (Hattie & Timperley, 2007)

Those questions are reminiscent of the work with the IUP and even a GPS, for that matter. But feedback is only formative in its function, and thus effective, when it provides information of the position right now compared with the destination and used to alter the next step on the path there (Black & Wiliam, 1998). But how does the teacher keep track?

**Preliminary Results**

According to preliminary analysis of random examples of IUP with written assessment
from three different municipalities; there is not much information on students’ positions at all, and especially in the field of Technology education. Technology education is not even mentioned in many of them, and when it is, the information is mostly combined or more accurately described as mixed with Science.

In order to get a better view of teachers’ knowledge of the work with the IUP and written assessments, a questionnaire among teachers was launched. The questionnaire was piloted among 54 teachers, with different backgrounds and experience, but all from the same municipality. When they were asked to state which subject matters they taught and which they wrote written assessments on, most of them did not mention Technology education. Some just stated all in their answer, however, it is unclear whether Technology education was included as one of them. The preliminary results express the need for more in-service training and the need for a common language and guidelines and support from the school head for the work with the IUP. Teachers also stated that they wrote many written assessments. This is consistent with the report made by the National Agency for Education, (Skolverket, 2010).

The results from the questionnaire are also in agreement with my conclusion after studying the samples of written assessments and IUPs from different municipalities and schools. Apparent from those samples of written assessments is that the teacher lack in-service training about the IUP and assessment. Teachers need training in how to account for one criterion at a time, to evaluate the different qualities in their curriculum and to provide relevant feedback to students (Lindström, 2006).

The focus of my research is to study the teacher’s description of their work with assessments, the teachers’ descriptions/opinion of the position right now and the teachers’ strategy to guide their pupils towards the goals, i.e. the GPS allegory. A review of research on assessment in Sweden, concludes that there is a lack and a great need for research on classroom assessment (Lindberg, 2005) and the opportunity to study teacher’s work with the IUP is relatively new so, as mentioned, rare. According to Lundahl most of the teachers and teacher education students do not get any training in assessment at all (Lundahl, 2009). Another issue, about the fact that teachers lack education about the assessment and the work with IUP, is that there was classified information in some of the examples gathered. Since the IUP is an official document the consequences can be even more troublesome. Despite these issues, the central concern that motivates my research about children’s knowledge development is the question; Does the teacher help or hamper?

Discussion
How does the teacher keep track in the field of Technology education? Is it possible to study assessment in Technology education among teachers who teach younger children in Sweden, when not much Technology education is going on? Add the fact that our syllabus is quite obscure and open for many interpretations. As an example, a grade five pupil is supposed to; be able to describe in some areas of Technology they are familiar with, important aspects of the development and importance of Technology for nature, society and the individual (Swedish National Agency for Education, 2009). Can we even discuss equity in assessment?

The preliminary results so far, provide the basis for a further investigation, which will be undertaken in classroom settings, following a couple of teachers and their pupils working with a Technology task in the fall of 2010. Teachers working with Technology education and/ or assessment are identified, for the study of their work and the
assessment process by means of observations, video recording, interviews and pupils’ self-estimations. Interview with the teachers about how they do the assessment of their pupils’ achievements, and how they keep records of the assessment process on the way towards stipulating written assessments for the IUP, will be made. Results from the study will illuminate how early year teachers in Sweden perform assessments in Technology, including how they keep record of this process in order to make sure that their pupils reach the level of knowledge they are entitled to. The aim is to contribute to increasing knowledge about the underlying factors of the assessment process in Swedish schools. I hope to be able to present some preliminary results, and my GPS performance for some of the questions, at the conference.

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