

Right on track or going nowhere?



An extract of the Norwegian report from PISA 2003
Short English version

Summary and Conclusion

In this final chapter we would like to summarize some of the most important findings from the results chapters (3-10). Then we would like to present some of the results across the different subjects to be able to give a better understanding of the Norwegian students in a Nordic and international perspective. Finally, we would like to consolidate all the results in one interpretation for an overall message. The central issue will be what this message has to say about Norwegian schools, and not at least how can we, or should we relate to this.

Summary of findings from the results chapters

First in this chapter, we would like to summarize in bullet points what we believe are the main findings in each of the chapters (3-10). The overviews will serve as a starting point for the rest of this chapter and guide for the readers to see where the different subjects are discussed.

Our main findings are shortly summed up as the following:

Chapter 3 Mathematics

- Norwegian students perform near the OECD average, but significantly below all the Nordic countries.
- Norwegian students are quite good in the issue Uncertainty, but relatively weak in Change and Relationships and Space and Shape.
- Norwegian students have had a minor fall of performance in PISA 2003, compared to PISA 2000, in the two subjects that can be compared directly, Space and Shape and Change and Relationships. In Change and Relationships, we are falling behind because nearly all the other OECD countries have improved their performance in this issue.

- Males perform better than the females in almost every country, but in Norway these differences are very small.

Chapter 4 Science

- Norwegian students perform significantly lower than the OECD average in science.
- Norway is among the countries which showed the largest significant decline in performance.
- There are small differences between males' and females' performances and these are mostly in favor of males. In all the countries females perform better on tasks which measure process skills, while males perform best on tasks which measure conceptual understanding.

Chapter 5 Reading

- Norwegian students perform, as in PISA 2000, just above the OECD average. Norwegian students have had a minor decrease in their performance compared to PISA 2000, but the decrease resembles the decrease in the OECD average.
- The gender difference in reading in favour of females has increased. This is mainly due to the decrease of male performance.
- Norwegian girls perform relatively high on tasks which demand reflection and evaluation.
- The results show a weak, but clear tendency of more positive attitudes to reading activities among Norwegian students and they read more in their spare time than in 2000. The percentage of males who never read literature has declined considerably.

Chapter 6: Problem solving

- Norwegian students perform below the OECD mean, and it is also significantly lower than the rest of the Nordic countries.
- Norwegian girls perform slightly better than the Norwegian boys, but the difference is relatively

small. In some tasks we find relatively high gender differences, and the results seem to reflect the stereotyped gender pattern.

Chapter 7: Self-regulated learning

- Norwegian students report that they use learning strategies in Mathematics less than the OECD mean. This is found both in rehearsal strategies, elaboration strategies and especially control strategies in mathematics.
- Regarding motivation for the subject mathematics, Norwegian students report that lower interests for mathematics than the OECD mean, but they report above the OECD mean when it comes to the importance of mathematics for future education and work. Boys report a higher motivation than girls in both these areas.
- Norwegian boys have significantly better self-efficacy in mathematics than Norwegian girls, despite the fact that there are small differences in the achievement level.
- There are relatively strong relationships between students' degree of self-regulation and their performance in mathematics in our country. No other country has a stronger correlation between the reported use of rehearsal strategies in mathematics and the achievement level than Norway.

Chapter 8 What is the importance of home background?

- The correlation between the mathematical competence and socio-economic background is smaller in Norway than the OECD mean.
- Norway has the highest correlation between the students' expected educational level and home background of all the Nordic countries.

Chapter 9: School factors

- In Norway there are small differences between the schools when it comes to the learning outcome, compared to other countries.
- In an international perspective, Norwegian students report a strong sense of belonging to their school.
- Norwegian students are generally less positive to the learning outcomes of their schooling than the OECD mean. They also report that they

have less positive teacher-pupil relation, and less supportive teachers.

- Both students and principals describe a more problematic school climate in our country than other countries. Norwegian students report more noise, disturbances and wasted time than the rest of the OECD countries. Norway has the highest percentages of principals who report that the students' learning is disturbed by disruptions of classes by other students.

Chapter 10: What characterizes Norwegian schools that perform high in Mathematics?

- A "good" school is defined as a school which performs higher than expected, regarding the students' socioeconomic background. "Good" schools in Norway are known for having positive teacher - student relations, supporting teachers and relatively good work environment in the classes. Students in "good" schools have also higher motivation for mathematics.
- In "good" schools students practice more rehearsal and use of control strategies when they are working with mathematics.

Some results across the subjects

Nordic performances in each subject-domain

Some of the results are interesting in a cross-curriculum perspective. This is why we would like to study some cross curricular patterns in the Nordic countries, as Nordic profiles. Figure 11.1 shows the performance in mathematics, science, reading and problem solving for the Nordic countries relative to the OECD mean. The results in each subject domain are discussed earlier, but here we would like to focus at the pattern that emerges. The first we notice is the Finnish students' performance. They are far above their Nordic students in all the subject domains. There seems to be more general than subject specific reasons why Finnish students perform so high. We can suggest a way of describing the differences between Norwegian and Finnish students by comparing how much improvement each country has during a year. TIMSS 1995 had data for 6th

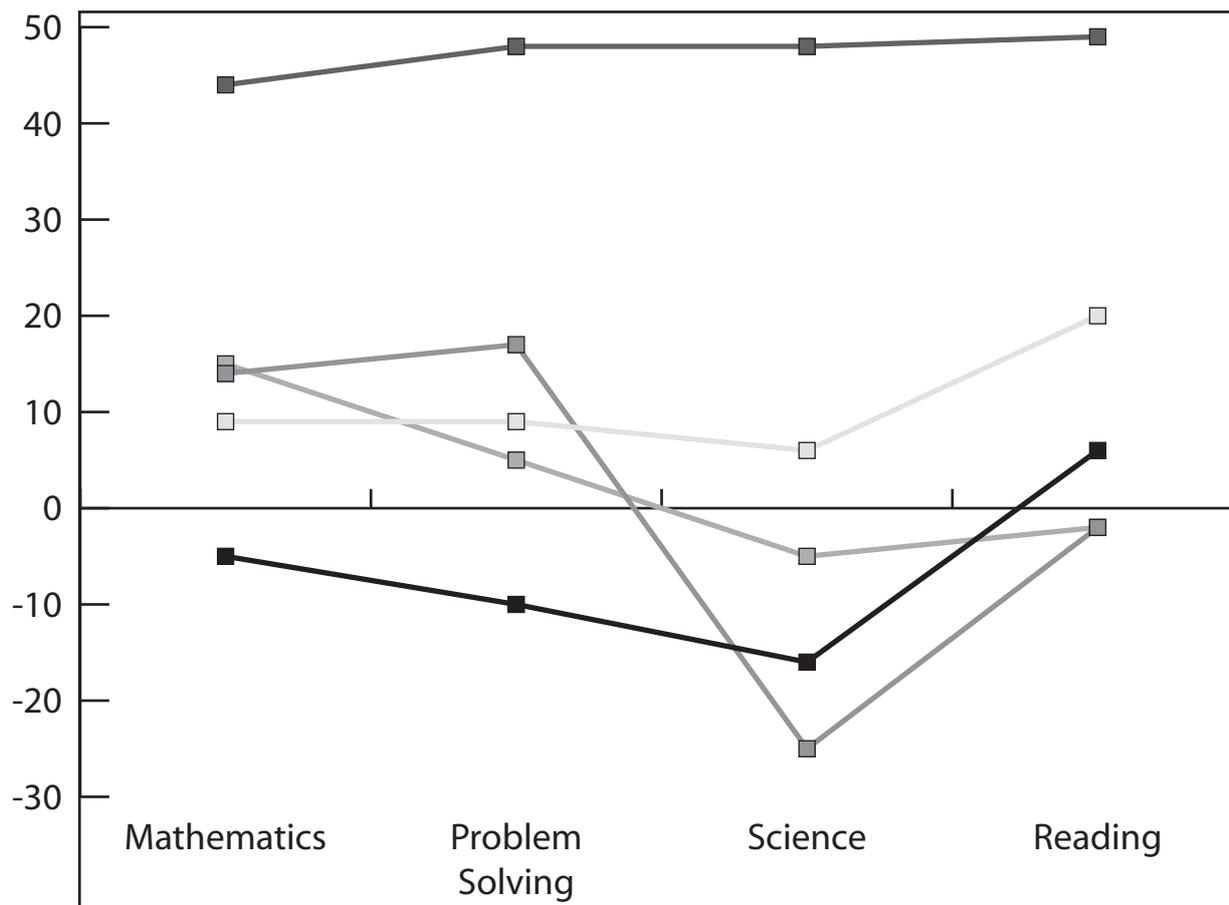


Figure 11.1
Score for the Nordic countries in points above or under the OECD mean.

- Norway
- Sweden
- Denmark
- Finland
- Iceland

and 7th grade, and the improvement from 6th to 7th grade was 30 points, and the points were calculated in the same way as in PISA (Lie et al. 1997). This suggests that the differences between the Finnish and the Norwegian students in each subject domain resembles almost two years of schooling. Without interpreting this too literary, it clearly demonstrates that the Finnish students have knowledge and intellectual abilities that make them well prepared for further education and “lifelong learning”.

The differences between the other Nordic countries are smaller, but with some interesting patterns also. The Swedish profile resembles the

Norwegian one, even if it lies 10 to 15 points higher. The Swedish students are slightly better than the Norwegian in all the domains, which was also a characteristic finding in earlier TIMSS and PISA-data (Lie et al 1997, 2001). When it comes to Denmark and Iceland the profiles are different, but with a considerable strength in mathematics. The new domain in PISA 2003, problem solving, stands out as the most cross curricular competency. As earlier mentioned in Chapter 6, this domain represents an area which mainly focuses on intellectual ability such as analytical reasoning. Such cross-curricular competencies are similar to reading strategies in that they are

of great importance in all subject areas, and the relatively weak Norwegian performance may give us the key to understand some of the results also behind the other domains. Nevertheless have we consciously placed problem solving next to mathematics, because these two areas exhibit the highest correlation and seemingly have most in common.

Changes since PISA 2000

We can summarize the subject performance in Norway by saying that they are at and under the OECD mean in all subject domains, and as a

whole our country appears as the weakest of all the Nordic countries. In PISA 2000, the Norwegian results as a total were closer to the OECD mean, so there are reasons for looking more closely at what characteristic changes have happened since last time. Figure 11.2 shows some changes from 2000 to 2003, here presented as the difference between the two scores for the two assessments. It is important to notice that the point differences represents the same in these two years, so the changes in the figure, as far as possible, represent real changes and not only increases or decreases performances compared to other countries. This opportunity is not present in mathematics, for

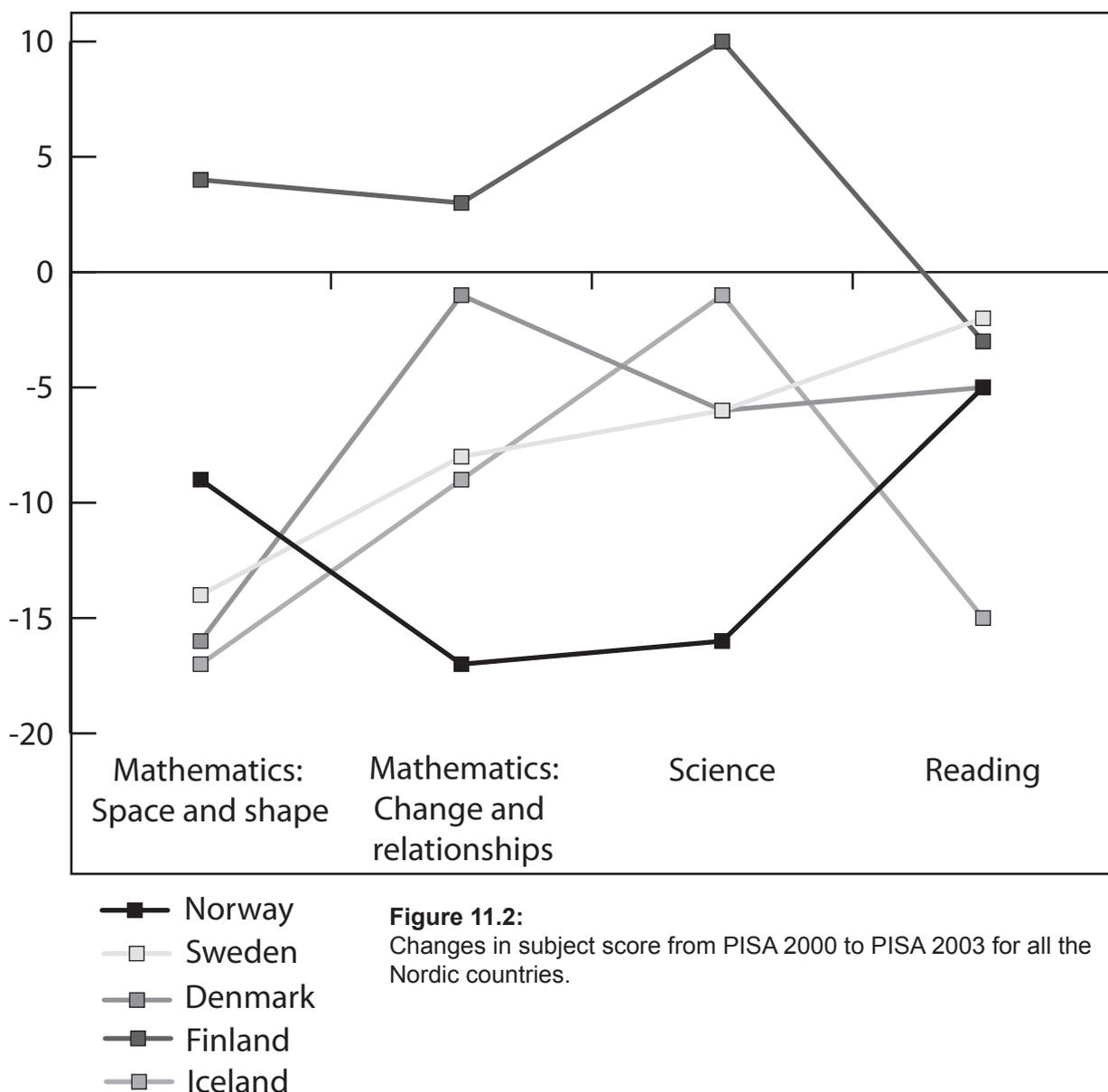


Figure 11.2: Changes in subject score from PISA 2000 to PISA 2003 for all the Nordic countries.

several reasons which are explained in chapter 3. Instead we have showed the changes for the two scales in mathematics where this is possible.

In figure 11.2, the Finnish results are again what stand out. Finnish students have consistently improved their performance since 2000, and this is especially remarkably when they already in 2000 achieved highly. For the rest of the Nordic countries this figure gives a slightly dark picture of the decrease of performance in almost all the areas. In an international context, these countries stand together as a group with significantly decreased performance. Even though our country's data together with Iceland as a whole show the most disturbing results, there are still reasons to discuss the situation in a Nordic perspective.

Gender differences

In PISA 2000 there were two noticeable patterns in gender differences in the Nordic countries:

- In OECD as a whole, there were high differences in favor of the females in reading, almost none in mathematics, and minimal differences in favor of the females in science. As a general tendency, this was also the case in the Nordic countries.
- The gender differences in the Nordic countries were generally more in favor of the females than in OECD as a whole, but with significantly differences among the Nordic countries. The Finnish females showed specifically strong performances, while the performance of the Danish females were weak in all subject areas.

The results this time are shown for every subject domain in figure 11.3. The figure shows some patterns similar to those from PISA 2000. Also this time the Danish females perform noticeably weak, as a consequence the performance favors the males more than in the other countries. In Iceland we see the opposite results in all the subject domains, having increased the female performances since 2000. Iceland has the highest gender differences in reading of all the OECD countries. The gender differences in reading have increased the most in Norway, and as in

Iceland it is the males who have decreased their performance. In the new area problem solving, the pattern is close to what we find in mathematics, except that we conclude with stating that problem solving seems to be more “girlfriendly” than mathematics in all countries.

What has happened in the most problematic areas?

We have in 11.1 and 11.2 given a brief summary and overview of what we think is the most important findings. Some of these results are closely related to similar problems in PISA 2000. It is therefore natural to ask which changes we can see, and what we can conclude regarding the direction Norwegian schools is headed.

The following Norwegian results from PISA 2000 were regarded as particularly problematic:

- The Norwegian results in the subject domains were only average, something which was regarded as bad, given the Norwegian context.
- The gender differences in reading in favor of the Norwegian females were among the highest in OECD.
- Norwegian students reported a low use of learning strategies.
- Norwegian classrooms were reported by principles and students to be noisy and disruptive.

If we are going to ask which changes have occurred since 2000 in all of these areas, we must conclude that what was problematic in 2000 now appears to be even more problematic:

- This time, Norwegian students perform even weaker than in 2000 in all subjects' domains where we can compare the results in detail. The decrease in performance has been especially large in science.
- The gender difference in reading has increased.
- There are no signs of better use of learning strategies.

These data suggest that the school climate is even worse. Our country appears to be the

country in OECD where you find most noise and disturbance.

PISA 2003 has given us some information which we did not have in 2000. In the new area problem solving the Norwegian perform unexpectedly low and lowest of all the Nordic countries. Problem solving is not a subject, but as reading it is basically the ability to use analytic reasoning. As for reading, it is easy to admit that being weak in this skill, might give students problems in other subjects, especially in math and science. Another new insight from PISA 2003 is that the Norwegian students report that they do not think of their school outcome, as very positive.

On one hand what seem to be the main problems in Norwegian schools are confirmed, and on the other hand, it looks as though these problems are increasing. We cannot expect large changes over a period of three years; PISA 2003 was carried through only one year after the results from PISA 2000 were published. In this light, even small changes are important, because they tell us about certain lines of development. Norwegian schools seem to be facing a considerably remarkable challenge which should give the school politicians important tasks in deciding what changes are necessary. It seems to be time for fundamental changes in order to find a path towards positive development.

Some few positive signals

It is not easy to point to positive signals in the Norwegian results. Some positive aspects are however worth mentioning and commenting:

- Norwegian students stand out positively when it comes to the sense of belonging to school. It is important to remind the reader that this does not include the teaching, but primary the relations to other students.
- There are few differences between the schools in our country, in the sense that in an international perspective it doesn't matter for the mathematical achievement where in the country and in which school the student is. This might signify that new strategies might be carried out systematically and successfully at a national level across the country.

- Norwegian students perform relatively well on the mathematics uncertainty scale.
- We interpret this result as a direct result of the Norwegian curriculum which stresses the issues statistics, and interpretation and representation of data.
- The Norwegian boys report this time slightly better reading habits, both when it comes to attitudes and frequencies of reading.
- If this trend continues, there is reason to expect a gradual improvement of the boys' reading literacy.

PISA as an assessment of the Norwegian school

Premises for the evaluation

We are now at the end of presenting the results, and it is time for a few comments of a different kind. So far we have discussed the results in both a nationally and international perspective, and we have also referred to and compared the results with other research. We would now like to look at our results in a more educational politics context. We are not educational politicians ourselves, but we realize of course that our results might come to give important premises for the political debate in the years ahead.

PISA is related to a mode of knowledge production we call evaluation. Evaluation or evaluation research usually starts where researchers are commissioned to assess the results of a reform. One example of this is the research around the evaluation of Reform 97 (Haug 2003). The task we were given has not had specific formulations related to the Norwegian school reality. This task can therefore not be interpreted as an evaluation of the Norwegian schools on its own terms. Instead, PISA has developed definitions of competencies based on international consensus in terms of their being central in the future, both in a professional carrier as well as in the society. PISA might therefore be said to evaluate the Norwegian school on external premises. To which degree does the Norwegian School System succeed in cultivating some general competencies of which there is broad, international consensus regarding their importance for young students in a lifelong perspective?

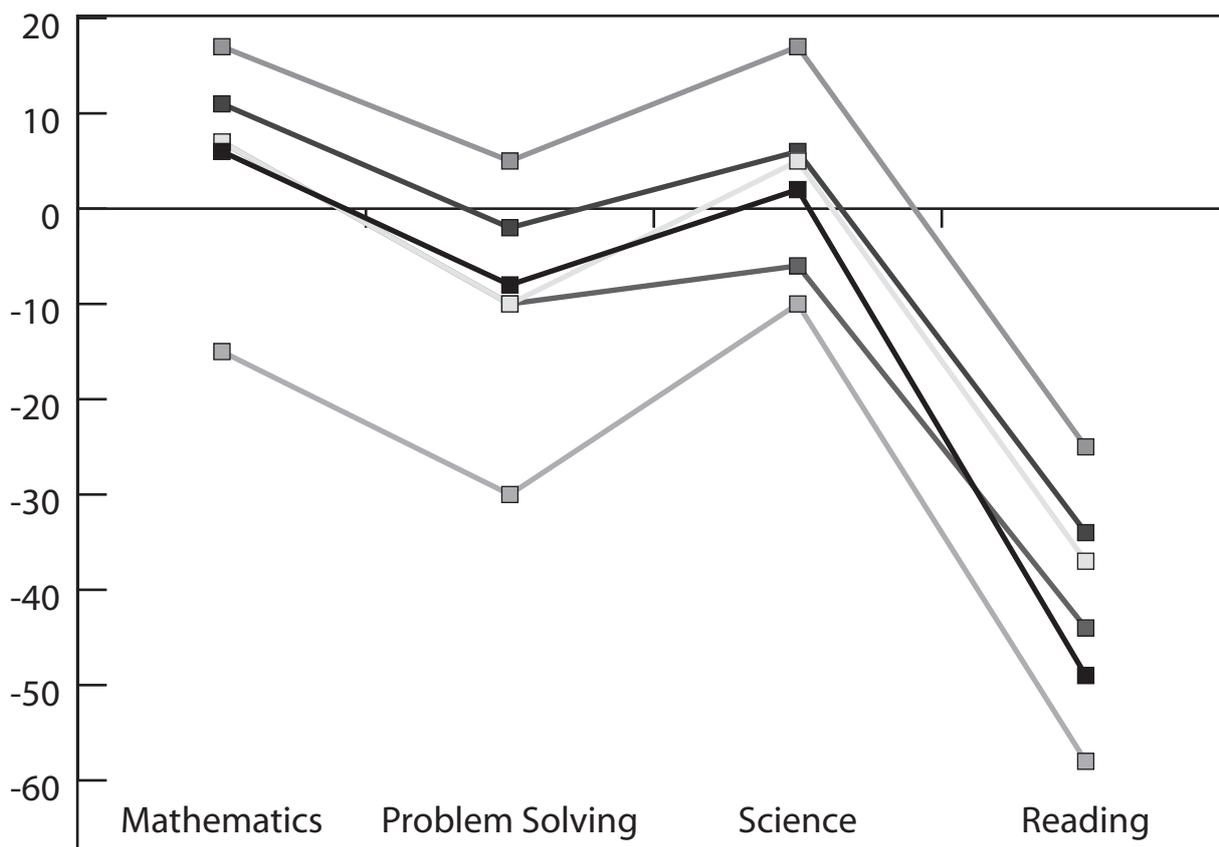


Figure 11.3: Difference in points between males and females score in each of the subject domains. Positive value means in the favor of males.

- Norway
- Sweden
- Denmark
- Finland
- Iceland
- OECD

The goals of L97 are multifaceted, and a lot of them of such a character that it is impossible to measure to what extent the actual goal is reached, or even to judge whether one is headed in the right direction to reach it. In an international assessment, the comparative perspective will of course be essential, something which also moves the focus away from the discussion regarding to which degree the goals in L97 are reached. An international perspective gives us the possibility to discuss national goals and operational the goals in a meaningful way. To see what other countries succeed and not succeed in might be important premises for our own country. Based on the PISA findings, one might discuss whether the goals

are reached to a reasonable degree. By looking at what other students are able to achieve, we might easier judge what we can expect from our own students. In a comparative perspective, we can in a meaningful way for instance talk about whether results show relatively “large” variation and relatively “strong” relation to the students’ home background.

We have in the earlier chapters given our evaluation of to what degree L97 seems to cover the competencies in mathematics, science, and reading, problem solving and self-regulated learning the way these areas are defined in PISA. In one domain, reading, we have clearly ascertained that our curriculum does not have clear goals for

what is known as “the second reading training”. Accordingly it is difficult to find general goals which cover what is measured in the domain problem solving, even if some of the current skills are partly covered in mathematics. In the domain of mathematics and also partly in science, we have showed that the overall goals in our curriculum coincide well with PISA’s definitions of the competencies which are measured.

Regarding Mathematics, we have also used some of the results from the Evaluation of Reform 97, related to the subject Mathematics (Alseth et al 2003) to draw a picture of the Norwegian curriculum and the Norwegian classrooms. Through this it is, as far as we can see, difficult to explain the weak results in Norwegian performances in Mathematics with the argument that the Norwegian curriculum differs from what is measured in PISA. It is therefore fair to say that the mathematic results show a relevant goal of the outcome quality in Norwegian schools. Generally the same might be said about science, even if it is obvious that important aspects of this domain are not measured in PISA. If the government perceive the performance level which is documented here as “too weak” and wish to do something about the situation, it will not be natural to do something with the curriculums’ overall statements and listed issues. A better strategy would probably be to develop more precise and concrete descriptions of what it means to reach the competence goals.

As we have shortly described in chapter 1, PISA is under quality control. Detailed reports are published where these quality controls are documented (see Adam and Wu 2002). From our own experience and from the documentation in other countries, we are convinced that the data holds a high quality and gives a reliable picture of the situation in each participating country. In one area, however, we are not so certain, and this concern to what extent is it possible to motivate the students to do their best in the test situation. At the worst, if some of the few measured differences between countries and between genders should be influenced by different test motivation, this would only show that the will to make an effort and the perseverance for schoolwork are the most important factors in achieving good results.

Is the Bildung aspect forgotten?

Some might argue that the PISA study emphasizes too much measures of knowledge in a narrow area, and that especially the subject domains are colored by “back to basic” and the education on the premises of business, and that there is not enough focus on the Bildung aspect. This is of course legitimate to claim, but we would like to point at some important moments in this respect. First of all, we can hardly understand that the basic skills which are in the center in PISA are not also important aspects of Bildung. Being able to read, understanding quantitative information and reasoning, analytical reasoning and basic skills in science are important factors for being able to acquire new knowledge and to be able to use these in concrete situations whether this is in education, in a job career or in the search for a meaningful leisure time and a deeper understanding in life.

Of course there are other important areas which PISA does not measure. The PISA results can therefore not alone give a valid measurement of the quality in a broad sense. But we may state that what is emphasized in PISA of knowledge, skills and attitudes in many ways represents the overall goals which are stressed in L97. This can easily be seen in the slogan of PISA, “Learning for life”, which refers to knowledge which is important in real life, not only in schools and higher education. This slogan also reflects other aspects than the cognitive ones. Motivation, positive self-efficacy and use of good learning strategies are not only important for succeeding in school, but are also an important part for learning in a life long perspective. We will therefore claim that the PISA results give a balanced picture of the Norwegian school system and to what extent certain goals in central areas have been reached.

Right on track or going nowhere?

An overall description

Our task will now be to point at some general patterns and tendencies and some possible options and eventually consequences of following these. Our work as researchers in PISA gives us the opportunity to do this, but we also realize that this role does not give us privileged positions when it

comes to clear normative statements about what one should do in the Norwegian schools today. What kind of school we want and what kind of values should be the basis for the Norwegian school are questions which cannot be answered by research.

Let us list some of the problematic areas in the Norwegian school based on an international perspective from the PISA results: low and decreasing achievements (compared to PISA 2000), larger variation between students than expected, little use of learning strategies, a lot of noise and disturbance in the classrooms, problematic relations between teachers and students, big gender differences in reading, students do not think they got much of their schooling. This is not only a list of isolated problematic areas. There are obviously some connections here, and we will try to understand some of them.

Changed student- and teacher roles

There have been a number of changes in the Norwegian school system in recent years, but a lot of these changes are connected to society as a whole. The changing student and teacher roles have many of their qualifications outside school. The changes have particularly involved an increase of student participation. Their voices are important and adults have spoken for them, like in a report from 1999 by The Children Commission and “The Pupil Inspectors”, which are net surveys where the students anonymously report about their school situation at a national level. The strong democratic influence in school is a part of the changing times, where there are fewer acceptances for strong authoritative attitudes both in school and in workplaces. The democracy of school has given us more autonomous students, they know about their rights and are able to set their expectations. Norwegian students do not only stand out as conscious about their own rights, they also have considerable knowledge about democracy and good “democracy preparedness

and involvement” (Mikkelsen et al 2001, 2002). In contrast to students a generation ago, our students seem to be outspoken and capable of presenting their subject results or argue in social situations. The students have influence when it comes to how the school year is planned according to the curriculum, choices of issues and choice of assessment. Through “The Pupil Inspectors” they have got a medium where they can freely speak about what they are not satisfied. Some will even claim that this place indirectly encourage to find areas where they are not satisfied. The satisfaction of student felt needs, even in a short term perspective, are now influencing the schoolwork.

The slogan “from teaching to learning”, involves in light of new learning theories a shift of focus from the teachers’ teaching to the students’ learning. In the tradition of Piaget we have what we can call a constructivist idea, that learning implies an active act where the students themselves construct their understanding and these ideas are influencing our schools. We see a strong emphasize of “responsibility for their own learning”, student centered teaching, self-regulated learning, project work and self-evaluation. Change in student roles changes the teacher role. In line with the new learning approach where students are active and independent, the teacher role is to make sure that learning can take place, by supervising the student. In short we can say that the teacher has changed from being a disseminator of knowledge to being a guide.

We believe that there is nothing to gain by having a pedagogic debate where different teaching strategies are described as opponents. A lot of teachers express an uncertainty about how they are suppose to behave as guides to enhance student learning and teachers who earlier had their strength in lecturing, are now unsure of to what extent they can go through the curriculum in lectures, without being seen as old-fashioned and out of date. In the rhetoric we see that teaching and learning are set up against each other in a very unfortunate way.

From teaching to learning or to activity?

We will claim that only stressing one specific method does not necessarily follow a constructivist view, which has to do with a certain learning theory and not a theory for teaching. Having one view of learning, doesn't necessarily mean that there is a specific teaching method following this view. There is no straight line between students constructing their independent understanding and student centered methods. Active learning happens in the brain, and brain activity is not dependent of a certain pedagogical method. The important factor is to which degree the method is able to "trigger" this activity. This does not involve visible activity, neither to which degree is the activity independent or self-initiated.

Rather it is a matter of in which degree the learning activity in itself is able to "trigger" this activity. A good teacher may be able to act as a guide in a way so learning might occur. But this demands that the learning goals are in focus for both the students and the teacher, and that the project work is carried through in a way that enhances the learning goals. In the same way, a good teacher might be able to give a lecture which can enhance the learning activity among the audience when going through new domain material. But this demand being able to see the students attention and reactions, and not at least, it involves knowing what the student already knows.

L97 changed the student and teacher role, even if to some degree L97 continues the pedagogy from M87 and M74. Pedagogical changes are something which normally does not happen because of research that show that something works better than other things. This was also the case with L97. Big changes have been implemented, but perhaps there has been little understanding of the difficulties in acting out these changes in the classroom according to the intentions. Perhaps it is also difficult to understand what these intentions were in the first place.

Teaching strategies develop over time, based upon the teacher herself and in relation to the

context, and as a result of experience. We might call this a sort of "pedagogical evolution". In this aspect implies that even teaching methods change in an adaptive process for good goal achievement and the specific learning goals. Similar as evolution in biology depends on mutations, the development of new teaching strategies demands new ideas. Some of them are useless, but others through experience, trying and failing, will stand out as adequate repertoire as fruitful procedures for good learning. Evolution demands time, and when it comes to implementing new curricula, this is well known. In line with this, there are reasons to point at the fact that there seems to be a mismatch between the intentional changes from L97 and the weak attention about the suppositions and time it would take for the changes to lead to good learning.

There may be reason to ask basic questions about the new teaching methods and the way the school day is structured. Rhetorically, changes are often presented as good in themselves, and changes are made without always having the empirical knowledge about whether it will work out better or not. A typical example of this, are the new schools which are built based upon certain pedagogical ideas, or schools which tear down their blackboards in all their classrooms. Another example is the appointment of the so called "Demonstration schools". These are schools which have been evaluated as excellent, even though criteria regarding student learning have not been part of the evaluation.

Mathematics may be a subject domain which more than any other subject are targeted by new teaching methods. Being able to connect mathematics to what is known and familiar, is the overall goal in the curriculum; including showing that mathematics is the important tool for describing and solving problems in many situations. Cross curricular methods and working with specific questions may be of relevance for learning mathematics, especially learning mathematics as it is defined in PISA. Nevertheless, we are concerned about the new methods in mathematics. A central issue here is not only whether the project, roleplay, game etc. are experienced as fun for the students,

but rather to which degree the student are able to learn something of it. We hardly see any evaluation of the innovative changes based upon learning outcome. One reason for this is probably because it is difficult to measure the effect of teaching program. One example which shows the uncertainty around a too concrete approach to mathematics is the description of the innovative school in the report to the Storting "Culture for learning" (white paper, UFD 2004, p. 3), where it is emphasized that students put puzzles together of geometric figures, calculate the average speed of cars passing by, throw dice or "run around with measuring wheels or doing something else strange and funny". It might be that this school has a plan for the learning of mathematics in all these activities. It is still legitimate to point out that the way this example is presented in the report to the Storting, it is the activity which is at the center and not the positive learning outcome. In the evaluation of teaching of mathematics in Norway, Alseth et al (2003) pointed out that the main challenge with new methods is to be aware of which mathematical conceptions and processes the activity is meant to enhance. This puts great demands on the teachers, both when it comes to their own command of the subject matter and their ability reflects on the didactics.

Aimless wandering going nowhere?

If we study the learning goals in L97 in detail, we notice a remarkable thing. The curriculum for the different subject domains in Norway has a lot of different statements like the students are supposed to "read", "do", "experience" and such. It seems to be filled with descriptions of activities and learning material, but it is hardly any description of what they are going to learn from what they have been "doing" or "experienced". A curriculum which is supposed to include absolutely all the students in Norway, it is easy to understand that it cannot describe concrete learning goals which we know many students will not be able to reach. On the other hand, with no clear learning goals to reach after, there is a danger that the activities in themselves will be the goal. With no clear

goals, it is of course also easier to lose track and go in the wrong direction, all the activities will then be equally important. Thinking about subject domains and expectations, these activities might seem to be without any specific purpose, accidentally, "aimless wandering going nowhere".

The evaluation of Reform 97 showed that there are many and varied activities going on in the Norwegian classrooms in all grades. But the purpose of all the changing activities may seem to be a little unclear. It seems to be more important to do something, to be active, than to learn something. Rapid change of activities might prevent students from studying in depth and being able to concentrate. Instead the endless changes might enhance superficial learning. The researchers of the evaluation program noticed unclear goals and unfocused subject expectations from the teachers. It seemed overall as if the teachers were afraid of asking the students to do something, especially in the comprehensive school (Klette et al 2003, Haug 2004).

We have deliberately avoided using words such as "progressive" and "traditional" pedagogy in the descriptions above. We don't see those kinds of dichotomies as fruitful, since they in many ways give a false impression of the situation. We think there is an obvious truth in the perspective that it is not what kind of teaching method which is used, but rather the quality of the work carried out by the teacher, no matter what method is used. Not at least we believe that independent of teaching method the teacher's insight and effort will determine the student's subject domain learning outcome and progress. The teacher and writer Jon Severud has described his ideas about knowledge and teacher roles as the following in his book "School and It's Discontents": "It is an illusion that one might (put the teachers in brackets as pedagogical consultants and) conceive of students as grown ups, independent self-motivated learners with flexible time in school and self-prepared individual plans for the day" (2003: 222).

Much could be said about the teacher role and the change from lecturer to guide. With no doubt, the new teacher role as a guide is highly demanding for teachers. There is little tradition

in using learning goals in a good way as a part of project work, and therefore it is not so strange that teachers do not find themselves comfortable in such a teaching role. This type of teacher role, also demands even more subject knowledge from the teacher, since there is no clear path from activity to learning. In an international perspective, the Norwegian teachers seem to be class teachers more than teachers of a specific subject, teaching several different subjects, and therefore they have relatively low competence in certain subject domains. Lack of subject competence will make it particularly difficult to meet new challenging pedagogical changes. In a subject such as Mathematics this is easy to see.

A generation ago some might have thought of teaching as the same as learning. A teacher could give his lecture and teach his curriculum, and it was the student's job to "receive" the teaching as it was given to him. This could lead to learning, especially if the teacher was a great storyteller and the students had the motivation for active listening. Obviously, little is learned in a lecture if the student is only physically present, but fails to listen and take part.

Today, one might say that there is a similar tendency to confuse independent learning activities with learning. For example, project work might be an excellent way of learning, based upon the condition that the learning goals are focused. If not, project work might be a typical method for not learning anything specific at all. The same might be said about using ICT as a part of the learning activity in the classrooms. It might enhance learning, in addition to enhance the competence of using ICT as a tool for learning. But surfing around on the internet and downloading from the internet, might also be a way of learning nothing at all.

About noise and disturbance

Noise and disturbance seems to be the biggest problem in Norwegian schools. It is important to point out that neither students nor the headmaster are asked what they mean about noise and disturbance, something which might heat up the public discussion of this. It is rather noise and

disturbance which prevent the students from learning. The results show that schools which perform well according to their assumptions, have less problems with the learning environment than schools which have low performances. A better class environment looks like one of the major challenges in Norway.

What's behind this problematic situation in Norwegian classrooms? Letting students participate more, might positively influence the school and make it more democratic. However, this demands a structured teaching of what it means to participate in planning and evaluating his or her own work, and the students can only do this eventually, and not until they are ready for the responsibility for their own learning. But it is also necessary that the teacher stipulates clear commands and holds high expectations for all students. "Being responsible for his or her own learning" has been a well known slogan, but you cannot give a student this challenge without making sure that the student is capable of having it. Student participation demands a guiding teacher who is able to have strong expectations and "stipulate demands". In schools where teachers are not sure about how they may do this, teachers might experience that students are taking control and are in charge of the teaching, and we can see a mismatch in student participation where the teacher has problems being seen upon as the authoritative teacher. If the teacher tries to hold high expectations for the students in such a classroom, he or she is risking being unpopular and exhausted. Tendencies like this, lead to problematic pedagogical climate. And if the "negotiating students" are left to dominate the classrooms, it might be difficult for the teacher to act as the authoritative leader.

A teacher, who abdicates from the role as authoritative, might leave the students into what is known as the "tyranny of the group". From our data, there is reason to believe that the students do want to participate, but in structured ways where the teachers create clear demands and act as models by showing what it takes to learn a specific subject domain.

A restoration of the teacher role is needed and seems to be a huge challenge for the Norwegian

school. There are reasons to believe that there are some basic conditions for a good learning environment and for better learning, and perhaps also for better relationships between students and teachers, then what is reported from our data (see chapter 9). We interpret our data in such a way that the students actually prefer teachers who dare to stand out as leaders with clear goals both in pedagogical and social settings. This is not about bringing back authoritative attitudes, but more about being the leader of the learning environment, built upon the subject knowledge and good leader management to support the students in their learning process and social development.

Getting down to work

The increase of student participation has probably also influenced what kind of learning the students find “fun” or “cool”. Young people today live in an age where even information should entertain; this is what is known as “infotainment”. Schools are in danger of follow this pattern if there is no discussion about this and if schools don’t dare to be an opponent to the popular culture. There are no short cuts to knowledge. The secret behind subject improvement lies in hard work and clear goals. This might seem to be a secret in the Norwegian school system despite that this should be well known. It is probably related to the fact that goal oriented work actually can be quite a lot of hard work.

Data from PISA 2000 shows that Norwegian students have low values when “Work investment and perseverance were measured, at the same time this correlated highly with performance. We do not have any information about the student’s achievement motivation in 2003, but there is no reason to think that it is particularly different now. That’s why there is reason to emphasize the danger in students’ natural avoidance of “getting down to work”. From PISA 2000 our country also had low values on the construct “Teacher with high expectations”, but we have no data from this construct in 2003. We note that there are many things which seem to point in the direction that the Norwegian school has low expectations to

their students compared to other countries. Again, it is easy to see that there is a strong need for teachers who are able to hold high expectations for all their students.

Letting the students choose their learning method might lead them to choose the easiest way. Using the students interests might motivate them when it comes to subjects and tasks, but it does not necessarily give the students better learning outcome in important areas. What seems fun and entertaining at the moment might not be what is of importance and interest in a longer perspective. What is known as “getting down to work” to understand something very often gives the students valuable insight. Even rehearsal might sometimes be a valuable learning strategy, when it is important to learn something by heart, which later will make it possible to use the mental energy for analytical reasoning. Perhaps we are now in an area which might explain some of the low performances in problem solving for Norwegian students.

Learning strategies and self-regulated learning

The PISA results show that we find a relatively weak correlation between the student’s self-regulation and subject performances. In a school system where the teacher is passive and leaves the students much alone working as they might find the best themselves, it is easy to understand these results. The new student role demands that the students are able to self regulate their own learning, and this is even more important when it comes to their learning outcome. The students, who lack learning strategies and motivation for learning, are not able to cope with the new student role. Working with the students’ learning strategies and motivation to learn, would seem to be an important goal in the Norwegian school in the years to come. We do not have data from PISA which directly shows us how this is best done, but this is clearly described by others. When it comes to the development of learning strategies, most researchers emphasize that the teacher must help the students to reflect upon their own learning process. This can be done by

including an analysis of what the learning goal is for a lesson. This also includes discussing how this goal is reached, and what kind of skills is needed and what kind of quality criteria one might expect for the final product. The teacher's most important tool in such a process would be to be able to discuss the learning process with the different students alone and in the class. "Learning to learn" is only achieved by practicing different types of strategies and skills, at the same time as the teacher guide the student towards a better self-efficacy and increase the ability to monitor his or her own learning.

The road ahead

We will now make some final comments about the basic decisions the Norwegian school system is faced with. It is now a time for change, some old truths might seem to be left, and new messages seem to create a lot of fuss. PISA has pointed at some central issues, which we have been discussed and to put in a meaningful context. The PISA results speak about low performances, less than optimal pedagogical environment and a lack of useful learning strategies. In this respect we have pointed at some challenges. By implementing new methods one has to expect lower performances before they get better: In every reform, and not at least with new curricula, it takes time before it is implemented and this is why the low results might reflect that the new methods are still not quite implemented. But when the results from PISA 2003 seem to show a decrease of the performance, this interpretation might seem like wishful thinking rather than a reasonable explanation.

Our interpretation of the PISA results gives an overall picture of the situation, which is in line with research findings regarding Reform 97. In our interpretation the fundamental underlying factors behind the PISA results are the following:

- The teacher's tendencies to be unsure about their own role as leader and responsible for the students learning and learning strategies.
- A tendency to confuse activity and learning
- A demand for student centered methods in combination with unclear expectations in the subject domains.

We do not wish to be considered as spokesmen for one or another pedagogical tradition which have conflicting ideas. Instead we would like to emphasize that all teaching strategies might be carried out with high or low quality leading to high or low learning outcome. We wish for example not to portray project work as a bad method in itself, but it is obvious that it is very demanding to use such a method and get high learning outcome. It seems like a lot is yet to be done in this respect, especially if the method is forced on teachers without any motivation or any good assumptions for using this method. Similarly, we would like to distant from the broad misunderstanding that all kind of lecturing is of no use. In the same way we would warn against the assumptions that rehearsal and working with automation of certain skills are useless. On the contrary, our data seems to show that in a lot of situations, it would actually be an important strategy.

Working with a new curricular in Norwegian school, we hope that PISA has contributed with important data and given some premises for an important discussion about which way to go from here in the Norwegian school system.

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