Results from TIMSS Advanced 2008

Results from TIMSS Advanced show that Norwegian pupils who were enrolled in full in-depth study programs in physics and mathematics in upper secondary school last year showed less competence in mathematics and physics in 2008 than Norwegian pupils did who took the test in physics in 1995 and mathematics in 1998.

Despite the clear setback in performance by Norwegian pupils, the results for physics were relatively good compared with pupils in other countries. Performance by Norwegian pupils in mathematics on the other hand was clearly worse than the international scale average set by the 1995 TIMSS Study. On an international scale, only Sweden showed a greater setback than Norway. This was true for both subjects.

The TIMSS Advanced Study for 2008 shows the same structure for teaching methods at Norwegian upper secondary schools that TIMSS and PISA showed for primary and lower secondary school. In Norway, emphasis is placed on independent working methods, meaning pupils work to solve assignments on their own, more so than in most other countries. The standard approaching to solving problems with subsequent discussions afterward where pupils reflect on their answers is given less emphasis in Norwegian schools than in other countries.

More than 36 per cent of teachers in mathematics at grade 3 in upper secondary school are 60 years old, or older; just as many are between the ages of 50 and 59. Twenty-six per cent of physics teachers are 60 years old or older. Many mathematics and physics teachers will retire from teaching in the coming years. Recruitment of younger teachers is currently insufficient to fill the positions left by retiring teachers.

Norway seems to have a high level of competence among mathematics and physics teachers in scientific subjects in upper secondary education compared with the other countries that participated in TIMSS Advanced. Researchers at ILS point out that part of the reason for the poor performance of upper secondary pupils may be insubstantial basic skills learned in mathematics in general and algebra in particular.

Only 11 per cent of Norwegian 19 year olds participated in theoretical in-depth study programs in mathematics, and 7 per cent had full in-depth study in physics by the end of the 2008 school year. This means that one per cent fewer 19 year olds participated in such in-depth study programs in 2008 when one compares this to physics in 1995 and mathematics in 1998.

Pupils who participated in TIMSS Advanced 2008 have mainly followed the curricula for L97 in primary and lower secondary school and R94 in upper secondary school. However, these pupils started with M87 in their first year of school in 1996. The results can therefore *not* be seen in the context of the Norwegian Knowledge Promotion program being introduced. Norwegian pupils who took 3MX or 3FY in their last year of upper secondary schooling in 2007/2008 were the basis for the study for Norwegian results.

TIMSS stands for Trends in International Mathematics and Science Study, while Advanced refers to the study applying to pupils who chose full in-depth study programs in mathematics and physics in upper secondary school. This is a comparative study on behalf of IEA (International Association for the Evaluation of Educational Achievement) which was first presented in 1995. Norway participated then, taking initiative for the follow-up study in 2008, and this is part of the reason why the international presentation of the results is done from Norway. The project is run in Norway by the Institute for Teacher Education and School Development (ILS) at the University of Oslo. Ten countries participated in TIMSS Advanced in 2008: Armenia, Philippines (only mathematics), Iran, Italy, Lebanon, Netherlands, Norway, Russia, Slovenia and Sweden.