

Estonian children second in the world in scientific literacy

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The long-awaited results of the international PISA survey conducted by the Organisation for Economic Cooperation and Development (OECD) have finally been made public. Our students achieved fifth place in scientific literacy in the PISA survey. The results of countries were also presented according to performance levels in the survey.

PISA experts have defined Level 2 as the baseline level. On the PISA scale, baseline level is the level at which students start to demonstrate the science competencies that will enable them to participate successfully in life situations related to science and technology. Demand for highly qualified workers has increased in the world. This means that on one hand, top specialists are required for scientific research and development of technologies, whilst on the other hand good baseline skills are important for implementation of technologies. The number of students with high and low skill levels is an important indicator in projecting economic growth and social development.

It is a pleasure to admit that in terms of acquired baseline skills, our students were in second place in scientific literacy, ninth in mathematical literacy (third in Europe) and twelfth in reading literacy (seventh in Europe). This means that most of our students have acquired at least the baseline level of skills and work with less capable students has been successful.

Our students are on an evenly high level

Another important result in the international context is that the effect of the socio-economic background of our students did not have a significant impact on their performance. When we compare the top ten countries, then we can say that the results of students from New Zealand, Holland and Liechtenstein were noticeably more dependent on their socio-economic background whilst our results were practically the same as those of Finland and Canada. It can also be pointed out that the results of our students according to schools did not differ remarkably as the relevant difference in results was smaller than the average of other countries. The performance of students according to schools varied less than 5% in Finland, up to 10% in Norway and we remained at the 10-20% level with Sweden, Poland, Spain, Latvia, Ireland, Canada and Azerbaijan. The result of Estonia was 15.9%.

Even though our students exceeded the average OECD result significantly in all three PISA areas, we still have to seriously think about the reasons why there is a gap between the three assessed literacy categories: the results in scientific literacy were better than in mathematical literacy and reading literacy.

When compared to other countries, we have paid considerably more attention to teaching less capable students – as a small country, it is important to involve all our students in learning. However, in the interests of social development, we should focus more on developing the abilities of more talented students. For example, one-fifth of students achieved Level 5 and Level 6 in Finland and the same indicator in New Zealand was 17%, whilst only 11.5% of our students achieved these levels.

All in all, the PISA data give us an important information base that we can use in the development of our education system after some detailed analysis and additional research.

The next PISA survey will be conducted in 2009 and we certainly intend to take part in it. The emphasis in the new survey will be on reading literacy.

What are the possible reasons for our success?

As a historian, I would first like to say that our people have considered education to be highly valuable for centuries. We can be proud that there are schools in Estonia whose history dates back to more than three hundred years. One hundred years ago, farmers dreamt about being able to educate at least one of the children on a higher level. The situation has changed and most young people today would like to acquire higher education.

However, if we try to explain the possible reasons for our success, then we cannot ignore our recent history. We know that some of the decisions made have been unpopular among teachers and met with reluctance, but this survey shows that our major and minor educational reforms have been successful on the whole.

The most important thing, of course, is that our students took it seriously, which allows us to say that most of our young people are mature and responsible. In addition to praising our students, I would also like to highlight the good work done by our teachers. Estonian teachers have been able to teach skilfully and consistently, they have adapted to changing requirements and understood the needs of modern society.

Teachers and study programmes cannot be separated from each other. It is important that we have teachers with good knowledge and teaching skills, but it is also important to have a good study programme on which teaching is based. Estonian students, whose performance surprised the world and us as well, have been learning according to the study programme adopted in 1996, which was slightly adjusted in 2002. TIMSS results demonstrated already that our study programme corresponds to contemporary requirements and the PISA survey confirmed once again that we have a study programme that we can rely on. Any development and amendment of this programme must be well considered before anything is done. The success of sciences in PISA and TIMSS surveys can be explained by the fact that natural science is taught in primary school and the emphasis has always been on application of knowledge and practical activities.

Teachers of natural sciences have been some of the most active project writers, which has helped them to find new opportunities for making study forms more diverse and learning natural sciences more attractive for students. IT projects also have their place here.

We must also mention the high level of our teacher training. Our young teachers have received valuable training and older teachers have been offered refresher training whenever necessary.

The authors of our textbooks and other study literature also deserve a mention alongside our students, teachers and study programme. The last decade saw the time when textbooks had to be rewritten due to the changes made in the study programme. The content and exercises of new textbooks were aimed at the application of knowledge. We all know that finding textbook writers in a small country is difficult, but despite this we have many good textbooks. Even during the occupation years most of our textbooks were written by Estonian authors. Maybe the brave decision made back then – to keep our own textbooks and not start using the study

materials of another country – is one of the reasons why our performance today differs so much from the results achieved in Latvia and Lithuania.

One of the decisions made in the last decade was to implement external assessment of study results. Giving educational institutions more freedom to decide what, how much and how they teach created the need to monitor the achievement of the study results set in the study programme on the national level. Keeping the study process on course was one of the aims of harmonised basic school and state examinations. Even though we took part in PISA for the first time now and in TIMSS in the year 2003, the exercises used in international surveys that have been made public in the course of previous surveys have been the examples followed by our test and examination writers. This is why the exercises used in our tests and examinations for a long time now are such where students have been required to link their knowledge to life situations and where skills are valued.

Successful study processes have been supported by the reorganisation of school management, the organisation of education and the external assessment of educational institutions. Here we can mention the decision made in the beginning of the 1990s, which was to decentralise educational institutions. The success of a school is guaranteed by the existence of a community and cooperation. This was also the time when activities under the *Schools with Distinction* project were performed, which helped school managers to see management from a new angle and develop the skill to organise changes in education during the complicated transition period. Schools in Estonia are relatively autonomous institutions when compared to many other countries. School managers in other countries can only dream about making the kind of decisions that their colleagues can make over here. Acceptance of quality management principles by many school managers and implementation of criteria-based external assessment have helped to create the situation where we can take pride in our students.

We also have to mention the gradual introduction of the principles of inclusive education into our legal acts, which has applied certain pressure on schools as they now have to pay more attention to less capable children. Adaptation of study needs considering the individuality of students has been an important principle followed in the preparation of educational strategy documents and in the amendment of legal acts.

The PISA survey showed that excellent results can be achieved even when financial resources are limited. Nobody could predict that Estonian students would be so successful. Even we did not expect it. Foundations for success like this are not laid in a couple of years or guaranteed with one or two factors. We have chosen the right path and made several correct decisions. A very big thank to our teachers, students and their parents, all our educated people and all of us – this is a great achievement by a small nation.