Haridus- ja Teadusministeerium

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Summary of PISA 2012 results for Estonia

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Summary

PISA survey measures knowledge and skills of 15-year students in three domains: **mathematics, reading and science**. Primary goal of the study is to assess how well students nearing the end of the compulsory education have acquired knowledge and skills necessary to meet the challenges of the society and apply their knowledge to real life problems. PISA survey results allow objective comparison of the compulsory education level in Estonia and other countries. Estonia has previously participated in PISA 2006 and 2009 cycles.

- In country comparison the performance of Estonian 15-year old students ranks among the top achievers in the world, and among the best performers in Europe. The results have improved since PISA 2006 and 2009. For instance, in science in Europe Estonia ranks 1st -2nd together with Finland.
- Schools with Russian language of instruction have improved considerably since previous PISA cycles. Students in both Estonian and Russian language schools have shown improvement and the gap between the two language groups is decreasing. The results for the Russian language students have increased two times.
- Estonian Basic (comprehensive) school has done a very good job. Special attention has been paid to weaker students. Among other European countries Estonia has the smallest amount of low achievers; the same applies when considering all participating countries. PISA 2012 report points out high level of equality of Estonian education system.

Background

In PISA 2012 the main domain of assessment was mathematics, reading and science being minor domains. Apart from the test booklets all students filled out student questionnaire which provides student background information, attitudes towards mathematics and school.

510 000 students from 65 countries participated in PISA 2012 assessment. In Estonia 5867 students participated. Total number of 15 year-olds in Estonia in 2012 was 12 439, this means that almost half of the PISA age population was assessed.

206 Estonian schools participated, 166 schools were with Estonian as the language of instruction, 37 with Russian as language of instruction and 3 mixed language schools. 79% of the students (1917 girls and 1867 boys) took the test in Estonian and 21% of the students (492 girls and 503 boys) took it in Russian.

Results

- The performance of Estonian 15-year-olds in the participating country comparison is very good.
- Survey results give an evaluation to changes implemented in the education system, show the direction of the development in the country and predict its future workforce.
- High student performance shows that students are ready to meet the challenges of the modern society and continue their education successfully in the next level of their schooling.

Student mean scores

Domain	2006 Mean score	2009 Mean score	**2012 Mean score**	**Gain since 2006**
Reading	501	501	**516**	+15
Maths	515	512	**521**	+6
Science	531	528	**541**	+10

Rankings according to the mean scores

Domain	**2006**		**2009**		**2012**	
	All countries	In Europe	All countries	In Europe	All countries	In Europe
Reading	13	8	13	5	**11**	**4**
Maths	14	6	17	7	**11**	**4**
Science	5	2	9	2	**6**	**2**

Rankings according to statistically similar mean scores

Domain	**2006**		**2009**		**2012**	
	All countries	In Europe	All countries	In Europe	All countries	In Europe
Maths	12–16.	5–8.	14–17.	5–8.	10–14.	3–6.
Reading	9–19.	4–12.	10–26.	2–15.	9–15.	3–6.
Science	3–8.	2.	7–11.	2–3.	4–7.	1–2.

Results in mathematics (*detailed table at the end*)

- The mean score for Estonia in mathematics is 521 points. In Europe we share 3.-6. place with the Netherlands, Finland and Poland. Among all participating countries Estonia ranks 10 - 14. The result since 2006 has increased for 6 points.
- The mean score in the computer based assessment of mathematics is 516 points. This places Estonia as the best performing country in Europe and 9th among all participating countries (32 countries participated in e-mathematics test)
- 81% of Estonian students think that mathematics is important and they will need it in their future studies. Estonian students think that results in mathematics strongly depend on their own efforts.
- Estonian students are persistent but with low self-concept about mathematics. Two thirds think that they are not good at maths and only 27,4% of the students look forward to mathematics lessons. Girls experience higher level of anxiety towards mathematics than boys.

Results in reading (*detailed table at the end*)

- Mean score in reading is 516 points. This result is similar to Poland, Liechtenstein and the Netherlands and places us from 3rd - 6th place. Finland has the highest score among the European countries. Among all participating countries Estonia ranks from 9th to 15th place. In comparison with PISA 2006 Estonian results have increased 15 points.
- Mean score in the computer based assessment of reading is 523 points. (32 countries participated in e-reading test)

Results in science (*detailed table at the end*)

- Mean score in science is 541 points. In European comparison Estonia shares the 1st and 2nd place together with Finland. Among all participating countries we share 4th - 7th spot. In comparison with PISA 2006 the results have increased 10 points.

Results according to the language of instruction – Russian student performance has rapidly improved

In comparison with PISA 2006 the performance of Estonian language schools has improved 8 points, Russian student performance 16 points. Notable is the Russian student improvement in reading as it has increased for 38 points since PISA.

Since 2006 the gap between Estonian and Russian language schools has decreased:

- In reading from 66 points to 36.
- In maths from 40 points to 31.
- In science from 43 points to 36.

Although the gap is still big, it is decreasing rapidly. Estonian student score is 524 points, Russian students score 488 points. The gap is 36 points which can be considered as close to one year of schooling. It is important to note that Russian student performance since 2006 has increased 38 points. Also in science Estonian students perform better, their score is 549, Russian students 514, the difference is 35 points.

In reading there is a big gap between performance of boys and girls

Boys perform considerably lower than girls in reading. The difference is 44 points, which is more than one year of schooling.

The performance gap between boys and girls since 2009 has remained the same – 44 points (girls 538, boys 494). One school year equals 39 points. Thus in reading boys are behind girls for more than one school year.

- The best performers in reading are girls from Estonian schools. Their performance is similar to the results of the best performing countries. Results in computer based assessment in reading are similarly high and girls are better performers (girls 541, boys 504, and gap 37 points).
- There is no gender difference in performance in science; in maths boys perform 5 points better than girls.
- Girls have lower self-concept about mathematics than boys.

Estonian education system provides equal opportunities

Estonian student performance is not influenced by student background.

- More than a third of students with low socio economic background are among the best performers. There is no gender difference among performance of resilient students.
- Estonia is among countries with an education system that provides equal opportunities for its students. High performing countries where maths performance is not affected by student socio economic background are the following: Estonia, Finland, Liechtenstein, Canada, Australia, Japan, Korea, Hong Kong (China) and Macau-China.
- Implementing principles of comprehensive school- equal teaching quality across the country. Although we are among the best performing countries, there is a performance gap between urban (534 p) and rural schools (518). After accounting for socio economic background statistically significant gap is still there.

Lowest amount of low proficiency students in Europe

Estonia is among the top countries that have the smallest amount of students that have not reached the baseline level of proficiency. In PISA second proficiency level is the baseline level. Students at this level should be able to manage in everyday life. Most of Estonian students have reached this level in all three assessment domains (in reading 90,9% of students, in maths 89,5% of students, in science 95%). The trend during the six years has been positive.

In Europe we are the first in all three assessment domains with the smallest amount of weakest students. In all three domains about 2/3 of Estonian students have reached the third level of proficiency.

- Among the participating countries only Shanghai (China), Hong Kong (China), Singapore have even smaller amount of low performers.

Percentage of students whose performance is below second level of proficiency and Estonian rankings

Domain	2006			2009			2012		
	Amount of St %-	All countries	In Europe	Amount of St %-	All countries	In Europe	Amount of St %-	All countries	In Europe
Maths	7,7%	9	4	13,3%	10	3	10,5%	5	1
Reading	12,1%	8	3	12,6%	7	2	9,2%	4	1
Science	7,7%	2	2	8,3%	5	2	5,0%	2	1

Increase in numbers of top performers:

There has been an important increase in the number of students that have reached 5th and 6th levels of proficiency. The trend has been positive.

Top performers (levels 5 and 6) in Estonia (%):

Domain	2006	2009	2012
Maths	12,6%	12%	14,6%
Reading	6%	6%	8,4%
Science	11,5%	10,4%	12,8%

66% of the Estonian students say they feel happy at school

- 76% of Estonian students are satisfied with their school, 66% of the Estonian students say they feel happy at school. However, the happiness factor and student performance are linked weakly.
- The happiest students are in countries where the performance is lower. However, in countries like Switzerland, Liechtenstein and Holland most students feel happy, they perform well and the socio economic influence on performance is weak.

School climate is important

School climate and student performance are connected.

- In general student attitude towards school is positive, they think that what they have learned at school will be useful after finishing (91%) and only few students think that going to school has been a waste of time (7%).
- Almost 80% of students think that school has encouraged them to make decisions.
- ¾ of students believe that school has prepared them for adult life. Most students have good relationships with teachers.
- Good student teacher relationships and teacher positive characteristics contribute to positive performance.

Estonian students are e-students

- Estonian students lead the lead tables in internet usage during the work days. Only 1,39% of students do not use internet on a school day. During the weekend Estonian students are second in using internet; they are among the top ones who participate in social networks. Also Estonians are leading according to the usage of school web and e-school platforms.

Estonian challenges

Ability of the education system to care for development and potential of every child, especially talented students. In maths among of top level achievers (5 and 6 levels) we have 14,6% (in Shanghai 55,4%).

Gender gap in reading performance– boys perform considerably lower. In reading boys perform 44 points lower than girls.

Difference in performance between students from Estonian and Russian language schools. Although the difference between both school groups has decreased, the difference is still considerable (44 points in reading, 31 points in maths, 35 points in science).

Mean performance of all participating countries in all three domains

- Countries marked in green have statistically similar performance as Estonia

Maths			Reading			Science		
Jrk nr	Tulemus	Riik	Jrk nr	Tulemus	Riik	Jrk nr	Tulemus	Riik
1	613	Shanghai (Hiina)	1	570	Shanghai (Hiina)	1	580	Shanghai (Hiina)
2	573	Singapore	2	545	Hong Kong-China	2	555	Hong Kong-China
3	561	Hong Kong-China	3	542	Singapore	3	551	Singapore
4	560	Taibei (Hiina)	4	538	Japan	4	547	Japan
5	554	Korea	5	536	Korea	5	545	Finland
6	538	Macao (Hiina)	6	524	Finland	**6**	**541**	**Estonia**
7	536	Japan	7	523	Iirimaa	7	538	Korea
8	535	Liechtenstein	8	523	Taibei (Hiina)	8	528	Vietnam

9	531	Šveits	9	523	Canada	9	526	Poland
10	523	Holland	10	518	Poland	10	525	Canada
11	**521**	**Estonia**	**11**	**516**	**Estonia**	11	525	Liechtenstein
12	519	Finland	12	516	Liechtenstein	12	524	Saksamaa
13	518	Canada	13	512	Uus-Meremaa	13	523	Taibei (Hiina)
14	518	Poland	14	512	Austraalia	14	522	Holland
15	515	Belgia	15	511	Holland	15	522	Iirimaa
16	514	Saksamaa	16	509	Belgia	16	521	Austraalia
17	511	Vietnam	17	509	Šveits	17	521	Macau (Hiina)
18	506	Austria	18	509	Macau (Hiina)	18	516	Uus-Meremaa
19	504	Austraalia	19	508	Vietnam	19	515	Šveits
20	501	Island	20	508	Saksamaa	20	514	Sloveenia
21	501	Sloveenia	21	505	Prantsusmaa	21	514	Suurbritannia
22	500	Taani	22	504	Norra	22	508	Tšehhi
23	500	Uus Meremaa	23	499	Suurbritannia	23	506	Austria
24	499	Tšehhi	24	498	USA	24	505	Belgia
25	495	Prantsusmaa	25	496	Taani	25	502	Läti
26	494	Suurbritannia	26	493	Tšehhi	26	499	Prantsusmaa
27	493	Iirimaa	27	490	Itaalia	27	498	Taani
28	491	Läti	28	490	Austria	28	497	USA
29	490	Luxembourg	29	489	Läti	29	496	Hispaania
30	489	Norra	30	488	Ungari	30	496	Leedu
31	487	Portugal	31	488	Hispaania	31	495	Norra
32	485	Itaalia	32	488	Luksemburg	32	494	Ungari
33	484	Hispaania	33	488	Portugal	33	494	Itaalia
34	482	Venemaa	34	486	Iisrael	34	491	Horvaatia
35	482	Slovakkia	35	485	Horvaatia	35	491	Luksemburg
36	481	USA	36	483	Rootsi	36	489	Portugal
37	479	Leedu	37	483	Island	37	486	Venemaa
38	478	Rootsi	38	481	Sloveenia	38	485	Rootsi
39	477	Ungari	39	477	Leedu	39	478	Island
40	471	Horvaatia	40	477	Kreeka	40	471	Slovakkia
41	466	Iisrael	41	475	Türgi	41	470	Iisrael
42	453	Kreeka	42	475	Venemaa	42	467	Kreeka
43	449	Serbia	43	463	Slovakkia	43	463	Türgi
44	448	Türgi	44	449	Küpros	44	448	Araabia ÜE
45	445	Rumeenia	45	446	Serbia	45	446	Bulgaaria
46	440	Küpros	46	442	Araabia ÜE	46	445	Tšiili
47	439	Bulgaaria	47	441	Tšiili	47	445	Serbia
48	434	Araabia ÜE	48	441	Tai	48	444	Tai
49	432	Kasahstan	49	441	Costa Rica	49	439	Rumeenia
50	427	Tai	50	438	Rumeenia	50	438	Küpros
51	423	Tšiili	51	436	Bulgaaria	51	429	Costa Rica
52	421	Malaisia	52	424	Mehhiko	52	425	Kasahstan
53	413	Mehhiko	53	422	Montenegro	53	420	Malaisia
54	410	Montenegro	54	411	Uruguay	54	416	Uruguay
55	409	Uruguai	55	410	Brasiilia	55	415	Mehhiko
56	407	Costa Rica	56	404	Tuneesia	56	410	Montenegro
57	394	Albaania	57	403	Colombia	57	409	Jordaania
58	391	Brasiilia	58	399	Jordaania	58	406	Argentiina
59	388	Argentiina	59	398	Malaisia	59	405	Brasiilia

60	388	Tuneesia		60	396	Indoneesia		60	399	Colombia
61	386	Jordaania		61	396	Argentina		61	398	Tuneesia
62	376	Kolumbia		62	394	Albaania		62	397	Albaania
63	376	Katar		63	393	Kasahstan		63	384	Katar
64	375	Indoneesia		64	388	Katar		64	382	Indoneesia
65	368	Peruu		65	384	Peruu		65	373	Peruu

Mean performance of European countries in all three domains

- Countries marked in green have statistically similar performance as Estonia

Maths				Reading				Science		
Jrk nr	Tulemus	Riik		Jrk nr	Tulemus	Riik		Jrk nr	Tulemus	Riik
1	535	Liechtenstein		1	524	Soome		1	545	Soome
2	531	Šveits		2	523	Iirimaa		2	**541**	**Estonia**
3	523	Holland		3	518	Poola		3	526	Poola
4	**521**	**Estonia**		4	**516**	**Estonia**		4	525	Liechtenstein
5	519	Soome		5	516	Liechtenstein		5	524	Saksamaa
6	518	Poola		6	511	Holland		**6**	522	Holland
7	515	Belgia		7	509	Belgia		7	522	Iirimaa
8	514	Saksamaa		8	509	Šveits		8	515	Šveits
9	506	Austria		9	508	Saksamaa		9	514	Sloveenia
10	501	Island		10	505	Prantsusmaa		10	514	Suurbritannia
11	501	Sloveenia		**11**	504	Norra		11	508	Tšehhi
12	500	Taani		12	499	Suurbritannia		12	506	Austria
13	499	Tšehhi		13	496	Taani		13	505	Belgia
14	495	Prantsusmaa		14	493	Tšehhi		14	502	Läti
15	494	Suurbritannia		15	490	Itaalia		15	499	Prantsusmaa
16	493	Iirimaa		16	490	Austria		16	498	Taani
17	491	Läti		17	489	Läti		17	496	Hispaania
18	490	Luxembourg		18	488	Ungari		18	496	Leedu
19	489	Norra		19	488	Hispaania		19	495	Norra
20	487	Portugal		20	488	Luksemburg		20	494	Ungari
21	485	Itaalia		21	488	Portugal		21	494	Itaalia
22	484	Hispaania		22	485	Horvaatia		22	491	Horvaatia
23	482	Venemaa		23	483	Rootsi		23	491	Luksemburg
24	482	Slovakkia		24	483	Island		24	489	Portugal
25	479	Leedu		25	481	Sloveenia		25	486	Venemaa
26	478	Rootsi		26	477	Leedu		26	485	Rootsi
27	477	Ungari		27	477	Kreeka		27	478	Island
28	471	Horvaatia		28	475	Venemaa		28	471	Slovakkia
29	453	Kreeka		29	463	Slovakkia		29	467	Kreeka
30	449	Serbia		30	449	Küpros		30	446	Bulgaaria
31	445	Rumeenia		31	446	Serbia		31	445	Serbia
32	440	Küpros		32	438	Rumeenia		32	439	Rumeenia
33	439	Bulgaaria		33	436	Bulgaaria		33	438	Küpros
34	394	Albaania		34	394	Albaania		34	397	Albaania

How to interpret the results

PISA results are reported in two ways according to the **proficiency levels and mean scores**. When interpreting the mean scores it should be noted that 1 school year is 39 points.

Task difficulty and student proficiency

Difficult items	**6. level** **5. level**	**:D** Student A, at a relatively high proficiency level
Moderate items	**4. level** **3. level**	**:)** Student B, at a moderate proficiency level
Easy items	**2. level** **1. level**	**:|** Student C, at a relatively low proficiency level

PISA uses proficiency levels to describe the types of skills that students at each particular level are likely to complete. Test questions that focus on simple tasks are categorized at lower levels whereas those that are more demanding are categorized at higher levels.

A single continuous scale shows the proficiency of students and difficulty of tasks. The higher the item on the scale the more difficult it is.

By showing the proficiency of each student on the same scale, it is possible to describe the level of mathematical literacy that the student possesses.

The table below shows the score points for each level in each subject:

	Below 1	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Maths	Below 358	358-420	420-482	482-545	545-607	607-669	669 +
Science	Below 335	335-410	410-484	484-559	559-633	633-708	708+
Reading	**Below 1b**	**Level 1b**	**Level 1a**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
	Below 262	262-335	335-407	407-480	480-553	553-626	626-698	698+