

Learning Achievement in CEE/CIS Region: An Analysis of 2006 PISA Results

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Plan

- Standardized international testing: PISA, TIMSS and PIRLS: similarities and differences
- PISA specifics and brief history
- Findings
- Recommendations



What International Tests Measure



- Progress in International Reading Literacy Study (PIRLS)
- The Program for International Student Assessment (PISA), and
- The Trends in International Mathematics and Science Study (TIMSS)



What is PISA? Why PISA?

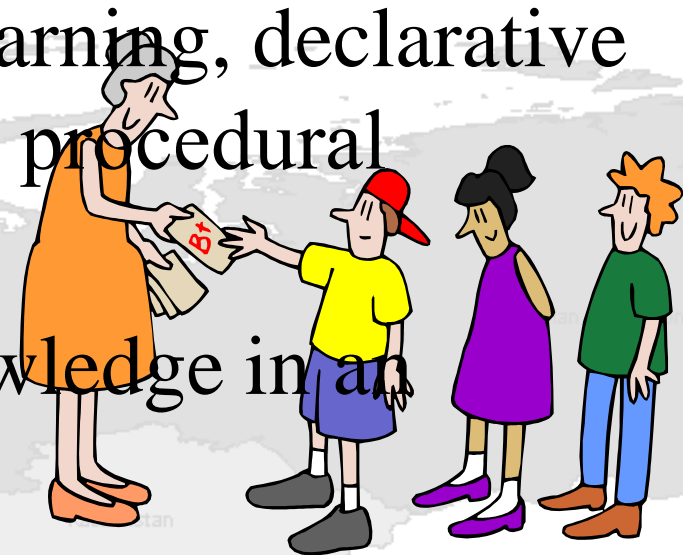
- Millennium Development Goals (MDG) and Education for All (EFA) - focus on educational quality.
- Analysis of the quality and relevance of basic education.
- Student learning outcomes (mean scores) in reading, science and mathematics.



What PISA Measures

Ability to:

- Integrate formal and informal learning, declarative knowledge ('knowing that') and procedural knowledge ('knowing how');
- Access, select and evaluate knowledge in an information-rich world;
- Develop and apply diverse forms of intelligence;
- Learn and work effectively in teams;



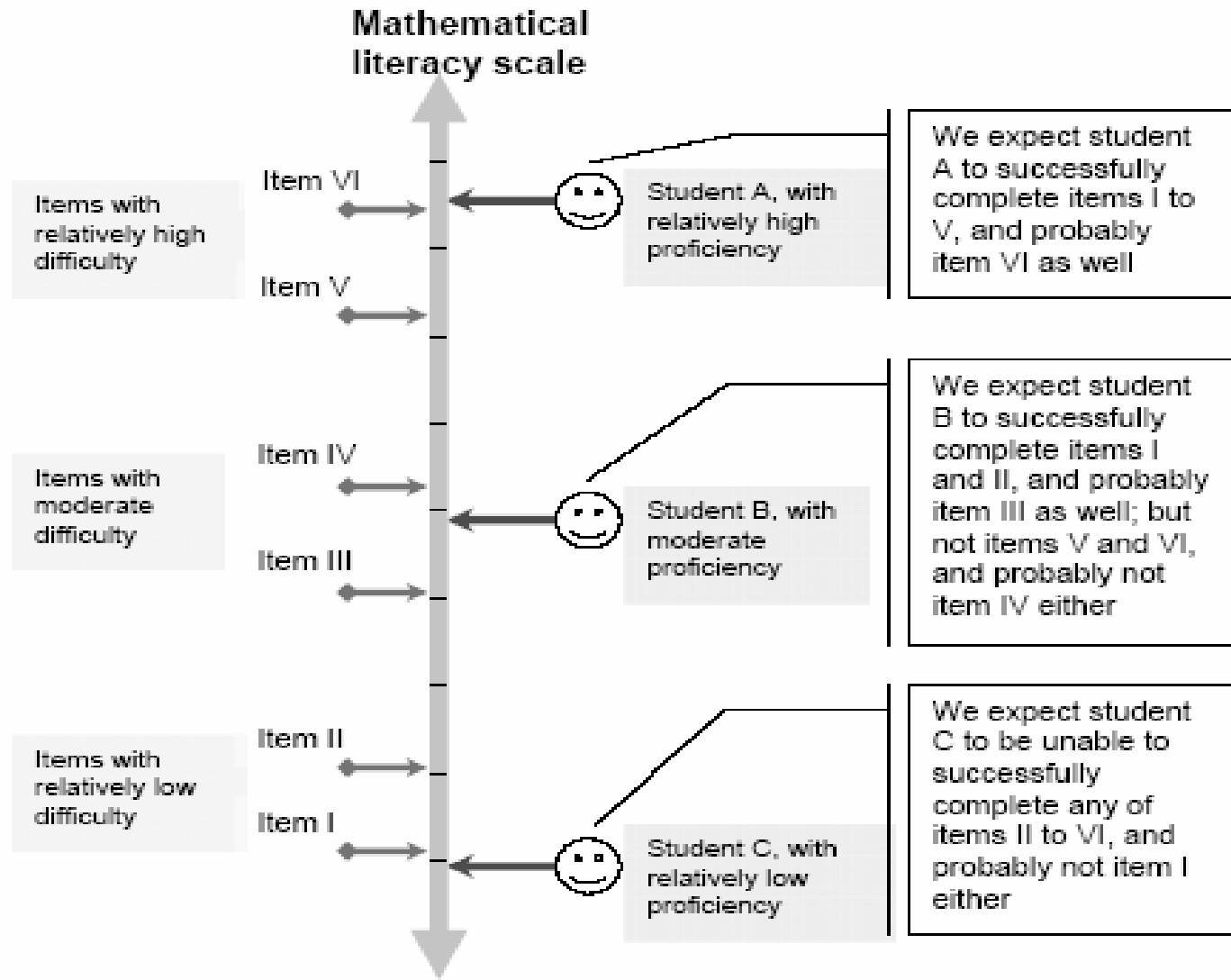
What PISA Measures

- Create and transpose knowledge;
- Cope with ambiguous situations, unpredictable problems and unforeseen circumstances;
- Deal with multiple careers – i.e., learning how to ‘reinvent’ oneself, locate oneself in a job market, and choose the relevant education and training.

To sum it up, **PISA measures skills that determine one’s competitiveness in the new global economy.**



Test Construction: Rasch Model



Proficiency Levels

- Six proficiency levels in math and science
- Five proficiency levels in reading
- 1.3% OECD students reached Level 6 of the PISA 2006;
- 5.2% OECD students scored below Level 1.



Country Grouping

- ***OECD countries:*** Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, New Zealand, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
- ***EU8 countries:*** Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia.
- ***Other countries:*** Argentina, Brazil, Chile, Colombia, Hong Kong-China, Indonesia, Israel, Jordan, Liechtenstein, Macao-China, Qatar, Chinese Taipei, Thailand, Tunisia and Uruguay.



Country Grouping

- ***UNICEF programme countries:*** Azerbaijan, Bulgaria, Croatia, **Kyrgyzstan**, Montenegro, Romania, Russian Federation, Serbia, **Turkey**.
- ***CEE/CIS countries:*** Azerbaijan, Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Kyrgyzstan, Latvia, Lithuania, Montenegro, Romania, Russian Federation, Serbia, Poland, Slovakia, Slovenia.



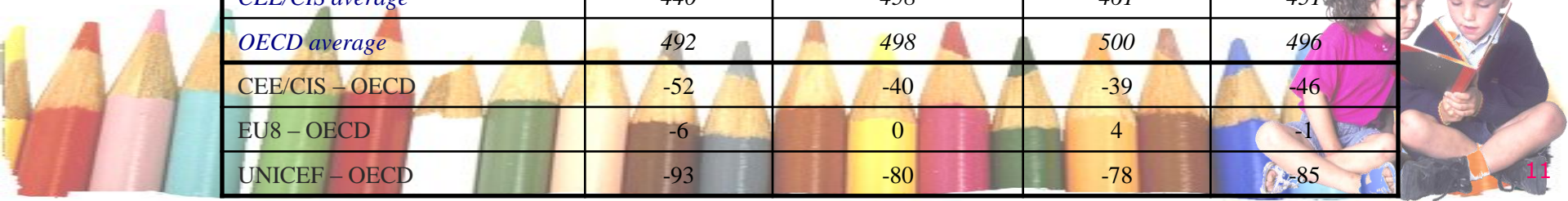
Overall Performance

Country	Reading	Mathematics	Science	Average
<i>Estonia</i>	501	515	531	516
<i>Slovenia</i>	494	504	519	506
<i>Czech Republic</i>	483	510	513	502
<i>Poland</i>	508	495	498	500
<i>Hungary</i>	482	491	504	492
<i>Latvia</i>	479	486	490	485
<i>Slovak Republic</i>	466	492	488	482
<i>Lithuania</i>	470	486	488	481
<i>Croatia</i>	477	467	493	479
<i>Russian Federation</i>	440	476	479	465
<i>Turkey</i>	447	424	424	432
<i>Serbia</i>	401	435	436	424
<i>Bulgaria</i>	402	413	434	416
<i>Romania</i>	396	415	418	410
<i>Montenegro</i>	396	399	412	401
<i>Azerbaijan</i>	353	m	382	368
<i>Kyrgyzstan</i>	285	311	322	306
<i>CEE/CIS average</i>	440	458	461	451
<i>OECD average</i>	492	498	500	496
CEE/CIS – OECD	-52	-40	-39	-46
EU8 – OECD	-6	0	4	-1
UNICEF – OECD	-93	-80	-78	-85

OECD average

CEE/CIS average

Source:
OECD 2006,
PISA
database,
Tables 2.1c,
6.1c, 6.2c.



General Findings



- EU8 countries perform above the UNICEF program countries.
- The CEE/CIS average is lower than the OECD average.
- EU8 countries are on a level with the OECD.



General Findings

- Russia and Croatia are the two UNICEF program countries that perform above the CEE/CIS average.
- Croatia is the only UNICEF program country that is on a level with EU8 countries in reading and science.
- Estonia and Slovenia (with the Czech Republic in science and mathematics and Poland in reading) are significantly above the OECD average.



General Findings

- Thirty-one per cent fewer students reach Level 2 literacy in reading, science and math in the UNICEF program countries than in the EU8 countries.
- Students in CEE/CIS countries are better at explaining phenomena scientifically than they are at identifying scientific issues or using scientific evidence. Why? - Teaching is still focused on delivery, accumulation and reproduction of facts.



Change in Educational Outcomes Over Time

- Reading: SS* improvement between PISA 2000 and 2006 in Poland and Latvia, and a decline in the Russian Federation, Bulgaria and Romania.
- Mathematics: no change in average performance in the eight CEE/CIS countries from 2003.
- Science: SS progress between 2000 and 2003 in Poland, Czech Republic, Latvia and Russian Federation.
- Poland made the most progress since 2000. This is attributed to a 1999 reform **which required student tracking only after the age of 15.**

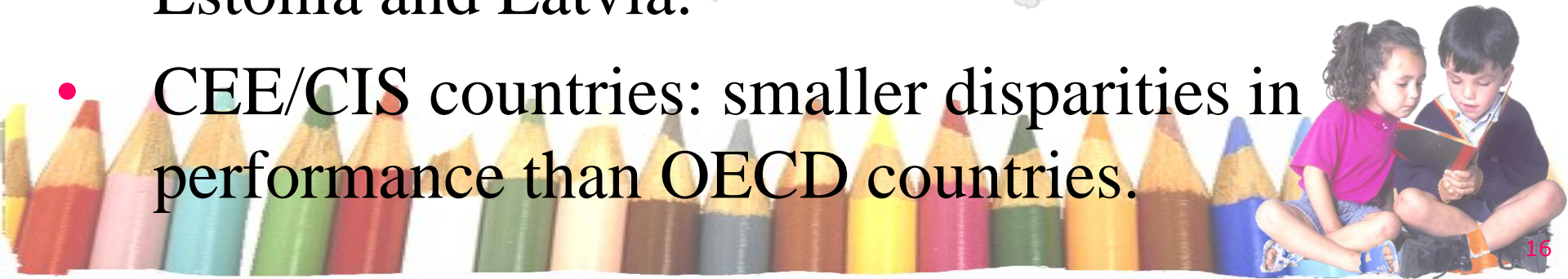
*SS – statistically significant



Equity

Size of the gap between the top-achievers and lowest-achievers in a country, as measured by the difference between the 95th and 5th percentiles:

- UNICEF program countries: lower within-country disparities, except for Kyrgyzstan and Bulgaria.
- The EU8 countries: larger disparities, except for Estonia and Latvia.
- CEE/CIS countries: smaller disparities in performance than OECD countries.



Equity

- Bulgaria – the only CEE/CIS country with disparities larger than the OECD average in all three literacy domains.
- Disparities are relatively large in all countries.
- No trade-off between high achievement and low disparities: the two can go together.



Equity

- Estonia, Latvia and Poland have the lowest between-school variance, **AND** high levels of performance. It means that **providing similar learning opportunities across schools is compatible with high overall achievement.**
- Hungary, Czech Republic, Slovakia, Turkey and Bulgaria, where students are separated into different school types at the age of 11, have a relatively high proportion of between-school variance.



Equity

- Reading: girls do significantly better than boys in all countries, but the average gap in favour of girls is larger in the CEE/CIS than it is in the OECD.
- Mathematics: girls perform better in 11 out of 17 CEE/CIS countries but differences are generally small.
- Science: boys perform better in 10 out of 17 CEE/CIS countries but differences are small.
- On *average*, girls in CEE/CIS countries tend to do better than boys relative to OECD countries in all three literacy domains.



Equity

- **Socio-economic status and family background** - most important factors influencing performance in all countries.
- In Bulgaria and Czech Republic students of different socio-economic background have the largest overall difference in expected science scores; Azerbaijan has the least.



Equity

- In all countries **except Poland**, the association of the school's socio-economic intake with performance is much larger than that of an individual's own background, and is particularly large in **Slovenia** and the **Czech Republic**.
- **Estonia** is achieving both high levels of quality and equity in learning outcomes.

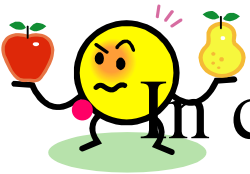


School and System Factors

- Strong relationship between country wealth and educational expenditure and educational performance among the CEE/CIS countries, but not true for the richer OECD countries. Some CEE/CIS countries are too poor to provide sufficient educational opportunities.
- Location: students in smaller communities have lower mean performance than those in larger communities. But if socio-economic intake is controlled, the disadvantage of schools in smaller communities often disappears.



School Selection, Choice and Transparency



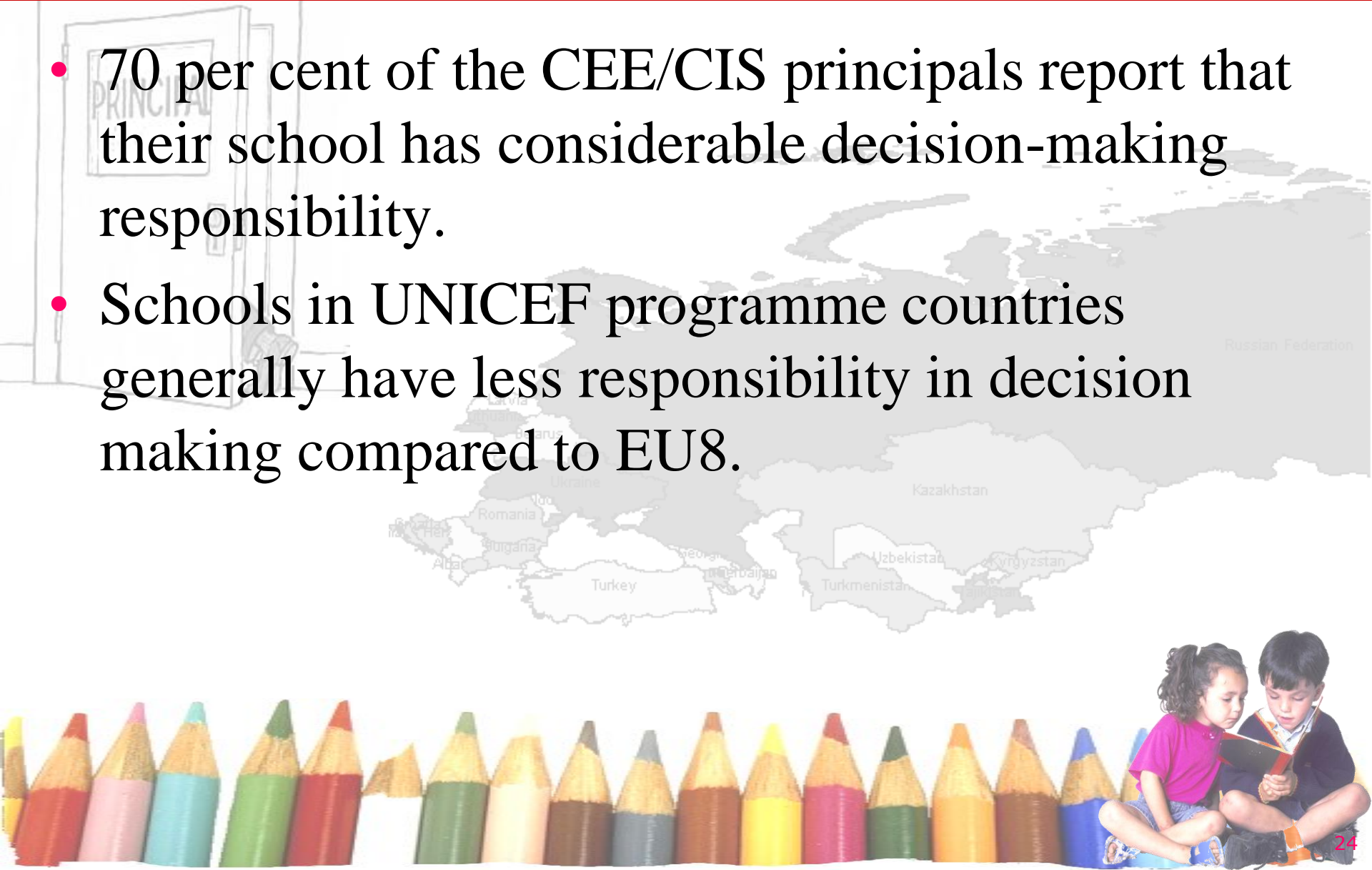
In countries where students are placed into different types of schools or programs at an early age, socio-economic background tends to have a significantly larger impact on student performance.

- Having ability grouping for all subjects within school is negatively associated with performance.
- Schools posting achievement data publicly seem to do better overall in PISA.



School Autonomy

- 70 per cent of the CEE/CIS principals report that their school has considerable decision-making responsibility.
- Schools in UNICEF programme countries generally have less responsibility in decision making compared to EU8.



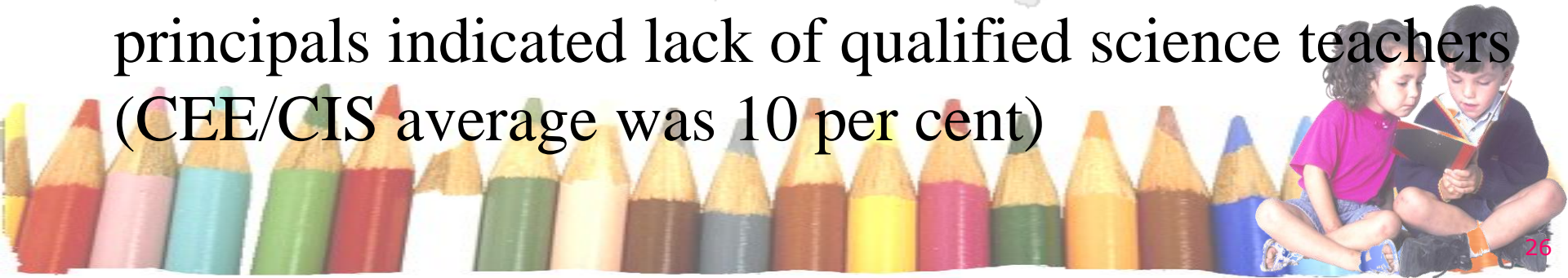
School Autonomy

- The higher the principals' degrees of autonomy in decision-making the better is average PISA performance.
- Students in educational systems that give more autonomy to schools to formulate the school budget tend to perform better, even controlling for other variables.



School Resources

- A lack of qualified teachers and a perceived inadequacy of a school's educational resources are negatively related to science performance.
- Pupil/teacher ratios and the number of computers per student are **NOT** related to performance.
- More than 75 percent of school principals in Russian Federation, Montenegro, Azerbaijan, and Kyrgyzstan mentioned inadequacy of educational resources.
- 60 per cent of Azerbaijan, Kyrgyzstan and Turkey principals indicated lack of qualified science teachers (CEE/CIS average was 10 per cent)

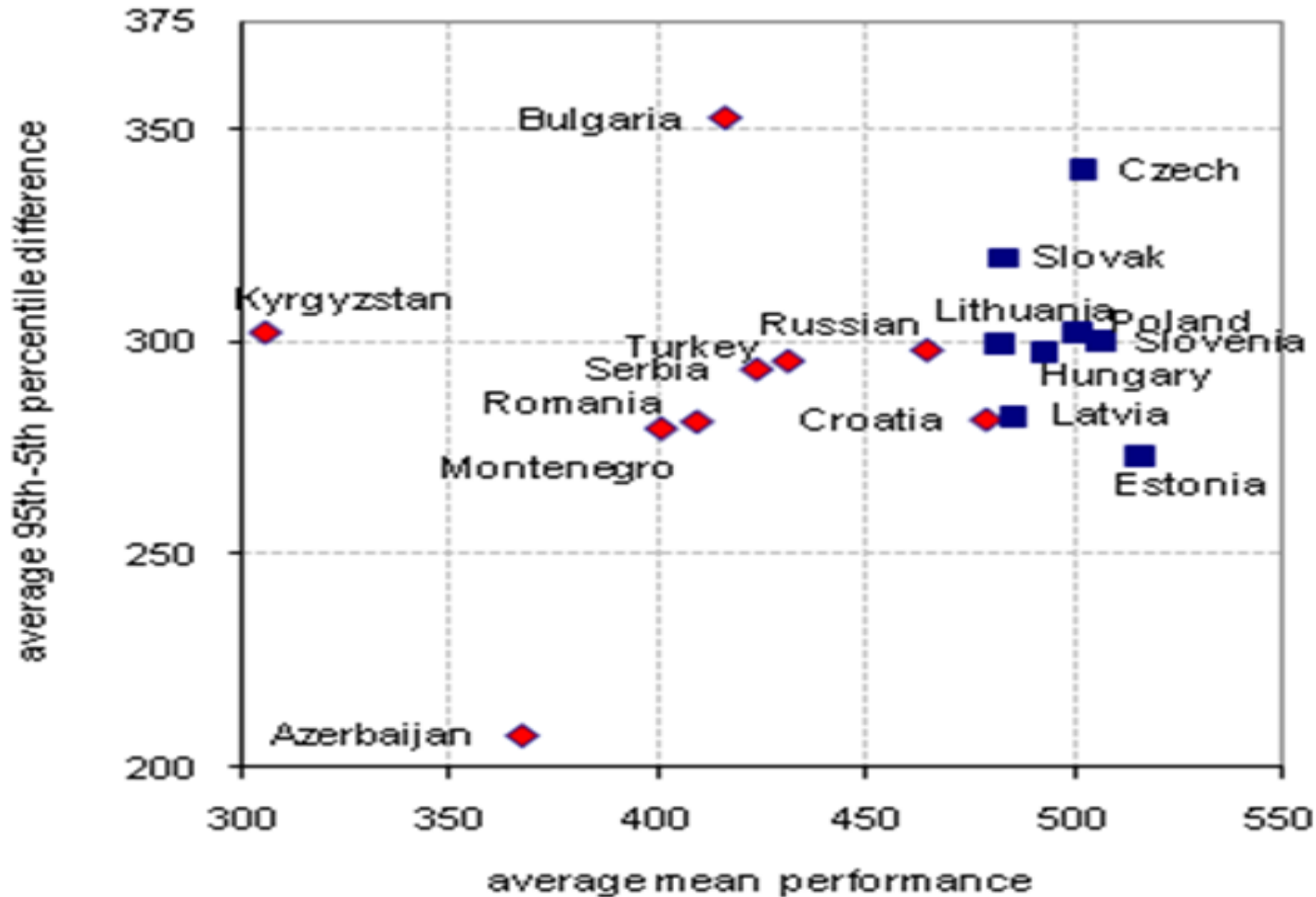


Learning Time

- The average students' learning time is positively associated with performance.
- Participating in school activities (science clubs, fairs, competitions and excursions) is also positively related to performance.
- **NOTE:** Finland, the top-performer in all three domains, devotes less time to regular lessons in school than the OECD average.



Mean Performance vs. 95th to 5th Percentile Difference: Science, Reading and Mathematics



Source:
OECD
2006,
Tables 2.1c,
6.1c, 6.2c.



Reading

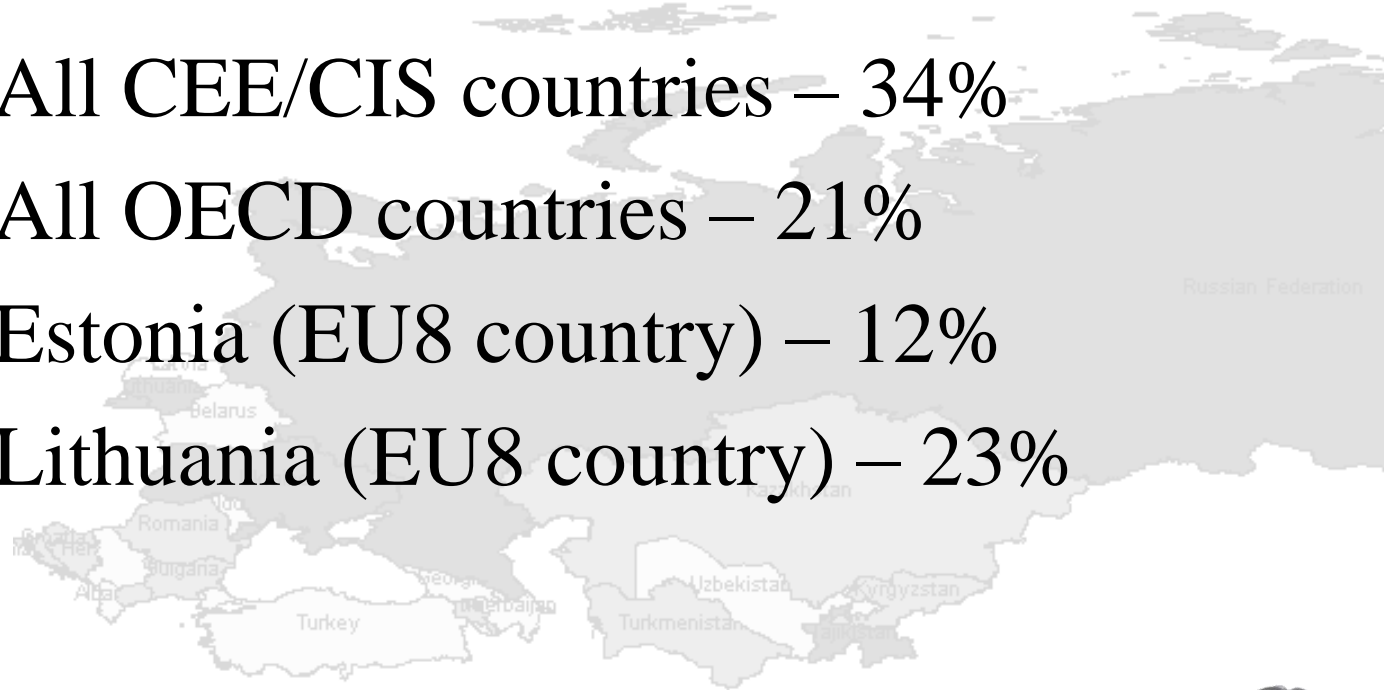
- 37% students in CEE/CIS countries vs. 31% in OECD countries failed to reach Level 2;
- In UNICEF programme countries, except for Turkey and Russian Federation, more than half of students were not able to achieve the baseline level of achievement.



Mathematics

FAILED TO ACHIEVE LEVEL 2

- All CEE/CIS countries – 34%
- All OECD countries – 21%
- Estonia (EU8 country) – 12%
- Lithuania (EU8 country) – 23%



Science

- 32% students in CEE/CIS countries vs. 19% in OECD countries failed to reach Level 2;
- Russia and Croatia matched OECD averages.



Attention

The numbers for all three levels of literacy might be skewed for the countries with low enrollments for 15-year olds – the weakest are least likely to enroll thus driving the achievement for their country up!



Public-Private

- 98 per cent of all 15-year-olds are enrolled in government or public schools in all countries in the region except in the Czech Republic, Slovakia and Hungary.
- Better results of private schools are explained by their more advantageous socio-economic intake.
- Public schools tend to do better if we keep socio-economic background constant.



Claims of the CEE/CIS Countries Which Performed Poorly

- The testing system is inadequate for assessing the quality of their educational programs;
- The incompatibility of their curriculum and what is being tested by PISA;
- The incompatibility of teaching methods used in their schools and competencies developed by their teachers and what is being measured by PISA; and,
- Other tests (PIRLS) or Olympiads show different results.



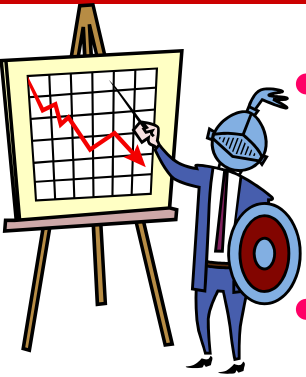
Reasons for Poor Performance (Political)



- Lack of or underdeveloped democratic relations and procedures in schools;
- Inconsistent rules for placing and promoting students;
 - Denying opportunities to pursue higher education to most of the high school graduates;
 - Inconsistent and rigid grading system;



Reasons for Poor Performance (Political)



- Over-centralization of educational administration;
- Lack of recognition of the rights of children and parents;
- Outdated and inadequate physical facilities and equipment;
- Lack of or very few private schooling alternatives;



Reasons for Poor Performance (Political)

- Little entrepreneurial activity supporting education;
- Lack of continuity in education system;
- Lack of consistent and motivational teacher evaluation system
- Lack of professional teaching publications and pedagogical literature useful to most teachers; and
- Poor management of the education system.



Reasons for Poor Performance (Economic)

- Inadequate school resources and per student spending in Kyrgyzstan, Azerbaijan and Montenegro;
- Poor preschool coverage;
- Poor system of teacher pre-service and in-service training;
- Low incentives for the best individuals to come into the teaching profession.



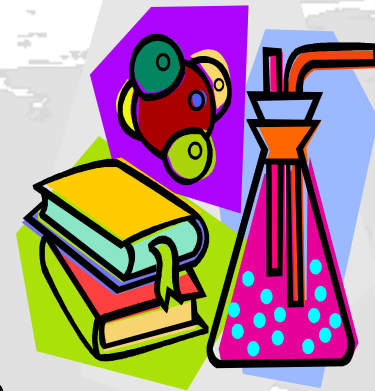
Reasons for Poor Performance (Economic)

- Inadequate school buildings and furniture; poor heating/cooling systems;
- Malnutrition, health problems;
- Low school teacher and administrator salaries.

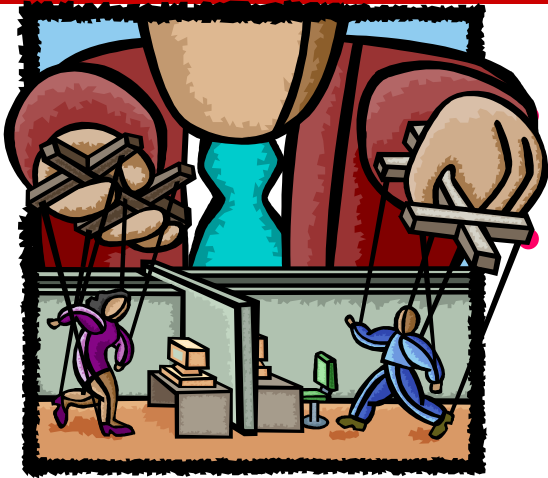


Reasons for Poor Performance (Curricular)

- Concentration on knowledge acquisition in math and science and simple descriptions in reading.
- Insufficient quantities of textbooks and teaching materials, especially in native languages in some countries (Kyrgyzstan, Azerbaijan).
- Inadequate existing textbooks and teaching materials.



Reasons for Poor Performance (Other)



Poor school management system;
Inadequate assessment practices
and lack of attention to student
learning outcomes;

- High levels of migration and refugees in Azerbaijan, Kyrgyzstan and some parts of Russia.



Policy Recommendations

Curriculum:

- Align the curriculum with modern skill needs in the areas of reading, mathematics, science and information literacy (incorporate PISA requirements for Levels 4-5 Reading and 5-6 Science & Math).
- Develop high quality materials and textbooks.
- Make sure that humanities and arts are balanced with math and science.



Policy Recommendations

Curriculum

- Review current standards and align them with modern requirements.
- Develop assessment capacity at each level, beginning with the classroom teacher up to education minister.
- Effectively incorporate technology into school curriculum.
- Address the issue of low reading achievement in reading among boys.



Policy Recommendations

Teacher preparation and professional development

- Make immediate effort to deal with teacher shortage in Bulgaria, Kyrgyzstan, Croatia Azerbaijan, Montenegro, Romania and Serbia
- Revise the teacher training curriculum and improve teacher training
- Establish high quality competitive in-service professional development system.
- Develop high quality teaching materials.



Policy Recommendations

Finance

- Establish per student school financing system.
- Provide tax benefits for private not for profit schools.
- Establish merit pay for the teachers and administrators based on standards and value-added approach.



Policy Recommendations

Administration



- Improve preschool coverage and preschool education.
- Improve high school student attendance, especially in low-performing PISA countries.
- Organize pre-service training of educational administrators
- Improve leadership quality at each level.
- Improve educational funding management.



Questions

THANK YOU!

