Chapter 6

Assessment and examinations

This chapter outlines the current assessment instruments applied in the Kyrgyz Republic and the roles of the Kyrgyz Academy of Education and National Testing Centre. It offers recommendations on how to better align the assessment process to include formative assessment and university entrance exams. It also looks at Kyrgyzstan's participation in international, comparative sample based surveys such as PISA, PIRLS and TIMSS.

Current status

Article 5 of the Education Law of 2003 requires the Ministry of Education and Science (MOES) to set State Educational Standards (SES) for basic education, and to evaluate the system. The MOES Department for Regulations and Standards, together with the Kyrgyz Academy of Education (KAE), develops curricula and examinations based on SES.

Continuous assessment

There is no formal mechanism to track an individual student's progress from grade 1 through to school leaving. Informal continuous assessment is done by teachers; it is not explicitly linked to SES, but focused on textbook content. Teachers generally "check" the knowledge that students have acquired during a lesson or a group of lessons by assessing the students orally or by asking them to make blackboard presentations. Teachers give immediate feedback to their students, and this can achieve significant learning gains although slower learners may find it difficult to "perform" in front of their peers.

The main aim of classroom assessment in Kyrgyzstan is the giving of grades (marks), usually according to the number of errors the students make; it often happens that teachers anticipate how a student will perform, so that some students continually get low grades without much encouragement or advice on how to improve. Moreover, the grade band (5 to 1; 5 = highest and 2 = fail) is extremely narrow. The lowest mark ("1") is never given, and a "2" only rarely, so that essentially there are only three grades: 3, 4 and 5. Such a narrow scale provides very little specific information about actual achievement, and very little room for showing progress. For example, if a student performs poorly but the teacher is reluctant to give a "2" (fail), a "3" might be given, while a student performing very well but not quite well enough to receive a "4", might also receive a "3". Clearly these two marks reflect entirely different levels of achievement, yet they appear identical on paper.

Teachers keep a daily record of marks given in class as well as marks on weekly tests and other assessments; all these marks are aggregated (by subject) for each quarter and reported to the school director and to the parents. However, for reasons noted earlier, these aggregated marks reflect very little specific information about a student's progress.

Intensive training of teachers in formative assessment in two pilot *oblasts* (Issyk-Kul and Talas) has yielded good results.[1] More details on teachers and the teaching career are provided in Chapter 9. It is hoped that this initiative can be extended across the country, especially since the model also uses badly needed incentives for teachers, so that both students and teachers benefit.

National end-of-cycle examinations

There is no formal examination at the end of primary school (grade 4). Grade 9 and 11 summative (exit) exams are set by MOES in collaboration with the KAE, but administered in schools and scored by teachers. There is an Assessment Unit which was previously housed in the MOES and at the time or review team visits was integrated in the KAE. The Unit sets and runs the promotion exams at the end of grades 5, 6, 7, 8, and 10 and the school leaving (certification) exams at the end of grades 9 and 11 described below.

Promotion exams

There are no promotion exams in primary school grades 1-4. Repetition rates in grades 1 and 2 of primary school are low overall (only 94 children in grade 1 in 2006/7 for the Kyrgyz Republic), but 80 of these were in Chui *Oblast*. At grade 2, 116 children in Kyrgyzstan had to repeat the grade, with again a high proportion (51) in Chui and in Osh *Oblast* (38). Other *oblasts* had no or only a few repeaters. No information was made available to the review team to explain these differences. It may be that teachers in Chui and Osh *Oblasts* are given different guidelines by their *rayon* departments; for example, it seems unlikely that grade 1 children in Chui are performing significantly worse than their peers elsewhere.

Far more boys than girls – and more rural than urban students – have to repeat an early primary grade. Nevertheless, the very low numbers of repeaters indicates that nearly all children progress to the next grade with their age group. (NSC, 2007, Tables 2.33 et seq.)

From grade 5 onwards there are end-of-year exams that are used for promotion of students to the next grade. These examinations and their requirements are set by the Ministry but administered and marked (scored) by schools according to guidelines set by the Ministry. The same range of marks (1-5) is used as for continuous assessment, although again there is no consistent "marking scheme" to guide teachers in assigning marks to students' work. Exam sessions are held twice each year – one main examination in June plus one re-take session in August for students with unsatisfactory marks. Students with an unsatisfactory mark (less than 3) in one subject are allowed to re-take the exam in that subject. Students with more than one unsatisfactory mark must repeat the year.

Each year, four subjects for promotion exams are determined by the MOES; two of the subjects are mandatory for all students. The subjects change each year, apparently to ensure curriculum coverage. The actual assessment tasks are developed by the subject teacher and approved by the methodological council of the school. The exams are marked by the school. There is

no mechanism to ensure that standards are the same in all schools. There are no standard assignments or any standardised marking criteria. The mandatory subjects are examined by written tests; for non-Russian speakers there is also an oral examination in Russian. Additional subjects can be included, depending on the year; for example, in grades 6 and 7 foreign languages are added, but where there are no teachers a school can choose another subject. At grade 8, there is an oral exam in Russian or a written exam in Kyrgyz language.

It should be noted that not all students take promotion exams; those with an average year mark of 4 or 5 are exempt, so that only students with an average mark of 3 need to take them. (Students with an average mark of 2 must repeat the year.) Because not all students take these exams, and because they are not comparable across classes, schools or *rayons*, it is not clear to the review team what purpose they serve. The examined content is the same as the content covered during the year; since it cannot be assumed that much additional learning has taken place between the end of a school year and the date of the exam, the results cannot be significantly different from those already available from continuous assessments. The burden on students, teachers and schools of these promotion exams is disproportionate to any benefits they may yield.

Assessment for school leaving certificates ("Attestation") at end of grades 9 and 11

The purpose of these final exams is to determine whether the required level of achievement has been reached, so that successful students can be awarded a school-leaving certificate. In theory, these exit exams should be based upon the relevant State Education Standards for each subject, although in practice there is often no clear link to the SES requirements.

Grade 9: four mandatory subjects:

1. Mathematics (written tasks);
2. Mother tongue (essay);
3. History (oral);
4. Russian language for Kyrgyz-language schools, Kyrgyz language for Russian/Uzbek/Tajik-language schools (oral).

New-type "profiled" schools (*e.g. gymnasia* and *lycées*) may have an additional exam related to their profile; for example, foreign-language profile students may have an exam in English or German while a science-profile student may have a physics exam.

Grade 11: five subjects, of which four are mandatory:

1. Algebra and elements of analysis (written);
2. Mother tongue (essay);
3. History (oral);
4. Russian language for Kyrgyz-language schools, Kyrgyz language for Russian/Uzbek/Tajik-language schools (written, dictation);
5. Chosen subject (usually chosen by the school, for all grade 11 students).

Guidelines for the final attestation exams in mandatory subjects are developed by KAE in accordance with the SES. The actual tasks (questions) are developed by the subject teacher, and approved by the methodological council of the school. In each school, a special "Attestation Committee" is set up, consisting of subject teachers; the school director/deputy director chairs the Committee. Exams are marked by the school. There is no mechanism to ensure that standards in marking students' responses are the same in all schools. Because these exams are very low-stakes, and because in most cases each student has drawn a different set of (previously known!) questions to answer (see Box 6.3), there are few incentives or opportunities to "cheat".

Alternative National Testing Centre tests

In parallel to these national grade 9 and grade 11 examinations, there is a self-financing National Testing Centre (NTC) housed within the building of the MOES (and to some extent under the MOES's policy direction) but otherwise independent of the Ministry structure. This NTC was set up in 1995, with the help of United Nations Development Programme (UNDP) funding for equipment and a minimal amount of staff training. In 1999, the NTC became self-financing, employing its own staff (eight professional staff and a number of technical support staff) and generating its own finances by offering fee-paid[2] objective tests in 14 subjects (both in Russian and in Kyrgyz) to students at the end of grades 9 and 11.

These voluntary NTC tests are said to be "objective", in that the items (questions) are drawn from a large item bank containing nearly 30 000 items in 20 subjects for the 9/11 attestation exams and 1 800 for higher education.[3]

These items have undergone classical item analysis and there are item characteristics data (*e.g.* percentage of correct answers) available for each item, so that results can be analysed electronically, giving a more objective picture of student performance. There is a 100-point scale, and there are set grade boundaries; for example, a student scoring between 60 and 71 points receives a "3", between 72 and 89 a "4", and between 90 and 100 a "5". However, these cut-off points are fixed over the years even though the set of items included in

the tests changes every year. Without an appropriate item analysis using item response theory to compute item difficulty level and calibrate tests across the years based on the common items, there is no comparability and no consistency across the years in terms of what students at each grade can do.

In 2008, about 23 000 students opted to take part in NTC tests, a rise from about 9 000 in 2002, so that, in effect, more students take the tests but a higher percentage of them fail.

It was therefore not clear to the review team why students would voluntarily pay for these tests or what benefit they derive from them, especially since, according to the NTC's own data, more than 80% of candidates at grades 9 and 11 fail (*i.e.* have scores below 60). The NTC's data for the years 2000-08 show some decline in performance in most subjects tested. Indeed, it appears that the trend is downward: in grade 11 history, for example, 44.6% failed in 2000 and 67.5% failed in 2008, while the percentage receiving the highest marks declined from nearly 30% in 2000 to less than 16% in 2008. A similar decline is evident in grade 11 geometry where in 2008 66% of candidates failed (compared with 47% in 2000) and only 15% received the highest mark (36% in 2000). Since these tests are designed to be more "objective" than the national examinations, such poor and deteriorating results raise serious concerns about the quality of learning in secondary education in Kyrgyzstan.

National sample-based assessments

A similar decline is shown by national sample-based surveys, which have been done since 2000, first under the Monitoring of Learning Achievement (MLA) initiative of UNICEF/UNESCO. Two studies – one for primary 1-4, and one for grade 8 in secondary – were conducted in 2000 and 2002 respectively (see references, and discussion below). In 2005, a further MLA for Kyrgyzstan was carried out (grade 4 students). This survey showed that, far from improving, school performance among children in Kyrgyzstan had actually deteriorated since 2001: only 58.8% of grade 4 students passed a standard mathematics test, down from 81.4% in 2001; and just 44.2% passed a literacy test, down from 59.1% in 2001. This decline may to some extent be attributable to a change in the *types* of questions on the 2005 tests, or to their level of difficulty *vis-à-vis* the previous ones; but it is also a reflection of the worsening conditions in classrooms and the pressures faced by teachers and families.

Using a mixture of tests and questionnaires, the 2005 MLA study once again reveals a decline in the quality of primary education in Kyrgyzstan: "In general, the literacy levels in primary schools in 2005 showed sharp falls in all aspects, pupils of primary schools lacked the basic verbal, grammar, spelling, and punctuation skills to successfully continue the next phase of their education" (MLA, 2005, p. 25).

This downward trend is shown even more strongly by a subsequent National Sample-Based Assessment (NSBA) carried out in 2007, as part of the Government of Kyrgyzstan/World Bank Rural Education Project (REP). The 2007 NSBAs at grades 4 and 8 were based on Kyrgyzstan's own 2005 State standards as well as the curricula at that level. The review team was told that the NSBAs are not directly comparable to the MLA tests because they look for different competences and skills – for example the application of concepts in different contexts, or logical reasoning. The NSBAs are also influenced by the types of items on PISA 2006.

The 2007 NSBA results were shocking. No fewer than 64.4% of grade 4 students scored "below basic level" in reading comprehension, and 62.0% scored "below basic level" in mathematics. According to the definition given by the Centre for Education Assessment and Teaching Methods (CEATM), "below basic" means that *"students do not demonstrate sufficient knowledge and skills for successful further learning"*. At grade 8 the results in 2007 were even worse: fully 84.3% scored "below basic" in mathematics, and 73.5% scored "below basic" in reading comprehension. The review team was told that the disastrous results at grade 8 were, to some extent, due to the fact that "no remedial action had been taken" after the earlier MLAs, and that no additional effort had been made to raise the levels of student learning in basic skills such as numeracy and reading with understanding.

As discussed below and in Chapter 7 of this report, the NSBA 2007 as well as the PISA 2006 results show consistently that students in schools with Russian as the main language of instruction perform better than those in schools where students are taught mainly in Kyrgyz, Uzbek or other languages. Where parents have a choice, they therefore prefer to send their children to Russian-language schools; indeed more than 60% of students in these schools come from Kyrgyz-speaking families. Clearly it is the quality of education in Russian-language schools that make a difference, rather than the ethnicity or mother-tongue language of the students. This reflects a serious imbalance in the quality of educational provision in Kyrgyz Republic, and ought to be the subject of serious debate.

University entrance

Starting from 2002, a National [Scholarship] Test (*Obsherespublikanskoe Testirovanie* or "Republic wide testing", abbreviated to ORT – a SAT-type multiple choice test) has been conducted annually by the Centre for Education Assessment and Teaching Methods (CEATM), a non-governmental professional assessment and testing organisation, originally established by the American Councils for International Education (ACCELS)[4] with support from United States Agency for International Development (USAID). Students who do not qualify for scholarships but are admitted to university faculties (through

a combination of their grade 11 graduation exam and faculty-set entrance examinations) are so-called "contract" students who pay fees. In-depth discussion is found in Chapter 10 on Higher Education.

The ORT is being extended to all candidates for university entrance, in order to reduce current levels of corruption and bribery related to the allocation of university places. In this sense, the Russian term (ORT) is more appropriate than the "Scholarship" test, because it no longer pertains only to candidates wishing to qualify for scholarships.

Olympiads

These are strong and highly regarded. The review team was told, however, that the MOES had abolished the previous right of Olympiad and Gold Medal winners to enter (some) faculties without entrance examinations, so that now all candidates aspiring to university entrance in one of the "budget" places must participate in the ORT mentioned above, although their school records are also taken into account so that high achievers will still be recognised for their school performance.

International comparative sample-based surveys

Kyrgyzstan took part in OECD-PISA 2006 as one of 57 countries around the world. The results were extremely disappointing, in that Kyrgyzstan's 15-year-olds were ranked last (57th place out of 57) in overall performance in reading literacy, science literacy, and mathematics literacy.

PISA reports students' performance in two different ways: performance scales and proficiency levels. Performance scales were constructed for each of the three subject domains – science, mathematics and reading – to have a mean score among OECD countries of 500 points, with about two-thirds of students across OECD countries scoring between 400 and 600 points (*e.g.* one standard deviation is 100). Proficiency levels are defined for the purpose of describing what competencies students performing at each level demonstrate. Proficiency levels were defined for each of the three subject domains. Student scores in science and mathematics were grouped into six proficiency levels, with Level 6 representing the highest scores (and hence the most difficult tasks) and Level 1 the lowest scores (and hence the easiest tasks). Table 6.1 presents the descriptions of the six proficiency levels on the science scale.

Regarding a country's mean score, students in the Kyrgyz Republic achieved a mean score of 322 points in science, 311 points in mathematics, and 285 points in reading. These are the lowest scores among the participating countries and economies. Table 6.2 presents mean scores in science, mathematics and reading for all

Table 6.1. **Summary descriptions of the six proficiency levels in science**

Level	Lower score limit	Percentage of students able to perform tasks at each level (OECD average)	What students can typically do at each level
6	707.9	1.3% of students across the OECD can perform tasks at Level 6 on the science scale	At Level 6, students can consistently identify, explain and apply scientific knowledge and knowledge about science in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they are willing to use their scientific understanding in support of solutions to unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social, or global situations.
5	633.3	7.7% of students across the OECD can perform tasks at Level 6 on the science scale	At Level 5, students can identify the scientific components of many complex life situations, apply both scientific concepts and knowledge about science to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical insights to these situations. They can construct evidence-based explanations and arguments based on their critical analysis.
4	558.7	20.3% of students across the OECD can perform tasks at Level 6 on the science scale	At Level 4, students can work effectively with situations and issues that may involve explicit phenomena requiring them to make inferences about the role of science or technology. They can select and integrate explanations from different disciplines of science or technology and link those explanations directly to aspects of life situations. Students at this level can reflect on their actions and they can communicate decisions using scientific knowledge and evidence.
3	484.1	27.4% of students across the OECD can perform tasks at Level 6 on the science scale	At Level 3, students can identify clearly described scientific issues in a range of contexts. They can select facts and knowledge to explain phenomena and apply simple models or inquiry strategies. Students at this level can interpret and use scientific concepts from different disciplines and can apply them directly. They can develop short communications using facts and make decisions based on scientific knowledge.
2	409.5	24.1% of students across the OECD can perform tasks at Level 6 on the science scale	At Level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.
1	334.9	14% of students across the OECD can perform tasks at Level 6 on the science scale	At Level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and follow concretely from given evidence.

countries and economies that participated in PISA 2006, as well as the OECD average scores. Among the participating countries and economies, Finland performed highest in science; Chinese Taipei, Finland, Hong Kong-China, and Korea performed highest in mathematics; and Korea performed highest in reading.

Establishing proficiency levels makes it possible not only to rank students' performance but also to describe what students can do. Figure 6.1 presents the proportion of students at each proficiency level. The Kyrgyz Republic has a comparatively small proportion of top performers: no Kyrgyz 15-year-olds in the sample reached Level 6 on the science scale (OECD average 1.3%). Students at Level 6 should demonstrate that they can consistently identify, explain and apply scientific knowledge, and knowledge about science, in a

Table 6.2. **Mean score and range of rank of the countries/economies in science**

			Range of rank			
			OECD countries		All countries/economies	
	Mean score	Standard Error	Upper Rank	Lower Rank	Upper Rank	Lower Rank
Finland	563	(2.0)	1	1	1	1
Hong Kong-China	542	(2.5)			2	2
Canada	534	(2.0)	2	3	3	6
Chinese Taipei	532	(3.6)			3	8
Estonia	531	(2.5)			3	8
Japan	531	(3.4)	2	5	3	9
New Zealand	530	(2.7)	2	5	3	9
Australia	527	(2.3)	4	7	5	10
Netherlands	525	(2.7)	4	7	6	11
Liechtenstein	522	(4.1)			6	14
Korea	522	(3.4)	5	9	7	13
Slovenia	519	(1.1)			10	13
Germany	516	(3.8)	7	13	10	19
United Kingdom	515	(2.3)	8	12	12	18
Czech Republic	513	(3.5)	8	14	12	20
Switzerland	512	(3.2)	8	14	13	20
Macao-China	511	(1.1)			15	20
Austria	511	(3.9)	8	15	12	21
Belgium	510	(2.5)	9	14	14	20
Ireland	508	(3.2)	10	16	15	22
Hungary	504	(2.7)	13	17	19	23
Sweden	503	(2.4)	14	17	20	23
Poland	498	(2.3)	16	19	22	26
Denmark	496	(3.1)	16	21	22	28

Table 6.2. **Mean score and range of rank of the countries/economies in science** *(cont.)*

			Range of rank			
			OECD countries		All countries/economies	
	Mean score	Standard Error	Upper Rank	Lower Rank	Upper Rank	Lower Rank
France	495	(3.4)	16	21	22	29
Croatia	493	(2.4)			23	30
Iceland	491	(1.6)	19	23	25	31
Latvia	490	(3.0)			25	34
United States	489	(4.2)	18	25	24	35
Slovak Republic	488	(2.6)	20	25	26	34
Spain	488	(2.6)	20	25	26	34
Lithuania	488	(2.8)			26	34
Norway	487	(3.1)	20	25	27	35
Luxembourg	486	(1.1)	22	25	30	34
Russian Federation	479	(3.7)			33	38
Italy	475	(2.0)	26	28	35	38
Portugal	474	(3.0)	26	28	35	38
Greece	473	(3.2)	26	28	35	38
Israel	454	(3.7)			39	39
Chile	438	(4.3)			40	42
Serbia	436	(3.0)			40	42
Bulgaria	434	(6.1)			40	44
Uruguay	428	(2.7)			42	45
Turkey	424	(3.8)	29	29	43	47
Jordan	422	(2.8)			43	47
Thailand	421	(2.1)			44	47
Romania	418	(4.2)			44	48
Montenegro	412	(1.1)			47	49
Mexico	410	(2.7)	30	30	48	49
Indonesia	393	(5.7)			50	54
Argentina	391	(6.1)			50	55
Brazil	390	(2.8)			50	54
Colombia	388	(3.4)			50	55
Tunisia	386	(3.0)			52	55
Azerbaijan	382	(2.8)			53	55
Qatar	349	(0.9)			56	56
Kyrgyzstan	322	(2.9)			57	57

■ Statistically significantly above the OECD average □ Not statistically significantly different from the OECD average
Statistically significantly below the OECD average

Source: OECD PISA database 2006.

Box 6.1. **Interpreting differences in PISA scores (1): how large a gap?**

The Programme for International Student Assessment (PISA) is a triennial survey of the knowledge and skills of 15-year-olds. It is the product of collaboration between participating countries and economies through the Organisation for Economic Co-operation and Development (OECD), and draws on leading international expertise to develop valid comparisons across countries and cultures. More than 400 000 students from 57 countries making up close to 90% of the world economy took part in PISA 2006. The focus was on science but the assessment also included reading and mathematics and collected data on student, family and institutional factors that could help to explain differences in performance.

PISA assesses the extent to which students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society, focusing on student competencies in the key subject areas of reading, mathematics and science. PISA seeks to assess not merely whether students can reproduce what they have learned, but also to examine how well they can extrapolate from what they have learned and apply their knowledge in novel settings, ones related to school and non-school contexts.

The focus of the PISA 2006 assessment was on science. The analyses of this paper mainly examine students' performance in science, but the performance scales in science, mathematics and reading are highly correlated: the correlation coefficient between the science performance scale and the mathematics performance scale is 0.72 and it is 0.69 between the science and reading performance scales in the Kyrgyz Republic.

The Kyrgyz Republic participated in PISA 2006 for the first time. In the Kyrgyz Republic, 5 904 students from 201 schools participated in PISA 2006. The national desired target population (15-year-olds in school at grade 7 or above) was approximately 92 000 students, which accounts for 72% of the total population of 15-year-olds in the Kyrgyz Republic.

variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they demonstrate use of their scientific understanding in support of solutions to unfamiliar scientific and technological situations.

In the Kyrgyz Republic, 86% of 15-year-olds do not reach Level 2, the baseline level of achievement on the PISA scale at which students begin to demonstrate the science competencies that will enable them to participate actively in life situations related to science and technology (Figure 6.1). Level 2 requires competencies such as identifying key features of a scientific investigation, recalling single scientific concepts and information relating to a situation, and using results of a scientific experiment represented in a data table as they support a personal decision. By comparison, students at Level 1 often confuse key features of an investigation, apply incorrect scientific information, and mix personal beliefs with scientific facts in support of a decision.

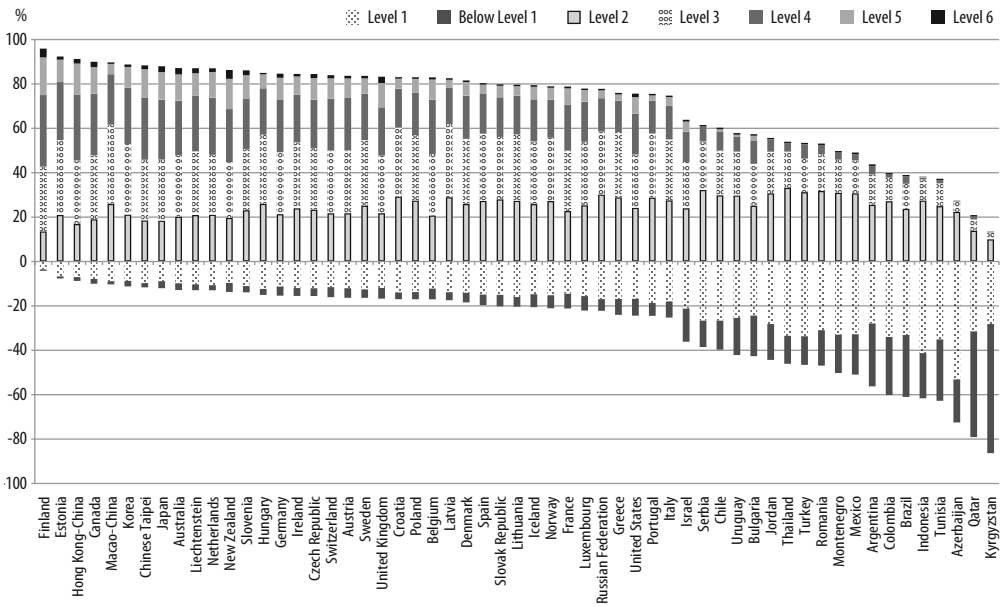
Box 6.2. **Interpreting differences in PISA scores (2): how large a gap?**

What is meant by a difference of, say, 50 points between the scores of two different groups of students? The following comparisons can help to judge the magnitude of score differences. A difference of 74.7 score points represents one proficiency level on the PISA science scale. This can be considered a comparatively large difference in student performance in substantive terms. For example, with regard to the skills that were described above in the section on the PISA 2006 assessment framework, Level 3 requires students to select facts and knowledge to explain phenomena and apply simple models or inquiry strategies, whereas at Level 2 they are only required to engage in direct reasoning and make literal interpretations.

Another benchmark is that the difference in performance on the science scale between the countries with the highest and lowest mean performance is 241 score points, and the performance gap between the countries with the fifth highest and the fifth lowest mean performance is 143 score points.

Finally, for the 28 OECD countries in which a sizeable number of 15-year-olds in the PISA samples were enrolled in at least two different grades, the difference between students in the two grades implies that one school year corresponds to an average of 38 score points on the PISA science scale.

Figure 6.1. **Percentage of students at each proficiency level in science**



Note: Countries are ranked in descending order of percentage of 15-year-olds at Levels 2, 3, 4, 5 and 6.

Source: OECD PISA database 2006, Table 2.1a.

Similarly, in mathematics, almost 0% of Kyrgyz 15-year-olds reach at least Level 5 on the mathematics scale (OECD average 13%); 11% reach the baseline Level 2 of mathematics performance; and 89% perform below Level 2. In reading, almost 0% of Kyrgyz 15-year-olds reach at the highest reading level, Level 5 (OECD average 8.6%); while 12% are capable of basic reading tasks at Level 2 – locating straightforward information, making low-level inferences of various types, working out what a well-defined part of a text means and using some outside knowledge to understand it.

PISA 2006 has identified that, in the Kyrgyz Republic, approximately 40% of variation in 15-year-old students' performance in science are attributable to the differences between schools, while 60% are attributable to the range of student performance within schools. A substantial proportion of performance variation between schools can be explained by the differences in the schools' average socio-economic background of students. Schools with socio-economically less advantaged students tend to perform lower (OECD, 2007 [PISA 2006 initial report]).

In examining the level of school resources – human resources, material resources, and learning time, PISA 2006 has shown that schools in the Kyrgyz Republic have a very low level of school resources, in terms of adequate

Table 6.3. **Relationship between school resources and performance in science**

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
School resources										
• Human resources (0 = all science teaching positions filled; 1 = one or more vacant science teaching positions)	-6.9	(9.0)					-1.8	(8.7)	9.9	(5.8)
• Material resources (Index of the quality of schools' educational resources)			9.2	(3.9)			8.9	(3.8)	-5.1	(2.7)
• Learning time in regular classes in science at school (hours per week)					7.0	(0.5)	7.0	(0.5)	6.8	(0.5)
Socio-economic background										
• Socio-economic background of students									3.6	(1.2)
• Socio-economic background of schools									81.4	(5.6)
Within-school variance explained (%)	0.0		0.0		4.7		4.7		4.9	
Between-school variance explained (%)	0.3		3.3		5.6		8.8		63.9	

Source: OECD PISA database, 2000.

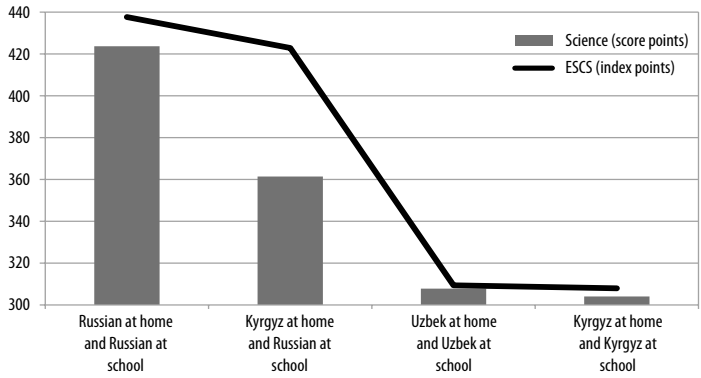
number of teachers, quality of school resources and students' learning time at school, compared with other OECD countries (OECD, 2007). In regard to the relationship between school resources within the country, Table 6.3 shows that there is no significant difference in performance between the schools with no vacant science teaching position and the schools with one or more vacant science teaching positions – *i.e.* the proxy of human resources – (Model 1), while there are significant relationships between material resources and performance as well as between students' learning time and performance (Models 2 and 3).

Often schools with more advantaged socio-economic students tend also to have better school resources. The relationships between school resources and performance, therefore, were examined, taking into account the socio-economic background of students and schools. The results in Model 5 show that there is no significant relationship between school material resources and performance, when the socio-economic background of students and schools are taken into account. However, the relationship between *students' learning time* and performance is significant, even accounting for the socio-economic background of students and schools. Students who spend more time in regular science lessons at school tend to perform better, beyond the impact of socio-economic background.

With the PISA 2006 data, it is also possible to examine student performance by various population subgroups such as gender, language groups, and school location. The results show that females slightly outperformed males in science, and outperformed by a great deal in reading, but there is no gender difference in mathematics performance (OECD, 2007).

In terms of language groups, Figure 6.2 shows that students speaking Russian at home and attending schools where Russian is the language of instruction

Figure 6.2. **Students' performance in science by language groups**



Note: ESCS stands for the PISA Index of Economic, Social and Cultural Status.

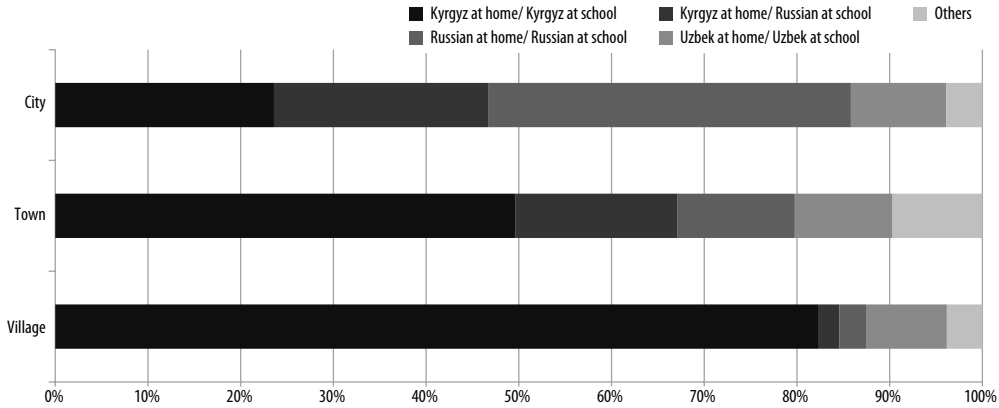
Source: OECD PISA database, 2006.

(*Russian at home and Russian at school*) perform highest, followed by student speaking Kyrgyz at home and attending school where Russian is the language of instruction (*Kyrgyz at home and Russian at school*). Students speaking Uzbek at home and attending schools where Uzbek is the language of instruction (*Uzbek at home and Uzbek at school*) and students speaking Kyrgyz at home and attending schools where Kyrgyz is the language of instruction (*Kyrgyz at home and Kyrgyz at school*) perform the lowest.

According to the school location, the performance level differs greatly. Students in schools in cities tend to perform the highest (393 score points in science), which is followed by students in schools in towns (331 score points), and students in schools in villages perform the lowest (301 score points). The language subgroups and school locations are somewhat interrelated: students who use *Russian at home and Russian at school* and students who use *Kyrgyz at home and Russian at school* are more likely to be found in cities, while students who use *Kyrgyz at home and Kyrgyz at school* tend to be in villages (see Figure 6.3). PISA 2006 has also shown that there are significant differences in the levels of socio-economic background, school material resources, and students' learning time across the language subgroups as well as across school location.

In summary, educational policies targeting socio-economically disadvantaged schools will be effective for improving the overall performance level as well as enhancing equality in learning opportunities. These educational policies could be a provision of educational materials such as textbooks and teaching materials to the schools and a subsidization of teachers' salary which enables schools to provide longer hours of teaching in main subjects. Schools which needs these interventions in urgent tend to be schools which provide instruction in Kyrgyz and Uzbek. Schools which provide instruction in Kyrgyz tend to be located in villages.

Figure 6.3. **Language groups by school location**



Source: OECD PISA database, 2006.

Issues in learning and assessment of student achievement

Approach to learning

In general, teaching and learning methods used in classrooms remain traditional: teacher-centred and "directive". Students are expected to give cued responses and, because instructional time is limited and most schools work on a two- or even three-shift system, with curriculum content which tends to be heavy, there is little time for students to develop and express their own ideas. The review team saw very little evidence of problem solving, classroom interaction, group work, "productive learning", or co-operative or other forms of active learning. If used at all, they are used only in connection with international, pilot or NGO projects such as the Open Society Institute and Soros Foundation Network's Step by Step or UNICEF's work in community-based pre-school. When asked, teachers say that their job is to "cover the textbook content in the available number of hours on the timetable": in other words, they focus on *teaching* as if it were an end in itself.

Naturally, the consequence is that classroom assessment is based on how well a student is able to memorise and repeat exactly what the teacher or the textbook says, rather than on how well he/she is able to apply, analyse, or discuss a new piece of knowledge, or how well he/she can in other ways show that something has been *understood*. The grade (mark) a student receives is based on the ability to reproduce learned material without omissions or language mistakes. One mark is deducted for 1-3 mistakes; two for more, etc. According to the Standards, to get the top mark pupils should be able to give examples from their own experience and give reasons for their opinion. In practice, "a 5 is awarded for remembering everything in the textbook, and opinions are not required, except perhaps in literature classes" (ADB, 2008, Chapter 1).

In addition, much of the teachers' attention is given to high-ability students. As in many other Former Soviet Union (FSU) countries, the mythology of the "Olympiads" persists: the fact that some gifted students do well in such competitions is cited as evidence that the overall quality of learning in the school is high. In reality, these Olympiad winners and Gold Medal winners[5] are a tiny minority – perhaps the top 2% of the ability range; they are identified early in their school careers, and often intensively coached for Olympiad competitions by the best teachers. The remaining 98% of students, ranging from the very able to the average to the low-achievers, receive far less attention. In fact, *the curriculum does not sufficiently differentiate between various levels of ability*, so that average and below-average learners struggle to cope with a "one-size-fits-all" curriculum.

This does not mean that children should be grouped or "tracked" by (perceived) ability: only that neither the curriculum nor the time-table allows teachers to create room for each student to learn at his/her own pace, concentrating

on basic competences and skills rather than being forced to keep up with demands that are achievable by only a few.

Students' attitude to learning

Students' academic self-concept is an important outcome of education, and a trait that correlates strongly with student success. Self-concept measures the general level of belief that students have in their own academic abilities. PISA shows to what extent do the assessed 15-year-old students believe in their own science competencies. The results of 2006 indicate that students in the Kyrgyz Republic have higher self-concept than the OECD average, in every question measuring students' self-concept: 84% of students reported that they could usually give good answers in science tests (the OECD average is 65%), A large proportion of students – between 76 and 80% respectively – said they were confident in learning science, reporting that they agreed that they learned school science topics quickly, or understood concepts or new ideas very well (the OECD averages are between 55 and 59%). Furthermore, 85% agreed that school science topics were easy and 78% agreed that learning advanced science would be easy (the OECD average is 47% for both questions) (OECD, 2007).

However, an important finding is that, within the Kyrgyz Republic, the index of self-concept in science is negatively correlated with students' performance. This means that students who have a higher level of self-confidence in science tend to perform *worse* in science than a student who has a lower level of self-confidence in science. Thus, in the Kyrgyz Republic students' self-concept is not underpinned by their actual level of performance. By contrast, in all OECD countries the relationship is positive: students who have a higher level of self-confidence in science also tend to perform better in science (OECD, 2007). The Kyrgyz Republic is one of only two countries where the relationship is negative (the other country is Indonesia).

One possible explanation for this discrepancy between students' self-concept and performance could be that educational goals are set lower for low-performing students: teachers teach only basic topics and give less demanding tasks to low-performing students, while they teach more advanced topics and give more demanding tests to high-performing students. In order to improve the overall achievement level for the country, it is crucial for Kyrgyz Republic to establish standardised educational goals, a standardised assessment system, and to provide additional support so that students who are not meeting the established standards are enabled to reach them, rather than lowering educational goals and let less able students believe they are doing well in science. To maintain students' self-confidence, however, it would also be important to provide constant support, guidance and daily feedback in the classroom, through formative assessment.

Examination practices

The national examinations at grades 9 and 11 are "low stakes", first because nearly everyone passes (upwards of 95%), and second because in most cases the exam questions are known and published in advance. For grade 11 mathematics, for example, the MOES/KAE publishes a booklet of 300 numbered questions – this booklet is available for about KGS 18 (USD 0.40), and remains in force for up to three years. Teachers and students spend considerable time preparing for these published questions, although they will not know until the actual day of the exam which questions they will have to answer. Similarly, essay questions and

Box 6.3. **Organisation of examinations**

On the day of the examinations, *rayon* departments or sometimes the schools themselves use a complex system of allocating a different set of questions ("variant") to each candidate, so that no two students in the room have the exact same exam paper. Using again the mathematics example, this is done by choosing up to 30 different sets of five questions from the booklet, by number, and writing the relevant five numbers on a strip of paper, *e.g.*

Maths	Question 1	Question 2	Question 3	Question 4	Question 5
Variant 1	Booklet no. 9	28	13	16	14
Variant 2	5	2	8	11	13
Variant 3	6	23	16	18	27
Variant 4	13	9	11	15	10
Variant 5	2	20	19	29	3

...etc. (up to the number of students in the class).

The methodologists at the *rayon* level, or sometimes the school staff, cut the grid into horizontal strips – for example Variant 3 would be:

6	23	16	18	27

Each strip is then folded up, and all are placed in a sealed envelope; on the exam day the envelope is opened and each student picks a strip out of the envelope, consults his maths booklet, and answers (in the case above) booklet questions number 6, 23, 16, 18, and 27.

Essay questions (for example in literature) are set on texts studied by the candidates during the year. Students are extensively "coached" in writing and memorising model answers. **Oral examinations** are conducted in each school by its "Examination Commissions" which normally consist of the chairperson of the Commission, the student's own teacher, and one or two other teachers or "assistants". Again, the "tickets" (*biljete, i.e.* strips of paper containing three questions each) are placed in an envelope. Each candidate selects his/her "ticket", and is then given 15 or 20 minutes to prepare before being called before the Commission.

the questions to be asked in oral examinations (so-called "tickets" or *biljete*) are published in the newspapers about 2-3 months before the exams. Thus – although the use of advance-notice questions and booklets guarantees that textbook content is well rehearsed! – *students are never faced with an exam question they have not seen before, or with a task that requires them to apply their knowledge in a different way,* which is probably why 15-year-olds in Kyrgyz Republic perform so poorly in studies like PISA and the national sample-based assessments.

While on a certain level this is efficient, cheap, and "impartial", the most obvious problem is that strip 2 may be more difficult (or easier) than strip 9, and that without reliable item statistics[6] it is obviously impossible to create multiple variants that are of equal difficulty, or that test the same range of skills required by the subject standards. More seriously from an educational point of view, this kind of cued-response "drilling" on previously known questions lays a heavy, constricting hand on teaching and learning.

The practice of pre-publishing examination questions months or even years in advance should be abandoned at once. This would allow teachers and learners to concentrate on what the SES and subject curricula require, rather than on endlessly rehearsing "stock" answers to a narrow range of previously known, and heavily memory-based, questions. No doubt such a move will be controversial, but it is essential in the interest of "competence-based" learning, which the MOES supports according to the (draft) *Education Development Strategy 2011-2020.*

International and European indicators and benchmarks

Although education systems and their standards reflect the values and aspirations of the nations they serve, and are therefore based on *national* views of quality in education, there is also a growing recognition that many of these values and aspirations are *common across national boundaries*, and that it is possible – and desirable – to identify common ground.

International indicators

To a considerable extent, international surveys such as OECD's PISA reflect an international view of what students in a high-quality education system should be able to achieve by the end of basic education (usually about 9 years of schooling). Similarly, the Progress in International Reading Literacy Study (PIRLS) sets a benchmark for reading literacy for 9-10 year olds in a large number of countries worldwide, while the Trends in International Mathematics and Science Study (TIMSS) does the same for mathematics and science at grades 4 and 8.

Kyrgyzstan has participated in PISA 2006 (see discussion above), and although the 2006 results were disappointing, Kyrgyz Republic also took

part in the PISA 2009 survey in the hope that it will show an upward trend in achievement. The review team observed that within these few years the Kyrgyz Republic was able to disseminate widely the new concept of students' learning outcome, which focuses the students' ability *to apply knowledge in a real-life context* rather than merely memorising facts. Enhancing people's awareness is an important first step. This, however, has to be supported by effective interventions in order to improve students' performance. The review team was not informed of any of state-wide interventions such as increasing time spent on learning basic subjects, providing more appropriate teaching materials, and providing appropriate teacher training between 2006 and 2009. It is important to give a caution, therefore, that the PISA 2009 results might not yet show the full potential that Kyrgyz Republic students have. It usually *takes time* to see changes in educational outcome after a new approach has been introduced. A long-term perspective is essential to plan educational policy reforms and interventions.

Given Kyrgyz students' disastrously poor National Sample-Based Assessment (NSBA) results in reading literacy at grades 4 and 8 in 2007, the review team would also recommend a renewed emphasis on "reading with understanding", possibly with a view to taking part in the next Progress in International Reading Literacy Study (PIRLS) survey in 2011. As with PISA, such participation might lead to improved teaching and learning of basic, functional literacy in primary schools.

European benchmarks

In 2003 the Education Council of the European Commission adopted five "reference levels of European average performance" or European benchmarks. The two most relevant to Kyrgyzstan are that:

1. By 2010, at least 85% of 22 year olds in the European Union should have completed upper secondary education.
2. By 2010, the percentage of low-achieving 15 years old in reading literacy in the European Union should have decreased by at least 20% compared to the year 2000.

These benchmarks are set too high for Kyrgyzstan at this moment, but because of the steady increase in migration and labour mobility in Central Asia and neighbouring countries, international and European consensus on what "educational quality" means is likely to become a common reference point for countries around the world, and therefore it would be in Kyrgyz Republic's interest to pay attention to them in formulating its own education development strategy for the next decade.

Table 6.4. **Status of assessment and examination system reforms in various CEE-CIS countries, 2009**

Status is reported on a general, 5-point scale as shown below.

0 – not planned/not started **1** – early planning/discussion stage **2** – development and experimentation [= small-scale trials] **3** – piloting [= larger-scale trials] and implementation **4** – operational **n.i.** – no information

	Establishment of new assessment authority	Reform of Matura/ Baccalaureate examination	Introduction of other school exams or assessments e.g. basic school	Standardisation of university entrance examinations	Introduction of sample-based national assessment	Participation in international assessments (PISA, TIMSS, PIRLS)[c]
Armenia	4	4	3	4	0	4
Azerbaijan	4	1	1	4	1	4
Belarus	4	4	n.i.	4.	n.i.	0
Bulgaria	1	1	0	0	0	4
Czech Republic	4	3	2	0	0	4
Estonia	4	4	4	4	4	4
Georgia	4	4	4	4	4	4
Hungary	4	4	0	4	4	4
Kazakhstan	4	1	1	4	1	4
Kyrgyzstan	4	1	1	4[a]	1	4
Lithuania	4	4	4	4	4	4
Macedonia	4	4	1	2	4	4
Moldova	2	2	1	3	4	4
Montenegro	4	2	2	1	3	4
Poland	4	4	4	3	n.i.	4
Romania	4	4	4	4	4	4
Russian Federation	4	4	3	4	2[b]	4
Serbia	4	0	4	0	4	4
Tajikistan	2	2	0	2	4?	0
Ukraine	4	4	2	4	2	4
Uzbekistan	4	0	0	4	4	1

Notes: a. Kyrgyzstan has a non-compulsory test of verbal and mathematical reasoning, originally intended to select university entrants who qualify for government support; but it is increasingly being used also by candidates who pay their own university fees.

b. Some regions (Samara, Vologda) are conducting some sample-based assessments at primary level, *e.g.* in mathematics and Russian language, but there are none at Federal level.

c. PISA – Programme for International Student Assessment; TIMSS – Trends in International Mathematics and Science Study; PIRLS – Progress in International Reading Literacy Study.

Source: G. S. Bethell and J.V. Crighton *et al.* (2006), and personal communications. UNICEF, 2007: *CEE and CIS Regional Study on Education: Education for some more than others?*, Geneva: UNICEF. Updated in May 2009.

Recommendations related to assessment and examinations

Policy level

- Most countries in Central and Eastern Europe and the Commonwealth of Independent States have introduced new forms of assessment that are designed to be valid, reliable, fair, and "clean". Table 6.4 shows the current status of assessment reform in a number of countries that have similarities to Kyrgyz Republic, *e.g.* in terms of transition status, or previous education system structures. It also shows that Kyrgyz Republic can draw on a wealth of regional experience when it plans to reform its own assessment system, as intended in the (draft) *Education Development Strategy 2011-2020.*
- *The grading (marking) scale*, which now has only three useful levels (3-4-5) does not give enough information about the actual level and quality of student's learning, or about his/her progress in relation to previous performance. In addition, since there are no agreed criteria for what a "3" or a "5" means in terms of competence or achievement, the marks given by teachers are non-comparable across classrooms, schools and *rayons.* At the very least, there should be clear descriptors setting out what *e.g.* a "3" in mathematics at grade 6 stands for, in terms of achieving the subject standards for that level.
- *No failing marks ("2")* should be given in the early years of primary school. In fact, it would be better if parents received a narrative progress report for their child, rather than marks. With formative assessment (see below) there should also be no need for any child to repeat grade 1 or grade 2, because learning problems would be spotted early and remedial help would be given immediately.
- *The promotion examinations at the end of grades 5, 6, 7, and 8 should be abolished.* They apply only to some students, and they do not yield any significant information in addition to that already available through continuous assessment. The burden on the system, as well as on students who may already be under stress, is disproportionate to the information gained.
- *The exit examinations at grades 9 and 11 should be fundamentally changed.* The current practice of pre-publishing examination questions – in booklets, in newspapers, or otherwise – must be abandoned immediately, so that students are free to concentrate on building competence in applying what they know to previously un-seen questions. This will, at first, be controversial because the pass rates (now 95% or above) are likely to be lower, and careful thought must be given to what remedial work will be made available to students who do not pass these new-style exams. However, in the long run, the quality of learning will improve and reach internationally acceptable levels.

- *Kyrgyzstan should continue to take part in international comparative studies such as PISA,* in addition to its own national sample-based assessments (NSBAs). Given also students' disastrous performance in reading literacy (according to every national or international study so far), it may be useful for Kyrgyzstan to participate in the 2011 PIRLS study so that more attention will be paid to reading with understanding rather than reading "at speed", which is now the practice in most classrooms.
- *More emphasis should be placed on the systematic use of assessment results to* inform education policies and practices that lead to improved quality of education, and thus to better learning outcomes. There is little point in gathering data, unless they are carefully analysed to pinpoint the reasons why Kyrgyzstan students can (or cannot) show the competences that may be expected of them; and unless these insights are relayed to policy makers, *rayons*, schools and teachers so that positive action can be taken.

Implementation level

- *All teachers and trainee teachers should be trained in the use of formative classroom assessment*, so that students receive prompt and informative feedback on their work and how to improve it. This way, any difficulties can be spotted and remediated right away, before the student alls behind and becomes discouraged. The work on formative assessment done in Issyk-Kul (part of the Government of Kyrgyz Republic/World Bank Rural Education Project – REP) for example, should be considered for nationwide expansion, especially since it is linked to teacher performance evaluation and incentives, and to improved school management. According to project evaluations, it was very difficult for the teachers to accept and implement formative assessment at first, but after they saw opportunities to be rewarded with incentives, the implementation process became faster and easier, and student learning improved. Training materials have been developed, so that it would be relatively easy to extend the training to both pre- and in-service programmes.

Notes

1. Part of the Government of Kyrgyz Republic /World Bank REP project.
2. The fees are low – about KGS 50 to 100 for both pre-tests and tests. The NTC does not pay rent to the MOES for its offices, but they may offer expertise to the Department for Testing and/or the KAE.
3. This is for the first level of higher education (in six subjects). There is also a data base for secondary professional education (four subjects).
4. An international not-for-profit organisation working to advance education and research. In Kyrgyzstan, the ORT (*Obsherespublikanskoe Testirovanie*) tests are frequently referred to by their initial name, as the "ACCELS" tests.
5. Apparently the practice of allowing Gold Medalists to enter university faculties without further examination has been abandoned.
6. Although it is possible to see the MOES/KAE maths booklet as an "item bank" – and previous test results as a form of "pre-testing" of items – there is no systematic gathering of information about item parameters (for example, level of difficulty) and therefore there is no way to "calibrate" each item (question) and then to "calibrate" each resulting variant of the test (question paper or "strip") against a common standard. This is a technical issue but an important one in terms of fairness and reliability.

References

Asian Development Bank (ADB) (2008), *Policy Studies Chapter 1: Status and Quality of Curriculum, Classroom Assessment and Teaching and Learning Materials in the Kyrgyz Republic*, ADB, Bishkek.

Centre for Educational Assessment and Teaching Methods (CEATM) (2007), *Results of the 2007 National Sample-Based Assessment*, grade 4, CEATM, Bishkek.

Ministry of Education and Science (MOES) (2006), *Education Development Strategy of the Kyrgyz Republic (2007-2010)*, 19 October 2006, MOES, Bishkek.

Ministry of Education and Science (MOES) (2007), *Plan and Timetable for Schools, Kyrgyzstan, 2007-2008 Academic Year* in Kyrgyz and Russian (2007), MOES, Bishkek.

Ministry of Education and Science (MOES) (2009) (Draft) *Education Development Strategy of the Kyrgyz Republic 2011-2020*, January, 2009, MOES, Bishkek.

National Statistical Committee (NSC) (2007), *Review of Indicators of the "Education for All" Program in the Kyrgyz Republic,* NSC, MOES and the Rural Education Project funded by the World Bank, Bishkek.

National Statistical Committee (NSC) (2008), *Education and Science in the Kyrgyz Republic*, *Statistical Bulletin*, Bishkek: Kyrgyz Republic.

OECD PISA 2006 database. http://www.pisa.oecd.org.

OECD (2007), *PISA 2006: Science Competencies for Tomorrow's World*, Volumes 1 and 2, OECD, Paris.

OECD (2008), *Education at a Glance 2008: OECD Indicators*, OECD Publishing.

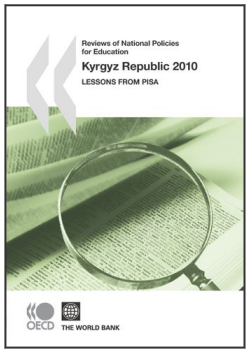
UNICEF Regional Office for CEE/SEE/CIS (2007), *Education for Some More than Others,* UNICEF, Geneva.

UNICEF/UNESCO and the Ministry of Education and Culture, Kyrgyzstan (2001), *Monitoring Learning Achievement: National Survey of Primary Education Quality*, Centre for Public Opinion Studies and Forecast, Bishkek.

UNICEF/UNESCO and the Ministry of Education and Culture, Kyrgyzstan (2003), *Monitoring Learning Achievements II (8th Grade): National Survey of Quality of Learning in the 8th Grade,* Centre for Public Opinion Studies and Forecast, Bishkek.

UNICEF/UNESCO and the Ministry of Education and Culture, Kyrgyzstan (2005), *Monitoring Learning Achievements (4th grade).* Nationwide Study of the Quality of Education in Primary Schools in the Kyrgyz Republic, Center of Public Opinion Study "El Pikir", Bishkek.

World Bank and the International Association for the Evaluation of Educational Achievement (IAEA) Web site *http://www.worldbank1.org/education/exams.*



From:

Reviews of National Policies for Education: Kyrgyz Republic 2010

Lessons from PISA

Access the complete publication at:

https://doi.org/10.1787/9789264088757-en

Please cite this chapter as:

OECD (2010), "Assessment and examinations", in *Reviews of National Policies for Education: Kyrgyz Republic 2010: Lessons from PISA*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/9789264088757-9-en

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at http://www.oecd.org/termsandconditions.