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## The Big Improvement in PISA 2009 Reading Achievements in Serbia: Improvement of the Quality of Education or Something Else?

DRAGICA PAVLOVIĆ BABIĆ<sup>\*1</sup> AND ALEKSANDAR BAUCAL<sup>2</sup>

∞ The PISA 2009 results in Serbia show a big improvement in reading literacy compared to 2006 – the average score is 41 points higher, which is equal to the effect of a whole year of schooling in OECD countries and represents the second highest improvement ever recorded in a PISA study. In the present paper, we discuss potential reasons for such a big improvement based on analysis of the PISA 2009 reading achievements in different countries, with a special focus on countries from the same region (Croatia, Slovenia, Montenegro, Bulgaria, Romania and Albania). The analysis shows that the largest part of the improvement was realised at lower achieving levels, suggesting that the dominant method of teaching in schools is a traditional method oriented towards the acquisition and reproduction of academic knowledge. Findings of data analysis support the conclusion that the improvement is mainly the result of certain contextual factors, such as higher student motivation and a high level of official support for the PISA study in Serbia, rather than representing a real improvement in the quality of education.

**Keywords:** PISA, Quality of education, Reading literacy

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## **Reading as an educational outcome: operationalisation and possible approaches to measurement**

Measurement of reading as an important educational outcome has a tradition as long as the testing of knowledge itself, having been part of school and research practice since the beginning of the twentieth century. In parallel with changes in society, the economy and culture, as well as with more intensive research into the nature of reading processes, the definition of reading has changed. Consequently, the instruments used to measure this concept have also changed and developed.

In the middle of the last century, under the influence of behaviourism and later of information processing theory, the belief that reading comprehension ability is a series of discrete mental abilities that form a hierarchy was predominant. However, the research focuses of these two approaches were different: behaviourists were more involved in the structural aspects of reading (trying to answer the question as to which activities participate in reading), while the cognitive approach dealt with the functional aspects of reading processes (how activities are coordinated). Thanks to research that originated under the influence of ideas from information processing theory (LaBerge & Samuels, 1974), we gained a plausible explanation of the role of attention in fluent reading, as well as a definition of the process of text understanding as a structure of meanings built through a series of hypotheses that the reader formulates, verifies, adopts or discards while reading. For these researchers, reading is “uncertainty” that exists in the reader, not on the page, and hypotheses are formulated in order to reduce this uncertainty. Efficiency in reading increases with the number of confirmed hypotheses and with more sub-skills being brought to the level of automation.

Understanding educational outcomes, including reading, in line with these conceptions means that knowledge and skills can be broken down into components, with each component always behaving in the same way, regardless of contextual factors. In this case, in the construction of test sets there is a strict requirement that tests should be one-dimensional, i.e., that all items in a sub-test measure the same characteristic, ensuring that the score has essentially the same meaning for all individuals (the assumption of universality). Reading is seen as the sum of discrete abilities and skills (e.g., text understanding, reading speed, oral and written production) that are taught gradually, and their relative contribution can be determined by factor analysis. Tests developed within the framework of this approach are mainly composed of multiple choice questions, suggesting that the main task of the respondents is to find the correct answer

and not to engage in interpretation.

Since the 1970s, measuring reading has been impacted by the penetrating socio-cultural theory of Vygotsky on the interdependence of thought and language, and since the 1980s, when the importance of metacognition was recognised in cognitive psychology, researchers of reading have been oriented towards identifying metacognitive strategies that facilitate and control awareness of the level of text understanding. Metacognitive strategies were identified by comparing reading behaviour and introspective reports about reading given by good and poor readers. For example, in one study (Brown, 1980) good readers were asked to describe how clear the goals of reading are and to identify important aspects of text messages. They were then asked how they control whether they understand the text and whether they are taking the correct steps. According to Underwood, when formative assessment and metacognitive reading comprehension strategies that facilitate understanding entered the reading area in 1970s and 1980s, our understanding of the nature of reading and the nature of training in reading were changed forever (Underwood, 1997).

The beginning of 21<sup>st</sup> century was marked by a rapid increase in the number of studies of educational achievement, caused by the change of the existing conceptual paradigm and clearly visible in the expansion of research studies that have largely abandoned the traditional principles of psychometric testing.

What caused this paradigm shift? One reason (although not the most important reason) for the change in conceptual approach is the increased theoretical knowledge (and, based on this, empirical knowledge) about the nature of learning processes that was developed within constructivist and cognitive theories of psychological development. It would be more accurate to say that rather than opening up the issue of the quality assessment of educational outcomes, theoretical knowledge has provided answers. Some of the issues and concerns arising from the practical application of findings derived from the external evaluation of educational achievement in order to improve teaching practices are: how could assessment results and the objectives and functions of education be harmonised, and does education justify the investment?

An analysis of the theoretical approaches that have shaped the conceptual framework of the modern assessment of educational outcomes, especially the PISA project, shows that the term “competence” is frequently used as a central construct. Competences are defined and operationalised within “conceptual pragmatism,” which defines this construct in a pragmatically relevant and scientifically plausible way (relying primarily on theoretical knowledge about the nature and structural characteristics of the knowledge developed within social constructivism and cognitive orientations).

One of the definitions of competences developed in this approach was adopted in the OECD project DeSeCo (Definition and Selection of Competencies), with which the PISA research study abuts directly. Competency is defined as the capacity of an individual to successfully respond to complex, composite requirements in a particular context through the mobilisation of psychosocial conditions, including their cognitive and non-cognitive aspects (Rychen & Salganik, 2003). In other words, competencies are seen as internal mental structures, as dispositions, or resources “embedded” in the individual. There is a wide range of attributes that are seen as components of the internal structure of competence. There is no disagreement amongst various authors about the fact that both higher-order cognitive skills (e.g., analytical or critical thinking, decision-making ability, problem-solving ability) and total or specific knowledge must be mobilised for the attainment of competent achievement (Kirsch et al., 2002; Rychen & Salganik, 2003).

The concept of reading literacy adopted in PISA relies on cognitive concepts that highlight the interactive nature of the reading process and the creative nature of the process of understanding. Cognitive scientists argue that the meaning of the text is constructed in the interaction between the text and the reader (Underwood, 2007). In this interaction, the reader brings cognitive and metacognitive strategies to work on the text, as well as previous knowledge and experience, including specific knowledge and experience in reading situations, such as the use of textual and situational incentives. The text contains certain linguistic and structural elements and addresses a specific topic, while context determines the purpose of reading and the selection of reading strategies appropriate to the text.

### **Reading literacy as an educational competence**

The definition of reading literacy in the PISA study, similar to that in other international reading assessments, such as PIRLS (Progress in International Reading Literacy Study, in Mullis et al., 2007) and ALL (Adult Literacy and Lifeskills, in Lemke & Gonzales, 2006), emphasises the importance of reading in active and critical participation in society, thereby promoting the ability of students to read and to critically analyse information and use it for different purposes. Changes in the definition of the learning process and promotion of the concept of lifelong education have led to a broader understanding of the concept of literacy. Literacy does not only mean the skill of decoding written words and literal understanding of the meaning, which is typically mastered during the first years of schooling; literacy means merging functional and

transfer knowledge, skills and strategies that people acquire throughout their lives and through interaction in the social groups to which they belong. Essentially, this definition of literacy says that reading is not a unitary skill, but rather a compilation of processes, approaches and skills that vary depending on the reader and the type of text, as well as the goal or situation in which the text is read (Campbell et al., 2001). Based on these definitions, the PISA project has developed the following definition of reading literacy: *understanding, using and reflecting on written texts in order to achieve personal goals, develop skills and potential, and to contribute to community life* (Kirsh et al., 2002; OECD, 2010).

In other words, the concept of literacy describes the capacity of students to apply knowledge and skills in real life situations, and to analyse, draw conclusions and accurately communicate the solutions arrived at.

This definition implies a broad range of situations in which reading literacy plays an important role, ranging from an individual's aspirations, acquiring qualifications or finding a job, to less specific situations, such as meeting the challenges of modern society in order to enrich and improve one's quality of life. In accordance with the different contexts in which reading takes place, the assessment of reading literacy involves using a range of different types of texts.

## Reading Research in Serbia

Assessing reading as an educational outcome does not have a long tradition in Serbia. The practice of testing achievements in the area of reading is closely related to the very few assessment studies in education. In spite of the fact that reading was defined and operationalised as an educational outcome of great importance in these research studies (and, therefore, reading achievement represents a measure of the quality of the education system), research findings have not significantly influenced the educational policy, if at all (Baucal & Pavlovic Babic, 2010). In the curriculum, reading is reduced to a correspondence between written text and speech. On the other hand, in addition to conventional tests of knowledge in the area of language (spelling, grammar, knowledge of literature, vocabulary), the first comprehensive assessment of educational achievements (Havelka et al., 1990; UNICEF, 2001) also included the measurement of reading speed and reading comprehension. Since 2000, by participating in the PISA study and developing national assessment studies, the research focus has shifted from testing isolated language skills and knowledge to complex skills that are manifested through work on the text (Baucal et al., 2007; Baucal & Pavlovic Babic, 2010; Pejic et al., 2009). Findings reported in the present paper belong to this research orientation. Operationalisation of reading

literacy and research design make the findings relevant for educational policies, and achievement in reading literacy is seen as one of the indicators of the quality of education in Serbia.

### **The main characteristics of reading literacy in the PISA project**

In the process of the operationalisation of reading literacy, it became evident that there were three main characteristics on which the determination of reading is based: the text, the aspects and the situations. Each of these key features was further developed into subcategories that serve for the further operationalisation of reading.

*Text.* Until recently, a correct definition of reading would include texts written (printed) on paper. Today, it is a common, everyday activity to read a text on a screen. In the PISA 2009 study, Serbia did not participate in testing reading literacy in digital texts. Students from Serbia worked on texts that were, in terms of format, linear (continuous) or nonlinear (not continuous) and had a sequential organisation, thus demanding different approaches of the reader. In terms of type of presentation and content, texts are classified into the following categories: description (information related to the characteristics of an object – typically answers to What questions), narration (text responding to the questions such as When, and In what order), presentation (answers to How questions), argumentation (arguments and proposals are exposed, often answers to Why questions), instructions (instructions on how to do something), and exchange (text interacting with readers and exchanging information with them).

*Aspects.* These are, in fact, mental strategies, approaches and intentions used by the reader, classified into three main categories: access to information and information retrieval, integration and interpretation, reflection and evaluation. Access to information and information retrieval means browsing, searching, and the identification and selection of relevant information – the retrieval of information assumed relevant or the automatic understanding of the text. There is little or no interpretation. There are no gaps within the meaning of the text that need to be compensated for – meaning is evident and clearly stated in the text. The reader must recognise the importance of information or ideas. Integration and interpretation are processes that we use to build the meaning of the text. Integration refers to the establishment of a relationship (or relationships) between parts of the text. Interpretation refers to the process of building sense, based on information that is not (always) complete or explicit. It also involves developing and deepening first impressions, as well as acquiring

a more specific and more complete understanding of the text. While building the meaning of the text, the reader also formulates conclusions on information or ideas that are not explicitly given. This allows the reader to draw conclusions that go beyond literal interpretation of the text and to fill in gaps and uncertainties. For successful readers, these processes are brought to the level of automation. Reflection and evaluation – thinking about the text and evaluating its content or form of interaction – implies a reference to prior knowledge, experiences and ideas. The reader compares the facts and opinions expressed in the text with his/her own knowledge and opinions, assesses their foundation, reveals contradictions and inconsistencies, analysing arguments, evidence and refutations, and finally articulates and expounds his/her conclusions and attitudes. He/she looks for evidence in the text and pits it against evidence from other sources of information, using general and specific knowledge, but also the ability of abstract thinking.

*Situation.* Based on content, purpose of reading and the students' relationship with the context to which the text refers, texts are classified into four categories: personal, educational, occupational and public.

## **Method**

### ***Research Design***

The PISA study uses the balanced incomplete block (BIB) assessment design (Johnson, 1992; NAEP, 2001). The BIB design has been developed for large-scale assessments in order to enable measurement of a broad range of competencies or knowledge, while limiting the time of participants engagement to 2-3 hours. In order to obtain reliable individual measures of different competences, a relatively large number of items needs to be used. So as to reduce each participant's time of engagement, items are organised into a number of item blocks, which are connected according to a specific scheme into booklets. Thus each booklet contains only a part of the items, chosen in such way that the content in each booklet overlaps with two other brochures. The BIB design requires the use of IRT techniques to analyse the data (Birnbaum, 1968; Bond & Fox, 2007; Lord, 1980).

### ***Sample***

The PISA sample targets 15-year-old students, regardless of the class that they are attending at the time. In Serbia, the PISA 2009 sample was stratified – schools are the first stratum and students the second. The PISA 2009 study in Serbia involved 190 schools, mostly upper secondary schools. In each



secondary school, 35 students were selected (fewer students were selected in primary schools, where there is a small proportion of 15-year-old students). The student sample in Serbia was also designed to be representative of the type of educational programme in upper secondary education. The planned sample size was 5804, of which a total of 5523 students were tested (about 95% of the planned sample). The structure of the sample by gender and the class attended by the student at the time of PISA assessment is shown in Table 1.

**Table 1:** Structure of the sample of students from Serbia who were tested in the PISA 2009 study according to gender and class attended at the time of PISA assessment

		Females		Males	
		Freq.	%	Freq.	%
Compulsory primary education	7 <sup>th</sup> grade	2	0.1%	4	0.1%
	8 <sup>th</sup> grade	21	0.7%	38	1.4%
Upper secondary education	1 <sup>st</sup> grade	2757	97.0%	2594	96.8%
	2 <sup>nd</sup> grade	63	2.2%	44	1.6%
Total		2843	100.0%	2680	100.0%

***Instrument***

The instrument for the assessment of reading literacy in the PISA 2009 study consisted of 13 brochures that contained a total of 131 items. The brochures were distributed to the students according to the spiral method (NAEP, 2001) so that between 416 and 439 students were surveyed by each of the 13 booklets.

Each item was designed to examine one component of reading literacy and particular types of texts. In addition, each item was contextualised so that it applied to a personal, social, professional or educational context. In other words, each item can be described by three dimensions: component of reading, type of text and type of context. Items also varied according to formal characteristics: closed items, complex closed items, limited open items, open items and items with a short answer.

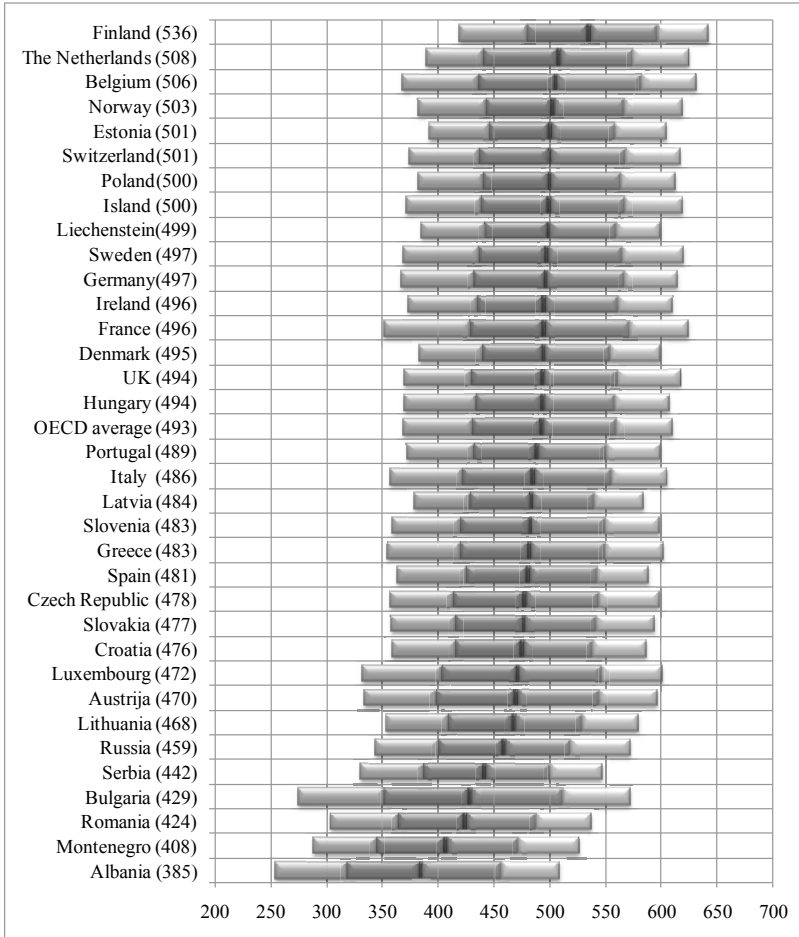
**Results**

***General achievements on the PISA reading scale***

To what extent was reading competence developed in the 15-year-olds from different countries? Based on the data, it is possible to generate different indicators of student achievements. In the present paper, the average achievement, percentiles, distribution by levels of achievement and data on trends are analysed.

Figure 1 shows the average achievements on the PISA reading literacy scale of students from different countries in Europe. In addition to the average achievement, the data indicates the extent to which the achievements of students within each country differ. The differences that exist among students are described by percentiles (10%, 25%, 75%, and 90%).

The data show that students from Finland have the highest score ( $M=536$ ,  $SE=2.3$ ), which is 43 points higher than the OECD average ( $M=493$ ,  $SE=0.5$ ). Bearing in mind that one year of schooling, according to estimates for OECD countries, has an average effect of about 40 points (OECD, 2010), we can say that the education system in Finland supports the development of reading literacy to a greater extent than education systems in other OECD countries, as the difference corresponds to the effect of one year of schooling. In other words, when the reading literacy of students from Finland is compared to the reading literacy of students from other OECD countries one could gain the impression that the students have been educated one year longer. Since there is no significant difference in the number of years students spend in the education system up to the age of 15, this means that the education system in Finland is more effective than those of other OECD countries. In addition to students from Finland, students from the Netherlands ( $M=508$ ), Belgium ( $M=506$ ), Norway ( $M=503$ ), Estonia ( $M=501$ ), Switzerland ( $M=501$ ), Poland ( $M=500$ ), Iceland ( $M=500$ ) and Lichtenstein ( $M=499$ ) also attained average achievement that is statistically significantly higher than the OECD average.



**Figure 1:** Average student achievements on the PISA reading scale, and student achievements on 10, 25, 75, and 90 percentile. (data for selected countries in Europe)

The average achievement on the reading scale of students from Serbia was about 442 points (SE=2.4). This is statistically significantly lower than the OECD average, with a difference is about 50 points, which corresponds to the effect of about 1.25 years of schooling in OECD countries. This suggests that the education system in Serbia is somewhat “less supportive” of the development of PISA reading competence compared to OECD countries.

Compared with students from other countries in the region (Table 2), students from Serbia have a similar level of reading literacy to students from

Bulgaria, and a higher level than students from Albania ( $M=385$ ), Montenegro ( $M=408$ ) and Romania ( $M=424$ ), while the level of reading literacy of students from Serbia is significantly lower than students from Croatia ( $M=476$ ) and Slovenia ( $M=483$ ). The average achievement of students from Serbia is about 30-40 points lower than the average achievement of students educated in Croatia and Slovenia, which corresponds to the effect of almost one year of schooling.

When the trend in the reading literacy of students from Serbia is analysed, it can be seen that a big improvement was achieved between the PISA 2006 and 2009 studies (Table 2). In the PISA 2003 study, students from Serbia achieved an average of 412 points (OECD, 2004). In the next cycle, in 2006, the reading literacy of students from Serbia dropped by 11 points to 401 points (OECD, 2007). In the PISA 2009 study, however, the average achievement of students from Serbia was 41 points higher than in 2006. This improvement is similar to the effect of one year of schooling in OECD countries and is one of biggest improvements ever recorded in a PISA study. The average achievement of students from Montenegro, Bulgaria and Romania also improved between these two PISA cycles, by between 16 and 28 points. In the same period, the average achievement of students from Croatia remained at the same level as in 2006, while the average achievement of students from Slovenia decreased by 11 points.

**Table 2:** Average student achievement on the reading literacy scale in 2003, 2006, and 2009.

Country	2003	2006	2009	Difference between 2009 and 2006
Serbia	412	401	442	+41
Croatia	--	477	476	-1
Slovenia	--	494	483	-11
Montenegro	--	392	408	+16
Bulgaria	--	402	429	+27
Romania	--	396	424	+28
Albania	--	--	385	--

### *Internal differences in student achievement within specific countries*

In addition to the average achievement, it is important to take into account the differences that exist between students within each country. Here the focus will be on differences that exist in Serbia. As can be seen from the data shown in Figure 1, the lower quartile of students in Serbia achieved fewer than

388 points, which places them amongst the very low achievers, while the upper quartile of the most successful students achieved above 500 points. In addition, the lower deciles of students from Serbia fall below 330 points, while the 10% of students with the highest scores achieved scores above 547 points.

Although these differences in student achievement from the lower/upper quartiles and deciles are rather large, they are lower than those from other countries. For example, although the average achievement of students from Serbia and Bulgaria is at a similar level, the differences between students from Bulgaria are much larger than the differences between students being educated in Serbia (this is illustrated by the length of the bar for Bulgaria and Serbia in Figure 1). The inter-quartile difference in Bulgaria is about 160 points, while that of Serbia is considerably lower – about 110 points. As a result of this, the top 10% of students from Bulgaria have scores that are significantly higher than the average top 10% score of students from Serbia (572 vs. 547 points). However, when achievements of the 10% of students with the lowest scores are compared, the opposite situation is evident – low performing students from Serbia have significantly higher achievements (331 vs. 276 points).

### ***The development of individual components of reading literacy***

Since reading literacy was the central domain in the PISA 2009 assessment, data for different components of reading competence were also provided. In Table 3, data on student achievements in different components of reading literacy are presented. The data are expressed as the difference between the average achievement of students in certain components and the average achievement on the reading scale. If the difference is positive, this suggests that students are somewhat more successful in a given component, while a negative difference means that students are less successful in this aspect of reading competence. Thus the profile of the achievement of students from different countries in different components may indicate relative advantages and shortcomings of the respective education system in terms of providing learning opportunities to students to develop their reading competence (OECD, 2010).

The data from Table 3 suggest that students from Serbia were relatively successful in identifying and selecting information in the text, while they were significantly less successful in reflecting on and evaluating the texts. According to this profile, students from Serbia are most similar to students from the following European countries: Slovenia, Austria, Slovakia and Hungary. Students from the UK and Greece have the opposite profile – these students are relatively more successful in terms of reflecting on and evaluating the information and texts than in terms of identifying and selecting information. Students

from Serbia deal better with linear texts than with nonlinear texts, following the general trend in other countries. This means that students from Serbia are more successful in working with traditional texts that present information in context, while they are somewhat less successful with nonlinear texts (such as, for example, graphs, tables, diagrams, maps, forms, advertisements, etc.).

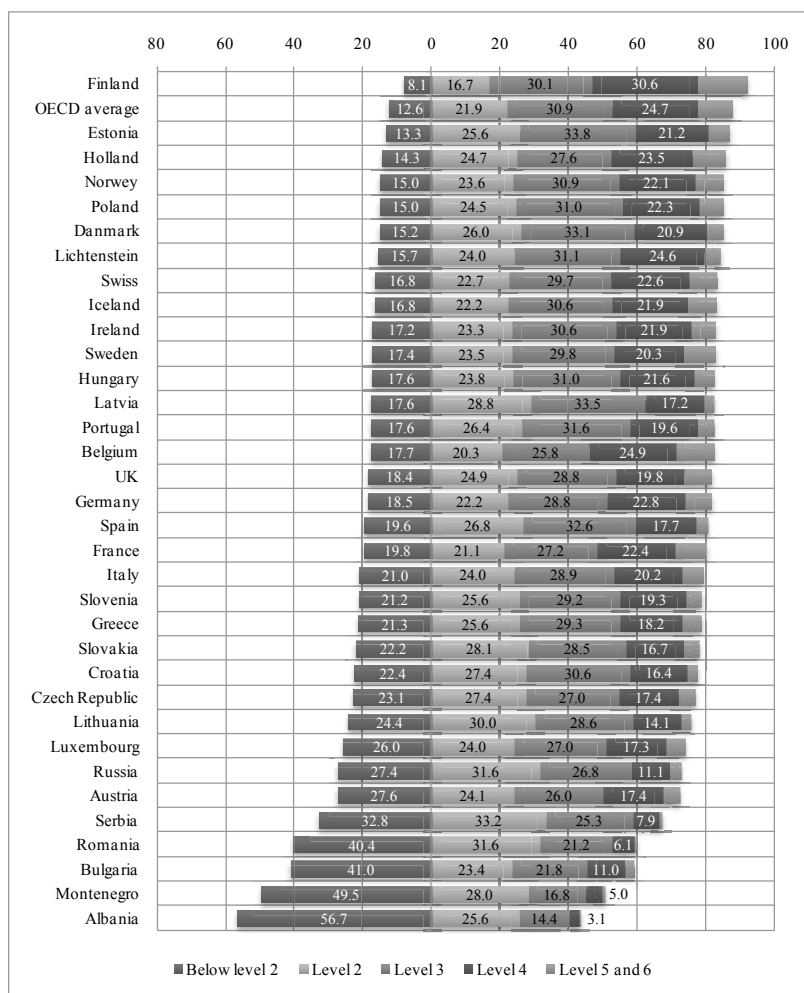
**Table 3:** Comparison of average achievements in different components of reading literacy in relation to the average student score on the reading scale.

	Average score	The difference between the average achievement of certain components and the average achievement on the reading literacy scale				
		Reading aspects			Different types of texts	
		Approach and finding	Connecting and interpreting	Processing and interpreting	Linear texts	Nonlinear texts
Serbia	442	7	3	-12	2	-4
OECD	493	2	0	1	0	0

***Different levels of reading literacy: the distribution of students by levels***

In addition to the average achievements of students, the achievements of students are also described by the percentage of students who attained each of the six levels of achievement – from the lowest level (level 1) to the highest level (level 6). Level 2 has a special significance, since it is treated as the threshold of functional reading literacy both in the PISA study and in EU statistics. Students at this level can understand and cope with only simple, familiar texts in which the important information is clearly marked and easily distinguishable. Existing studies show that young people who are below level 2 at the age of 15 will be faced with significant difficulties in terms of future education and employment opportunities (Bertschy, Cattaneo, & Wolter, 2008).

Figure 2 shows data on the percentage of students who are below level 2, and on each subsequent level of achievement. The data for the two highest levels are aggregated, as the percentage of students at the sixth level is rather small in most countries.



**Figure 2:** Percentage of students at each proficiency level on the reading scale (PISA 2009) – countries are ordered according to the percentage of students below PISA level 2

The data show a big difference in the percentage of students who may be considered as functionally illiterate in the reading domain. In Finland, which has the highest average achievement, less than 10% of students fall below level 2 in the reading domain. In OECD countries, an average of 12.6% of students remained below level 2 and are consequently treated as functionally illiterate. In Estonia, the Netherlands, Norway, Poland and Denmark, less than 15% of students can be considered to be functionally illiterate. With this percentage of functional illiterates, these countries have already achieved the European

benchmarks in education for the year 2020 (less than 15% of students below the level 2) (EU, 2009). Many European countries have between 15% and 20% functional illiteracy amongst students - Liechtenstein, Switzerland, Iceland, Ireland, Sweden, Hungary, Latvia, Portugal, Belgium, Britain, Germany, Spain and France. In some other countries, the percentage of functionally illiterate students is between 20% and 30%: Italy, Slovenia, Greece, Slovakia, Croatia, the Czech Republic, Lithuania, Luxembourg, Russia and Austria. Finally, in Romania, Bulgaria and Montenegro this percentage exceeds 40%, while in Albania it reaches almost 57%.

Data for Serbia show that about 33% of students have not reached level 2. This means that every third student aged 15 in Serbia has difficulty in understanding complex texts, which can represent a significant obstacle to their further education, where reading and understanding textbook texts is an important prerequisite to success in school learning. On this basis, it can be assumed that a third of students from upper secondary education in Serbia will have significant difficulties in continuing their education and finding job opportunities.

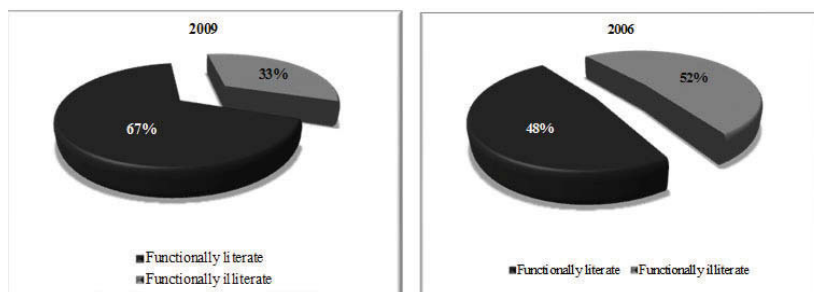
What is the situation with the percentage of students who managed to reach level levels 5 and 6, which represent the highest levels of reading literacy? In two countries (Finland and Belgium), more than 10% of students attained levels 5 and 6, which is the average for OECD countries – 14.5% in Finland and 11.2% in Belgium. In the following ten countries, the percentage of students at the two highest levels is between 7% and 10% (The Netherlands, France, Sweden, Iceland, Norway, Switzerland, UK, Germany and Poland), and in twelve countries it is between 4% and 6% (Hungary, Estonia, Italy, Luxembourg, Greece, the Czech Republic, Austria, Portugal, Denmark, Liechtenstein, Slovenia and Slovakia). In other countries, including Serbia, the percentage of students at these two levels is below 3%. In Serbia, only about 0.8% of students barely reached level 5 in the domain of reading literacy. In other words, if we imagine a school with 1,000 students, in most European countries there would be from 40 to 100 students with the highest level of reading literacy, while in Serbia there would only be only 8 students. These data indicate that the education system in Serbia does not manage to provide learning opportunities to the best students in order to support them in developing reading competence to the highest level.

In summarising the findings on the distribution of students from Serbia at different levels of development of reading literacy, it can be said that after almost nine years of compulsory education every third student has failed to reach the minimum level of functional literacy (level 2), whereas very few students from Serbia manage to reach the highest levels of reading literacy.

Although every third student from Serbia failed to reach the level of



functional literacy in PISA 2009, this result represents a very significant improvement when it is compared to findings from the PISA 2006 study. In the PISA 2006 study, 52% of the students from Serbia fell below level 2, which means that in 2009 the percentage of functionally illiterate students was reduced by almost 20 percentage points (Figure 3).



**Figure 3:** Change in the percentage of students who failed to reach the level of functional literacy in the domain of reading literacy. (PISA 2006 and 2009)

Based on the data presented in Table 4, it can be seen that the biggest changes between the two cycles of the PISA study are related to a decrease in the percentage of students falling below level 2. Changes related to the other proficiency levels are significantly smaller. This suggests that the education system in Serbia significantly improved learning opportunities for most struggling students, thus increasing their chances of reaching the level of functional literacy in the reading domain.

Linking this finding with the finding that the average achievement of Serbian students improved significantly between PISA 2006 and 2009 studies, it can be concluded that the increase in the average achievement occurred primarily as a result of progress made at the lower end of the reading scale. In other words, the improvement in average achievement was largely due to the fact that the education system improved its capacity to support students who are struggling the most.

**Table 4:** Percentage of students in Serbia who have attained certain levels of reading literacy. (PISA 2006 and 2009)

Year	Below level 2	Level 2	Level 3	Level 4	Levels 5 and 6
2006	51.7	28.1	16.0	3.9	0.3
2009	32.8	33.2	25.3	7.9	0.8
Change	-18.9	5.1	9.3	4.0	0.5

## Discussion

The results presented above trigger two issues that should be considered, and simultaneously provide the basis for formulating certain hypotheses as answers to these issues. The first question is: why is the average achievement of students in Serbia significantly lower than in most OECD countries and in other European countries? Secondly: what could explain the improvement in the average achievements made between the 2006 and 2009 PISA studies?

Assuming that the PISA results mainly reflect students' experience in education, primarily in formal education (facilities, operational procedures, typical learning activities, typical patterns of interaction with teachers, textbooks, etc.), rather than differences in so-called "biological potentials," the answer to the first question should be sought in the education system. We believe that when formulating an answer to the first question it is important to bear in mind three findings: (a) the average achievement of students from Serbia is similar to the average achievements of students from Bulgaria and Romania, (b) differences in achievement between students in Serbia are smaller than in the other countries, and (c) a small number of students from Serbia reached the two highest levels, 5 and 6.

Countries (Bulgaria and Romania) that have fallen into the same group as Serbia for several cycles of PISA (Baucal & Pavlovic Babic, 2010) have three important characteristics in common: (a) these are countries in which the overall economic situation is worse than in other European countries, and therefore the investment in education is substantially lower, which is especially true for per capita funding (Eurydice, 2009), (b) educational practice is to a greater extent knowledge-oriented, i.e., students are mainly supported in the acquisition of appropriate academic knowledge and skills rather than in developing key competencies (EU, 2002; Eurydice, 2010), and (c) the dominant form of teaching/learning practice in the classroom is lecturing, while active learning, inquiry based learning and project learning are rather incidental. (Dimou, 2009; Ivic, Pesikan & Antic, 2001; Mintz, 2009; UNICEF, 2001; EU, 2007).

Consequently, we believe that the lower average results of students from Serbia may be only partially explained by the weaker economic situation. As earlier studies (Baucal & Pavlovic Babic, 2010; OECD, 2010) have shown, the relationship between the economic situation in a country and investment in education, on the one hand, and academic achievements, on the other hand, is not strong enough to be the only explanation. We assume that the main explanation for the lower results is related to the fact that teaching and learning in Serbian schools is still typically directed toward the appropriation of academic knowledge, with traditional lectures being the prevailing form of teaching and learning (Dimou, 2009; Ivic, Pesikan & Antic, 2001; UNICEF, 2001). In such conditions, there are scarce learning opportunities for the development of the key competencies and critical thinking that are typically demanded by PISA items, especially those from the highest proficiency levels. This explanation is supported by the fact that less than 1% of students from Serbia managed to reach levels 5 and 6.

In this context, another question becomes very intriguing: if teaching in schools is predominantly directed towards the acquisition of academic knowledge, and if nothing has changed significantly in this respect in the period 2006-2009, how can the remarkable achievements in improving the average reading scale literacy be explained? The results shown earlier indicate that the average achievement was improved largely due to the fact that the percentage of students attaining level 2 increased significantly. However, moving students from the bottom of the scale across the threshold of the second level was not accompanied by an increased number of students at the two highest levels.

Overall, we believe there is no doubt that students and teachers in PISA 2009 were more motivated and more engaged than they were in 2006. It is also true that the Ministry of Education, which was indifferent towards the PISA 2006 study, was very supportive and had a feeling of ownership in PISA 2009. These changes in attitudes towards the PISA study influenced schools, teachers and students to be more motivated to achieve better results. This motivational factor contributed immensely to the improvement of achievement at the lower end of the scale. Therefore, our assumption is as follows: a significant number of students who had difficulty with PISA tasks in 2006 easily gave up solving the tasks, while in 2009 these students made an effort to solve at least the tasks at the lower PISA levels. However, at the upper end of the scale motivation without adequate competencies could not improve the scores. As a result, in 2009, unlike in 2006, many more students from Serbia passed the lower limit of functional literacy, which led to an increase in average achievements but did not significantly increase the percentage of Serbian students on the 5<sup>th</sup> and 6<sup>th</sup> levels.

In order to understand the significance of the improvement in achievement, the general social context in which the students are educated also needs to be taken into consideration. Students who participated in the PISA 2009 study were born in 1993 and started their education in 2000. They are the first generation of Serbian students participating in the PISA study who did not experience a serious interruption in their education due to a lack of electricity or heating, or to strikes, regional conflicts and other events related to the turbulent 1990s. They were educated in relatively stable social conditions after 2000. Therefore, it is very likely that the stable social conditions have also contributed to a certain extent to the improvement of the academic achievement of Serbian students.

It can be concluded that the relatively low average achievement of Serbian students is very likely the result of the dominance of traditional teaching/learning practices, which encourage the transmission of academic knowledge. Furthermore, it seems that the big improvement in the reading domain is not primarily a result of an improvement in the quality of education in Serbia; it is more likely to be a result of assuring proper conditions for PISA 2009 assessment in Serbia. In other words, PISA 2009 results reveal the actual quality of education in Serbia, which was somewhat blurred by the discouraging context in the previous PISA 2006 study. Finally, it can be said that PISA 2009 results are the first baseline study of the quality of education in Serbia to be used in subsequent years for monitoring and policy purposes.

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