PIRLS 2001 RESULTS IN THE CONTEXT OF THE EUROPEAN UNION EXPANSION

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Abstract

The first IEA Progress in International Reading Literacy Study (PIRLS 2001) assessed students' reading achievement at the fourth grade in 35 countries. Information on teaching, learning and home factors was collected from students, their parents, their teachers and their school principals. Among the participating countries, there were seven current European Union (EU) countries (Germany, Greece, France, Italy, the Netherlands, Sweden and the United Kingdom), as well as seven EU candidate countries (the Czech Republic, Cyprus, Hungary, Latvia, Lithuania, the Slovak Republic and Slovenia), slated to join the EU in May 2004. In the last thirteen years, these seven candidate countries have undergone dramatic changes in all fields, including education. What are they bringing into the EU regarding their experiences in developing and reforming educational systems? What similarities and differences are there among fourth graders' reading achievement, teachers and reading instruction, school contexts, students' attitudes towards reading, students' self-concept, out of school activities and literacy-related activities in the home? All of these questions are of great interest as all of these countries will form one Union with a common will to improve and stabilize economies, including providing the best education for their children. This paper examines the major PIRLS 2001 results for all of fourteen countries, highlighting similarities and differences in home educational resources, early home literacy activities, school community and their effects on student achievement.

INTRODUCTION

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Netherlands, Sweden and the United Kingdom), as well as seven EU candidate countries (the Czech Republic, Cyprus, Hungary, Latvia, Lithuania, the Slovak Republic and Slovenia), slated to join the EU in May 2004. Data for England and Scotland were aggregated and labelled "United Kingdom".

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RESULTS

Exhibit 1 presents the distribution of student achievement in reading for all 14 countries. For the purpose of this report, data for England and Scotland were aggregated and labelled "United Kingdom". Countries are listed in decreasing order of average (mean) scale score. As a point of reference, the overall mean for all 35 countries participating in PIRLS 2001 was set at 500. The range in achievement in reading across the 14 countries varies from 561 for Sweden to 494 for Cyprus. Performances between countries appear evenly distributed with no apparent pattern to distinguish between current EU countries and the newcomers.

When we compare achievement levels among individual countries in Exhibit 2, we can see whether or not differences in achievement between certain countries are statistically significant, or not.

Sweden achieved the highest reading literacy result of all participating countries. The Netherlands and the United Kingdom also achieved results higher than the other countries, being outperformed only by Sweden. Latvia, Lithuania and Hungary achieved significantly lower results than Sweden and the Netherlands. Italy and Germany were outperformed by the United Kingdom as well, but had as high, or higher, achievement than the other six countries. Only four countries significantly outperformed the Czech Republic: Sweden, the Netherlands, the United Kingdom and Latvia. France, Greece and the Slovak Republic had significantly better reading results than Slovenia and Cyprus. And finally, Slovenia outperformed only Cyprus. From this brief appraisal, we can see that these fourteen countries display a wide range of achievement levels that, as a general note, do not seem to correlate with whether a country is a current EU member, or a candidate country. It is, therefore, important to analyse in greater detail similarities and differences among these countries. Do the candidate countries display similar patterns in reading achievement, student attitudes and experiences? How do the candidate countries compare with the current EU countries in regards to those same attributes?

Exhibit 1: Distribution of Reading Achievement

Countries	Reading Achievement Scale Score	Average Scale Score	Years of Formal Schooling	Average Age
Sweden		**561 (2.2)**	**4**	**10.8**
† **Netherlands**		**554 (2.5)**	**4**	**10.5**
2a **United Kingdom***		**550 (3.1)**	**5**	**10.2**
Latvia		545 (2.3)	4	11.0
† Lithuania		543 (2.6)	4	10.9
Hungary		543 (2.2)	4	10.7
Italy		**541 (2.4)**	**4**	**9.8**
Germany		**539 (1.9)**	**4**	**10.5**
Czech Republic		537 (2.3)	4	10.5
France		**525 (2.4)**	**4**	**10.1**
2a **Greece**		**524 (3.5)**	**4**	**9.9**
Slovak Republic		518 (2.8)	4	10.3
Slovenia		502 (2.0)	3	9.8
Cyprus		496 (3.0)	4	9.7

200 300 400 500 600 700 800

Percentiles of Performance

5th 25th 75th 95th

Average and 95% Confidence Interval (±2SE)

† Met guidelines for sample participation rates only after replacement schools were included.
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( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
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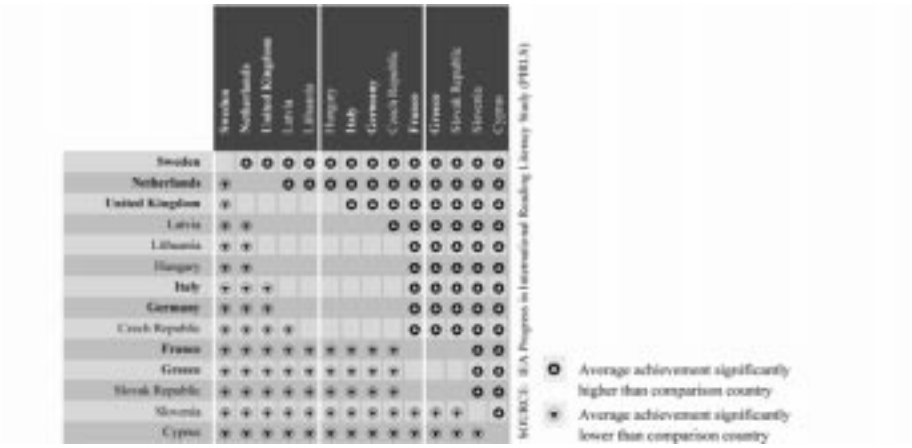
Countries presented in bold are current EU members.

SOURCE: IEA Progress in International Reading Literacy Study (PIRLS)

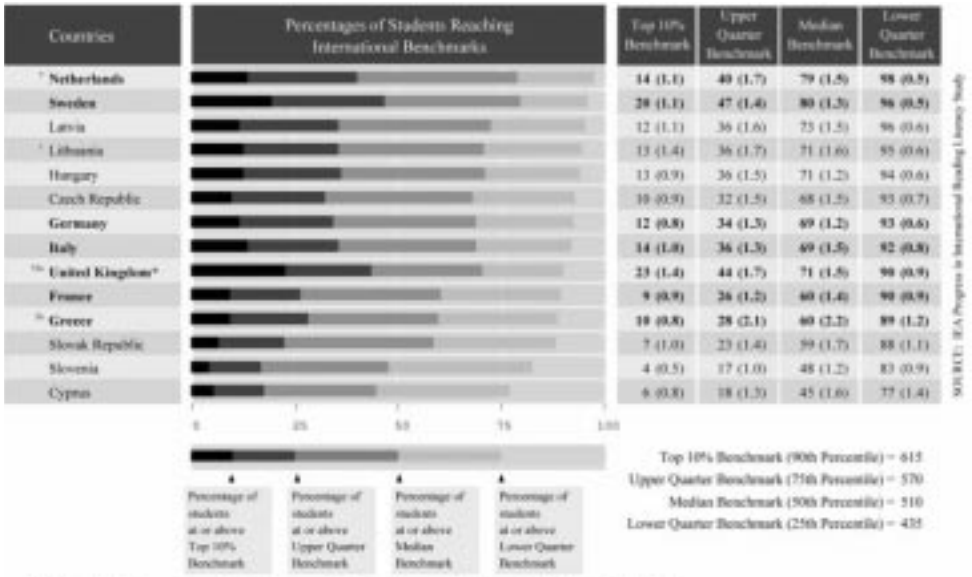
Exhibit 2: Multiple Comparisons of Average Reading Achievement



International Benchmarks

The international benchmarks in reading achievement, especially the lower quarter benchmark, are useful in characterizing the proportion of students that have a level of reading comprehension adequate to allow them to progress through their early school years. Exhibit 3 shows the countries ordered by decreasing percentage of students reaching the lower quarter benchmark.

Exhibit 3: Percentages of Students Reaching PIRLS International Benchmarks



† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7).
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2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4).
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The highest percentage of students reaching the lower quarter benchmark is in the Netherlands, with 98% (14% reach the top 10% benchmark). The next two countries are Sweden (20% reach the top 10%) and Latvia (12% in the top 10%), with 96% of students reaching the lower quarter benchmark. Lithuania is next with 95%, followed by Hungary (94%), Germany and the Czech Republic (93%), Italy (92%), France and the United Kingdom (90%), Greece (89%), the Slovak Republic (88%), Slovenia (83%) and Cyprus (77%). 10% of students in the United Kingdom did not reach the lower quarter benchmark, but at the same time 23% of students reached the top 10%. That is the highest percentage among all the participating countries. This ranking, however, does not display any pattern that would allow us to distinguish the current EU countries from the candidate countries.

Home Educational Resources

We now focus our attention on home educational resources in Exhibit 4 – students' answers about number of books and educational aids in the home, and parents' answers about their education and the number of children's books – since most candidate countries have generally been characterized as having lower economic conditions. Past studies have often demonstrated a strong link between socio-economic status in a country and student achievement in school.

Exhibit 4: Index of Home Educational Resources

Countries	HER Index	Average Achievement	Percent of Students	Simultaneous Confidence Intervals (Within each Country)
France	**High**	**570 (4.3)**	**15 (1.0)**	
	Medium	**523 (2.1)**	**79 (0.9)**	
	Low	**477 (5.5)**	**7 (0.5)**	
Germany	**High**	**576 (2.7)**	**17 (0.9)**	
	Medium	**538 (1.7)**	**79 (0.8)**	
	Low	**472 (5.6)**	**4 (0.4)**	
[2a] Greece	**High**	**575 (5.2)**	**11 (1.1)**	
	Medium	**525 (3.4)**	**80 (1.3)**	
	Low	**481 (5.8)**	**9 (1.0)**	
Italy	**High**	**585 (5.2)**	**7 (0.6)**	
	Medium	**542 (2.2)**	**86 (0.8)**	
	Low	**497 (5.7)**	**7 (0.6)**	
† Netherlands	**High**	**573 (3.8)**	**12 (0.8)**	
	Medium	**555 (2.3)**	**84 (0.7)**	
	Low	**506 (5.9)**	**4 (0.5)**	
Sweden	**High**	**586 (2.7)**	**26 (1.4)**	
	Medium	**553 (2.2)**	**73 (1.4)**	
	Low	**– –**	**1 (0.2)**	
[1a] United Kingdom*	**High**	**582 (4.2)**	**27 (1.0)**	
	Medium	**545 (2.8)**	**69 (0.9)**	
	Low	**476 (7.4)**	**4 (0.4)**	
Cyprus	High	531 (5.5)	13 (0.9)	
	Medium	496 (2.7)	80 (0.9)	
	Low	455 (8.9)	8 (0.7)	
Czech Republic	High	570 (3.8)	15 (1.2)	
	Medium	535 (2.2)	83 (1.2)	
	Low	– –	2 (0.3)	
Hungary	High	586 (3.5)	21 (1.2)	
	Medium	537 (1.8)	75 (1.1)	
	Low	472 (6.6)	4 (0.5)	
Latvia	High	577 (3.8)	15 (0.9)	
	Medium	541 (2.4)	83 (0.9)	
	Low	– –	2 (0.5)	
† Lithuania	High	587 (4.4)	11 (1.1)	
	Medium	540 (2.5)	88 (1.1)	
	Low	– –	1 (0.3)	
Slovak Republic	High	560 (4.5)	10 (1.1)	
	Medium	518 (2.7)	85 (1.3)	
	Low	– –	5 (0.9)	
Slovenia	High	547 (3.8)	11 (0.7)	
	Medium	499 (1.7)	86 (0.7)	
	Low	– –	3 (0.4)	

SOURCE: IEA Progress in International Reading Literacy Study (PIRLS)

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– – Estimates based on too few observations.
Countries presented in bold are current EU members.

Looking at the distribution of students by the home educational resources index in Exhibit 4, we can observe 3 clusters. The first cluster consists of countries with a high percentage of students in the highest level of the index: the United Kingdom (27%) and Sweden (26%). Both countries can be found among the high achieving countries. The second cluster consists of countries with a relatively high percent of students in the lowest level of the index: Greece (9%), Cyprus (8%), France and Italy (both at 7%). These countries tend to be among the lower achieving countries. All remaining countries constitute a third cluster. We can then begin to see some hints of a positive relationship between home educational resources and student achievement. This is confirmed when we examine in more detail student achievement levels at each of the three levels of the index within each country.

In all countries we find a very strong and positive relationship between student achievement and the availability of home educational resources, including parents' education. The achievement gap between students in the highest level of the index, and students in the middle level of the index, ranges from a low of 18 points in the Netherlands, to a high of 50 points in Greece. Netherlands appears as an outlier in this regard, since the next lowest gap is 33 points in Sweden. Because of the very low percentage of students at the lowest level of the index in a number of countries, estimation of their achievement level is unreliable. Nonetheless, among those with reliable estimates for the lowest level of the index, the gap between the middle level and the lowest level ranges from a low of 41 points in Lithuania, to a high of 69 points in the United Kingdom. Thus, the overall gap between the highest level and the lowest level reaches a high of 114 points in Hungary. The smallest overall gap remains relatively high, at 67 points in the Netherlands. Considering that the achievement gap between grades has been estimated at 30 to 40 points in previous studies, this is striking evidence that the availability of home educational resources plays a major role in acquiring reading skills. However, the availability of home educational resources does not allow us to find any pattern to distinguish between current EU countries and the candidate countries.

Early Home Literacy Activities

Paying attention to, and caring for, our children's education before they start school, and during their early education, seems to bring about major improvements in reading achievement, as we can see in Exhibit 5. Reading is one of the first forms of education children receive early in school.

In all countries, there is a strong and positive effect between reading achievement and early home literacy activities (parents' answers about reading books, telling stories, singing songs, playing with the letters of the alphabet, playing word games or reading aloud signs and labels). For example, children in Greece, and in Cyprus, with a high early home literacy activities index, score 47 points more than their counterparts with a low index. The Netherlands has the smallest difference with 11 points favouring the high index group. Differences in the other countries vary from a low of 23, to a high of 46, all favouring the high index group. The United Kingdom has the highest percentage of students with a high early home literacy activities index (83%) and the lowest percentage of students with a low early home literacy

activities index (only 3%). Looking at the other countries, the percentages of students in these groups are very similar, regardless whether they are current EU members or newcomers.

It is worth noting that the relationship between early home literacy activities and student achievement, although a strong one, is not as strong as the one we observed with home educational resources.

School Community

There are interesting patterns in students' reading achievement when examining school community (urban, sub-urban or rural), as shown in Exhibit 6. In this table, we compare students' achievement, depending whether their schools are found in an urban, sub-urban, or rural setting.

We begin to see a first pattern emerging between the two groups of countries. As a general observation, we find comparable achievement levels by school community within current EU countries. Germany and the United Kingdom actually present an interesting feature, whereby student achievement in rural schools is higher than in urban schools.

In all candidate countries, we find that student achievement is highest in urban schools, and lowest in rural schools. The national gaps between rural and urban schools vary from a low of 11 points in the Czech Republic, to a high of 40 points in Hungary. This achievement gap is symptomatic of an important disparity in the delivery of education between rural and urban schools, with rural schools being left behind in some way. As a group, the candidate countries have relatively large populations of students attending rural schools. Although France, Germany and the Netherlands, being EU countries also with large populations of students in rural schools, they have achieved greater equity in the delivery of education.

As a general tendency, where there is an effect between urban or rural communities, it is that in the candidate countries, students living and attending school in an urban setting perform better. In the current EU countries, however, this tendency does not exist, and is actually reversed in Germany and the United Kingdom. As examples, we can cite Latvia, where children from urban schools score 36 points more than their counterparts in rural schools. In Germany, students from sub-urban, or rural schools, score 23 points more than those in urban schools.

These huge differences in student achievement by community among candidate countries should be an important future research question, exploring possible reasons for these performance differences between school communities, and possible solutions to bring about greater equity in learning opportunities, regardless of school community.

Finally, we can mention that students in France, Italy, the Netherlands, Cyprus, the Check Republic, Slovenia and Sweden do not show statistically significant differences in reading achievement, regardless of their school community. This would indicate that among the candidate countries, Cyprus, the Czech Republic and Slovenia have achieved some measure of equity between rural and urban schools, setting examples for the other candidate countries.

Exhibit 5: Index of Early Home Literacy Activities

Countries	EHLA Index	Average Achievement	Percent of Students	Simultaneous Confidence Intervals (Within each Country)
France	**High**	**537 (2.6)**	**56 (1.1)**	
	Medium	**521 (3.2)**	**34 (1.0)**	
	Low	**505 (4.9)**	**9 (0.6)**	
Germany	**High**	**550 (2.0)**	**43 (0.8)**	
	Medium	**542 (2.4)**	**43 (0.7)**	
	Low	**526 (3.6)**	**14 (0.6)**	
[1a] **Greece**	**High**	**540 (3.9)**	**57 (1.4)**	
	Medium	**514 (4.2)**	**33 (1.2)**	
	Low	**493 (7.2)**	**11 (1.1)**	
Italy	**High**	**551 (2.5)**	**62 (1.0)**	
	Medium	**536 (3.2)**	**30 (0.9)**	
	Low	**524 (4.9)**	**8 (0.5)**	
† **Netherlands**	**High**	**566 (2.8)**	**55 (1.2)**	
	Medium	**561 (2.8)**	**37 (1.0)**	
	Low	**555 (5.6)**	**8 (0.6)**	
Sweden	**High**	**572 (2.6)**	**41 (0.8)**	
	Medium	**561 (2.5)**	**45 (0.7)**	
	Low	**548 (3.5)**	**14 (0.5)**	
[2a] **United Kingdom***	**High**	**575 (3.3)**	**83 (1.0)**	
	Medium	**544 (5.6)**	**15 (0.9)**	
	Low	**– –**	**3 (0.4)**	
Cyprus	High	506 (4.3)	57 (1.3)	
	Medium	478 (4.6)	33 (1.2)	
	Low	460 (7.1)	9 (0.6)	
Czech Republic	High	548 (2.4)	52 (1.1)	
	Medium	535 (3.1)	41 (1.0)	
	Low	517 (5.6)	8 (0.6)	
Hungary	High	554 (2.6)	61 (1.1)	
	Medium	533 (2.5)	32 (1.0)	
	Low	528 (5.2)	7 (0.5)	
Latvia	High	555 (2.9)	59 (1.4)	
	Medium	539 (3.1)	34 (1.4)	
	Low	529 (5.5)	8 (0.5)	
‡ Lithuania	High	553 (2.9)	48 (1.3)	
	Medium	540 (3.3)	39 (1.1)	
	Low	528 (4.4)	13 (0.9)	
Slovak Republic	High	525 (2.9)	62 (1.0)	
	Medium	514 (3.4)	32 (0.9)	
	Low	502 (8.2)	6 (0.5)	
Slovenia	High	515 (2.2)	58 (1.2)	
	Medium	490 (2.9)	37 (1.0)	
	Low	479 (6.3)	6 (0.5)	

400 450 500 550 600

SOURCE: IEA Progress in International Reading Literacy Study (PIRLS)

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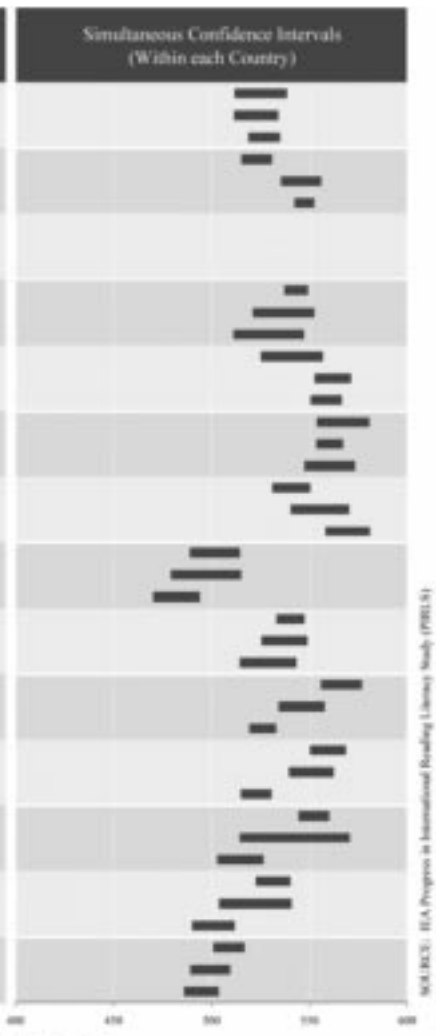
Exhibit 6: School Community

Countries	School Community	Average Achievement	Percent of Students	Simultaneous Confidence Intervals (Within each Country)
France	**Urban**	**525 (5.5)**	**36 (4.1)**	
	Suburban	**523 (4.7)**	**29 (4.2)**	
	Rural	**527 (3.3)**	**35 (3.6)**	
Germany	**Urban**	**523 (3.2)**	**33 (2.8)**	
	Suburban	**546 (4.3)**	**22 (2.9)**	
	Rural	**547 (2.0)**	**45 (3.8)**	
[2a] **Greece**	**Urban**	– –	– –	
	Suburban	– –	– –	
	Rural	– –	– –	
Italy	**Urban**	**543 (2.5)**	**76 (3.2)**	
	Suburban	**537 (6.5)**	**14 (2.5)**	
	Rural	**529 (7.5)**	**10 (2.2)**	
[†] **Netherlands**	**Urban**	**541 (6.6)**	**31 (4.0)**	
	Suburban	**562 (3.9)**	**22 (3.7)**	
	Rural	**558 (3.2)**	**47 (3.8)**	
Sweden	**Urban**	**567 (5.5)**	**15 (3.0)**	
	Suburban	**560 (2.8)**	**67 (3.8)**	
	Rural	**560 (5.4)**	**18 (3.5)**	
[1a] **United Kingdom***	**Urban**	**541 (4.0)**	**47 (4.5)**	
	Suburban	**555 (6.2)**	**32 (4.2)**	
	Rural	**569 (4.7)**	**21 (3.4)**	
Cyprus	Urban	502 (5.3)	45 (3.1)	
	Suburban	497 (7.5)	25 (3.2)	
	Rural	482 (4.9)	30 (2.7)	
Czech Republic	Urban	540 (3.0)	55 (3.4)	
	Suburban	537 (4.8)	17 (3.3)	
	Rural	529 (6.0)	28 (3.2)	
Hungary	Urban	566 (4.3)	28 (2.5)	
	Suburban	546 (4.9)	36 (2.5)	
	Rural	526 (2.8)	36 (1.7)	
Latvia	Urban	559 (3.8)	44 (3.8)	
	Suburban	551 (4.7)	18 (3.9)	
	Rural	523 (3.2)	37 (3.0)	
[1] Lithuania	Urban	552 (3.2)	71 (2.8)	
	Suburban	542 (11.7)	6 (2.1)	
	Rural	515 (4.9)	23 (2.4)	
Slovak Republic	Urban	531 (3.6)	50 (3.7)	
	Suburban	522 (7.7)	10 (2.5)	
	Rural	501 (4.5)	40 (3.1)	
Slovenia	Urban	509 (3.3)	39 (3.3)	
	Suburban	499 (4.2)	27 (3.7)	
	Rural	495 (3.6)	34 (3.0)	



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* Data for England and Scotland are aggregated and labelled "United Kingdom".
– Data not collected in Greece.
Countries presented in bold are current EU members.

CONCLUSION

In general we can see that these fourteen countries display a wide range of achievement levels, but the results do not seem to correlate with whether a country is a current EU member, or a candidate country. However, the last exhibit shows a pattern that needs more attention. In some cases the variations between the achievement levels by school community, among some candidate countries, put children in rural communities at a distinct disadvantage. Children attending rural schools do not appear to get the same quality of education as their urban counterparts. Further analyses are needed to explore the causes of this disparity. Are there factors related to the levels of funding available for rural schools, the quality and quantity of equipment found in rural schools, that could be lacking? Are there differences in the training and competence levels between teachers in rural and urban schools? Further comparisons of school and teacher characteristics between rural and urban settings might shed some light on the sources of disparities in learning opportunities in some candidate countries. Since there are countries, both among current EU countries and candidate countries, that have achieved some degree of equity in this regard, a direct comparison of their school and teacher characteristics could also provide clues to their success.

References

Mullis, Ina V.S., Martin, Mick et al., (2003). *PIRLS 2001 International Report*, Boston College

Mullis, Ina V.S., Martin, Mick et al., (2002). *PIRLS 2001 Encyclopedia*, Boston College

Mullis, Ina V.S., Martin, Mick et al., (1997). *TIMSS 1995 International Report*, Boston College