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Chestnut Hill, Massachusetts (30 September 2013)—A new report released by IEA and the TIMSS & PIRLS International Study Center at Boston College describes what the world's schools, teachers, and parents are doing to better ensure that children succeed in reading, mathematics, and science at the fourth grade.

The report, titled *TIMSS and PIRLS 2011: Relationships Among Reading, Mathematics, and Science Achievement at the Fourth Grade—Implications for Early Learning*, marks a landmark event—the first time that the TIMSS and PIRLS assessments coincided, making the combined study the first at the elementary level to be able to look at the issue of the culture of educational excellence. The report presents data from the same fourth grade students in 34 countries and 3 benchmarking entities that took the TIMSS and PIRLS assessments in 2011. In total, over 180,000 students, 170,000 parents, 14,000 teachers, and 6,000 school principals participated in these two studies worldwide.

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Overall, more than half of the 34 participating countries were successful in educating 90% or more of their fourth grade students to a basic level of proficiency in all three subjects.

"It is very difficult to ensure a balance of achievement across reading, mathematics, and science," said Drs. Ina V.S. Mullis and Michael O. Martin, Executive Directors of the TIMSS & PIRLS International Study Center. "So it is all the more impressive that so many countries have been able to ensure a basic level of student performance in all three subjects."

Five countries were able to educate more than one-third (35%) of their fourth grade students to a basic level of proficiency in all three subjects.

Interestingly, every country had its own unique strengths across the three subjects. For example, Chinese Taipei and Hong Kong SAR showed exceptional strengths in mathematics, while Finland showed strengths in reading and science.

Beyond identifying cultures of excellence, the report provides an understanding of what schools, teachers, and parents are doing to potentially help children achieve higher in these three core subjects.

“In every country, education is an important collective endeavor. All parties—teachers, parents, school and national administrators, and of course the children themselves—play a role in determining each student’s educational achievement,” said Drs. Mullis and Martin. “Of course, every country also is unique in its approach to education. However, the analyses presented in this report suggest that, across countries, there are a number of school and home factors that can positively affect student achievement in reading, mathematics, and science at the fourth grade.”

Working Together to Support Academic Success—First, effective schools support academic success when all parties—principals, teachers, parents, and students—are equally invested in achieving this goal. Specifically, analyses indicated that fourth grade students have higher achievement in reading, mathematics, and science under the following conditions:

- Teachers understand curricular goals;
- Teachers are successful in implementing curriculum;
- Teachers expect student achievement;
- Parents support student achievement; and
- Students desire to do well in school.

Providing a Safe and Orderly School Environment—Second, effective schools support academic success by providing a safe and orderly environment for students. Such an environment:

- Maintains discipline and safety;
- Is safe and orderly; and
- Reduces the frequency of bullying among students.

Engaging Instruction—Importantly, teachers in effective schools support academic success by making sure students are engaged in their reading, mathematics, and science lessons. To promote student engagement, teachers can do the following:

- Ensure that students know what they are expected to do;
- Ensure that students like what they read;
- Strive to be easily understood;

- Present content in interesting ways; and
- Give students interesting things to do and read.

Fostering an Environment for Learning—Fundamentally, parents' level of education is related to a child's level of achievement. Beyond this, a home environment supportive of educational attainment also contributes to a child's achievement. One significant element of the home environment is the number of books present, which can aid parents in engaging their child in both literacy and numeracy activities. The more a child engages in these activities, the more this influences the skills that the child is able to develop prior to entering elementary school; and these skills, in turn, influence the child's achievement in reading as well as in mathematics and science by the fourth grade.

Doing Early Literacy Activities with the Child—Analyses also indicate that engaging children in early literacy activities can help children develop both literacy and numeracy skills. This, in turn, also can lead to higher achievement in the three subjects at the fourth grade. Early literacy activities include reading books, telling stories, singing songs, playing with alphabet toys, talking about things you've done or have read, playing word games, writing letters or words, and reading aloud signs and labels.

Analyses show that literacy is more fundamental than numeracy in the early primary grades; reading is necessary for doing many mathematics- and science-related tasks at the fourth grade.

- Internationally at the fourth grade, in the context of mathematics and science, better readers have an advantage over poorer readers, especially when answering mathematics and science test questions that have high reading demands.
- Only the best group of readers was not disadvantaged when reading and responding to mathematics items with varying reading demands; this group of students performed equally well across questions of high and low reading difficulty.
- The mathematics achievement difference between good and poor readers is significant, and is particularly visible in the following countries: Austria, Chinese Taipei, Croatia, Hungary, Italy, Lithuania, Northern Ireland, Qatar, Romania, the Russian Federation, Saudi Arabia, Singapore, and the United Arab Emirates.

TIMSS and PIRLS are projects of the International Association for the Evaluation of Educational Achievement (IEA) and are directed by the TIMSS & PIRLS International Study Center at Boston College.

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In 2011, the following 34 countries assessed the same fourth grade students in mathematics, science, and reading as part of the TIMSS and PIRLS assessments: Australia, Austria, Azerbaijan, Chinese Taipei, Croatia, the Czech Republic, Finland, Georgia, Germany, Hong Kong SAR, Hungary, the Islamic Republic of Iran, Ireland, Italy, Lithuania, Malta, Morocco, Northern Ireland, Norway, Oman, Poland, Portugal, Qatar, Romania, the Russian Federation, Saudi Arabia, Singapore, the Slovak Republic, Slovenia, Spain, Sweden, United Arab Emirates. Botswana and Honduras assessed the same students in these three subjects at the sixth grade. Benchmarking entities included the Canadian province of Quebec, Canada, and the Emirates of Abu Dhabi and Dubai, United Arab Emirates.

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TIMSS and PIRLS 2011: Relationships Among Reading, Mathematics, and Science Achievement at the Fourth Grade—Implications for Early Learning is available online at the TIMSS & PIRLS International Study Center's web site at <http://timssandpirls.bc.edu> or by calling +1 617 552 1600.

To arrange interviews with TIMSS & PIRLS International Study Center Executive Directors Ina V.S. Mullis or Michael O. Martin, please contact Chad Minnich at chad.minnich@bc.edu.