



Chapter 1

Overview of PIRLS 2006

Ina V.S. Mullis and Michael O. Martin

1.1 Background

As the recognized pioneer of international assessments, IEA has been conducting comparative studies of students' academic achievement for approximately 50 years. IEA's Progress in International Reading Literacy Study (PIRLS) provides internationally comparative data about students' reading achievement in primary school (the fourth grade in most participating countries). The fourth grade is an important transition point in children's development as readers, because most of them should have learned to read, and are now reading to learn. PIRLS has roots in earlier IEA studies, including the reading component of IEA's six-subject study in 1973 (Thorndike, 1973; Walker, 1976) and IEA's Reading Literacy Study conducted in 1991 (Elley, 1992, 1994) and again in 2001 to provide trends (Martin, Mullis, Gonzalez, & Kennedy, 2003).

PIRLS was inaugurated in 2001 to provide reliable measurement of trends in reading comprehension over time on a 5-year cycle. Thus, PIRLS 2006 is the second in a continuing assessment cycle into the future, whereby PIRLS will be conducted again in 2011 and every 5 years, thereafter. To measure trends, confounding effects due to changes from one assessment to the next must be minimized, implying a certain amount of stability in the measurement process over time. At the same time, the assessment must remain current by allowing the introduction of new curriculum concepts, addressing changes in educational priorities, and incorporating the use of new measurement technology. Thus, while PIRLS 2006 built on PIRLS 2001, it also evolved in

important ways to provide more useful and more comprehensive information to the participating countries.

Because addressing the substantive and policy issues related to better understanding of the achievement results is fundamental to IEA's goal of improving teaching and learning, PIRLS also provides extensive information about the home and school contexts for learning to read. To set the national contexts for reading education, the *PIRLS 2006 Encyclopedia: A Guide to Reading Education in the Forty PIRLS 2006 Countries* (Kennedy, Mullis, Martin, & Trong, 2007) summarizes each country's education system, reading curriculum and instruction in the primary grades, and approaches to teacher education. Also, PIRLS includes an extensive array of questionnaires to collect information from students' parents, teachers, and schools, as well as from the students themselves.

1.2 The Participants in PIRLS 2006

Exhibit 1.1 presents the countries that participated in PIRLS 2006 and in PIRLS 2001. Forty countries and 5 Canadian provinces participated in the 2006 PIRLS assessment. Of these, 26 countries and 2 provinces had trend data from PIRLS 2001.

1.3 The PIRLS 2006 Framework

The underpinnings of the PIRLS 2006 assessment are set forth in the *PIRLS 2006 Assessment Framework and Specifications* (Mullis, Kennedy, Martin, & Sainsbury, 2006). More specifically, the PIRLS 2006 framework describes the two major aspects of reading to be addressed by the PIRLS assessments. PIRLS assesses four processes of reading comprehension: focus on and retrieve explicitly stated information; make straightforward inferences; interpret and integrate ideas and information; and examine and evaluate content, language, and textual elements. The processes are assessed within the two purposes that account for most of the reading done by young students both in and out of school: reading for literary experience and reading to acquire and use information.

To guide questionnaire development, the PIRLS 2006 framework also describes the contexts for learning to read, including national and community contexts, home contexts, school contexts, and classroom contexts. Finally, the framework also presents the basic assessment design and specifications for instrument development.

Exhibit 1.1 Countries Participating in PIRLS 2006 and 2001

Countries	2006	2001
Argentina		●
Austria	●	
Belgium (Flemish)	●	
Belgium (French)	●	
Belize		●
Bulgaria	●	●
Canada, Alberta	●	
Canada, British Columbia	●	
Canada, Nova Scotia	●	
Canada, Ontario	●	●
Canada, Quebec	●	●
Chinese Taipei	●	
Colombia		●
Cyprus		●
Czech Republic		●
Denmark	●	
England	●	●
France	●	●
Georgia	●	
Germany	●	●
Greece		●
Hong Kong SAR	●	●
Hungary	●	●
Iceland	●	●
Indonesia	●	
Iran, Islamic Rep. of	●	●
Israel	●	●
Italy	●	●
¹ Kuwait	●	
Latvia	●	●
Lithuania	●	●
Luxembourg	●	
Macedonia, Rep. of	●	●
Moldova, Rep. of	●	●
Morocco	●	●
Netherlands	●	●
New Zealand	●	●
Norway	●	●
Poland	●	
Qatar	●	
Romania	●	●
Russian Federation	●	●
Scotland	●	●
Singapore	●	●
Slovak Republic	●	●
Slovenia	●	●
South Africa	●	
Spain	●	
Sweden	●	●
Trinidad and Tobago	●	
Turkey		●
United States	●	●

Indicates country participation
in that testing cycle ●

1 Although Kuwait participated in PIRLS 2001, the data were not considered comparable for measuring trends.

Chapter 2 of this report describes the updates in the PIRLS framework between 2001 and 2006.

1.4 The PIRLS 2006 Test of Reading Comprehension

The PIRLS 2006 test of reading comprehension was based on 10 passages, 5 literary and 5 informational. Each passage was accompanied by approximately 12 questions, with the assessment comprised of 126 items in total. Two of the literary passages and two of the informational passages had been kept secure from the PIRLS 2001 assessment for the purposes of measuring trend, and these were carried forward for PIRLS 2006. The other three literary and three informational passages were newly developed for the 2006 assessment. The passages were identified and reviewed extensively by representatives of the participating countries. The TIMSS & PIRLS International Study Center conducted an item-writing workshop for country representatives to develop the test questions. So as not to overburden the young students participating in the assessment, PIRLS uses a rotated booklet design and the testing time is limited to 80 minutes (two passages) per student, with an additional 15–30 minutes allotted for a *Student Questionnaire*.

Chapter 2 of this report describes the instrument development process for PIRLS 2006 and provides details about the nature of the passages, items, and scoring guides for the constructed-response questions. The appendix of the *PIRLS 2006 Assessment Framework and Specifications* contains example passages, items, and scoring guides. The *PIRLS 2006 International Report* (Mullis, Martin, Kennedy, & Foy, 2007) includes the outcomes of the scale anchoring analysis conducted to describe students' achievement in terms of the strategies and skills elicited by the assessment, and the appendix contains two of the literary and two of the informational passages from the 2006 assessment.

1.5 The PIRLS 2006 Questionnaires

Building on the foundation provided in PIRLS 2001, the 2006 assessment included five questionnaires to collect data about the educational contexts for learning to read. The students answered questions pertaining to their home and school experiences in learning to read. Parents or caregivers of the sampled students responded to questions about the students' early reading experiences, child-parent literacy interactions, parents' reading habits and attitudes, home-school connections, and demographic and socioeconomic indicators. The

teachers of the sampled students responded to questions about characteristics of the class tested, instructional activities for teaching reading, classroom resources, assessment practices, and about their education, training, and opportunities for professional development. The principals of schools responded to questions about enrollment and school characteristics, school organization, staffing, and resources, and the school environment. As an innovation for PIRLS 2006, the National Research Coordinator (NRC) in each country completed an online *Curriculum Questionnaire* providing data on the goals of reading instruction.

Chapter 3 of the *PIRLS 2006 Technical Report* describes the process for developing the background questionnaires and summarizes the topics covered in each of the questionnaires. Chapter 13 describes the analysis of the background questionnaire data. The *PIRLS 2006 International Report* contains the results for the PIRLS background questionnaires including the indices or scales developed for approximately a dozen of the key background factors.

1.6 Sample Design, Implementation, and Participation

As explained in Chapter 4, PIRLS 2006 had as its target population students enrolled in the fourth grade of formal schooling, counting from the first year of primary school defined by UNESCO's International Standard Classification for Education (UNESCO, 1999). Accordingly, the fourth year of formal schooling should be the fourth grade in most countries. To avoid testing very young children, however, PIRLS has a policy that the average age of children in the grade tested should not be below 9.5 years old.

The PIRLS 2006 assessment was administered to carefully drawn probability samples of students from the target population in each country. The basic design of the sample was a two-stage stratified cluster design. The first stage consisted of sampling schools, and the second stage consisted of sampling intact classrooms from the target grade in the sampled schools. Typically, countries sampled 150 schools and one or two intact classrooms. Most countries achieved the minimum acceptable participation rates—85 percent of both the schools and students, or a combined rate (the product of schools' and students' participation) of 75 percent.

Chapter 4 provides details about the PIRLS 2006 sample design, and Chapter 9 describes the procedures used in calculating sampling weights and participation rates.

1.7 Translation Verification

The PIRLS 2006 instruments were prepared in English and translated into 45 languages. Although most countries administered the assessment in just 1 language, 9 countries and the 5 Canadian provinces administered it in 2 languages, Spain administered the assessment in its 5 official languages, and South Africa administered it in 11 languages. To ensure comparability among translated instruments, the IEA Secretariat, with support from the TIMSS & PIRLS International Study Center, orchestrates a rigorous translation, translation verification, and layout verification process.

Chapter 5 contains information about the procedures used in the translation and layout verification process.

1.8 Survey Operations and Quality Assurance

Each participating country and province was responsible for carrying out all aspects of data collection, using standardized procedures developed for the study and explained in specific units of the survey operations manual and in various training manuals. These manuals covered procedures for test security, standardized scripts to regulate the testing sessions, and steps to ensure that the correct students (those sampled) were being assessed. Each country was responsible for conducting quality control procedures and describing this effort in the online Survey Activities Report. In addition, the TIMSS & PIRLS International Study Center, in conjunction with the IEA Secretariat, conducted an independent quality control program. The reports from the Quality Control Monitors indicate that, in general, national centers were able to conduct the data collection efficiently, professionally, and in compliance with international procedures.

Chapter 6 provides an overview of the data collection procedures. A description of the quality assurance program, together with the results of observations of the Quality Control Monitors, is found in Chapter 7.

1.9 The PIRLS 2006 International Database

To ensure the availability of comparable, high-quality data for analysis, PIRLS 2006 took great care in creating the international database. PIRLS 2006 prepared manuals and software for countries to use in creating and checking their data files, and once the data were forwarded to the IEA Data Processing

and Research Center (DPC) in Hamburg, the data underwent an exhaustive cleaning process. Throughout the process, the data were checked and double-checked, and the national centers were contacted regularly and given multiple opportunities to review the data for their countries.

In conjunction with the IEA DPC, the TIMSS & PIRLS International Study Center reviewed item statistics for each achievement item in each country in case there were poorly performing items. Also, the scoring reliability data were checked for the constructed-response items, including the within-country, cross-country, and trend reliability data. In general, the items exhibited very good psychometric properties in all countries, and the scoring reliability was satisfactory (around 90% in most cases).

Chapter 8 of this report describes the procedures used by countries to check their national data, and the series of editing and documentation steps taken by the IEA DPC in creating the international database. Chapter 10 describes the process of reviewing the item statistics, and includes the scoring reliability results. The PIRLS 2006 International Database is publicly available via the TIMSS and PIRLS website, and is accompanied by the *PIRLS 2006 User Guide for the International Database* (Foy & Kennedy, 2008).

1.10 Scaling and Reporting the Student Achievement Data

As described in Chapter 11, the primary approach to reporting the PIRLS 2006 achievement data was based on item response theory (IRT) scaling methods. Student reading achievement was summarized using a family of 2- and 3-parameter IRT models for dichotomously scored items, and generalized partial credit models for constructed-response items with two or three available score points. The PIRLS reading achievement scales were designed to provide reliable measures of student achievement common to both the 2001 and 2006 assessments, based on the metric established originally in 2001. For more accurate estimation of results for subpopulations of students, the PIRLS scaling made use of plausible-value technology. In addition to the scale for reading achievement overall, IRT scales were created to measure changes in achievement in the two purposes of reading and two overarching reading processes.

To provide richly descriptive information about what performance on the PIRLS reading scale means in terms of the reading skills that students have and comprehension processes and strategies they can bring to bear, PIRLS identified four points on the scale for use as international benchmarks of

student achievement. A scale anchoring analysis was conducted to interpret the PIRLS scale scores and analyze achievement at the international benchmarks.

Chapter 11 presents in-depth information about scaling the PIRLS 2006 reading achievement data. Further information about the scale-anchoring analysis is found in Chapter 12. Chapter 12 also covers the procedures for estimating sampling variance and calculating the standard errors provided together with the statistics in the *PIRLS 2006 International Report*. The *PIRLS 2006 International Report* contains the analysis results.

References

- Elley, W.B. (1992). *How in the world do students read?* The Hague, Netherlands: IEA.
- Elley, W.B. (Ed.). (1994). *The IEA study of reading literacy: Achievement and instruction in thirty-two school systems*. Oxford, England: Elsevier Science, Ltd.
- Foy, P. & Kennedy, A.M. (Eds.). (2008). *PIRLS 2006 user guide for the international database*. Chestnut Hill, MA: Boston College.
- Kennedy, A.M., Mullis, I.V.S., Martin, M.O., & Trong, K.L. (2007). *PIRLS 2006 encyclopedia: A guide to reading education in the forty PIRLS 2006 countries*. Chestnut Hill, MA: Boston College.
- Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., & Kennedy, A.M. (2003). *Trends in children's reading literacy achievement 1991-2001: IEA's repeat in nine countries of the 1991 Reading Literacy Study*. Chestnut Hill, MA: Boston College.
- Mullis, I.V.S., Kennedy, A.M., Martin, M.O., & Sainsbury, M. (2006). *PIRLS 2006 assessment framework and specifications* (2nd ed.). Chestnut Hill, MA: Boston College.
- Mullis, I.V.S., Martin, M.O., Kennedy, A.M., & Foy, P. (2007). *PIRLS 2006 international report: IEA's progress in international reading literacy study in primary schools in 40 countries*. Chestnut Hill, MA: Boston College.
- Thorndike, R. L. (1973). *Reading comprehension education in fifteen countries. International studies in evaluation III*. Stockholm: Almqvist and Wiksell.
- UNESCO Institute for Statistics. (1999). *Operational manual for ISCED 1997: International standard classification of education*.
- Walker, D.A. (1976). *The IEA six subject survey: An empirical study of education in twenty-one countries*. New York: John Wiley & Sons Inc.