

Development Goals



United Nations Educational, Scientific and Cultural Organization

Measuring SDG 4: How PIRLS can help

How the Progress in International Reading Literacy Study (PIRLS) helps monitor Sustainable Development Goal 4 targets

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Why this booklet?

This booklet has been prepared for the international release of the 2016 Progress in International Reading Literacy Study (PIRLS) and ePIRLS at UNESCO. PIRLS is one of the International Association for the Evaluation of Educational Achievement's (IEA) core largescale international assessment projects, successfully administered every five years since 2001. It provides internationally comparative data on how well children read by assessing grade 4 students' reading achievement and offers policyrelevant information for improving teaching and learning. Initiated in 2016, ePIRLS is an extension of PIRLS that monitors how well grade 4 students read, interpret, and critique online information in an environment that looks and feels like the Internet.



The analyses presented in this booklet exemplify ways in which data from a cross-national learning assessment such as PIRLS can help monitor progress towards Sustainable Development Goal (SDG) 4, which aims to "ensure inclusive and equitable guality education and promote lifelong learning opportunities for all". This booklet accompanies the PIRLS and ePIRLS international reports and provides further insights on how learning assessments not only can help monitor learning outcomes but also other indicators in the SDG 4 monitoring framework, such as equity, school violence or teacher gualifications. In addition, it shows how learning is associated with particular factors that also need to be closely monitored. These include children's early childhood experiences, their motivation and educational aspirations, their home background and support they receive from their parents, as well as their learning and teaching environments.

UNESCO and IEA have released this booklet to increase participants' understanding of PIRLS and ePIRLS findings and their relevance for policymaking, the application of learning assessments to measure global education targets, and actions needed to translate the Education 2030 Agenda commitments into national education development efforts.

The IEA's Progress in International Reading Literacy Study

The International Association for the Evaluation of Educational Achievement (IEA) is an independent, international cooperative of national research institutions, and governmental and non-governmental research agencies. For almost 60 years, IEA has been conducting large-scale comparative studies of educational achievement and other aspects of education, with the aim of gaining in-depth understanding of the effects of policies and practices within and across systems of education. IEA has built a strong global network of scholars, researchers, policy analysts, and technical experts in large-scale educational research. IEA has international study centres on three continents, and representatives from almost 70 countries and dependent territories. Nearly 100 educational systems participate in IEA projects.



The Progress in International Reading Literacy Study (PIRLS) is one of IEA's core long-term international assessment projects. PIRLS is directed by the TIMSS & PIRLS International Study Center, Lynch School of Education at Boston College, United States, in close cooperation with the IEA. Statistics Canada monitors and implements sampling activities, the National Foundation for Educational Research in England and Wales and the Australian Council for Educational Research provide support for item development, and Educational Testing Service in the United States consults on psychometrics. The international coordination of the study is carried out in cooperation with national research coordinators of participating countries and dependent territories.

PIRLS provides internationally comparative data on how well children read by assessing students' reading ability, and offers policy-relevant information for improving learning and teaching. PIRLS collects considerable background information on how education systems provide educational opportunities to their students, and the factors that influence how students use these opportunities, by administering school, teacher, and student questionnaires, as well as the Learning to Read Survey completed by students' parents or caregivers. The collected background data include information about: national curriculum policies and implementation in reading; how the education system is organized to facilitate learning; students' home environment and supports for learning; school climate and resources; and how instruction actually occurs in classrooms. Sixty-one educational systems participated in PIRLS 2016, including 50 countries and dependent territories, and 11 benchmarking entities. For countries and dependent territories that have participated in previous assessments, the PIRLS 2016 results provide an opportunity to evaluate progress in reading achievement across four study cycles: 2001, 2006, 2011, and 2016.

The PIRLS target population is the grade that represents four years of schooling, counting from the first year of primary education. To better match the assessment to the achievement level of students, countries and dependent territories have the option of administering PIRLS or PIRLS Literacy (a variant which provides an improved measure of reading literacy skills at the lower end of the achievement scale) at the fifth or the sixth grade.

Initiated in 2016, ePIRLS is an extension of PIRLS that monitors how well grade 4 students read, interpret, and critique online information in an environment that looks and feels like the Internet. The ePIRLS online reading achievement scale enables also a comparison of students' online reading performance relative to their performance on the PIRLS reading achievement scales.

The role of international learning assessments in monitoring SDG 4

In 2015, UN Member States adopted a new set of ambitious goals to address poverty, inequality, disease, unsustainable patterns of consumption, climate change and other development challenges by 2030. The Sustainable Development Goals (SDGs) propose a comprehensive framework to ensure no one is left behind. The primary focus of SDG 4 is to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all," and its corresponding targets promote a renewed and broader focus on inclusion and equity. SDG 4 also expresses a clear concern with the results of educational processes – in terms of both effective acquisition of basic competencies, as well as of relevant learning for civic participation, social and cultural life and employment. This global commitment has important implications for education policy, planning and practice, and particularly, in areas that are critical to improving learning processes and outcomes. Such areas include teacher education and continuous professional development; curriculum development and the design of teaching and learning materials; school management; and learning assessment.

Learning assessment refers to a wide range of methods and tools used to evaluate, measure and document learning outcomes and learning progress. Assessments gather information from multiple sources on what learners know, what they can do with what they have learnt, and provide information on the processes and contexts that enable learning, as well as identifying factors that may be hindering progress in learning. Such evidence can be used to help learners to learn, teachers to improve instruction, planners to decide on resource allocations, and policymakers to evaluate the efficiency of education programmes. More recently, there has also been a growing interest in learning assessment for accountability, to determine the extent to which education systems yield the desired learning and social outcomes.

The Education 2030 Agenda requires efficient and accurate systems to measure progress towards SDG 4 commitments. International learning assessments can make important contributions to this process by collecting cross-national data that assess progress towards learning goals, creating a common language for defining and discussing competency levels in learning. These data are an important indicator of quality education, complementing the commonly used proxy indicators such as pupil-teacher ratios, percentage of trained teacher or expenditure per pupil as percentage of gross domestic product.

In addition to measuring learning achievement, international assessments include a set of background questionnaires for students, parents, teachers and school principals. Such contextual data enable in-depth analysis of achievement, track equity in learning outcomes, provide important information on learning determinants, and inform aspects of the broader SDG 4 monitoring framework. Interpreted together with learning achievement data, the evidence generated by the questionnaires allows for a better understanding of results in relation to children's early childhood experiences, their motivation and educational aspirations, their home background and the support they receive from their parents, and their school climate and learning and teaching environments. Such analyses provide evidence which stakeholders – teachers, school principals, parents, and policymakers - can use to contribute to improved learning for all.

SDG 4 targets, associated monitoring indicators and how PIRLS data can inform progress



Target 4.1: By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.
Global indicator 4.1.1 Proportion of children and young people in (a) Grade 2/3;
(b) at the end of primary... achieving at least a minimum proficiency level in reading, by sex.
Analysis: Percentage of grade 4 students above the PIRLS low international benchmark.



Target 4.2: By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education. **Global indicator 4.2.2** Participation rate in organized learning (one year before the official primary entry age), by sex.

Thematic indicator 4.2.3 Percentage of children under 5 years experiencing positive and stimulating home learning environments.

Analysis: Participation rate in preschool and effect of early reading activities.



Target 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

Thematic indicator 4.4.2 Percentage of youth/adults who have achieved at least a minimum level of proficiency in digital literacy skills.

Analysis: Effect of gender on information reading skills as an aspect of digital literacy.



Target 4.5: By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

Global indicator 4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated.

Analysis: Effect of early reading activities by gender, of books at home, and of language of instruction on reading skills.



Target 4.a: Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all. Thematic indicator 4.a.2 Percentage of students experiencing bullying, corporal punishment, harassment, violence, sexual discrimination and abuse. Analysis: Incidence of bullying and correlation with reading skills.



Target 4.c: By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

Global indicator 4.c.1 Proportion of teachers in ... (b) primary education ... who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country.

Thematic indicator 4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training.

Analysis: Availability of qualified teachers and content of teacher preparation.



Target 4.1: Primary education

The Education 2030 Agenda places learning outcome indicators at the heart of the international education monitoring framework. Part of the global indicator of target 4.1 is the percentage of students who meet a minimum level of proficiency in reading at grades 2/3 and at the end of primary education. PIRLS data directly inform the indicator at grade 2/3 level (as performance of grade 4 students counts as contributing to this level) but also at the end of primary level (for countries and dependent territories that administer the assessment to grade 5 or 6 students). Despite active steps taken since 2016 by the UNESCO Institute for Statistics, which has convened the Global Alliance to Monitor Learning, there is no global standard for proficiency yet. As a result, countries and dependent territories report data according to the benchmarks defined by the respective cross-national assessments in which they take part.

In the case of PIRLS, there are four different benchmarks (advanced, high, medium, and low), which describe the types of reading strategies children undertake and the cognitive processes of which they are capable. For example, students at the low international benchmark can retrieve explicitly stated information and make straightforward inferences.

Tracking progress in those countries and dependent territories where, at any one round since 2001, fewer than 90% of students had scored above the PIRLS low international benchmark provides interesting insights. In these settings, the average increase between two rounds was 3.6 percentage points. Morocco and Oman, two countries where enrolment rates have increased dramatically since 2000 are the two countries that recorded the largest increase between 2011 and 2016 in reading scores. If they maintain this rate of progress over the next 15 years, these countries will make huge strides towards meeting target 4.1. In practice, most countries make slower progress and some, such as Azerbaijan, Malta, Saudi Arabia and South Africa, even recorded declines in the 2016 assessment, taking them further from the target.

The PIRLS encyclopaedia also helps monitor commitments towards ensuring the relevance of learning outcomes by providing comprehensive information on the emphasis of the language curriculum.

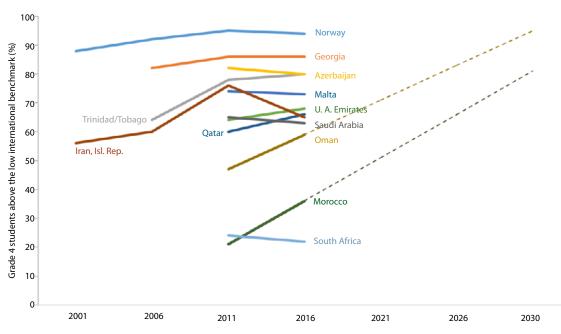


Figure 1. Percentage of grade 4 students above the PIRLS low international benchmark, selected countries, 2001-2016

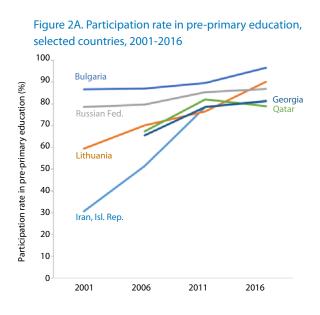
Note: Selected countries include those where, in any year, less than 90% of students were above the low international benchmark.

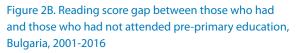


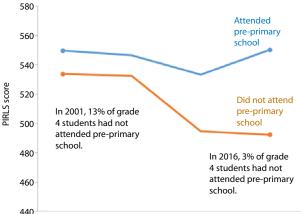
Farget 4.2: Early childhood

In general, countries and dependent territories that have participated in PIRLS have experienced an increase in the percentage of grade 4 students who had attended pre-primary school. For example, in the Islamic Republic of Iran, the percentage of children children that had attended pre-primary school increased from 31% to 81% in just 15 years. Access to pre-primary education may support the development of early reading skills: the 2016 survey found that those who had attended three years or more of pre-primary education scored 520 points on the PIRLS scale, while those who had not attended scored 472 points on average.

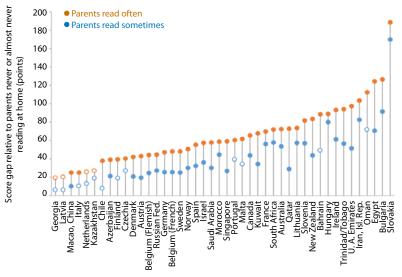
Caution is needed, however, when interpreting these scores. For example, in Bulgaria, the average score of those who had attended pre-primary school remained constant at about 550 points between 2001 and 2016. By contrast, the score of those who had not attended pre-primary school fell from 538 to 495 points during this time. This may be because the percentage of those who had not attended pre-primary school fell from 13% to 3%, and those last few children not accessing preschool are likely to have been among the most vulnerable.







One of the indicators under Target 4.2 refers to stimulating home environments. Children whose parents sometimes or often read to them at home in early childhood had an advantage in reading scores over those whose parents almost never or never read to them. In only eight participating countries and dependent territories did the percentage of children whose parents did not read to them at all exceed 5%; in Morocco it was 29%. Figure 3. Relationship between early reading activities at home and reading scores, 2016



Note: Solid circles indicate the score difference was statistically significant, while unfilled circles indicate the score difference was not statistically significant.



Target 4.4: Skills for work

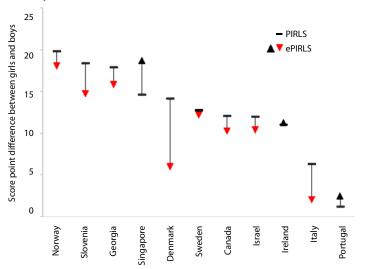
Target 4.4 focuses on relevant skills for youth and adults for "employment, decent jobs and entrepreneurship". Despite the wide scope of the target, it is challenging to identify skills that are relevant across countries and different labour market contexts. For that reason, the monitoring framework has focused on information and communications technology skills in general – and digital literacy skills in particular. From that point of view, the introduction of ePIRLS, which assesses online informational reading skills, can potentially offer interesting insights into the development of some aspects of digital literacy skills at a young age.

Grade 4 students in almost all countries and dependent territories that took part in ePIRLS have high exposure to technology at home and school. For example, at most 2% of students had low access to digital devices at home, i.e. either students reported there was no computer and internet connection, or parents reported there were fewer than four digital information devices and no digital device for reading. The only exception was Georgia (9%). At school, at most 15% of grade 4 students (in Portugal and the United Arab Emirates) were greatly affected by shortages of digital resources, according to their teachers.

Exposure to digital resources does not necessarily improve ePIRLS literacy scores. Students who spent more than 30 minutes per day searching for information on the internet scored slightly below those who spent less than 30 minutes per day. Nevertheless, students who spent more than 30 minutes per day using a computer or tablet to prepare reports and presentations performed better on average (549 points) than those who spent less than 30 minutes (535 points).

One dimension of interest is the potential effect of gender on PIRLS and ePIRLS reading scores (see target 4.5). While girls had a higher score in both assessments, being female had a slightly weaker effect on the ePIRLS score than on the PIRLS score in most countries, notably Denmark and Italy, after controlling for the potential influence of background characteristics, such as having many books at home or being economically affluent. This could suggest that boys may feel slightly more at ease with online than with printed texts.

Figure 4. Differences in reading achievement score points between girls and boys in PIRLS and ePIRLS







The Education 2030 Agenda calls on leaving no one behind and requires access to disaggregated data. PIRLS allows for greater disaggregation of data on learning outcomes by gender, socioeconomic status, and language as well as by age, disability, and other variables obtained from the different background questionnaires.

Gender

PIRLS 2016 reaffirms that girls considerably outperform boys in reading skills, which is a reminder that these gaps begin in early primary grades. There are significant differences in the way parents approach early reading activities at home with their girls and boys. In many countries and dependent territories, parents were more likely to read books at home often to their girls than to their boys. The largest gap was observed in Italy where 54% of girls but only 46% of boys enjoyed frequent reading activities at home.

Students' reading abilities at grade 4 differ by the frequency of early literacy activities. Students who were exposed to more of these activities in their early childhood had higher reading scores in PIRLS in nearly all countries. However, gender seems to play a role in the relationship between early reading activities and reading abilities at grade 4.

In most participating countries and dependent territories, a lack of early reading activities affects boys more than girls. On average, the reading score difference of boys whose parents read books often compared to those whose parents hardly ever read to books to them in early childhood is 64 points, compared to only 55 points for girls - a gender gap of nine score points.

Figure 5. Gender gap in incidence of parents

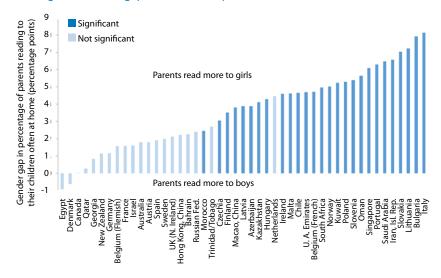
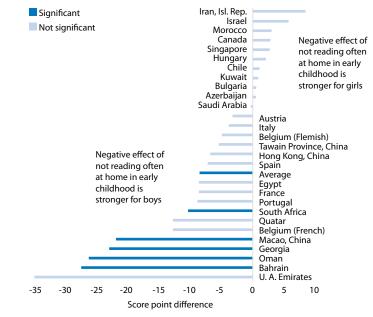


Figure 6. Gender gaps in reading score differences between children whose parents read books often, and children whose parents hardly ever read books, to them in early childhood



Note: Due to small sample sizes within the subgroups to be compared, the differences are statistically significant in only a few countries.

Socioeconomic status

Measures of socioeconomic status, such as income, consumption and wealth may indirectly capture the support children receive at home. However, in a learning assessment of grade 4 children, it is difficult to obtain information that can accurately capture differences in material conditions. It has therefore become common practice to ask children to report the number of books at home as a proxy of social, economic and cultural status.

This measure of home inputs shows large disparities between participating countries and territories. At the two extremes, 90% of homes in Egypt had fewer than 25 books (with 71% having fewer than 10 books); by contrast, in Finland the corresponding ratio was 20% of homes (with just 4% having fewer than 10 books).

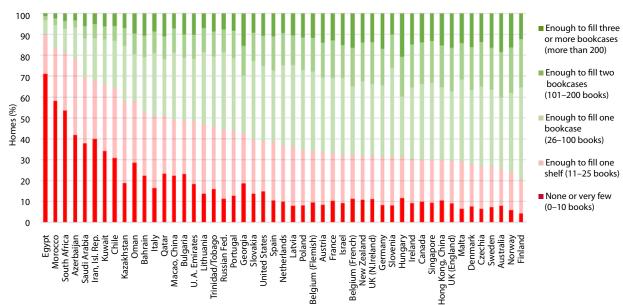
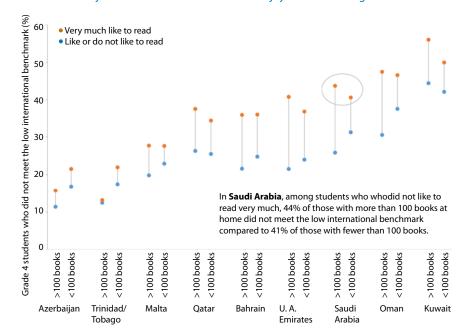


Figure 7. Distribution of grade 4 student families by possession of books, 2016

Within countries, growing up in an environment without books is associated with a much higher likelihood that the child does not meet the low international benchmark in reading skills. However, this does not tell the full story. In some countries, such as Oman and Saudi Arabia, children with more books at home who did not much like to read appeared to have slightly worse reading skills than children with fewer books at home who enjoyed reading.

Figure 8. Percentage of grade 4 students who did not meet the low international benchmark by number of books at home and enjoyment of reading



Note: Selected countries include those where the percentage below the international benchmark was above 20%.

Language

When children are taught in a language that they do not speak at home, they are at a disadvantage. Recognizing this factor is necessary to interpret the results of reading assessments. For example, practically all native speakers of the languawwwge of the test score above the low international benchmark in Spain and Slovakia, but in Slovakia, as many as 65% of children who do not speak the language of the test at home fail to pass this benchmark. Large gaps are observed in countries such as Chile, Malta and the Islamic Republic of Iran, where two to nearly three times as many children who do not speak the language of the test at home score below the low international benchmark.

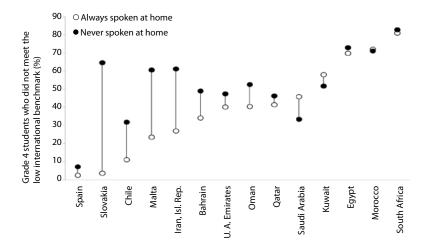


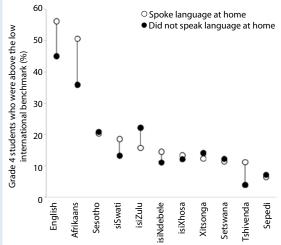
Figure 9. Percentage of grade 4 students who did not meet the low international benchmark by relationship to the language of instruction

South Africa: Commitment to home language education

South Africa has made a major effort to provide education in its 11 national languages. PIRLS provides evidence on the extent to which children who are taught in their home language acquire stronger reading skills. There is no clear pattern among African languages in the effect of being taught in one's home language, with Swati and Tshivenda speakers scoring better than their peers who were taught in those languages but spoke another language at home. However, apart from English, the number of students who did not speak the language of the test at home was limited.

For students speaking the language of the text at home, the outstanding feature of the distribution of reading skills is the vast gap between English/Afrikaans and the other nine national languages. While 56% of English-speakers and 51% of Afrikaans-speakers performed above the low international benchmark, only 20% of Setswana-speakers and no more than 7% of Sepedi speakers did.

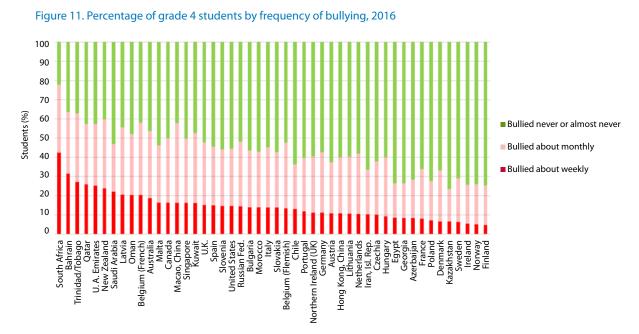
The disparity in performance among those taught in English between those who spoke English at home and those who did not is a clear indication that being taught in a language not spoken at home puts a child at a disadvantage. At the same time, 45% of non-English speakers performed above the low international benchmark, well above any of the African languages. It is likely that this result reflects the learning environment in English-medium schools and the socioeconomic status of the respective school populations. The same is true of Afrikaans-medium schools. More analysis is needed to disentangle these factors, but PIRLS data can help shed light on this key issue. Figure 10. Percentage of grade 4 students who were above the low international benchmark by relationship to the language of instruction, South Africa





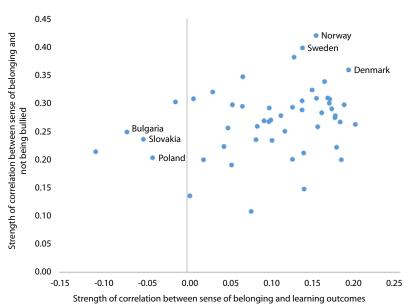
arget 4.a: Learning environment

The importance of a safe environment as a factor determining learning has been recognized in the Education 2030 Agenda. Learning assessments, such as PIRLS, provide insight into the quality of the learning environment. One aspect of this environment is the incidence of bullying. For example, the percentage of grade 4 students who had been bullied weekly varied from 42% in South Africa to 5% in Finland.



The data suggest that as the incidence of bullying decreases, students' sense of belonging to a school increases. Likewise, in most countries, the stronger the students' sense of belonging, the better their learning outcomes. This relationship is stronger in Scandinavian countries such as Denmark, Norway and Sweden, and weaker in Eastern European countries, such as Bulgaria, Poland and Slovakia. While these relationships do not constitute causal links, they draw attention to an issue that merits further investigation.







Formal qualifications

The Education 2030 Agenda calls for countries to increase the supply of qualified teachers and ensure that they are deployed where they are needed most. Although there is no international consensus yet on how to define a qualified teacher, one indicator is the highest level of formal education completed. In most countries, reading teachers of grade 4 students hold at least a Bachelor or equivalent degree of long cycle tertiary education (in green colour). In Bulgaria, Czechia, Finland, Germany, Georgia, Poland, and Slovakia, over 75% of grade 4 students are taught by reading teachers holding a Master's degree.

But there is variability both within and across countries and dependent territories. In some settings, reading teachers of grade 4 students hold a combination of Bachelor's and short-cycle tertiary degrees. For example, in Austria, 68% of grade 4 students are taught by reading teachers holding short-cycle tertiary degrees. In South Africa, 40% of grade 4 students are taught by reading teachers holding a post-secondary, non-tertiary degree. In Morocco and Italy, large numbers of grade 4 students are taught by reading teachers reporting only an upper secondary education certificate as their highest level of formal education completed (40% and 63%, respectively).

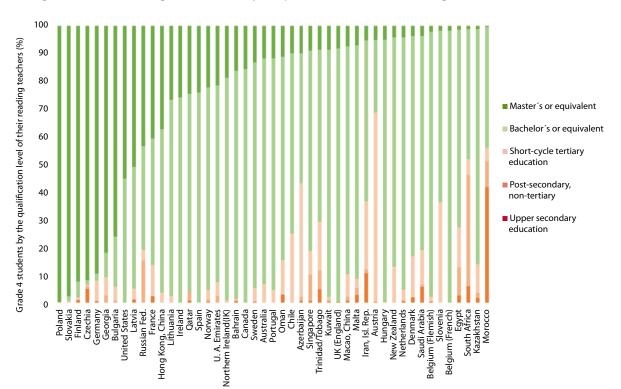


Figure 13. Distribution of grade 4 students by the qualification level of their reading teachers

Teachers' levels of formal qualifications have implications for the quality of education provision. Becoming an expert teacher comes about through a mix of high-quality formal education and practical training. By monitoring teachers' qualifications, countries can make evidence-based decisions on how to allocate resources for teachers' professional development based on needs or whether a policy reform is needed to improve initial teacher education.

Pedagogical training

Another indicator of teacher quality is whether teachers have received pedagogical training for the subjects in which they teach. In the case of reading, this includes study of the classroom language, reading pedagogy, reading theory, assessment methods for reading, as well as second language teaching, and methods for remedial instruction. In countries where the classroom language is different from the home language, teachers with specialized training can help close reading achievement gaps.

On average, across all countries and dependent territories participating in PIRLS 2016, 64% of grade 4 students are taught by reading teachers who report having studied reading pedagogy or teaching methods specific to reading instruction as an area of emphasis during their formal teacher education, and 70% by reading teachers who report having studied the classroom language as an area of emphasis. Both are crucial to providing high-quality reading instruction.

However, many teachers do not receive sufficient training on the specialized skills required to ensure successful reading achievement for all children. On average, across all countries and dependent territories participating in PIRLS 2016, only 18% and 23%, respectively, of grade 4 students were taught by reading teachers who reported having studied second language learning and remedial reading instruction as areas of emphasis.

Learning to read involves a complex interplay of language, perceptual (visual), and informationprocessing skills. Sometimes one (or more) of these processes breaks down, or is negatively affected by disadvantage, such as poor knowledge of the classroom language. In such cases, teachers should be able to assess students' particular difficulties in order to better adapt reading instruction.

However, only 32% of grade 4 students are taught by reading teachers who reported having studied assessment methods in reading. Teachers who can assess reading difficulties can better adapt their teaching methods to students' specific needs, thereby ensuring more inclusive and equitable quality learning for all.

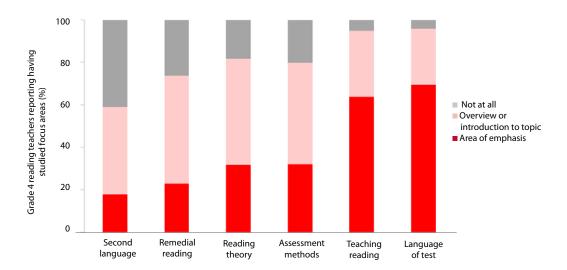


Figure 14. Proportion of grade 4 students whose reading teachers reported having studied particular areas during their education

UNESCO Education Sector

Education is UNESCO's top priority because it is a basic human right and the foundation on which to build peace and drive sustainable development. UNESCO is the United Nations' specialized agency for education and the Education Sector provides global and regional leadership in education, strengthens national education systems and responds to contemporary global challenges through education with a special focus on gender equality and Africa.



Education Sector

Educational, Scientific and Cultural Organization

The Global Education 2030 Agenda

UNESCO, as the United Nations' specialized agency for education, is entrusted to lead and coordinate the Education 2030 Agenda, which is part of a global movement to eradicate poverty through 17 Sustainable Development Goals by 2030. Education, essential to achieve all of these goals, has its own dedicated Goal 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." The Education 2030 Framework for Action provides guidance for the implementation of this ambitious goal and commitments.



IEA

The IEA is an international cooperative of national research institutions, government research agencies, scholars and researchers working to evaluate, understand and improve education worldwide. The IEA is a non-profit and independent organization. More than 60 countries are actively involved in the IEA network, and over 100 education systems participate in its studies.



TIMSS & PIRLS International Study Center

Located at Boston College's Lynch School of Education, IEA's TIMSS & PIRLS International Study Center conducts regular international comparative assessments of student achievement in mathematics and science (TIMSS) and in reading (PIRLS) in more than 60 countries.

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