Education in Zambia

Findings from Zambia's experience in PISA for Development

PISA
FOR DEVELOPMENT

OECD
BETTER POLICIES FOR BETTER LIVES

Findings from Zambia's experience in PISA for Development

Disclaimer

This report was developed by Zambia jointly with the Organisation for Economic Co-operation and Development (OECD), which assisted in the design of the report and provided input, guidance and assistance in its development. The report is published under the responsibility of Zambia and does not necessarily represent the official views of the OECD or its Member countries.

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Preface

The purpose of this publication, the first of its kind in Zambia, is to present the results of our country's participation in the OECD's Programme for International Student Assessment (PISA). PISA has become one of the world's premier yardstick for evaluating the quality, equity and efficiency of school systems. This report describes the results achieved by our students, the resources invested in our education system, and the learning environments in our schools and communities, in ways that allow for comparisons with other countries participating in PISA, some of them from our own continent. The data and analysis contained in this report will help our government and our educators identify the main challenges that may need education policy interventions in Zambia, and can inform the development of effective strategies to confront them.

Zambia joins almost 90 countries and economies that have participated in PISA since it began in 2000. Zambia is one of nine countries that partnered with the OECD through the "PISA for Development" initiative, whose aim is to make PISA more accessible and relevant to middle and low-income countries like ours. PISA-D saw important enhancement of the PISA assessment instruments themselves, which were re-designed to capture a wider range of performance levels and social contexts, but on the same scales as those used in the regular PISA assessment. We have also gone through the capacity development that has been built into the PISA for Development project and this will be utilised by us in future studies.

Dr. Felix Phiri
Permanent Secretary- Administration
Ministry of General Education

The Ministry of General Education's purpose is to shape an education system for our country that delivers equitable and excellent outcomes for all of our children and young people. A strong focus on student learning and well-being underpins all our policy and the services we provide.

It is to help us achieve our Ministry's purpose that we joined the OECD's Programme for International Student Assessment, PISA. This programme aims at evaluating education systems worldwide by assessing the extent to which 15-year-old students have acquired key knowledge and skills that are essential for full participation in modern societies. Zambia's participation in PISA demonstrates the importance we place on monitoring the educational achievement of our children and young people.

In this report, a team of Ministry of General Education officials has collated and analysed the information from our participation in PISA which can be used to benefit the education sector and, therefore, the children in our education system. This report contributes sound data, information and analysis for work undertaken to support the Government's existing education policies, strategies and programmes in the future. The report also brings out our education challenges, the experiences of other countries of similar size and economic status. This opportunity for international comparison and learning is an extremely valuable aspect of our participation in PISA.

The PISA focuses on the core school subjects of reading, mathematics and science, and does not just ascertain whether students can reproduce knowledge; it also examines how well students can extrapolate from what they have learned and can apply that knowledge in unfamiliar settings, both in and outside of school. This information about students' capacities in these three domains is combined with background data that enable us to look at the relationships between student achievement and contextual factors, such as students' health and well-being and their socio-economic backgrounds, students' attitudes to school and learning, the learning environment, quality of instruction, school resources, learning time, student engagement, family and community support.

You will find in the first five chapters of this report a detailed and thorough analysis of what PISA data tells us about our students' performances in reading, mathematics and science, how this performance compares to students in other countries and what factors are most strongly related to this performance. In the sixth and final chapter, the report lays out the policy implications of the findings and results and points the way for strengthening those of our current education policies that are most relevant and to adapting others, including education policies from other countries that may be useful for us to follow.

One of the most important things that PISA data tells us about our education system are that in Zambia only 5% and 2% and of our students achieved the minimum level of proficiency in reading and mathematics respectively. Among OECD countries on average, students' minimum level of performance is 80% in reading and 77% in mathematics. In common with almost all countries in the world, girls in Zambia outperformed boys in reading. We also found that students of urban schools outperformed students of rural schools in all subjects measured by PISA and that advantaged students were 14 times more likely than disadvantaged students to attain the baseline level of proficiency in mathematics. These are important messages for us regarding the quality of student learning and equity of our education system.

We look forward to government's full response to the findings and messages contained in this report and to follow up the suggestions regarding effective interventions that are set out in the final chapter. The effective interventions highlighted in this report include actions designed to:

- establish strong foundations for success and improving educational outcomes;
- improve the allocation of resources in education;
- improve the school environment;
- improve the quality of instruction; and
- strengthen family and community support for education.

Success in education relies on many people and organisations across the community working together for the benefit of children and young people. We trust the information in this report will help all of us involved in education in pinpointing the areas of difficulty and beginning to determine intervention strategies.

Dr. Michael M. Chilala
Director
Examinations Council of Zambia

In Zambia, 5% of students achieve the **minimum level of proficiency** in reading and 2% in mathematics.
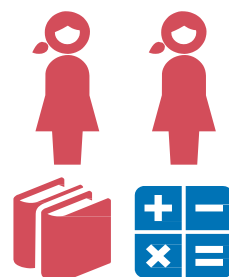
Girls outperform boys in reading by 14 points **and** in mathematics by 6 points.

Students of **urban schools outperform** students of **rural schools** in reading with a performance difference of 56 score points, the equivalent of more than a year of schooling..

A significant proportion of students report having **missed school for more than 3 months in a row** (24%), with health problems (their own, or those of family members) being often cited as the reason..

49% students report that several times a month or more they **discuss with their parents** how well they are doing at school.
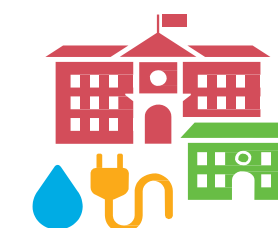
Rural and disadvantaged schools tend to have **school facilities** in worse condition than urban and advantaged schools.

Advantaged students are 14.4 times more likely than disadvantaged students to attain the baseline level of proficiency in mathematics.

The percentage of the Zambian population that has **attained at least grade 7 by age 15** in 2017 was 36%. The remaining 64% of 15-year-olds in 2017 were either in grades below 7 or out of school.

In Zambia, a large majority of students (81%) feel that they **belong at school**..

Zambia allocates 5% of **GDP** and 16.5% of **public expenditure** to education.

Disadvantaged students are 2.1 times more likely than more advantaged students to report **low life satisfaction**….

…and 1.8 times more likely than more advantaged students to report **poor or fair health**..

While 85% of students report that they **feel safe at school**, only 75% feel safe on the way home from school. At school, the most frequent threats to safety are theft and physical violence (threats and fights)..

The bottom line...

- Improve resource allocation particularly for rural and disadvantaged schools.
- Strengthen teacher recruitment policy by ensuring that teachers are deployed where they are needed and also make working in rural areas attractive.
- Reform the text book procurement policy. For example, procurement could be decentralized to districts and schools so that instructional resources are procured as need arises.
- Improve attainment by reducing school entry age and by strengthening remediation for students who lag behind to reduce grade repetition.
- Improve quality of instruction by strengthening teacher training by standardizing the curricular across Colleges of Education.

Zambia in PISA-D

In September 2017, **5,273 students** in 200 schools in Zambia…
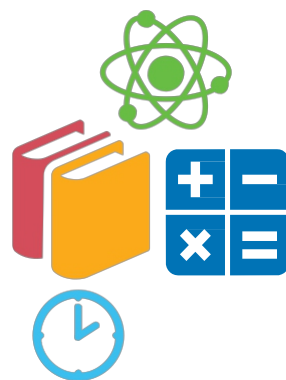
…took a **2-hour test** in reading, mathematics and science

3 questionnaires collect background information on students, teachers and schools to help explain the factors associated with the test scores, especially those related to equity and equality

…took a **2-hour test** in reading, mathematics and science

In Zambia, most 15-year-olds are finishing primary school at **grade 7**, and some are finishing lower secondary education at **grade 9**

9 countries participated in **PISA-D** and have results comparable to the **80+ countries** that have participated in **PISA**.

1

Zambia in PISA-D

Abstract

This chapter describes PISA and PISA for Development and also explains how the information collected in the assessment can be used to compare the education system in Zambia to other countries and drive improvement in students' achievement, attainment, well-being and engagement with learning. The last section of this chapter introduces the framework for the national report and what will be covered in the chapters that follow

1   In Zambia during September 2017 more than 5,000 15-year-old students in 7th grade or above from randomly selected schools across the country took a two-hour test in reading, mathematics and science. These tests were not directly linked to Zambia's school curriculum – rather, they were competency based and internationally comparable. The tests were designed by the Organisation for Economic Co-operation and Development (OECD) to assess the extent to which students in Zambia at the end of compulsory education can apply their knowledge to real-life situations and be equipped for full participation in society. In addition to the tests, background questionnaires for students, schools and teachers were completed to provide context which can help Zambia and the OECD to interpret the results. These tests are part of an international large-scale assessment of learning which is managed by the OECD and is called the Programme for International Student Assessment or PISA for short.

1.1 Zambia's participation in PISA-D

2   PISA evaluates students aged between fifteen years and three months and sixteen years and two months at the time of the evaluation, who are studying in the 7th grade or above. PISA is a triennial international survey that aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. To date, students representing more than 80 economies, including 44 middle-income countries, have participated in the assessment since the first round of testing in 2000. PISA assesses the extent to which 15-year-old students, near the end of their compulsory education, have acquired key knowledge and skills that are essential for full participation in modern societies. The assessment focuses on the core school subjects of science, reading and mathematics. Students 'proficiency in an innovative domain is also assessed (in 2015, this domain was collaborative problem solving). The assessment does not just ascertain whether students can reproduce knowledge; it also examines how well students can extrapolate from what they have learned and can apply that knowledge in unfamiliar settings, both in and outside of school. This approach reflects the fact that modern economies reward individuals not for what they know, but for what they can do with what they know

3   In Zambia the PISA test was administered between 11th September and 21st October, 2017. As in all countries, the sample of schools was selected by the OECD through WESTAT, an international organization in charge sampling for this study. This was based on a complete list of all schools with eligible students in the country submitted by national authorities, and of complete listings of 15-year-old students in these schools submitted by the school administrators in the selected schools. The data was therefore representative of the entire population of 15-year-old students in the country.

4   About 193, 000 school going students in Zambia were estimated to be 15 years old. In each country a sample that was representative of all the 15-year-old student population was selected. Rigorous sampling procedures were implemented in the selection of the samples to ensure the results were comparable, reliable and valid. The Zambian sample consisted of 5, 273 students belonging to 200 schools throughout the country. The sample included establishments of all the dependencies and modalities existing in the country, as well as of all the regions, in urban and rural areas. In each establishment, maximum of 40 students of 15 years were randomly selected.

5   A limited number of schools and students could be excluded from PISA. Acceptable exclusions represent less than 5% of the target population and must be justified. Schools, for example, might be excluded because they were situated in remote regions and thus inaccessible; students might be excluded because of intellectual disability or limited proficiency in the language of the assessment. In Zambia, the percentage of excluded schools amounted to less than 0.50% and included Special Schools. When the exclusion of students within participating schools, for example, because of severe disabilities - was also taken into account, the overall exclusion rate was 0.2%.

6   PISA focuses on the skills and knowledge that are essential for full participation in modern societies and assesses 15-year-olds because in most countries these students are near the end of compulsory education.

1.2   What is PISA?

7   Launched by the OECD in 1997, PISA assesses 15-year-olds' proficiency in reading, mathematics and science. It measures students' skills in applying what they have learned in school to real-life situations. PISA cycles have been completed in 2000, 2003, 2006, 2009, 2012 and 2015 and the 2018 cycle was under way. PISA is an on-going programme that offers insights for education policy and practice, and that helps to monitor trends in students' acquisition of knowledge and skills across countries and in different demographic subgroups within each country. Through PISA results, policy makers can gauge the knowledge and skills of students in their own countries in comparison with those in other countries, set policy targets against measurable goals achieved in other education systems, and learn from policies and practices of countries which have demonstrated improvement. This kind of international benchmarking is more relevant now than ever, given that every country in the world has signed up to the Education Sustainable Development Goal (SDG) agenda which is about ensuring

that every child and young person achieves at least basic levels of proficiency in reading and mathematics.

1.2.1 The PISA assessment

8 The triennial PISA assessment does not just ascertain whether students can reproduce knowledge; it also examines how well students can extrapolate from what they have learnt and can apply that knowledge in unfamiliar settings, both in and outside of school. This approach, which is described in more detail in Chapter 2, reflects the fact that modern economies reward individuals not for what they know, but for what they can do with what they know.

9 Through questionnaires distributed to students, parents, school principals and teachers, PISA also gathers information about students' home background, their approaches to learning and their learning environments – these questionnaires are described in more detail in Chapters 3, 4 and 5. Combined with the information gathered through the various questionnaires, the PISA assessment provides three main types of outcomes:

- basic indicators that provide a baseline profile of the knowledge and skills of students;

- indicators derived from the questionnaires that show how such skills relate to various demographic, social, economic and educational variables and to broader outcomes of education, such as attainment and well-being;

- starting with a country's second participation in PISA, indicators on trends that show changes in outcome levels and distributions, and in relationships between student-level, school-level and system-level background variables and outcomes.

10 PISA facilitates international comparison of countries' education systems through the use of common items, used by all participating countries, which are all located on a common measurement scale. PISA scores can be located along specific scales developed for each subject area, designed to show the general competencies tested by PISA. These scales are divided into levels that represent groups of PISA test questions, beginning at Level 1 with questions that require only the most basic skills to complete and increasing in difficulty with each level up to six – see Chapter 2 for the full descriptions of these levels. Once a student's test has been scored, his or her proficiency in reading, mathematics and science can be located on the appropriate scale. For example, a student who lacks the skills needed to correctly complete the easiest questions on a PISA test would be classified as below Level 1, while a student who has these skills would be at a higher level.

11 In each test subject, the score for each participating country is the average of all student scores in that country. PISA mean scores can be used to rank participating countries according to their performance in reading, mathematics and science. PISA does not give a collective score for all subjects combined; rather it gives a score for each subject area and this can be used to determine rankings by the mean score of each area.

12 For each subject assessed, PISA reports the results of students on a scale divided into the six "proficiency levels" mentioned above. Assessment tasks of similar difficulty are used to describe each proficiency level in terms of what students know and can do, when their scores fall within the range of a particular level. The performance of an education system in PISA can therefore be described in terms of the knowledge and skills that students have mastered by age 15 and is not represented by a single number or rank. For example, PISA reports the proportion of students that can not only read simple and familiar texts and understand them literally, but can also demonstrate, even in the absence of explicit directions, some ability to connect several pieces of information, formulate conclusions that go beyond the explicitly stated information, and connect a text to their personal experience and knowledge (Level 2 reading tasks); or the proportion of students who can work with proportional relationships and engage in basic interpretation and reasoning when solving mathematics problems (Level 3 mathematics tasks).

13 Furthermore, in order to offer insights for education policy and practice, PISA collects a wealth of contextual information about students, schools, and countries, which can be used to highlight differences in performance and identify the characteristics of students, schools and education systems that perform well under particular circumstances.

14 PISA is an ongoing programme that, over the longer term, will lead to the development of a body of information for monitoring trends in the knowledge and skills of students in various countries as well as in different demographic subgroups of each country. Policy makers around the world use PISA findings to gauge the knowledge and skills of students in their own country/economy in comparison with those in other participating countries/economies, establish benchmarks for improvements in the education provided and/or in learning outcomes, and understand the relative strengths and weaknesses of their own education systems.

1.2.2   PISA for Development

15 Over the past two decades, PISA has steadily increased the number of participating countries, from 44 in 2000 to 82 in 2018. As the number of countries joining PISA increases, PISA evolves to successfully cater for a larger and more diverse group of participants. Zambia decided to join the Programme for the first time when the OECD launched the PISA for Development (PISA-D) project in 2014. This is a one-off pilot project spanning six years that aims to make the assessment more accessible and relevant to a wider range of countries. The project is also a contribution to the monitoring of international educational targets related to the Education SDG, adopted by the United Nations General Assembly in 2015 as part of the Agenda for Sustainable Development. To accomplish its aims, the project sets out to:

- increase the resolution of the PISA tests at the lower end of the student performance distribution;
- incorporate an assessment of out-of-school 14-16-year-olds; and

- include the assessment of factors that contribute to students' success that are more relevant to middle- and low-income countries, such as a wider range of social and economic contexts.

The PISA-D test

16   The PISA-D school-based assessment is a two-hour test that students complete with pencil and paper. The test includes a combination of questions from the domains of reading, mathematics and science. Each student was given one of 12 possible test booklets, which overlap in content. By administering different booklets to different students, PISA-D can measure a wide range of knowledge and skills at the country level, without the need to administer an exceedingly long and complex test to individual students. All test booklets administered in PISA-D contain items that were part of the PISA 2015 instruments, to ensure that results can be reported on the PISA scale and remain comparable to those of countries that participated in PISA 2015.

17   Each test booklet is completed by a sufficient number of students to make appropriate estimates of the achievement levels on all items by students in each country and in relevant subgroups within a country (such as boys and girls, and students from different social and economic contexts). Just as PISA, however, PISA-D is not designed to estimate the performance of individual students or schools: its results are most valid and reliable when aggregated across a sufficient number of students. Comparability with PISA 2015, which was administered both on paper and on computers, is assured through common items.

18   While PISA-D has been implemented within the overall PISA framework and in accordance with PISA's technical standards and usual practices, it includes new features and enhancements to make the assessment more accessible and relevant to middle- and low-income countries. With regard to the test, these features and enhancements include:

- an equal treatment of the three major domains tested - reading, mathematics and science – unlike PISA, where one of the domains is given a particular focus in each cycle;

- test instruments that cover a wider range of performance at the lower levels of proficiency, while still providing scores that cover the whole of the PISA framework and are comparable to the main PISA results; and

- modified test instruments that have a reduced reading burden, in recognition of the lower levels of reading literacy capacity in middle and low-income countries.

Contextual questionnaires

19   Both the in-school and the out-of-school instruments include contextual questionnaires (students, principals and teachers for the in-school; and youth and parents for the out-of-school) which provide a context for the assessment results and a broader picture of educational success. Students respond to the questionnaire

after the test in the school-based assessment, while respondents in the out-of-school assessment respond to the contextual questionnaire before taking the test.

20 The contextual questionnaires include core items from PISA to facilitate international comparisons, as well as several distinct PISA-D items that are more relevant to middle and low-income countries. The new items respond to the policy priorities of the countries participating in PISA-D. The PISA-D contextual questionnaires also extend the measurement of student and school resources beyond the scales developed in PISA, to accurately describe situations of poverty and socio-economic disadvantage or of inadequate school buildings and equipment, as they can be found in developing countries.

Capacity building

21 A further feature unique to PISA-D is the learning and capacity-building opportunities that have been built into each phase of project implementation. In preparing to implement the assessment, PISA-D countries have undergone a capacity needs analysis based on PISA's technical standards and devised a capacity-building plan that is also relevant for strengthening their national assessment systems. The PISA-D countries have also been assisted by the OECD to prepare a project implementation plan that has guided their implementation of the survey and ensured that the necessary human and financial resources were put in place. PISA countries have not benefitted from similar support and the PISA-D project has served as the basis for a model of support within the core PISA survey which is now being offered more widely to all participating countries from the 2021 cycle onwards.

Participating countries

22 The PISA-D project has been carried out by the OECD in partnership with Zambia and eight other countries: Bhutan, Cambodia, Ecuador, Guatemala, Honduras, Paraguay, Panama, and Senegal.

1.3 Why Zambia is participating in PISA-D

23 One of the main reasons Zambia participated in PISA-D was because of its policy makers' wish to understand how the performance of students in the country compares, in relation to international benchmarks and to countries facing similar challenges elsewhere, and to identify the factors that are associated with underperformance in order to effectively eliminate it. The PISA-D results contained in this report provide these policy makers with data and evidence that can be used to determine what they can do to improve Zambia's education system and, ultimately, ensure that their students obtain the skills needed to succeed in tomorrow's world, as set out in the Education SDG Framework.

24 All countries are committed to achieving the key Education SDG target of all children and young people achieving at least minimum levels of proficiency in reading and mathematics by 2030. In Zambia, this means ensuring all young citizens have the knowledge, skills and capabilities necessary to achieve their full potential, contribute to an increasingly interconnected world, and live a fulfilling life. The Zambian government is committed to ensuring access quality education,

equity, and reducing the gender gap between boys and girls in schools, a trend that has existed in the country for a long period of time.

1.4 Reporting of results

25 The PISA-D results are published for the first time in this national report which has been produced by Zambia in collaboration with the OECD. As part of the report production process, the OECD and its contractors have provided inputs to Zambia to strengthen its capacities for data analysis, interpretation of PISA results, report writing and the production of tailored communication products to support the dissemination of PISA results and policy messages.

26 This national report and other communication products present Zambia's results in the context of the countries that participated in PISA 2015 and PISA for Development and include relevant analyses and information based on the policy priorities of Zambia. This report constitutes a summary of key results and analysis designed to stimulate a constructive debate on improvement, building upon and enriching already existing data and evidence from national, regional or international sources. This national report is the culmination of an engagement and communication strategy that has been implemented by Zambia over the past three years. This strategy has sought to involve key stakeholders in Zambia in the survey and the discussion of the results, and implications for policy. Stakeholders include pupils, parents, teachers, teacher unions, school principals, academia, civil society, media and central and local government.

27 This national report is published in conjunction with the full PISA-D data set and with an interactive web-based tool to explore the dataset. These products are freely accessible on the OECD website (www.oecd.org/pisa) to enable all stakeholders, and in particular independent researchers, to conduct their own analyses and contribute towards a policy dialogue for educational improvement.

1.5 The framework for Zambia's national report

The analytical framework

28 PISA-D uses the Education Prosperity model (Willms, 2015) as an overarching analytical framework, while also taking into account the goals of PISA-D, lessons from past PISA cycles and other international studies, recommendations from research literature and the priorities of the participating countries.

29 Education prosperity is a life-course approach that identifies a key set of outcomes, called "Prosperity Outcomes", for six key stages of development, covering the period from conception to adolescence, and a set of family, institutional and community factors, called "Foundations for Success", which drive these outcomes. When applied to PISA-D, the relevant outcomes and foundations correspond to the fifth stage of the Educational Prosperity framework, late primary and lower secondary (ages 10 to 15). The four Prosperity Outcomes at this stage are educational attainment, academic performance, health and well-being, and attitudes towards school and learning. The model further identifies five Foundations for Success: inclusive environments, quality instruction, learning time, material

resources, and family and community support. These elements of the framework are shown in shown in Figure 1.1.
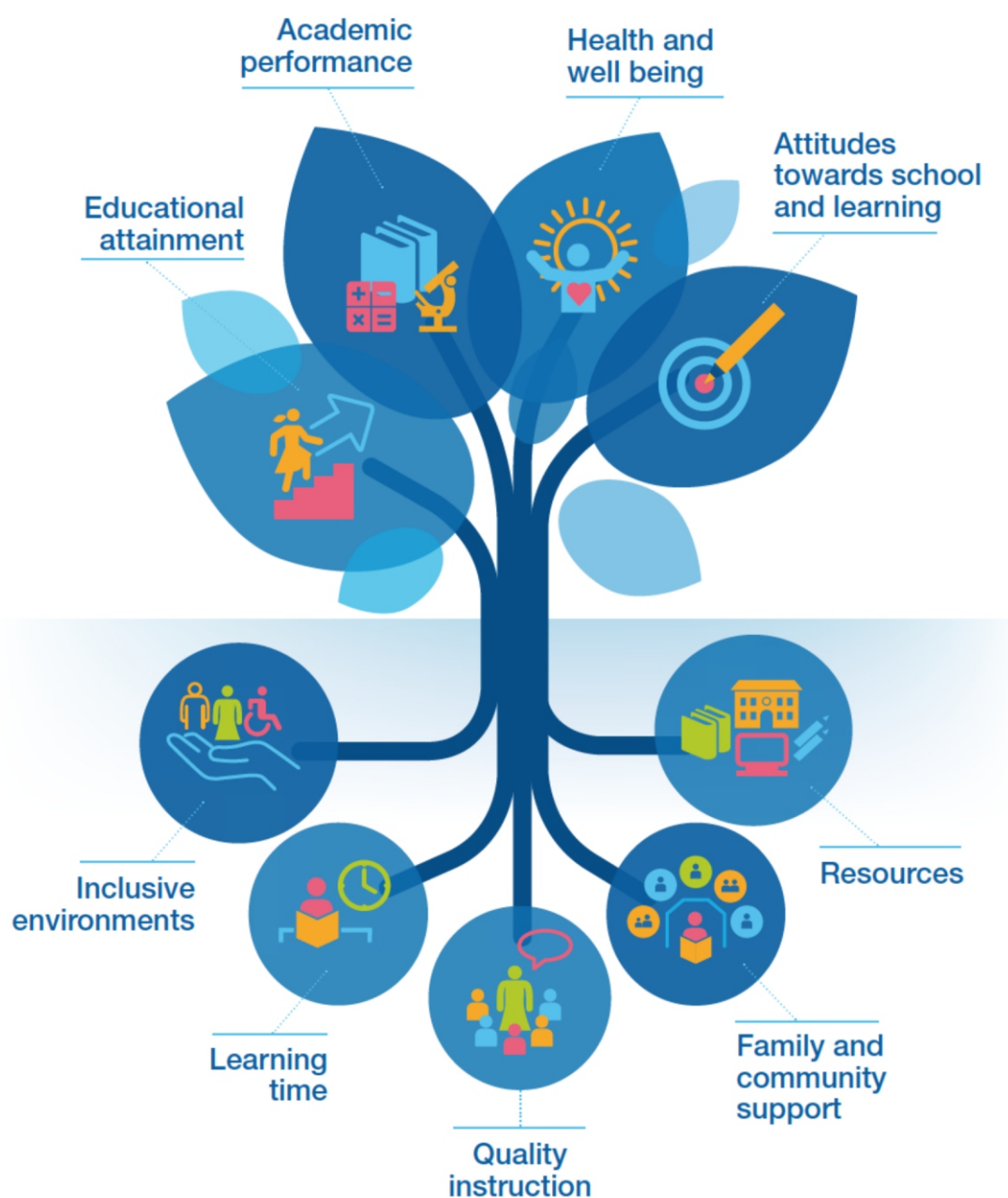
Figure 1.1: PISA –D Analytical Framework

30 This report is organised according to the framework discussed above. It distinguishes four core outcomes of education at age 15: student attainment; achievement in key subjects; subjective health and well-being; and attitudes towards school and learning.

31 Through the measure of proficiency in the PISA-D test, this report provides a rigorous assessment of what students have learned. This measure is based on frameworks for assessing reading, mathematics, and science literacy in PISA, which were enhanced to provide more detail on foundational knowledge and skills in each subject. The link with the PISA scales enables the results to be comparable

with international PISA results. In addition, the information collected for sampling operations in PISA provides comparative indicators about the attainment of 15-year-old youth in participating countries. Finally, self-report measures based on questionnaires can be used to indicate the level of health and well-being, as how engaged students are with school and with learning.

32 The underlying framework also identifies, based on international research, key aspects of the school, family, and community environment and important educational resources that are strongly associated with educational success. The factors are considered to be the foundations for success in any educational system. The presence of these resources and characteristics of the learning environment in the life of 15-year-olds is measured through questionnaires administered to participating students and children, but also through information collected from teachers, from school principals and from national sources of statistical information.

Quality, Inclusion and Fairness in education

33 The framework places great emphasis on equality and equity, with equality referring to differences among sub-populations in the distribution of their educational outcomes and equity referring to differences among sub-populations in their access to the resources and schooling processes that affect schooling outcomes.

34 In particular, the educational outcomes, resources, and opportunities are systematically compared not only with other countries internationally, but also within Zambia across six demographic factors for assessing equality and equity: gender (boys and girls); socio-economic disadvantage, including poverty; disability; language minority status, as indicated by the language spoken at home; the immigrant status of students; and urban/rural status, as indicated by the school location. The information on gender and on rural/urban status is collected both during sampling operations and in questionnaires, and is therefore available for all students; whereas the remaining background characteristics are reported by students themselves in the questionnaires.

35 Equity is concerned with fairness. A fair education system is one that minimises the effect of personal and social circumstances that are outside of an individual's control (such as gender, ethnic origin, or family background) on the opportunities to acquire a quality education and, ultimately, on the outcomes that he or she can potentially achieve (Roemer and Trannoy, 2016[1]). In this report, equity in education is discussed with reference to the provision of five key foundations for educational success: inclusive environments, quality instruction, learning time, material resources, and family and community support.

36 Equity is also concerned with inclusion. Inclusive environments are classrooms, schools, and broader communities that value and support inclusion. "Inclusion is a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education. It involves changes and modifications in content, approaches, structures and strategies, with a common vision which covers all children of the appropriate age range and a conviction that

it is the responsibility of the regular system to educate all children" (UNESCO, 2005). An inclusive education system ensures that all young people reach at least the minimum level of attainment, achievement, well-being and engagement which is required for participation in society. While barriers to attainment, achievement and health do not necessarily originate within educational institutions, a focus on inclusion requires that education policies remove these obstacles, where they exist, so that children can pursue what they value in life (Sen, 1999[2]).

37 Equality and equity are not an attribute of students or schools, but of the system, and are best assessed by comparing countries facing comparable circumstances. International large-scale assessments therefore present a unique advantage in assessing the levels of equity in education. This framework for analysing PISA-D results through the lens of quality, equality and equity, links PISA directly to the Sustainable Development Goals (SDGs) adopted by the United Nations in September 2015. Goal 4 of the SDGs seeks to ensure "inclusive and equitable quality education and promote lifelong learning opportunities for all". More specific targets and indicators spell out what countries need to deliver by 2030. The first target (Target 4.1), for example, urges countries to "ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes".

Structure of the national report

38 The remainder of this report is structured as follows:

- Chapters 2 and 3 discuss the learning outcomes at age 15 in Zambia. For each outcome, the average level, but also the variation in outcomes, including the prevalence of vulnerable youth, the inequality among groups of students and the extent to which family and home resources determine the outcomes will be discussed.

- Chapters 4 and 5 report on whether the foundations for success are present in Zambia and in all schools, i.e. the extent to which resources invested in education – and school material resources in particular – create good conditions for learning (Chapter 4); and the extent to which the broader classroom, school and social contexts (learning environment) support good outcomes for all (Chapter 5).

- The last chapter (Chapter 6) summarises the findings from PISA-D, relating them to the broader set of evidence about the effectiveness and efficiency of policy interventions, and cast the results in comparative perspective to stimulate an evidence-based discussion on policy reform in education.

Achievement and attainment outcomes at 15 in Zambia

In Zambia, 5% of students achieve the **minimum level of proficiency** in reading and 2% in mathematics.

Girls outperform boys in reading by 14 points **and** in mathematics by 6 points.

Students of **urban schools outperform students of rural schools** in reading with a performance difference of 56 score points, the equivalent of more than a year of schooling

Advantaged students are 14.4 times more likely than disadvantaged students to attain the baseline level of proficiency in mathematics.

The percentage of the Zambian population that has **attained at least grade 7 by age 15** in 2017 was 36%. The remaining 64% of 15-year-olds in 2017 were either in grades below 7 or out of school.

2

Achievement and attainment outcomes at age 15 in Zambia

This chapter discusses the PISA-D results in Zambia and what they reveal about the achievement and attainment outcomes in the country. The chapter looks at the enrolment of 15-year-olds in Zambia and their attainment, paying particular attention to the role of grade repetition. This provides important background for understanding student achievement in reading, mathematics, and science, and for comparing Zambia's performance with other countries. The chapter then presents the results - in particular, the levels of performance in reading, mathematics and science – and discusses the main indicators of inclusion, focusing on gender and socio-economic disparities as well as variation in performance across schools and between urban and rural areas.

1   Equipping citizens with the knowledge and skills necessary to achieve their full potential, contribute to an increasingly interconnected world, and ultimately convert better skills into better lives is a central preoccupation of policy makers in Zambia and around the world. The measures of student proficiency included in PISA and PISA-D were developed to monitor how close countries are to achieving this goal.

2   Skill requirements and the contexts in which skills are applied evolve fast. For this reason, PISA revises the definitions and frameworks behind each of its literacy measure every nine years, to make sure they remain relevant and future-oriented (see Box 2.1). By paying appropriate attention to the evolving nature of our societies, PISA invites educators and policy makers to consider quality of education as a moving target that can never be considered to have been acquired once and for all. As with previous cycles of PISA, the PISA-D cognitive frameworks and the framework for questionnaires have been reviewed and updated by a network of international experts who have experience with PISA, the relevant domains and the contexts found in middle- and low-income countries.

3   PISA-D assembles versions of the PISA assessment frameworks for reading, mathematical and scientific literacy that are based on the PISA 2012 and PISA 2015 frameworks but extends these frameworks to allow for more relevant measurement in Zambia and other middle- and low-income countries. Making the measurement more relevant to Zambia and these other countries requires more detail in the description of competencies of the most vulnerable students, those with the lowest levels of performance, which in turn requires including items that will enable the observation of these competencies in greater detail. Yet the relevance of PISA-D also depends on comparability with international PISA results: the instrument therefore allows for Zambia's students to demonstrate the full range of proficiency levels in PISA.

Box 2.1. What does PISA-D measure?

Each round of PISA measures students' proficiency in reading, mathematics and science. Unlike PISA, where one of the domains is given a particular focus in each cycle, PISA-D gives an equal treatment of the three domains.

The frameworks for all three domains emphasise students' capacity to apply knowledge and skills in real-life contexts: students need to demonstrate their capacity to analyse, reason and communicate effectively as they identify, interpret and solve problems in a variety of situations. The broad definitions of the domains used in PISA-D are the same ones which were used for PISA 2015:

Reading literacy is defined as an individual's capacity to understand, use, reflect on and engage with written texts, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society.

Mathematical literacy is defined as an individual's capacity to formulate, employ, and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. It assists individuals to recognise the role that mathematics plays in the world and to make well-founded judgments and decisions needed by constructive, engaged and reflective citizens.

Scientific literacy is defined as the ability to engage with science-related issues, and with the ideas of science, as a reflective citizen. A scientifically literate person is willing to engage in reasoned discourse about science and technology which requires the competencies to explain phenomena scientifically, evaluate and design scientific enquiry, and interpret data and evidence scientifically.

Student proficiency in each domain can be interpreted in terms of proficiency levels, with Level 6 being the highest Level on the PISA scales and Level 1 and below the lowest. Level 2 is a particularly important threshold, as this marks the baseline level of proficiency at which students begin to demonstrate the competencies that will enable them to participate effectively and productively in life as continuing students, workers and citizens.

The PISA-D instruments include more items at Level 2 and below than the main PISA test, providing a wider and more fine-grained picture of what 15-year-olds know and can do at these lower levels of performance. The PISA-D instruments also extend the lower end of the scales, by adding new described proficiency levels below Level 2:

In reading, Level 1c is a newly described proficiency level, corresponding to basic processes, such as literal sentence and passage comprehension.

In mathematics, proficiency Level 1 was renamed as 1a and two new proficiency levels (1b and 1c) were described, based mainly on the new items included in PISA-D, to better measure basic processes, such as performing a simple calculation and selecting an appropriate strategy from a list.

Source: OECD, 2017a.

16

4 PISA-D provides more than an assessment of the quality of students' learning. It selects the participants who take the test through scientific sampling procedures, first choosing the schools to participate, and then selecting students within those schools. In order to be considered eligible for PISA-D and listed in sampling forms, 15-year-olds must therefore be enrolled in school; the PISA-D standards further restrict the target population to those students enrolled in Grade 7 and above. The information PISA-D collects for its sampling operations therefore also provides comparative indicators about the attainment of 15-year-olds in participating countries.

5 Furthermore, PISA-D indicators can also be used to assess the equality of outcomes and equity in the provision of human and material resources using the rich information available in the PISA-D database on students' background, such as students' gender, socio-economic status, geographic location (rural or urban), immigrant background, language minority status, and disability. Differences in equality and equity can be compared among countries. PISA has put great effort into constructing a comparable indicator of socio-economic status, known as the PISA index of economic, social and cultural status (see Box 2.2) that has been extended for PISA-D, and this has been used in the analysis of Zambia's PISA-D data.

Box 2.2 Definition of socio-economic status in PISA and PISA-D

Socio-economic status is a broad concept. PISA estimates a student's socio-economic status by using the PISA index of economic, social and cultural status (ESCS), which is derived from several variables related to students' family background: parents' education, parents' occupations, a number of home possessions that indicate the household's material wealth, and the number of books and other educational resources available in the home. The PISA index of economic, social and cultural status is a composite score derived from these indicators. It is constructed to be internationally comparable.

The ESCS index makes it possible to identify advantaged and disadvantaged students and schools within each country. In this report, students are considered socio-economically advantaged if they are among the 25% of students with the highest values on the ESCS index in their country or economy; students are classified as socio-economically disadvantaged if their values on the ESCS index are among the bottom 25% of their country or economy. Following the same logic, schools are classified as socio-economically advantaged, disadvantaged or average within each country or economy based on their students' mean values on the ESCS index.

The ESCS index also makes it possible to identify advantaged or disadvantaged students by global standards. By placing all students on the same ESCS continuum, it is possible to compare the situation of students with similar economic, social and cultural resources across countries. For example, 39.7% of the students assessed by PISA in Zambia are in the lowest 20% of students internationally.

The ESCS index used in PISA-D extends the PISA index in order to adequately capture lower levels of education and lower levels of income and wealth, typically found for the majority of students in middle- and low-income countries, while keeping the link with the PISA measure. The PISA-D questionnaires include the long-standing questions used in PISA to assess the highest educational level of the parents, the highest occupational status of parents, and an index of home possessions, which has been extended to ensure it is relevant for middle- and low-income countries. The questionnaires also include new questions designed to capture youth's experience of poverty

Source: OECD, 2016a; OECD, 201

6   The discussion of PISA-D results for Zambia in the remaining sections of this chapter starts by comparing the enrolment of 15-year-olds in Zambia and their attainment, with particular attention to whether students stay "on track" according to their age. This provides important background for the main section in this chapter, which compares student achievement in reading, mathematics and science in Zambia with other comparable countries. The final section presents the main indicators of equality, focusing on gender, rural- urban status, language, immigrant status and socio-economic disparities.

2.1   Enrolment and attainment at age 15: a PISA-D perspective

2.1.1   What proportion of Zambia's 15-year-olds does the PISA-D sample represent?

7   As in PISA, when the schools and students that would take the test were selected, not all 15-year-old children in the country were included in the lists from which the participants were drawn. As noted above, on top of a birth date in 2002, in order to participate in PISA-D 15-year-olds not only had to be enrolled in school at the time of testing, but also in Grade 7 or higher.

8   Figure 2.1 shows the resulting coverage of the 15-year-old population in Zambia, in comparison with the OECD average and with other PISA D participating countries. This number, known as Coverage Index 3 (OECD, 2017b), is obtained by dividing the number of students represented by the PISA-D sample (participating students, weighted by their sampling weights), by the total number of 15-year-olds estimated from demographic projections. Zambia's coverage of 36.0% compares to PISA-D and OECD averages of 46.2% and 89% respectively. While a small proportion of students in Grade 7 and above may be excluded from PISA and PISA-D because they have disabilities, live in remote areas, or have limited language proficiency, the largest share of non-covered 15-year olds is made up of children who are not in school, or who have been held back in primary school grades. Figure 2.1 shows the percentage of 15-year-olds represented by PISA samples among PISA-D countries.
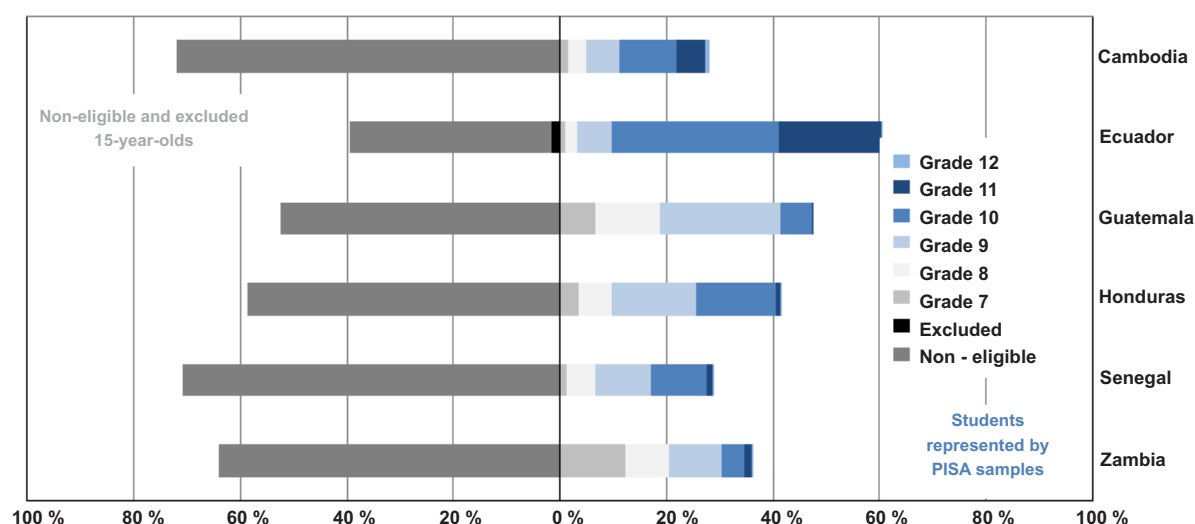
Figure 2.1: Educational attainment at age 15 in Zambia

Source: *OECD PISA 2015 database, OECD PISA-D 2018 database*

9   In general, this coverage rate in Zambia is consistent with the enrolment rate that can be computed from the country's administrative sources or household surveys. Apart from the small percentage of enrolled, but excluded students, discrepancies in enrolment figures between official documents and PISA-D data can have several origins, including: 1) differences in the primary source of data (households or schools); 2) differences in the methods used to collect the information (e.g. by asking schools for an overall number or a detailed list of students); 3) differences in definition of the target age; and 4) differences in the timing of collecting the information (PISA-D asks for student lists about one month before the assessment; administrative data may report enrolment as of the beginning of the school year).

10   Despite the potential for these differences, the enrolment in secondary education in Zambia is well reflected in the PISA-D data. In other words, the sample that took the test is representative of the 15 year old students in 7th grade or above of the country. Zambia has been expanding its enrolments at the secondary level. Several factors contributed to this expansion by lowering the social, economic or institutional barriers that had kept a large proportion of 15-year-olds out of school. Beginning early 2000, the Government announced the Free Primary Education Policy (FPE) and this led to increased enrolments in schools. Fundamental in policy development area has also been the enactment of the 2011 Education Act which included compulsory primary education for all children of the school going age, the outlawing marriage of the school going age and the recognition of community schools to support the achievement of EFA goals (MESVTEE, 2015).

11   Despite significant progress in Zambia over recent years, school drop-out rates remain a major preoccupation of government. Globally, research has shown that young adults who have left school without attaining a formal qualification are at high risk of poor employment, suffer worse health conditions, and are over-

represented among those committing crimes (Lochner, 2011; Machin, Marie and Vujić, 2011; Belfield and Levin, 2007).

12   The level of attainment and participation in education at the age of 15, reflected in coverage rates and in the distribution of PISA-D students across grades, provides important contextual information for interpreting the mean performance and variation among the students assessed in Zambia. Household surveys often show that children from poor households, ethnic minorities or rural areas face a greater risk of not attending or completing lower secondary education. Typically, as populations that had previously been excluded gain access to higher levels of schooling, a larger proportion of low-performing students will be included in PISA and PISA-D samples.

2.1.2   *The distribution of PISA-D students across grades*

13   Figure 2.1 also highlights that 15-year-olds in Zambia may be found across a relatively wide range of school grades. In Zambia over 34% of the PISA-D participants in 2017 were in Grade 7; and the share of 15-year-old students who were in Grade 7 or Grade 8 is larger (56.9%) than across OECD countries on average (5.1%). At the same time, Zambia also had a sizeable proportion of 15-year-old students in Grade 10 (11.3%); Grade11 (3.8%) and Grade 12 (0.4%) – one or two years ahead of track.

14   The variation in attainment among Zambia's 15-year-old students also constitutes an important context for interpreting PISA-D results. By focusing on students of comparable age across countries, PISA-D enables the fair comparison of the skills of students who are about to enter adult life. However, it must be understood that these students might be at different points in their educational career, both across countries and within countries, and that the variation in PISA-D results therefore reflects, in part, the variety of educational trajectories of participating students.

2.1.3   *Education attainment at age 15 by gender*

15   As Zambia has made basic education compulsory in recent years, attaining secondary education has become increasingly the norm for both boys and girls. More young women, than ever before, in Zambia are participating in formal education and enrolling in higher education. The percentage of the 15 to 19 year olds attending school, for instance, increased from 46.1% in 2000 to 64.5% in 2010 (CSO, 2012).

16   There has been substantial progress in the realm of those sitting for examinations at various levels as well. The total number of students registered for the 2017 Grade 7 examination, for instance, grew by 3.5% from 387, 263 in 2016 to 400,802 in 2017. This included 201,525 (50.3%) boys and 199,277 (49.7%) girls. The number of girls who entered for the examination rose by 4.2 % while that of boys rose by 2.8%. At grade 9 level, 350,246 candidates entered the 2017 examination. Of these, 177,057 were boys while 173,189 were girls. This translates to 50.6 % boys and 49.4% girls (ECZ, 2017). The trend in candidature growth and reduction in gender gap is not any different at 12 examinations. The number of female students entering the examination has continued to grow steadily since 2013, probably due

to interventions promoting female education put in place by the Ministry of General Education (MOGE) and stakeholders. Notable measure to ensure gender parity include the 50/50 enrolment policy, re-entry policy for girls who fall pregnant, the affirmative action for selection, special and provision of bursaries, and social safety nets for vulnerable children (MOGE, 2015).

17 The percentage of the Zambian population that has attained at least Grade 7 by age 15 in 2017 was 36.0%. Assuming that the total population of 15-year-olds is composed of equal proportions of boys and girls, the figure for boys was 35.0% and for girls 37.0%.
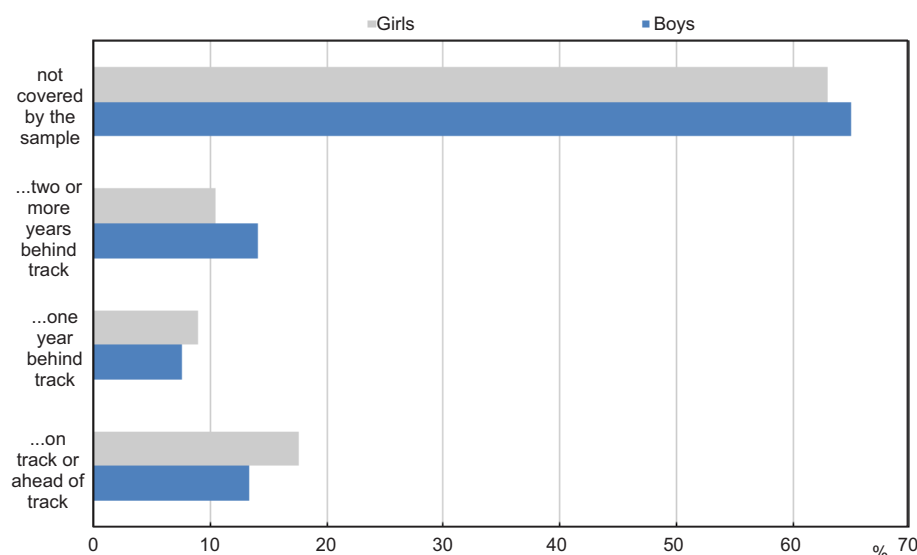
Figure 2.2: *Educational attainments at age 15 in Zambia, by gender*

Note: *all percentages are presented as a share of the estimated total population of 15-year-olds in the country.*

Source*: PISA for Development Database*

2.1.4 Grade repetition in Zambia

18 At age 15, students in Zambia who are "on track" in their progress are typically in grades 9. Many students fall behind for various reasons. One of the important factors is grade repetition, particularly in lower grades.

19 In Zambia 43.3% of students report having repeated a grade at least once in primary, lower secondary or upper secondary school, a higher percentage than PISA D (32.1%) and across the OECD (12%) on average(figure 2.3). While in theory, students might also be delayed in their schooling career without formally repeating a grade, e.g. because of sickness or because they are required to help out in the family business or to care after a family member, in practice, in all countries covered by PISA, variation in grade levels is strongly associated with the experience of grade repetition (OECD, 2016b: Figure II.5.2): students who are behind track are most likely to report having repeated a grade. Figure 2.3 shows the percentage of 15-year-old students in grade 7 and above who report having repeated a grade at least once in primary or secondary school. The countries and

economies were ranked in descending order of the percentage of students who repeated a grade.
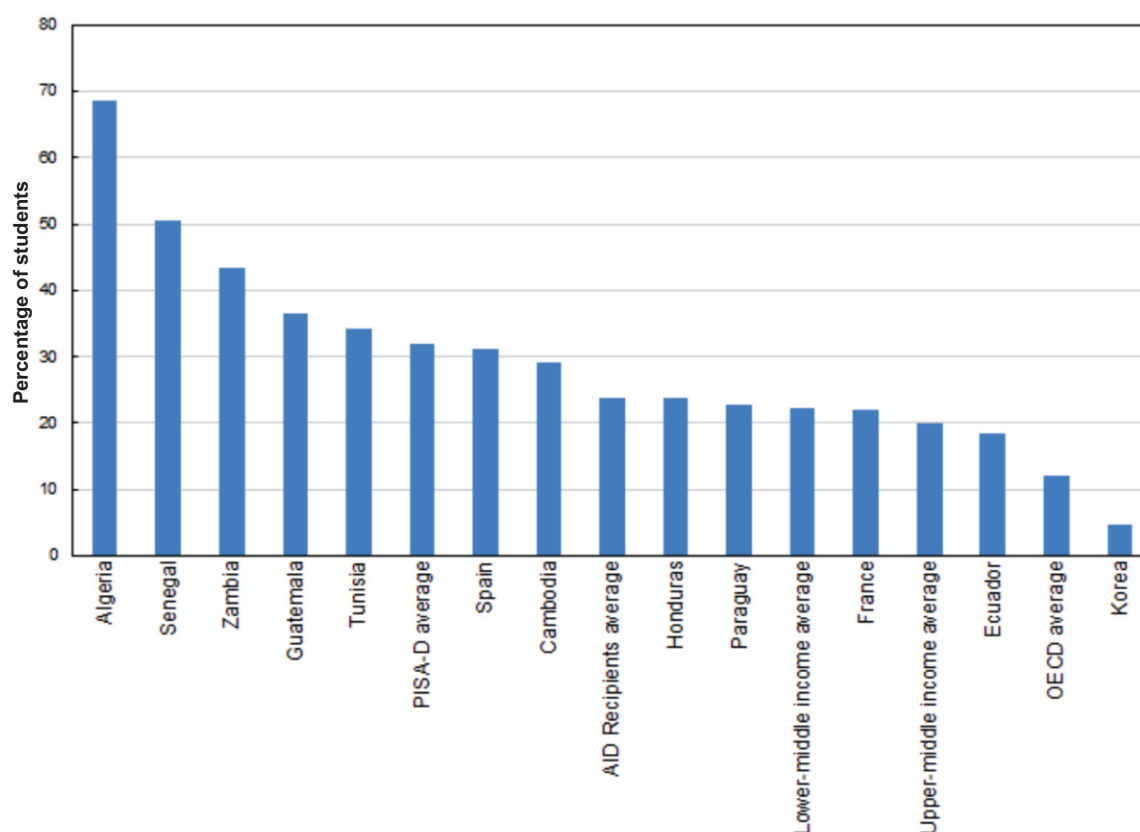
Figure 2.3: *Grade repetition rates. Comparison between Zambia and OECD average*
Source: *PISA 2015 and PISA for Development Database*

20. Grade repetition can be a costly policy, as it generally requires greater expenditure on education and delays students' entry into the labour market (OECD, 2013). In theory, repeating a grade gives students time to "catch up" with their peers if teachers believe they are not yet ready for more advanced coursework. If the curriculum is cumulative and further learning depends on a solid understanding of what has been previously learned, then promoting students regardless of their mastery of the content might place low-performing students in an increasingly difficult position at higher grades. If the practice is widespread, it might compromise performance in the school or education system as a whole.

21 But reviews of research encompassing different disciplines, countries and time periods have mainly found negative effects of grade repetition on academic achievement (Jimerson, 2001). Because grade repetition represents a visible marker of underperformance, it can stigmatise children. Students who have repeated a grade often also show more negative behaviour and attitudes towards school (Finn, 1989; Gottfriedson, Fink and Graham, 1994) and are more likely to drop out of school (Jacob and Lefgren, 2004; Manacorda, 2012). In addition, any positive short-term effects of grade repetition appear to decline over time (Allen et al., 2009). Grade repetition entails differences in the age of pupils in class. A wide range of pupils' age presents difficulties within the instructional setting. Teachers

may need to make adjustments in the approved educational programmes in order to accommodate diverse learning needs for the students.

22 Grade repetition is often unfair and is always costly, both for individual students who suffer from the stigma and for school systems as a whole. In addition, the practice of grade repetition reduces the incentive for teachers to diagnose and address underperformance in their classrooms. In systems where grade repetition is limited, teachers tend to assume greater responsibility for students' learning. Students who lag behind can be helped through remedial classes organized at school or extra support from staff at school.

2.2   Student achievement in Zambia

23 The easiest way to summarise student performance and compare countries' relative standing is through the mean performance of students in each country and domain assessed by PISA and PISA-D. But PISA and PISA-D also describe student performance by levels of proficiency (see Table 2.1, Table 2.2 and Table 2.3); in particular, in each subject they identify a baseline level of performance (called Level 2) – this level is also regarded as the minimum level of proficiency in reading and mathematics expected at the end of lower secondary school, as measured for Education SDG monitoring against Target 4.1. In all three PISA core subjects, the baseline level is the level at which students are able to tackle tasks that require, at least, a minimal ability and disposition to think autonomously.

Table 2.1 : PISA-D Reading proficiency levels

Level	Lower score limit	Characteristics of tasks
6	698	Tasks at this level typically require the reader to make multiple inferences, comparisons and contrasts that are both detailed and precise. They require demonstration of a full and detailed understanding of one or more texts and may involve integrating information from more than one text. Tasks may require the reader to deal with unfamiliar ideas, in the presence of prominent competing information, and to generate abstract categories for interpretations. *Reflect and evaluate* tasks may require the reader to hypothesise about or critically evaluate a complex text on an unfamiliar topic, taking into account multiple criteria or perspectives, and applying sophisticated understandings from beyond the text. A salient condition for *access and retrieve* tasks at this level is precision of analysis and fine attention to detail that is inconspicuous in the texts.
5	626	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of deeply embedded information, inferring which information in the text is relevant. Reflective tasks require critical evaluation or hypothesis, drawing on specialised knowledge. Both interpretative and reflective tasks require a full and detailed understanding of a text whose content or form is unfamiliar. For all processes of reading, tasks at this level typically involve dealing with concepts that are contrary to expectations.
4	553	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of embedded information. Some tasks at this level require interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole. Other interpretative tasks require understanding and applying categories in an unfamiliar context. Reflective tasks at this level require readers to use formal or public knowledge to hypothesise about or critically evaluate a text. Readers must demonstrate an accurate understanding of long or complex texts whose content or form may be unfamiliar.
3	480	Tasks at this level require the reader to locate, and in some cases recognise the relationship between, several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. They need to take into account many features in comparing, contrasting or categorising. Often the required information is not prominent or there is much competing information; or there are other text obstacles, such as ideas that are contrary to expectation or negatively worded. Reflective tasks at this level may require connections, comparisons, and explanations, or they may require the reader to evaluate a feature of the text. Some reflective tasks require readers to demonstrate a fine understanding of the text in relation to familiar, everyday knowledge. Other tasks do not require detailed text comprehension but require the reader to draw on less common knowledge.
2	407	Some tasks at this level require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require readers to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.
1a	335	Tasks at this level require the reader to understand the literal meaning of sentences or short passages. Most tasks require the reader to locate one or more independent pieces of information; to recognise the main theme or author's purpose in a text about a familiar topic, or to make a simple connection between information in the text and common, everyday knowledge. The reader is directed to consider relevant factors in the task and in the text. In tasks requiring interpretation, the reader may need to make simple connections between adjacent pieces of information.
1b	262	Tasks at this level require the reader to understand the literal meaning of sentences within single short passages. Some tasks require students to locate a piece of explicitly stated information in a single given text. The reader is explicitly directed to consider relevant factors in the task and in the text. Most texts at level 1b are short and they typically contain limited competing information.
1c	189	Tasks at this level require the reader to understand the literal meaning of individual written words and phrases within sentences or very short, syntactically simple passages with familiar contexts. Some tasks require students to locate a single word or phrase in a short list or text based on literal matching cues. Texts at level 1c are short and they include little if any competing information. Texts support students with a familiar structure, explicit pointers to the information, repetition and illustration.

Descriptors 2 through 6 are the same as those used in PISA 2012 and 2015. Descriptors 1a and 1b have been revised for better alignment with the new descriptor for Level 1c

Table 2.2 : PISA-D Mathematics proficiency levels

Level	Lower score limit	Descriptor
6	669	At Level 6, students can conceptualise, generalise and utilise information based on their investigations and modelling of complex problem situations, and can use their knowledge in relatively non-standard contexts. They can link different information sources and representations and flexibly translate among them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply this insight and understanding, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for attacking novel situations. Students at this level can reflect on their actions, and can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments and the appropriateness of these to the original situation.
5	607	At Level 5, students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations. They begin to reflect on their work and can formulate and communicate their interpretations and reasoning.
4	545	At Level 4, students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic, linking them directly to aspects of real-world situations. Students at this level can utilise their limited range of skills and can reason with some insight, in straightforward contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments and actions.
3	482	At Level 3, students can execute clearly described procedures, including those that require sequential decisions. Their interpretations are sufficiently sound to be a base for building a simple model or for selecting and applying simple problem- solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They typically show some ability to handle percentages, fractions and decimal numbers, and to work with proportional relationships. Their solutions reflect that they have engaged in basic interpretation and reasoning.
2	420	At Level 2, students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures or conventions to solve problems involving whole numbers. They are capable of making literal interpretations of the results.
1a	358	At Level 1a, students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are almost always obvious and follow immediately from the given stimuli.
1b	295	At Level 1b, students can respond to questions involving easy to understand contexts where all relevant information is clearly given in a simple representation (for example tabular or graphic) and defined in a short syntactically simple text. They are able to follow clearly prescribed instructions.
1c	236	At Level 1c, students can respond to questions involving easy to understand contexts where all relevant information is clearly given in a simple, familiar format (for example a small table or picture) and defined in a very short syntactically simple text. They are able to follow a clear instruction describing a single step or operation.

Descriptors 2 through 6 are the same as those used in PISA 2012, and level 1 was renamed Level 1a.

Table 2.3 : PISA-D Science proficiency levels

Level	Lower score limit	Descriptor
6	708	At Level 6, students can draw on a range of inter-related scientific ideas and concepts from the physical, life and earth and space sciences and use content, procedural and epistemic knowledge in order to offer explanatory hypotheses of novel scientific phenomena, events and processes or to make predictions. In interpreting data and evidence, they are able to discriminate between relevant and irrelevant information and can draw on knowledge external to the normal school curriculum. They can distinguish between arguments that are based on scientific evidence and theory and those based on other considerations. Level 6 students can evaluate competing designs of complex experiments, field studies or simulations and justify their choices.
5	633	At Level 5, students can use abstract scientific ideas or concepts to explain unfamiliar and more complex phenomena, events and processes involving multiple causal links. They are able to apply more sophisticated epistemic knowledge to evaluate alternative experimental designs and justify their choices and use theoretical knowledge to interpret information or make predictions. Level 5 students can evaluate ways of exploring a given question scientifically and identify limitations in interpretations of data sets including sources and the effects of uncertainty in scientific data.
4	559	At Level 4, students can use more complex or more abstract content knowledge, which is either provided or recalled, to construct explanations of more complex or less familiar events and processes. They can conduct experiments involving two or more independent variables in a constrained context. They are able to justify an experimental design, drawing on elements of procedural and epistemic knowledge. Level 4 students can interpret data drawn from a moderately complex data set or less familiar context, draw appropriate conclusions that go beyond the data and provide justifications for their choices.
3	484	At Level 3, students can draw upon moderately complex content knowledge to identify or construct explanations of familiar phenomena. In less familiar or more complex situations, they can construct explanations with relevant cueing or support. They can draw on elements of procedural or epistemic knowledge to carry out a simple experiment in a constrained context. Level 3 students are able to distinguish between scientific and non-scientific issues and identify the evidence supporting a scientific claim.
2	410	At Level 2, students are able to draw on scientific content knowledge or procedural knowledge to identify an appropriate scientific explanation, interpret data, and identify the question being addressed in a simple experimental design. They can use basic or everyday scientific knowledge to identify a valid conclusion from a simple data set. Level 2 students demonstrate basic epistemic knowledge by being able to identify questions that could be investigated scientifically.
1a	335	At Level 1a, students are able to draw on basic scientific content or procedural knowledge to recognise or identify explanations of simple scientific phenomenon presented using scientific language. With support, they can undertake structured scientific enquiries with no more than two variables. They are able to identify simple causal or correlational relationships and interpret graphical and visual data that require a low level of cognitive demand. Level 1a students can select the best scientific explanation for given data in familiar personal, local and global contexts. When presented with multiple factors of varying complexity requiring a low level of content knowledge or cognitive demand, students can select the best scientific explanations or procedures in a question in most but not all instances.
1b	260	At Level 1b, students can draw on everyday scientific knowledge to recognise aspects of familiar or simple phenomena presented using minimal scientific language. They are able to identify simple patterns in data, recognise basic scientific terms, identify the real-world features represented by simple models, and follow explicit instructions to carry out a scientific procedure.
1c	186	At Level 1c, students can recall an element of everyday scientific information or observations of common macroscopic phenomena to identify a correct scientific explanation or conclusion which has been communicated using non-technical or non-academic language and supported by illustrations.

Descriptors 3 through 6 are the same as those used in PISA 2015, while descriptors 2,1a and 1b have been revised for a better progression in knowledge from 1c. . The PISA-D test did not include items at Level 1c; the report therefore does not distinguish between performance at Level 1c and "below Level 1c", but reports them together as "Below Level 1b".

24 In reading, the baseline level of skills is defined as the level at which students can not only read simple and familiar texts and understand them literally, but also demonstrate, even in the absence of explicit directions, some ability to connect several pieces of information, draw inferences that go beyond the explicitly stated information, and connect a text to their personal experience and knowledge.

25 In mathematics, the baseline level of skills is defined as the level at which students can not only carry out routine procedures, such as an arithmetic operation, in situations where all the instructions are given to them, but can also interpret and recognise how a (simple) situation (e.g. comparing the total distance across two alternative routes, or converting prices into a different currency) can be represented mathematically.

26 In science, the baseline level of proficiency corresponds to the level at which students can draw on their knowledge of basic science content and procedures to interpret data, identify the question being addressed in a simple experiment, or identify whether a conclusion is valid based on the data provided.

27 Several other levels of proficiency have been described, to assist in the interpretation of PISA-D scores. Full descriptions can be found in table 2.1, table 2.2 and table 2.3. Comparing the proportion of students below and above the baseline levels of proficiency and the proportion who reach the highest levels of proficiency, makes it possible not only to gauge the average achievement level (indicated by Zambia's mean scores), but also the capacity of the Zambian education system to nurture excellence and to ensure minimum standards. The latter is an aspect of inclusiveness, i.e. of the Zambia education system's success in guaranteeing children's capabilities to pursue what they value in life.

2.2.1 Performance in reading, mathematics and science

Table 2.4: Snapshot of performance in reading, mathematics and science

	Science	Reading	Mathematics	Science, reading and mathematics	
	Mean score	Mean score	Mean score	Share of high achievers in at least one subject (Levels 3, 4, 5 or 6) in %	Share of low achievers in all three subjects (below Level 2) in %
OECD average	493	493	490	66.7	13.0
Upper-middle income average	411	410	402	31.6	39.3
AID Recipients average	399	393	384	25.9	47.0
Ecuador	399	409	377	22.6	44.0
Lower-middle income average	392	378	368	22.1	53.4
Tunisia	286	361	367	13.4	57.3
Paraguay	358	370	326	10.6	64.6
Algeria	376	350	360	10.0	61.1
Honduras	370	371	343	9.3	65.3
Guatemala	365	369	334	8.0	67.1
Senegal	309	306	304	3.5	85.8
Cambodia	330	321	325	1.6	85.8
Zambia	309	275	258	0.8	92.7

Source: *PISA 2015 and PISA for Development*

28 Table 2.4 shows the average performance of Zambia's students across the three domains, in comparison to the OECD average, as well as their relative standing among the benchmarking countries and economies with valid and comparable results in PISA 2015 or PISA-D.

29 Five main observations emerge from this table and from the comparisons of Zambia's mean performance with other countries in the three subjects:

- First, Zambia scores are below the OECD average in all three domains.

- Second, when comparing Zambia's performance to more comparable countries (i.e., those that are either geographically close to the country or have a similar Gross National Income) we find the following significant differences – Zambia's performance was in the lower end; Zambia's mean scores in all the domains were lower than the PISA-D average.

- Third, in reading, the mean score for Zambia was 275 against the PISA-D average of 346.

- Fourth, in common with most countries in PISA-D, mathematics appears to be the weakest of the three PISA subjects for Zambia. The mean score for Mathematics for Zambia was 258 against the PISA-D average of 324.

- Fifth, in science, the mean score for Zambia was 309 against the PISA-D average of 349.

30 As noted above, an important indicator for monitoring countries' progress towards achieving Target 4.1 of SDG Goal 4 is the proportion of 15-year-olds who have achieved at least minimum proficiency levels in reading and mathematics. The baseline levels of proficiency, defined above, can be used to monitor countries' success.

31 Zambia has a high share of students performing below the baseline level of proficiency in all subjects: only 5.0% of 15-year-old students can be said to reach a baseline level of performance in reading; 2.3% of 15-year-olds reach the baseline level of performance in mathematics; and 5.8% reach the baseline level of performance in science. Figure 2.4 presents the share of students above the baseline in each subject in Zambia in comparison with the OECD average/the average among the 10 comparison countries. In particular, it highlights that in Zambia there is a high proportion of students who perform below the baseline in all three subjects, but that the proportion of students who do not even attain the lower benchmarks of performance (Level 1a, 1b and 1c) is particularly large in mathematics.

32 While many students do not reach the baseline levels of proficiency, it should also be borne in mind that not all 15-year-olds in Zambia are "students"; as in other middle- and low-income countries, many 15-year-olds are not eligible to participate in PISA because these young people have dropped out of school, never attended school, or are in grade 6 and below. Among all 15-year-olds, the share that does not reach minimum levels of proficiency is therefore likely to be even

higher (assuming that the 15-year-olds not eligible to participate in school-based PISA assessment would not have reached the baseline level of performance if they sat the PISA test).

Reading

Mathematics
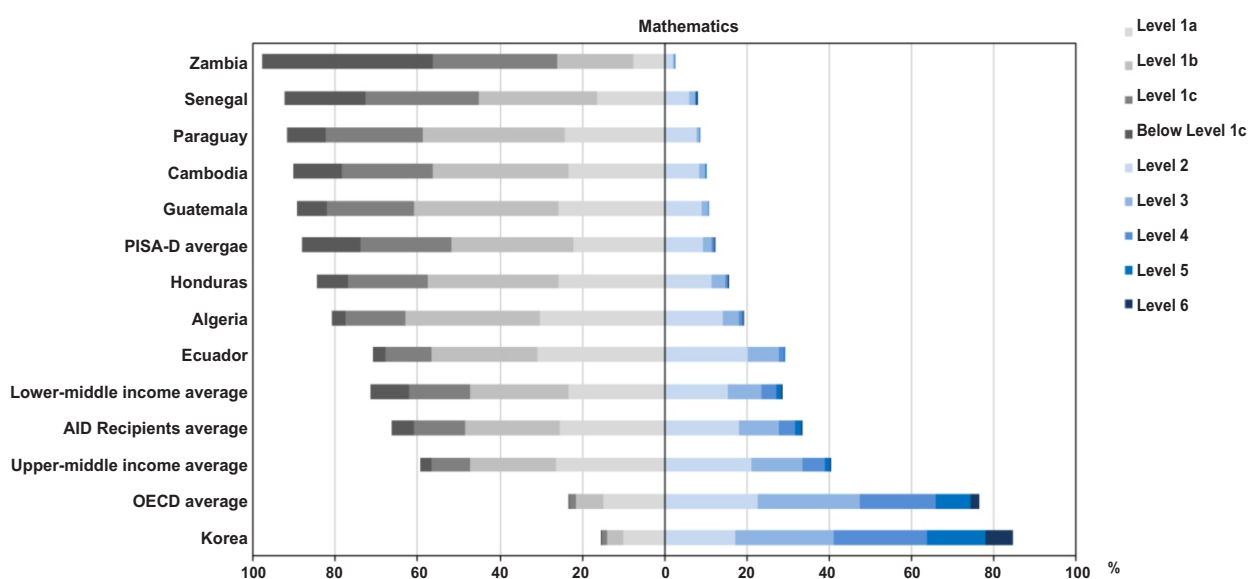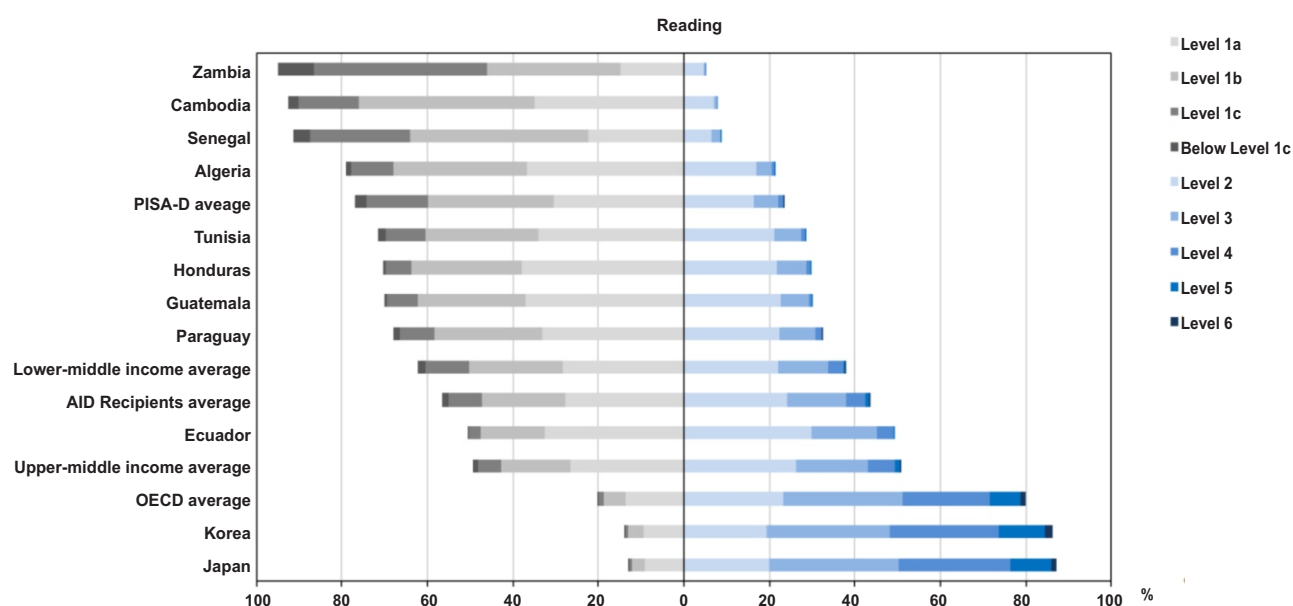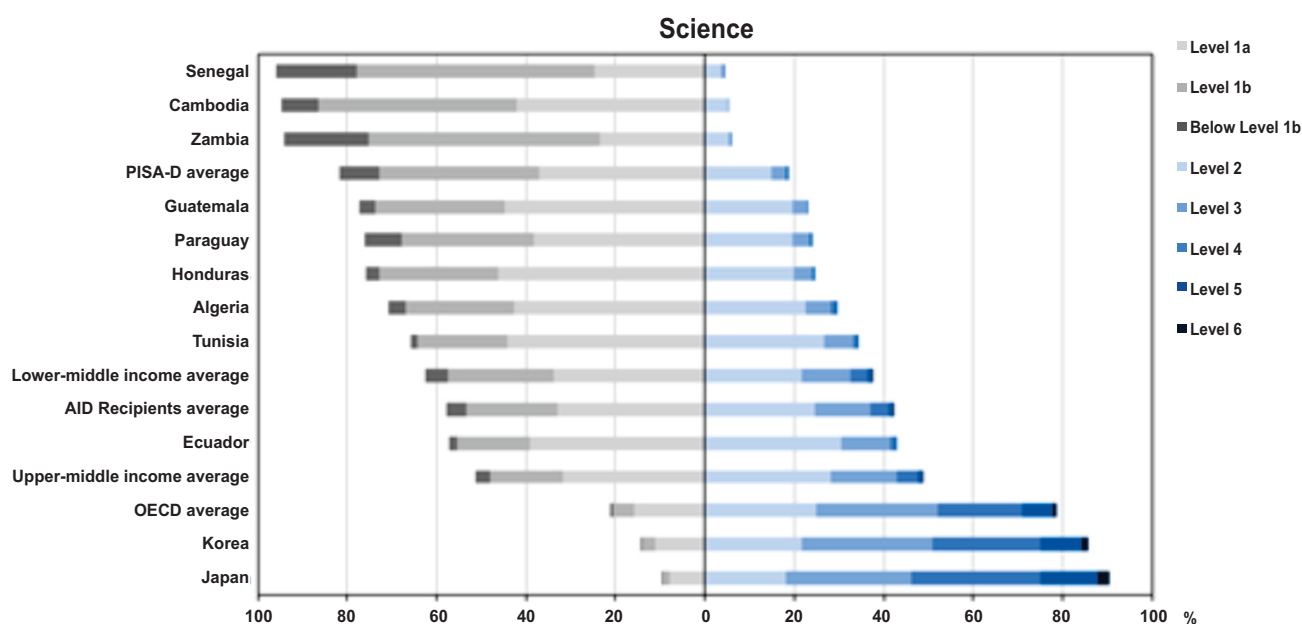
Science

Figure 2.4: Students' proficiency in reading, mathematics and science (%)
Source: PISA 2015 and PISA for Development Database

33 While the share of high performing students in Zambia is small and this report focuses on the lower levels of proficiency that are most common in the country, it is important to note that only 0.8% of 15-year-olds in Zambia demonstrated high levels of knowledge and skills in one domain at least; they perform at or above Level 3 – the typical level of proficiency among 15-year-old students in OECD countries. These levels of knowledge and skills are important attributes for future citizens and workers and the challenges for Zambia are to increase the share of high performing students.

2.2.2 *Low performers in reading*

34 Using PISA-D data we can describe the (limited) skills of low-performing students in particular, and thereby highlight with accuracy how far Zambia is from ensuring that schools are places of learning for all students.

35 Students who perform at Level 1a in reading can retrieve one or more independent pieces of information that are explicitly stated, identify the main theme or the author's intent in a text about a familiar topic, or make a simple connection by reflecting on the relationship between information in the text and common, everyday knowledge. The required information in the text is usually prominent and there is little, if any, competing information. The student is explicitly directed to the relevant factors to consider. This level identifies students who perform below the baseline in reading, but not too far from it (OECD, 2017a). Among low-performing students, these students are the closest to achieving the baseline level.

36 Across OECD countries, an average of 14% of students can solve Level 1a tasks in reading, but cannot solve tasks located above this level. Some 6.5% of students do not even attain Level 1a. In Zambia, 14.9% of students perform at Level 1a and 80.0% of students perform below Level 1a.

37 At Level 1b, students can solve only the easiest text comprehension tasks included in the PISA-D assessment, such as retrieving a single piece of explicitly stated information, e.g. from the title of a simple, familiar text or from a simple list

(OECD, 2017a). Level 1b corresponds to the highest level achieved by 31.1% of students in Zambia.

38 In Zambia, level 1c is the modal proficiency level of students as a greater share (40.6%) of students performs at this level than at any other proficiency level in PISA-D. Students, who perform at Level 1c, can only engage at best in basic reading processes. They can demonstrate their command of some sub-skills, or building blocks, of reading literacy, such as literal sentence or passage comprehension, but are unable to integrate and apply these skills to longer texts or to make simple inferences (see Box 2.3). Some students (8.3%) perform even below Level 1c.

Box 2.3. How PISA-D measures basic components of reading literacy

PISA-D included additional item types in the PISA reading assessment in order to assess the extent to which students understand the literal and inferential meaning of words, sentences and passages.

Two types of tasks were defined: sentence processing and passage comprehension.

The sentence processing tasks assess the ability to comprehend written sentences of varying lengths. In the PISA-D assessment, students see a set of sentences and must decide for each of the sentences if they make sense ("yes") or do not make sense ("no") with respect to general knowledge about the real world (as in the first item shown below), or the internal logic of the sentence itself (as in the second item).

Sample task 1

Directions: Circle YES if the sentence makes sense. Circle NO if the sentence does not make sense.

| The red car had a flat tyre. | YES | NO |
| Airplanes are made of dogs. | YES | NO |

Sample task 1 was developed for illustration purposes, and was not included in the assessment.

Passage comprehension tasks assess the ability to understand the literal meaning or "gist" of connected text and to make simple inferences across sentences in the text. In the PISA-D assessment, students see a paragraph from which certain words are purposefully deleted. The task is for the test-taker to complete the missing words by choosing one among three proposed options to complete the text.

Source: PISA for Development Reading Framework (OECD, 2018).

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39 In Zambia, 48.9% of 15-year-old students enrolled in grade 7 and above performed at Level 1c and below in PISA-D. The great effort will therefore be needed to reduce the proportion of students performing in the lower end of proficiency levels. This may require systemic monitoring and evaluation with the view of designing suitable strategies of enhancing quality instructional approaches and performance.

2.2.3 Low performers in mathematics

40 Students who perform at Level 1 in mathematics can answer mathematics questions involving familiar contexts where all the relevant information is present and the questions are clearly defined. They are able to carry out routine procedures – such as an arithmetic operation – according to direct instructions, in explicit situations (OECD, 2017a).

41 Students who perform below Level 1 may be able to perform direct and straightforward mathematical tasks such as reading a single value from a simple chart or table, where the labels used in the chart or table match the words in the question; but they are typically unable to do arithmetic calculations that do not use whole numbers or if they are not given clear and well-defined instructions (OECD, 2017a).

42 Figure 2.4 above highlights the severe difficulty of many students in Zambia in situations that require mathematical problem-solving ability. About 97.7% of students in Zambia do not reach the baseline level of performance in mathematics. The proportion of students below baseline performance in Mathematics was highest in Zambia compared to PISA-D and other benchmarking countries.

43 Among low-performing students, 7.6% of students perform at Level 1a, and are only able to perform routine tasks in well-defined situations, where the required action is almost always obvious. About 90% of students perform even below this Level, at Levels 1b, 1c or below 1c.

44 Level 1b is the highest level of proficiency in mathematics attained by about 18.4% of students in Zambia. These students can follow clearly prescribed instructions given in a syntactically simple text and sometimes perform the first step of a two-step solution of a mathematical problem.

45 At Level 1c, students can only understand mathematics questions involving simple, everyday contexts where all relevant information is clearly given and defined in a very short syntactically simple text. They are able to follow a single clearly prescribed instruction to perform a single step or operation. About 31.7% of 15-year-old students in Zambia are only proficient at Level 1c while a larger proportion (40.1%) even below.

2.2.4 Low performers in science

46 Students who perform at Level 1a in science can use common content and procedural knowledge to recognise or identify explanations of simple scientific phenomena. With support, they can undertake a scientific enquiry with no more than two variables (e.g. an input and an output variable). They can identify simple causal or correlational relationships and interpret graphical and visual data that require a low level of cognitive ability. Students at Level 1a can select the best scientific explanation for given data in familiar contexts (OECD, 2017a).

47 Across OECD countries, 15.7% of students perform at Level 1a, and only 5.5% of students perform below it. In Zambia, in contrast, 23.4% attain Level 1a while the larger proportion (70.8%) was performing even lower.

48   Students who perform at Level 1b in science can use common content knowledge to recognise aspects of simple scientific phenomena. They can identify simple patterns in data, recognise basic scientific terms and follow explicit instructions to carry out a scientific procedure (OECD, 2017a). Across OECD countries, 4.9% of students perform at Level 1b, and only 0.6% of students perform below it. In Zambia, in contrast, 51.6% attain Level 1b and 19.2% below it (Figure 2.4).

2.3   Equality of performance in reading, mathematics and science

49   Inclusion and fairness in education requires that all children have access to educational opportunities that lead to effective learning outcomes, irrespective of their gender, their ethnicity, or their parents' wealth, education or occupation. Thanks to detailed information about the background of participating students, PISA-D can measure inclusion and fairness among the student population; however, this represents only a partial description of inclusion and fairness in education – equity within the system. Full analysis would also require information about those 15-year-olds who are not covered by PISA-D samples – equity in access to the system – these 15-year-olds are the subject of the out-of-school component of PISA-D.

2.3.1   Gender gaps in performance

50   Figure 2.5 presents a summary of the differences between boys' and girls' performance in PISA-D in Zambia. In common with all countries that participated in PISA 2015, in Zambia boys' average reading performance is lower (268) than the average performance of girls (282). The 14 mean score point gap in Zambia is smaller than across OECD countries on average (27 mean score point difference) and close to the gap observed among PISA-D countries on average (11 mean score point difference). In mathematics, on the other hand, boys outperform girls by 8 score points on average for OECD countries and by 10 score points on PISA-D average. Most PISA-D participating countries except for Zambia and Cambodia had boys outperforming girls. In Zambia, although girls had a leverage of 6 score points difference over boys, the mean difference was not statistically significant. The similar pattern was observed in Algeria. The science performance of boys and girls in Zambia was also similar, a finding that was also observed, among countries participating in PISA-D, in Guatemala, Paraguay and Senegal. For the OECD average there is a 4 score points difference in favour of boys.
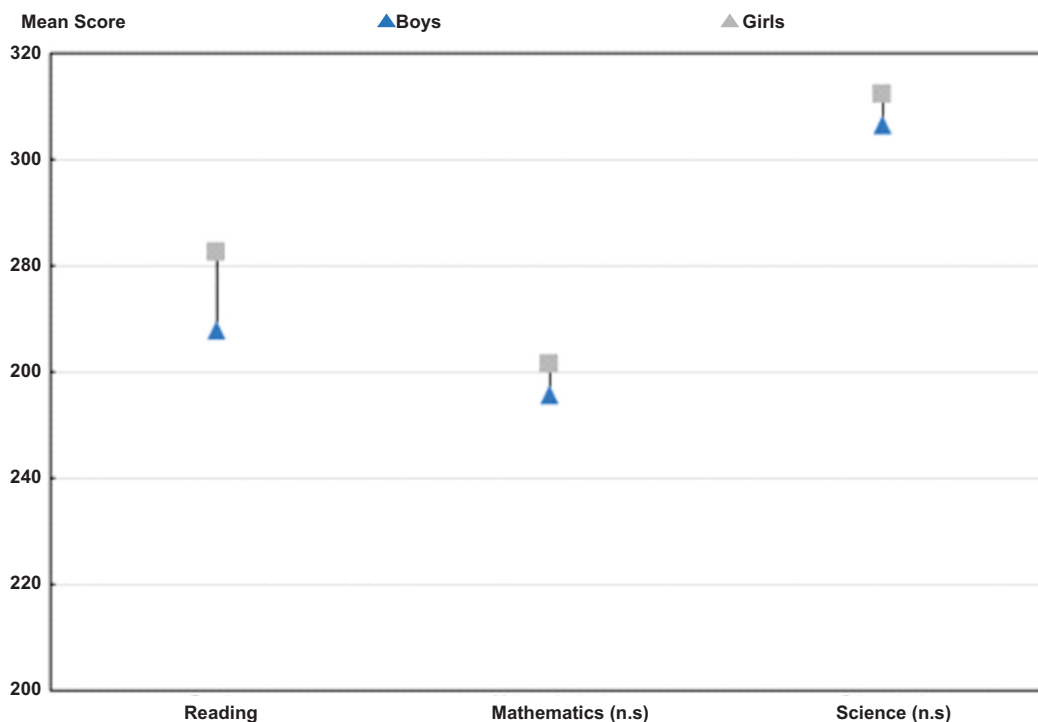
Figure 2.5: *Gender differences in reading, mathematics and science performance*

Note: *(n.s) indicates that the score-point difference between boys and girls in not significant in this domain.*

Source: *PISA for Development Database*

51 Overall, Figure 2.5 shows that gender differences in performance in Zambia are relatively narrow, compared to those typically observed across the OECD countries**.**

2.3.2 *Achievement by language spoken at home and language of instruction*

52 Fluency in the Language of instruction enhances achievement levels of students. In Zambia, where the language of instruction in grades 7 and above is English, 83.4% of students assessed in PISA-D reported speaking a different language at home whilst 16.6% reported speaking the language of instruction at home. Majority of the Zambian population speaks another language at home other than the language of instruction.

53 On average across OECD countries, the odds of low performance in reading and mathematics among students who speak a different language at home are more than twice as high (odds ratio of 2.3) as the odds among students who speak the same language, before accounting for other student-related variables, including socio-economic status and immigrant background. After accounting for these characteristics, language-minority students in OECD countries still have 1.4 times higher odds of underachieving than students who speak the language of instruction at home. Yet, the specific association varies from country to country.

54 In Zambia, speaking a different language at home increases the likelihood of low performance even after accounting for other variables. Students who do not speak the language of instruction at home are about 2 times more likely to perform below the baseline in reading, mathematics and science.
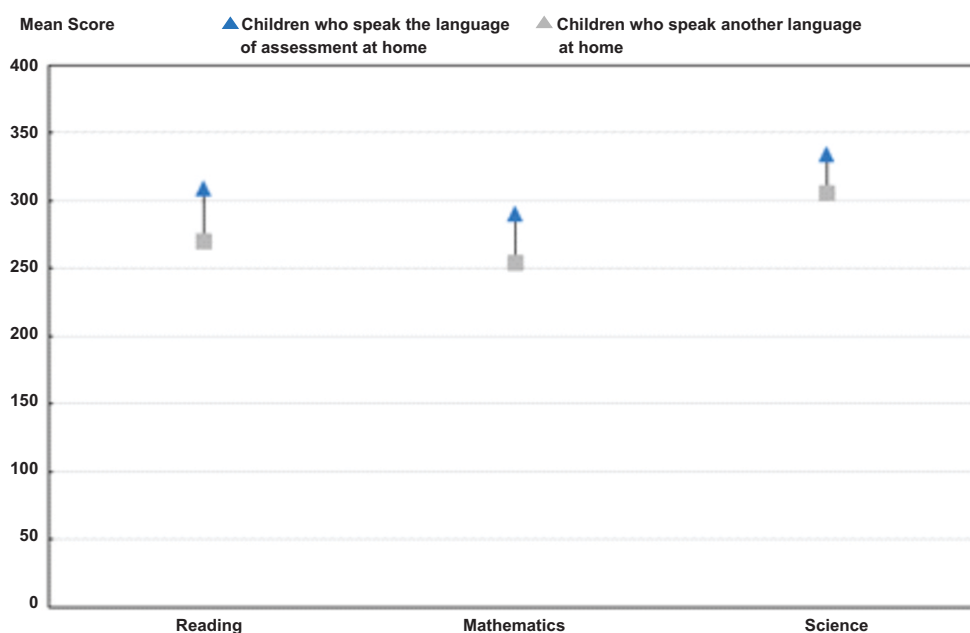
Figure 2.6: *Score-point difference in reading, mathematics and science, by whether students speak the language of assessment at home*

Note: *the score-point difference between students who speak the language of assessment at home and students who speak another language is significant after accounting for student's socio-economic status in all domains.*

Source: *PISA for Development Database*

2.3.3 *Socio-economic inequalities in performance*

55 The equity of education systems with respect to students from different socio-economic backgrounds can be examined through different statistical aspects of the relationship between students' performance in PISA-D and a students' socio-economic status. To simplify the exposition, and because this relationship is very similar for all domains assessed in PISA-D, this chapter only examines the relationship between reading and mathematics performance and the PISA index of economic, social and cultural status (see Box 2.2).

56 Three aspects of the relationship between socio-economic status and performance deserve particular attention: the level, the slope and the strength of the relationship. The level indicates whether the performance of students in a particular country or education system is higher or lower than that of students in other countries facing similar socio-economic conditions. The slope indicates to what extent students with more advantaged socio-economic backgrounds perform better than disadvantaged students, within each country on average. The strength indicates how small the chances are for disadvantaged students to perform as well as more advantaged students. Policies that promote equity and inclusion in education are expected to "raise and level" this relationship – i.e. to result in higher levels, but milder slopes and weaker relationships. Box 2.4 and Figure 2.9 show the average relationship between socio-economic status and performance across OECD countries, and illustrate the level, the slope and the strength graphically.

Table 2.5 Main indicators of socio-economic inequalities in education
Countries and economies' performance in reading and major indicators of equity in education

	Mean performance in reading		Equity in education					
			Inclusion		Fairness			
			Coverage of the national 15-year-old population (PISA Coverage index 3)	Percentage of students performing below Level 2 in reading	Percentage of variation in reading performance explained by students' socio-economic status		Score-point difference in reading associated with a one-unit increase in the ESCS[1]		Percentage of the between-school variation in reading performance explained by students' and schools' ESCS
	Mean score	S.E.	%	%	S.E.	%	S.E.	Score dif.	S.E.	%
Cambodia	321	(2.1)	28.1	92.5	(0.8)	4.5	(1.0)	12	(1.3)	57.3
Ecuador	409	(3.4)	60.6	50.6	(1.7)	17.9	(2.0)	29	(1.9)	72.8
Guatemala	369	(3.5)	47.5	70.1	(2.0)	19.0	(2.8)	26	(2.1)	72.1
Honduras	371	(3.5)	41.4	70.3	(1.8)	10.8	(2.6)	19	(2.4)	63.9
Paraguay	370	(3.7)	m	67.8	(1.9)	12.3	(1.7)	25	(2.0)	82.1
Senegal	306	(1.8)	29.0	91.3	(0.7)	3.4	(0.9)	10	(1.4)	43.1
Zambia	275	(3.9)	36.0	95.0	(1.0)	12.8	(2.5)	18	(2.1)	33.1
PISA-D average	346	(1.2)	42.6	76.8	(0.6)	11.5	(0.8)	20	(0.7)	60.6
OECD average	493	(0.5)	89.0	20.1	(0.2)	11.9	(0.2)	37	(0.4)	59.9
Algeria	350	(3.0)	78.8	79.0	(1.6)	1.0	(0.6)	7	(2.3)	26.0
Tunisia	361	(3.1)	93.0	71.6	(1.3)	8.2	(1.6)	20	(2.1)	44.7
Japan	516	(3.2)	94.7	12.9	(1.0)	10.0	(1.1)	41	(2.4)	62.1
Korea	517	(3.5)	91.7	13.7	(1.0)	9.6	(1.3)	44	(3.1)	56.9

ESCS refers to the PISA index of economic, social and cultural status

Note: *In Paraguay, due to the possible over-estimation of the total population of 15-year-olds in official population projections (see section "Special cases" in the PISA for Development Technical Report), the coverage of the national 15-year-old population may be significantly under-estimated.*

Source: *PISA 2015 and PISA for Development*

57 Table 2.5 shows the main indicators of socio-economic inequalities in reading performance for PISA-D and selected 2015 PISA participating countries.

58 The mean performance of students at different levels of the PISA index of economic, social and cultural status shows that students in Zambia tend to do worse than students across OECD countries and in PISA-D on average. In Zambia, the performance of the country's most disadvantaged students is below that of similarly disadvantaged students across OECD countries. It is lower than that of similarly disadvantaged students in other PISA-D participating countries even after accounting for differences in socio-economic conditions between the latter countries and Zambia. In addition, the most advantaged students in Zambia systematically perform below similarly advantaged students across OECD countries. In fact, the performance of Zambia's students lies below the performance achieved by similar students in OECD countries at all levels of socio-economic status.
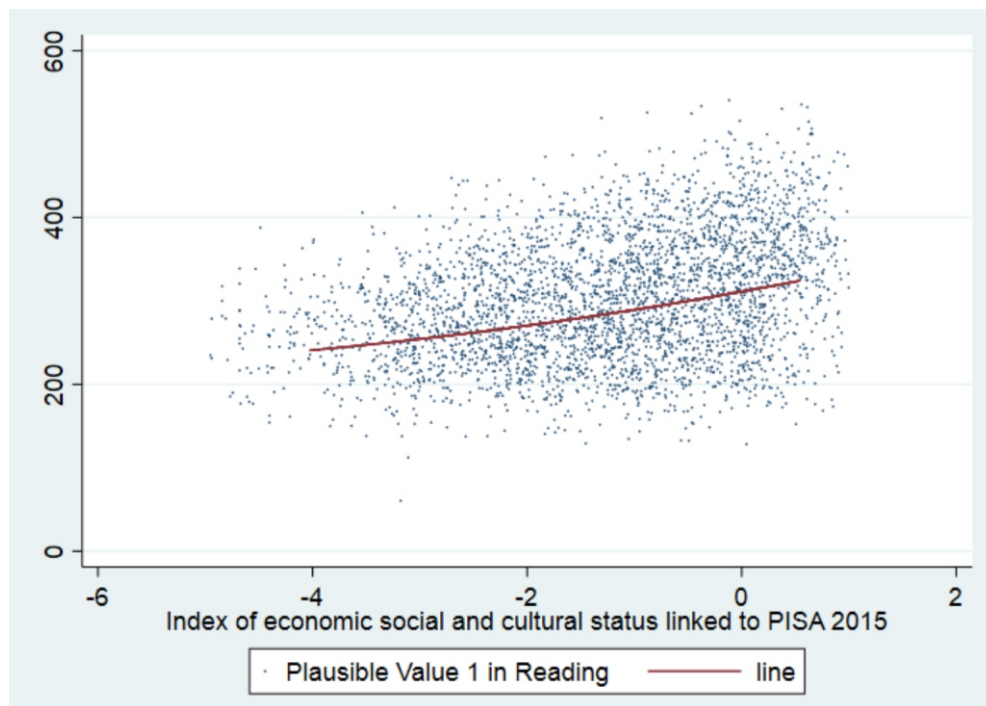
Figure 2.7: *Reading performance of students at different levels of the PISA index of ESCS*

Source: *PISA 2015 and PISA for Develoment Database*

59　When examining the inequality in learning outcomes through the slope and the strength of the relationship between mean performance and socio-economic status, Zambia stands out as having relatively mild slopes, meaning that socio-economic status is associated with smaller differences in mean performance than across OECD countries on average. At the same time, the relationship between socio-economic status and performance is as strong as on average across OECD countries. This strong relationship and mild slope implies that while the outcomes of advantaged and disadvantaged students do not differ as much in Zambia as in other countries, the chances of achieving good outcomes remain relatively low for disadvantaged students, compared to their more advantaged peers.

60　In fact, when examining the gaps between the highest and the lowest achievers across different levels of socio-economic status, Zambia shows a much steeper relationship with socio-economic status for high performance than low performance. This indicates that socio-economic status dampens disadvantaged students' chances of achieving at high levels significantly, and to a greater extent than it protects advantaged students from relatively low levels of performance (OECD, 2016a).

61　Indeed, the chances of Zambia's students achieving a baseline level of performance in reading or mathematics are generally much lower for disadvantaged students than the rest. Figure 2.8 compares the odds of reaching a baseline level of performance for the 25% of students with the lowest socio-economic status in Zambia to the odds for the remaining 75% of students. In Zambia, the 25% most disadvantaged students are more than 10 times more likely to perform below the baseline in reading and mathematics

Increased likelihood of disadvantaged students scoring below Level 2, and increased likelihood of advantaged students scoring at or above Level 3

Reading **Mathematics** **Science**
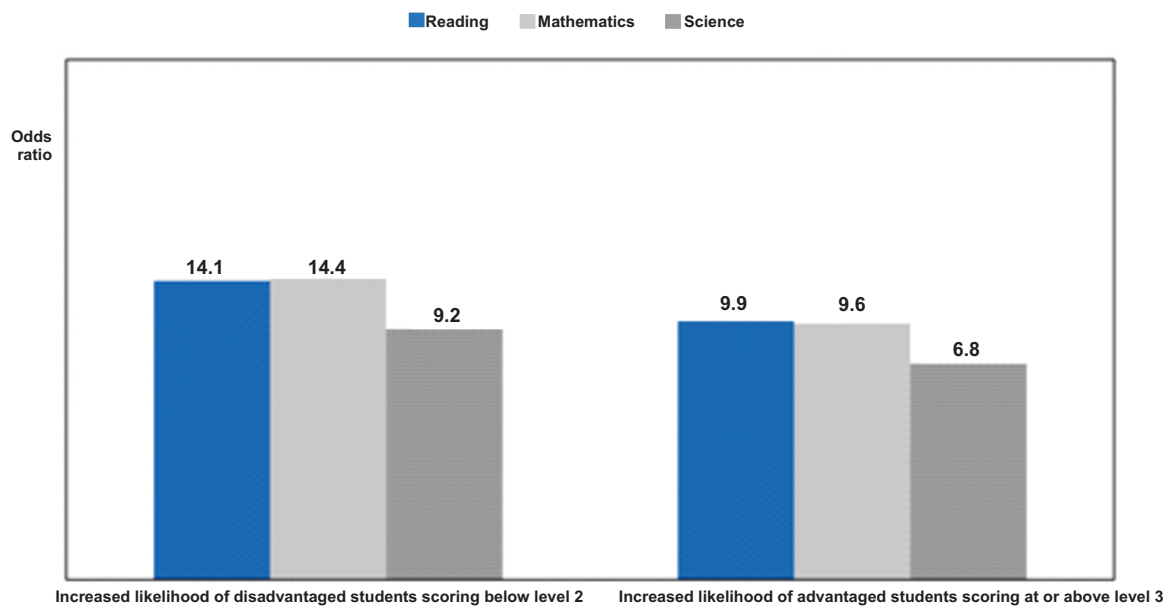
Figure 2.8: *Student performance and socio-economic advantage*

Notes: The figure reports the odds ratio on a logarithmic scale. All values are significant
Source: PISA for Development Database

Box 2.4. A graphical representation of the indicators of socio-economic inclusion and fairness

Figure 2.9 shows the relationship between the PISA index of economic, social and cultural status for OECD countries on average, and highlights the various indicators of socio-economic inclusion and fairness that are examined in this chapter.

Figure 2.9: Students' socio-economic status and science performance across OECD.

Source: OECD, PISA 2015 Database, Tables I.6.2a, I.6.4a, I.6.5
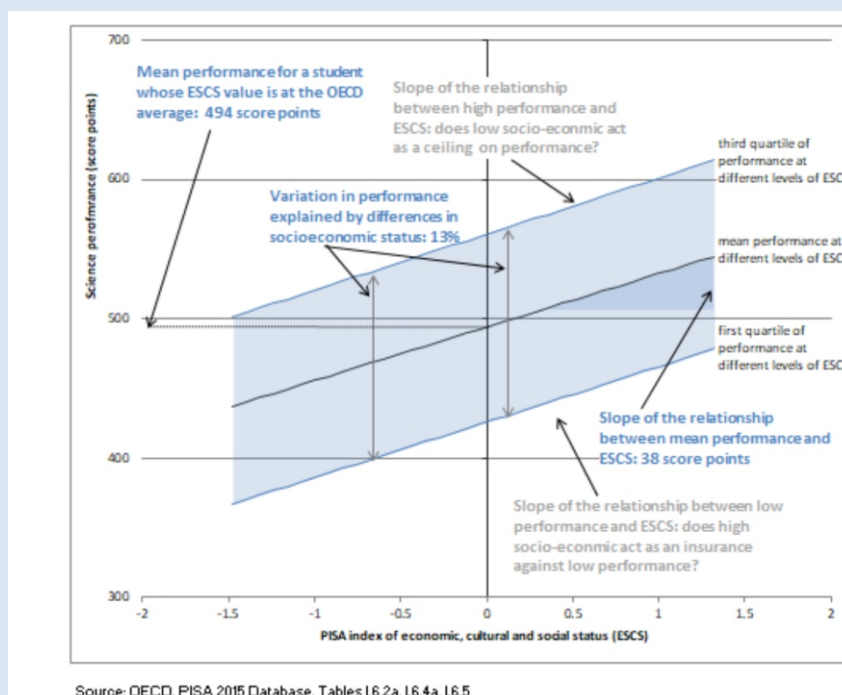
The black curve in the middle represents the average performance observed at different levels of socio-economic status. By comparing the vertical position of the curve across countries, e.g. at a value of zero on the PISA index of economic, social and cultural status (the international average), it is possible to identify differences in performance, after taking account of students' socio-economic status; this constitutes an indicator of inclusion.

The slope of this curve indicates how much, on average, the performance of students with higher socio-economic status lies above that of students with lower socio-economic status. The slope thus indicates the extent of inequality attributable to socio-economic status. Steep slopes indicate greater inequality, while more gradual slopes less inequality. The slope of this curve may also change across the continuum of socio-economic status, indicating that certain levels of socio-economic status are more related to performance differences than others. In this section, however, we focus on the average slope as an indicator of equity.

The blue curves above and below the black curve, on the other hand, represent the area within which the 50% of the students who score closest to the average can be found, for any level of socio-economic status: they correspond to the highest quartile and lowest quartile of performance for different levels of socio-economic status. An important indicator of equity is related to both the slope of the average relationship and the distance between these two lines: for a given slope, the closer the two blue lines are to each other, the stronger the relationship between socio-economic status and performance. Technically, the strength of the relationship is measured by the share of variation in performance that is explained by the PISA index of economic, social and cultural status. If the relationship between social background and performance is weak, then factors other than socio-economic status are likely to have greater bearing on student achievement. By contrast, when the relationship is strong, socio-economic status is highly predictive of the performance that students can achieve in a system.

Just as the slope may vary at different levels of socio-economic status, so may the distance between the upper and lower quartile. When the upper curve has a steeper slope than the lower curve, this may indicate that socio-economic disadvantage acts mainly as a ceiling on students' achievement, but that socio-economic advantage is no insurance against low achievement. If, on the contrary, the upper curve is less steep than the lower curve, and the variation in outcomes diminishes with socio-economic status, this may indicate that socio-economic advantage represents mainly an insurance against poor outcomes (relative to the country average), but that a significant fraction of disadvantaged students achieve at high levels despite their disadvantage.

2.3.4 Variation in performance among schools and between urban and rural areas and between public and private schools.

62 Ensuring consistently high standards across schools is a formidable challenge for any school system. Some performance differences between schools may be related to the socio-economic composition of the school's student population or other characteristics of the student body. When there are strong disparities in the home

and community resources available to different schools, they face an unequal task in ensuring that all students have the same opportunities for success. Such disparities may be related to residential segregation, based on income or on cultural or ethnic background; they can also be related to the design of school systems and system-level education policies, such as differences in the degree of autonomy granted to schools, and to policies emphasising greater competition for students among schools and greater school choice (Hsieh and Urquiola, 2006; Söderström and Uusitalo, 2010; Willms, 2010).

63 Figure 2.10 represents the variation in student performance in reading and mathematics between and within schools in Zambia compared to the OECD and PISA-D averages. The overall length of the bar represents the total variation in Zambia as a proportion of the OECD average level of variation in performance. The dark part of the bar represents the proportion of those differences that is observed between schools, and the light part of the bar represents the proportion observed within schools.
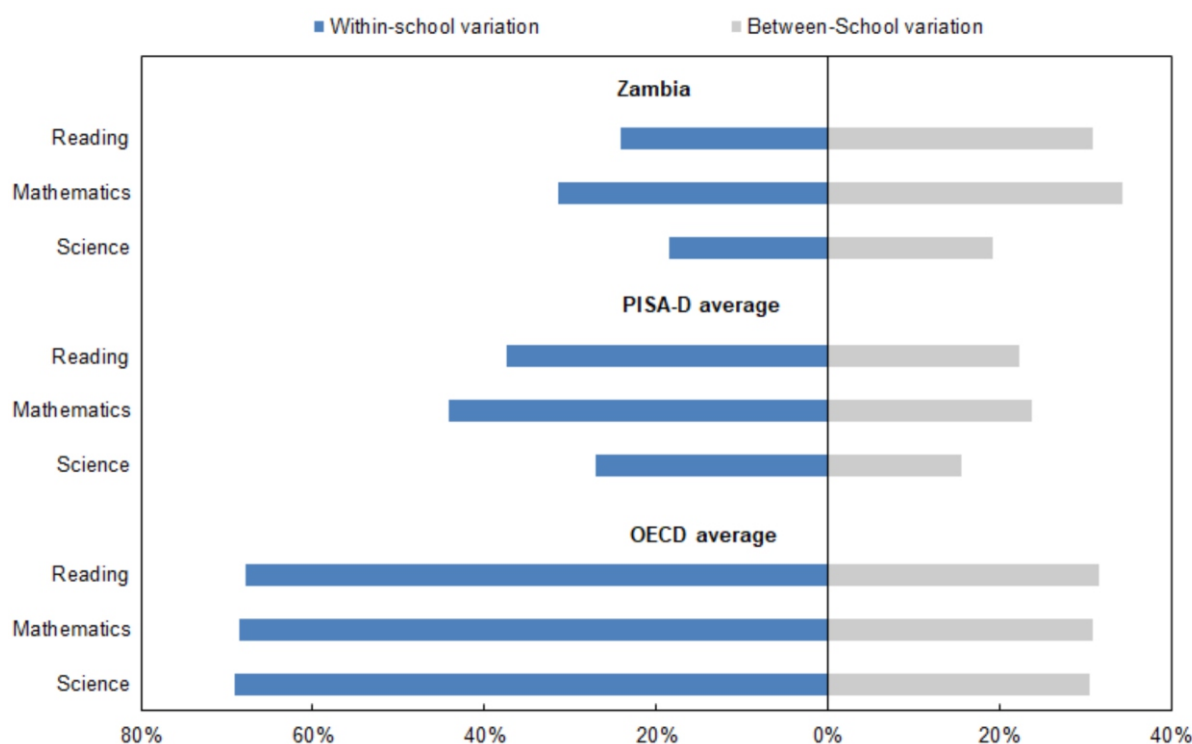
Figure 2.10: *Variation in reading and mathematics performance between and within schools*

Source: PISA 2015 and PISA for Development Database

64 Figure 2.10 shows that Zambia is characterised by low overall variation in students' results. It also shows, however, that, the variation is largely due to differences in performance between schools: about half of the variation in students' results lies between schools in Zambia, whereas in PISA-D and OECD countries on average, the between-school variation represents only about one-third of the total variation in performance. As a consequence, it is often sufficient to know what school students attend to form a relatively accurate prediction of their performance levels. Comprehensive education systems – those which do not sort

students by programme or school based on ability – often tend to have small between-school variations in performance. In the case of Zambia, the between-school variation may not be related to the existence of different tracks or pathways through education for students of different ability, but rather to factors such as those related to socio-economic differences across regions, school type and school categories (whether Primary or secondary).

65 Figure 2.11 shows the between-school variation as a proportion of the overall variation, both for students' achievement in mathematics and for students' socio-economic status. The height of the bars can be interpreted as a measure of how strong the associations are between attending a particular school and performance, while the symbols indicate how strongly schools are associated with differences in socio-economic status. Schools appear strongly associated with socio-economic status in Zambia. This means that generally in Zambia, the shares of advantaged and disadvantaged students vary significantly across schools, with some schools concentrating higher shares of disadvantaged students. But schools appear even more strongly associated with their students' results than with their socio-economic resources in Zambia.
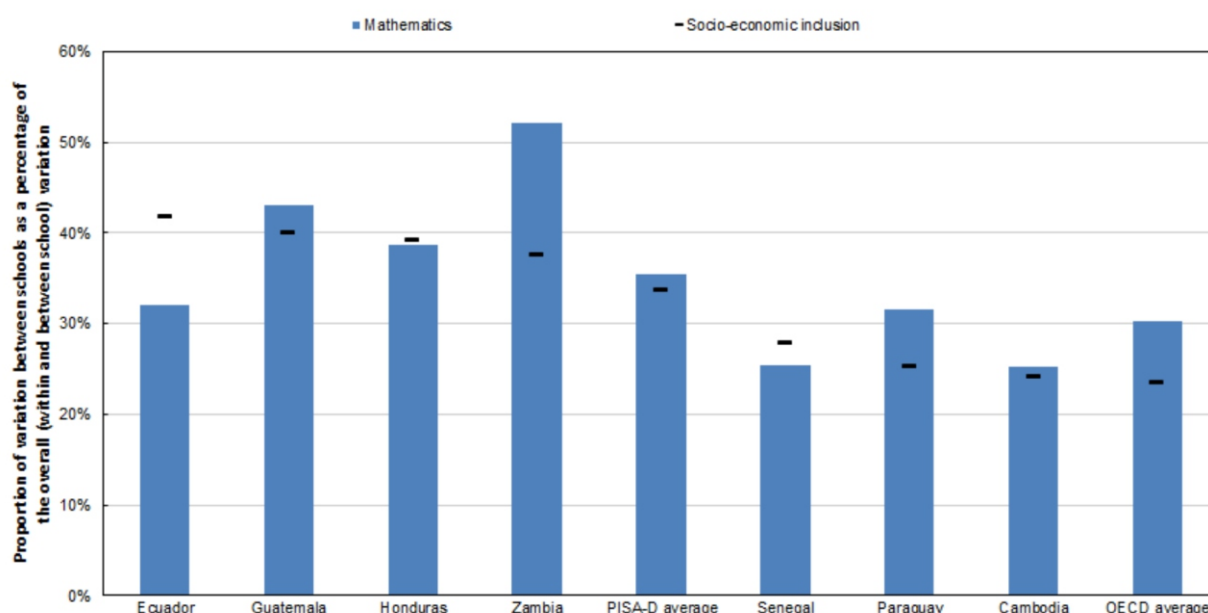
Figure 2.11: Between- school differences in mathematics performance and socio-economic status.

Note: Countries and economies are ranked in descending order of proportion of variation in mathematics performance that lies between schools

Source: OECD, PISA 2015 and PISA for Development

66 While the main channel through which socio-economic disadvantage relates to students' results is through school-level associations; within each school, socio-economic advantage or disadvantage is not associated with performance. This has important implications on how to target resources in order to improve equity in the system: in particular, by compensating schools and students for socio-economic disadvantage, Zambia can still achieve a good match between transfers and needs (good targeting) while avoiding some problems (such as stigma, limited take-up

and administrative costs) that are typically associated with more individualised policies.

67 A pattern of between-school differences similar to the one observed in Zambia is also found in most PISA-D Countries, indicating that PISA-D countries share similar challenges to ensure that all schools reach similar standards of performance.

68 The between-school differences observed in Zambia also reflect, in part, a divide between schools in urban and rural regions. Household survey data from low- and middle-income countries consistently show that children from rural areas (see Box 2.5 for a description of how PISA defines urban and rural schools) are significantly less likely to make the transition from primary to lower secondary school and from lower to upper secondary school, and are more likely to be delayed in their progression through the grade levels (UNESCO, 2015). In many regions, therefore, opportunities to participate in education remain unequally distributed, depending on students' locations. Chapters 4 and 5 will look more closely at how learning environments and school resources differ between urban and rural areas.

Increased likelihood for students in rural regions scoring below Level 2 on reading, science or mathematics scale.
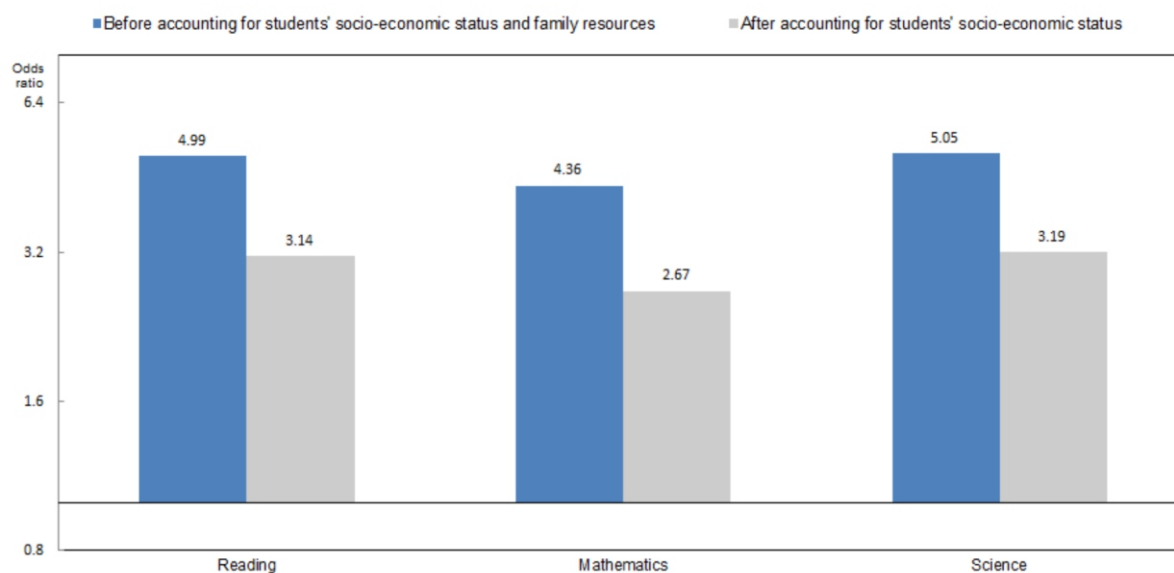
Figure 2.12: *Likelihood of low performance in reading, mathematics and science in rural and urban regions*

Notes: *The vertical axis is in logarithmic scale.*

Source: *PISA for Development Database*

69　In Zambia we can see a significant difference between the performance of students in urban and rural schools in reading, with 42.2 score point difference in favour of urban schools in this domain after accounting for socio-economic status. The difference in performance between rural and urban schools was consistent across all subjects.
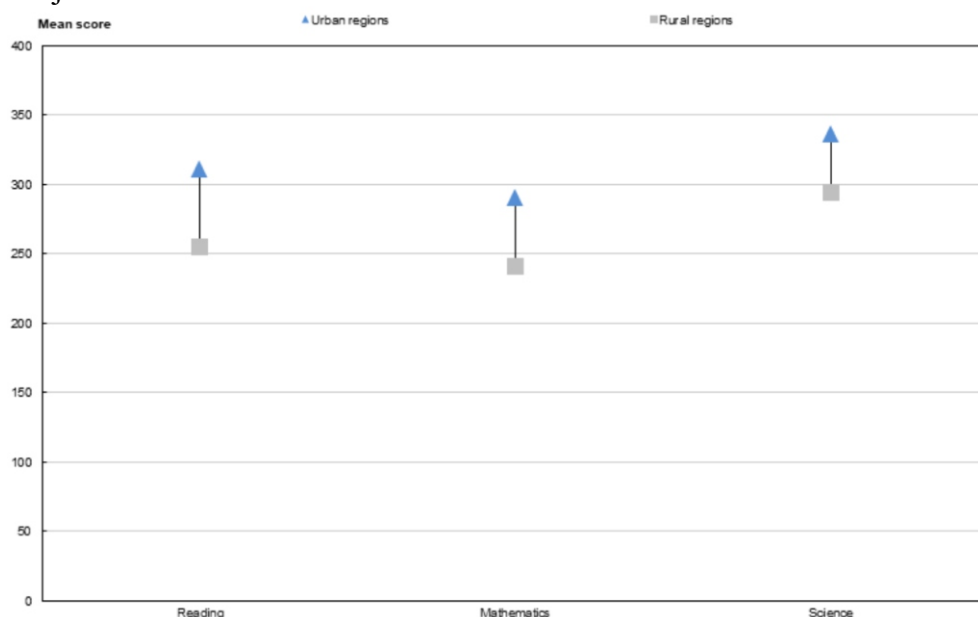
Figure 2.13: Score-point difference in reading, mathematics and science between rural and urban schools

Note: the score-point difference between urban and rural schools is significant after accounting of students' socio-economic status in the domains.

Source: PISA for Development Database

70　Differences between rural and urban schools will need concerted efforts from all stakeholders. Particularly, the Zambian government has put in place a law that discourages free transfer of teachers with the view of curbing the migration of teachers from rural areas into urban schools until after they have served for at least 2 years. This law aims at maintaining low teacher-pupil ratio. It is however, not clear as to whether this law has helped to curb rural – urban teacher imbalances. Secondly, government may need strong mechanism in the distribution of material resources so that schools in rural and urban areas have fair shares of resources. These aspects are further discussed in Chapter 4, where urban-rural differences in teacher resources, school facilities and instructional materials are discussed.

71　Comparisons were also made between school types depending on the running agency of a particular school in Zambia. The types included were Government- run schools and Grant -Aided Schools which are run by religious organizations. Private and community schools were not included in the analysis because their proportions were small to make meaningful comparisons. Grant -Aided Schools performed better than government schools across all subjects even after accounting for students' socio-economic status and family resources. The mean scores for Grant-Aided schools were 331 (for reading), 315 (for mathematics), and 352 (for science). This was against 269 (in reading), 252 (in mathematics) and 304 (in science) for government schools.

Health, well-being, and attitudes toward school and learning at age 15 in Zambia

In Zambia, 64% of students report that they are both **satisfied with life** and in **good health** .

88% of students agree that **trying hard at school** will help them **get a good job**

Disadvantaged students are 2.1 times more likely than more advantaged students to report **low life satisfaction...**

…and 1.8 times more likely than more advantaged students to report **poor or fair health** .

53% of students report **feeling hungry** , because there was not enough food, at least once over a 1-month period.

3

Health, well-being and attitudes toward school and learning at age 15 in Zambia

Abstract

This chapter describes the health, well-being and attitudes toward school and learning of 15-year-old students in Zambia. It identifies for each outcome a vulnerable population with poor health and well-being or negative attitudes towards school and learning, and summarises the relationship with the achievement and attainment outcomes that are discussed in Chapter 2.

1   Broadly speaking, well-being can be defined as the functioning and capabilities that are required to live a happy and fulfilling life (OECD, 2017, p. 61[1]). While well-being is in part a cultural construction, some aspects of well-being are universally accepted; these comprise, in particular, a physical dimension (good health), an emotional dimension, in addition to the material (wealth and the satisfaction of primary needs), cognitive and social dimensions. The term well-being is also used more narrowly, to refer to the subjective valuations that people make regarding their lives (Diener, 2007[2])).

2   Some conceptualisations of well-being, including the one used in the PISA 2015 framework, refer to a psychological dimension of well-being that encompasses both the emotional elements and a sense of purpose in life that for adolescents includes engagement with school and the goals and ambitions they have for their future. Therefore, though the PISA-D framework considers attitudes towards school and learning as an independent outcome, which is separate from the health and well-being outcome, for the purposes of this chapter, it will be treated as part of the psychological dimension of well-being.

3   This chapter is concerned with the physical and psychological well-being of 15-year-olds in Zambia, and with the relationship of these dimensions of well-being with poverty (an indicator of the material well-being of their families) and with their academic achievement and attainment (as indicators of cognitive well-being, and predictor of future material well-being). Each of the distinct dimensions of well-being constitutes a separate outcome, but can also be considered as an enabling condition with respect to the other dimensions, and ultimately with students' overall quality of life.

4   The indicators of physical and psychological well-being used in this chapter are all based on self-reports: by asking 15-year-olds about their feelings and their thoughts about life and school, PISA-D gives adolescents an opportunity to express themselves as individuals. This choice also signals that, while it is very important to invest in the future of children and adolescents (and therefore in their learning), it is at least equally important to pay attention to their present well-being and to promote their healthy development "here and now". At any stage of life, well-being is, in fact, a dynamic state: the assessment of well-being must be sensitive to both the current state and achievements ("functioning") and to the freedom they

have ("capabilities") to pursue what they value in life (Sen, 1999[3]); and the present well-being is the cumulative result of many influences over the course of life.

5   PISA-D includes, in particular, overall (subjective) evaluations of adolescents' health and life satisfaction. In addition, because of its educational focus and policy orientation, it highlights those aspects of psychological well-being which are more closely related to the experiences in school: the emotional well-being of students is captured by questions that focus on school-related anxiety; while adolescents' sense of purpose is indicated in particular by their attitudes towards school and learning (e.g. "trying hard at school will help me get a good job"). The PISA-D measures of health, psychological well-being, and of valuing school outcomes are described in detail in Box 3.1.

6   By age 15, adolescents have spent a considerable amount of time in the classroom: following lessons, socializing with classmates, and interacting with teachers and other staff members. What happens in school is therefore important to understanding whether students enjoy good physical and mental health, how happy and satisfied they are with different aspects of their life and their attitudes towards school and learning. At the same time, their health and well-being at age 15 as well as their attitudes towards school and learning are the cumulative result of several influences over their life-course: of their genetic disposition and the early influences on their physical and cognitive development, of the direct influence of their past health and well-being on their current state, of their exposure to environments that promote their healthy development and of their access to the required resources in their families, in their communities, and at school. While this chapter highlights some of the associations between health and well-being outcomes and contemporary school and education-related factors, this focus does not deny the importance of other factors in shaping the health and well-being of 15-year-olds.

7   The chapter includes only limited comparisons with other countries, in contrast to Chapter 2, and focuses on differences within Zambia (e.g. between boys and girls) and on the relationship between these outcomes and the achievement and attainment outcomes discussed in the previous chapter. The absence of cross-country comparisons is only in part a consequence of data limitations (the absence of comparable data for countries that participated in PISA 2015): rather, it is related to the subjective nature of the reporting scales and to the resulting uncertainty in the validity of comparisons (Box 3.2).

Box 3.1. How PISA-D measures health, well-being, and attitudes towards school and learning

PISA-D offers a set of health and well-being indicators for adolescents that cover both subjective evaluations of life-satisfaction and general health, the experience of negative events and emotions (e.g. disease, hunger, and anxiety) and the positive attitudes and sense of purpose that promote healthy development. Most of the PISA-D data on health and well-being are based on students' self-reports, and thus give adolescents the opportunity to express how they feel, what they think of their lives and of school and learning.

Health

The main measure of physical well-being is self-rated health. Students were asked to report a subjective rating of their health on a scale ranging from 0 to 10 ("In general, would you say your health is…"); the scale was accompanied by five descriptors ("poor", "fair", "good", "very good", "excellent"), with the labels for "poor" and excellent placed at the extremes of the scale, and "good" around the value of 5. Students who reported values between 0 and 4 are considered to report that their health is "poor" or "fair" and are described as having vulnerable health. This measure is not available for countries that participated in earlier cycles of PISA.

In addition, the assessment of students' physical well-being is also supported by questions about the experience of health-related problems such as sickness, hunger, anxiety, depression, pain and disease; and by reports of a physical or sensory disability. These measures are described in greater detail when they are first introduced in this chapter.

Psychological well-being

The main measure of psychological well-being is based on a general life-satisfaction scale. The PISA-D questionnaire asked students to rate their life on a scale from 0 to 10, where 0 means the worst possible life and 10 means the best possible life. The same measure was used also in PISA 2015. Similar to the PISA 2015 report (OECD, 2017[1]), in this chapter, students who reported values between 0 and 4 on the life satisfaction scale are described as "not satisfied with life" (and vulnerable), students who report values of 5 or 6 as "moderately satisfied", students who report values of 7 or 8 as "satisfied", and students who report values of 9 or 10 as "very satisfied".

In addition, the PISA-D questionnaire also contained questions about the experience of negative affective states (anxiety and depression). These measures are described in greater detail when they are first introduced in this chapter. Self-reported measures of life satisfaction are considered more stable indicators of subjective well-being than reports of positive or negative affective states (Gilman et al., 2008[4]).

Valuing school outcomes

Positive attitudes towards school and learning constitute an aspect of psychological well-being that receives particular attention in PISA-D, due to their implications for education policy. If students adhere to school values and find purpose and meaning in what they do at school, this can promote student engagement and participation in lifelong learning.

The "valuing school outcomes" scale was built from students' level of agreement (measured on a four-point scale from "strongly disagree" to "strongly agree") with the

statements:

- School has helped give me confidence to make decisions.
- School has taught me things which could be useful in a job.
- Trying hard at school will help me get a good job.
- Trying hard at school will help me get into a good university.
- I enjoy getting good grades
- Trying hard at school is important.

This question was not included in PISA 2015, but was part of the PISA 2012 questionnaire, allowing for some limited international comparisons. In PISA-D, a summary scale ("index of attitudes towards school – valuing school outcomes") was built to facilitate comparisons among students. In this chapter, students are considered to have negative attitudes towards school and learning if they "disagree" or "strongly disagree" with at least three of the above statements, corresponding to a value of 5 on the summary scale.

Box 3.2. Can subjective health and well-being be compared across countries?

Some caution is needed in interpreting the PISA-D data on health, well-being and attitudes towards school and learning. Despite the careful process followed for developing, translating, adapting and selecting the questions included in questionnaires and for analysing the responses of students, full comparability across countries and subpopulations cannot be guaranteed.

The PISA questionnaires use student self-reports to derive measures of health, well-being and attitudes towards school and learning. Self-reported responses are informative and useful, but they are susceptible to three possible biases: social desirability, i.e. the tendency to respond in a manner that is more acceptable in one's own social and cultural context (Edwards, 1953[5]); reference-group bias, i.e. the influence of an implicit comparison group that is known to the respondent only when reporting values on a subjective scale; and response-style biases, such as the tendency to use, or to avoid, extreme responses. These biases can operate differently in different cultural contexts, thus limiting the cross-country comparability of responses (van Hemert, Poortinga and van de Vijver, 2007[6]). In addition, when comparing the responses given in different languages, subtle differences in the nuances of translations may introduce additional uncertainty in the comparisons; such uncertainty is particularly difficult to identify and delimit for outcomes that are measured by a single question or by a handful of questions only, as documented in the forthcoming technical report.

Comparisons within and across countries are also affected by response rates, which may differ across groups of respondents. In order to fully represent the distribution of academic achievement in the population, PISA-D uses non-response adjustments and assigns imputed values (i.e. values estimated from a model, based on known information about the respondent) for reading, mathematics and science proficiency estimates; self-reported outcomes based on questionnaire measures however remain affected by non-response, e.g. if low-achieving students find it hard to complete the questionnaire. The overall level of missing data in Zambia due to non-response to the student questionnaire is 10.3% for self-rated health, 10.8% for life satisfaction, and 17.0% for the index of attitudes towards school – valuing school outcomes

3.2 Levels of health, life satisfaction and emotional well-being among 15-year-olds

8 This section analyses the levels of health and well-being reported by 15-year-old students. Figure 3.1 provides a summary of the main measures of health and well-being in Zambia. The percentage of 15-year-olds satisfied with life and in good health in Zambia is 64.5%; an additional 6.9% of students report being satisfied with life, but only report a poor or fair health; while 20.7% of students report good, very good or excellent health, but low levels of life satisfaction. About 7.9% of students were not satisfied with life and rated their health as poor.
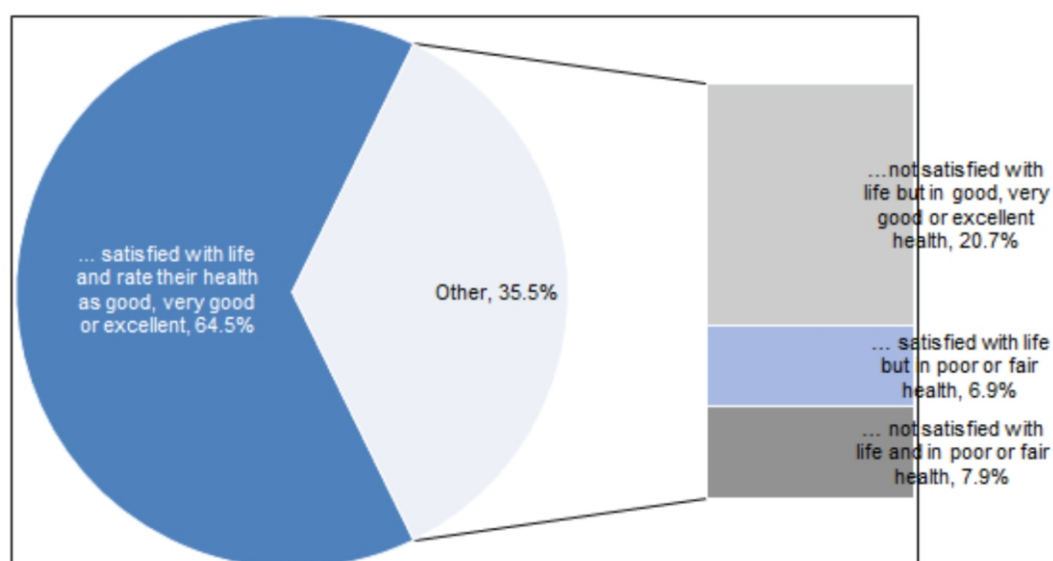
Figure 3.1: *15-year-old students' self-reported health and life satisfaction*

Source: *PISA for Development Database.*

3.2.1 Self-rated health and the experience of health problems

9 Children's physical health is the key element of physical well-being. It is particularly important for education policy in middle- and low-income countries, as children's health in these countries is more often compromised in ways that affect their educational outcomes – due to hunger; physical and emotional abuse; chronic illnesses such as asthma, bronchitis, diabetes or epilepsy; and acute illnesses that cause children to miss school and fall behind.

10   The main indicator of health in PISA-D is a subjective indicator of general health (self-rated health). Among adolescents, self-rated health is influenced not only to the presence or absence of chronic disease or disability, but also by a more general understanding of self (Inchley et al., 2016, p. 71[7]). Empirical studies have shown that self-rated health is an independent predictor of future morbidity and mortality even after controlling for other factors (Idler and Benyamini, 1997[8]).

11   PISA-D asks 15-year-olds to report their overall perception of their health and to report specific health problems they experienced during the past year.

12   On average, 15.0% of students in Zambia reported their health to be "poor" or "fair" (corresponding to values of 0,1,2,3 or 4 on the 0-to-10 self-rated health scale). About 27.0% of students rated their health as good (5 or 6), 22.4% as very good (7 or 8) and 35.0% as excellent (9 or 10). Figure 3.2 shows the self-rated health among 15-year old students among countries and economies. Students rated their health on a 0-to-10 scale. Countries were ranked in a descending order of percentage of students who rated their health as excellent.
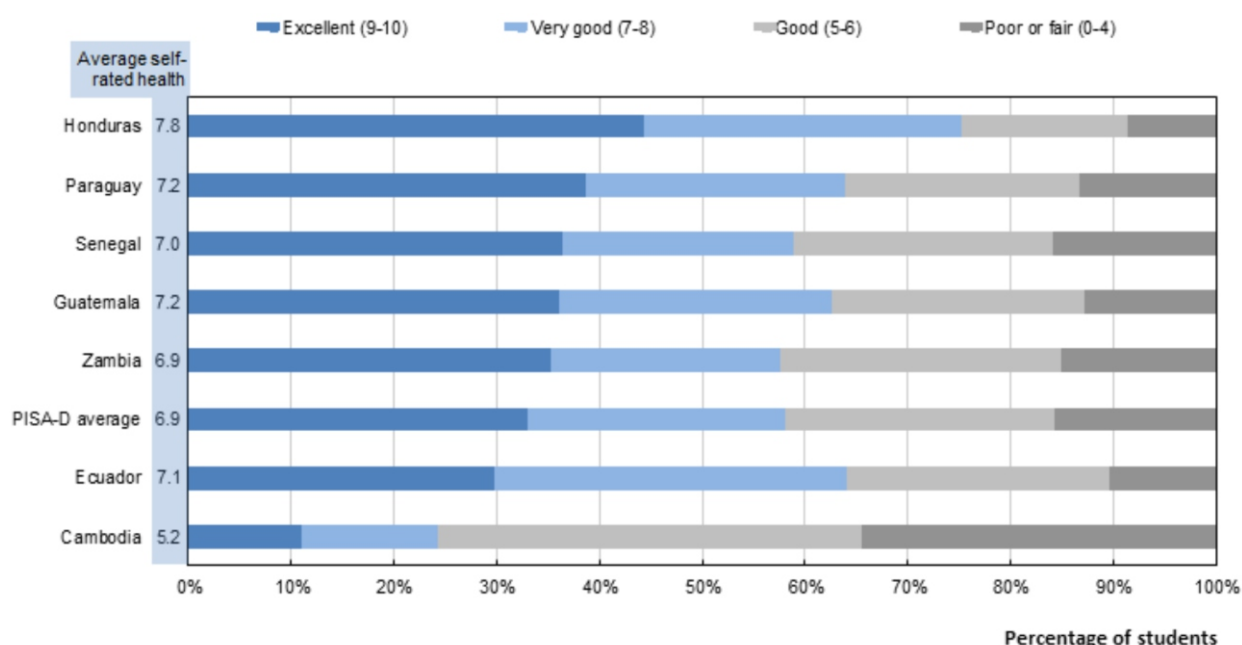
Figure 3.2:*Self-rated health among 15-year-old students*

Source: *PISA for Development Database*

13   Students who reported poor health were more likely to also report that they were affected by a health problem currently or during the past year. Figure 3.3 shows the percentages of students reporting a health problem, and how the likelihood of reporting "poor" or "fair" health is related to these. Health problems were ranked in descending order of their association with overall ratings of health as 'poor' or 'fair' (0 to 4 on health scale), as indicated by the odds ratio.
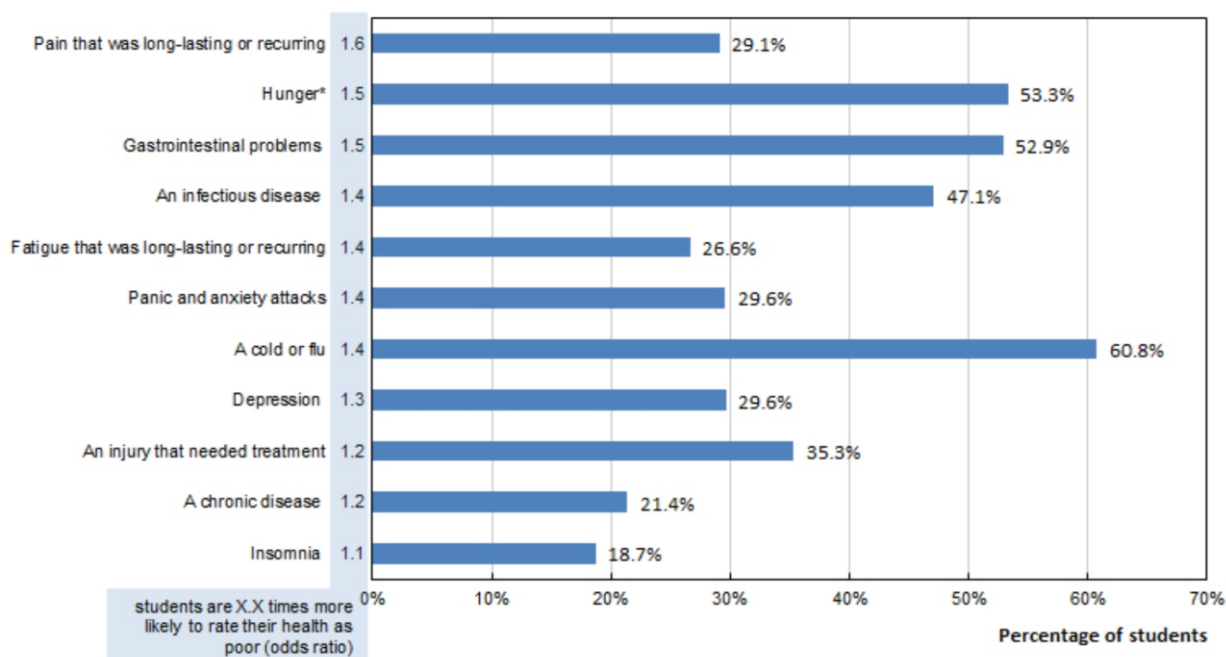
Figure 3.3: Percentages of students reporting a health problem

* *"Hunger represents the percentage of students who reported being hungry, because there was not enough food, at least about once a week over the 30 days prior to the PISA test.*

14 The important role of nutrition in learning has been well established and the intake of the required amount of food contributes positively to the levels of concentration and commitment to learning among students. Food insecurity is therefore a major threat to students' health and well-being. In Zambia, about 53.3% of the students said that they were hungry at least once a week. The break down was as follows: 27.7% of students reported that they had been hungry at least once a week during the past 30 days because there was not enough food, 15.2 % said they were hungry 2 to 3 times a week and 10.4% said they were hungry almost every day (Figure 3.4).

15 Food is a necessary element to enable one get through a normal day. Without an adequate amount of food, students may fall asleep in school or lack the energy to pay attention to instructions in class. Secondly, the brain requires energy to function properly. Children experiencing hunger are more likely to have problems with memory and concentration because they do not have the energy to carry out these functions. Hunger can affect the sleeping patterns as well, making a child too tired to get anything out of a full day of school.

Legend:
- Not hungry or hungry less than once a week
- Hungry 2 to 3 times a week
- Hungry at least once a week
- Hungry almost every day

46.7%
27.7%
15.2%
10.4%
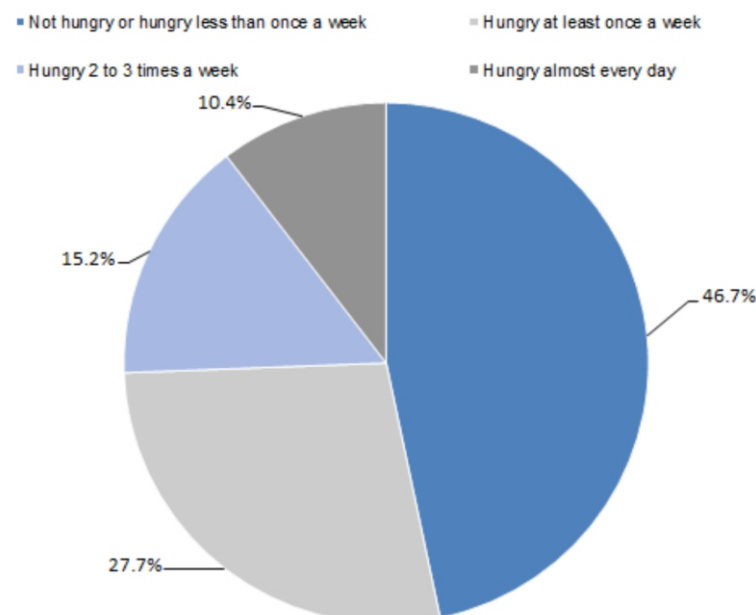
Figure 3.4: *Percentages of students reporting food insecurity*

Source: *PISA for Development Database*

3.2.2 Life satisfaction and emotional well-being

16 How satisfied with life are adolescents? In Zambia and on average, 15-year-old students are satisfied with the life they are living: they reported a level of 6.2 on a scale of life satisfaction that ranges from 0 to 10 (Figure 3.5). Countries and economies were ranked in descending order of the percentage of students who reported being very satisfied with their life.
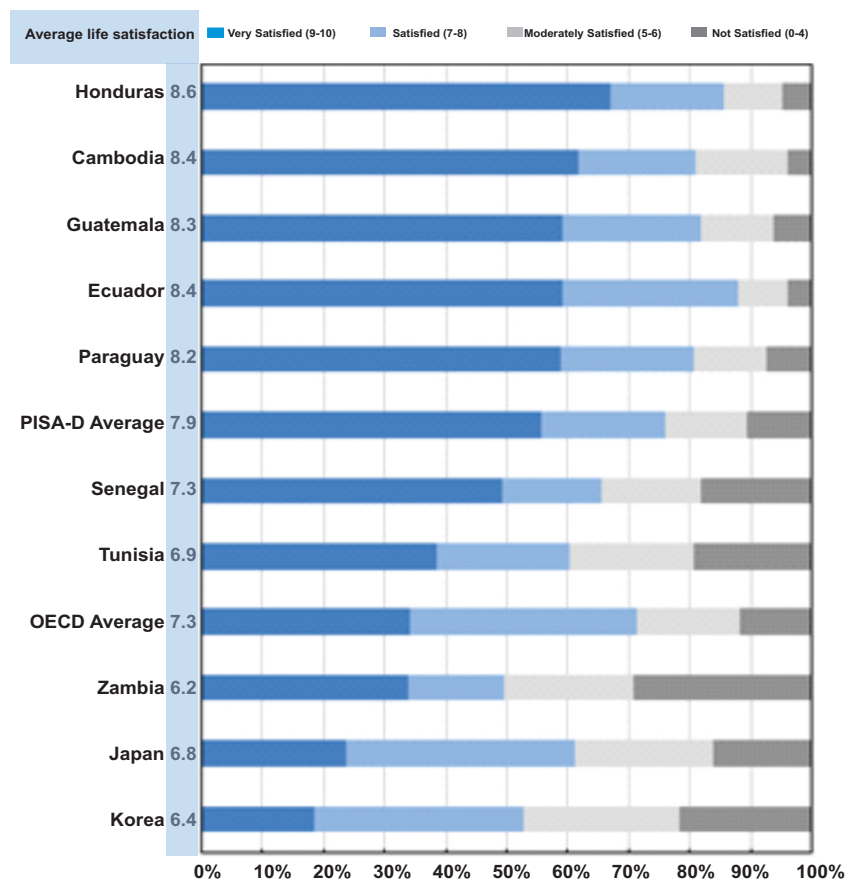
Figure 3.5: *Life satisfaction among 15-year-old students*

Source: *PISA 2015 and PISA for Development Database*

17 Much of the thinking around the link between education and the quality of students' lives has focused on mental health problems that children might manifest at school. Teenagers are particularly at risk of psychological disorders, because adolescence is a period of intense emotional upheaval (Gilman and Huebner, 2003). Common psychological disorders include anxiety and depression; while the origins of such disorders are often complex, the increasing academic demands that adolescents encounter as they progress through schooling, the pressure to get higher marks, and concerns about receiving poor grades are some of the sources of stress most often cited by school-age children and adolescents.

18 PISA-D asked students to report whether and how often they experienced feelings that constitute symptoms of anxiety or depression ("never or almost never", "about once a week", "2 or 3 times a week", "almost every day"). Feelings related to anxiety disorders include "I am too fearful or nervous", "I am afraid that other students think I am stupid", "I worry about a teacher asking me a question", and "I worry about what other students think of me". Feelings related to depression disorders include "I cry without a good reason", "I feel lonely", "Other students seem to have more fun than me", "I feel sad or depressed", "I have trouble falling asleep at night", and "a lot of things seem to bother me". Two scales were derived from students' reports about these feelings, with higher values indicating more and more frequent feelings of anxiety or depression; as this does not constitute a clinical diagnosis, however, no attempt was made to identify a threshold on these scales above which students are considered "anxious" or "depressed".

19 Figure 3.6 shows, for each feeling of anxiety or depression, the percentage of students who reported its occurrence "about once a week" or more frequently, as well as the average level of life satisfaction and the prevalence of low life satisfaction by quarter of the index of anxiety and depression. Feelings of anxiety and depression were sorted in descending order of their incidence among 15-year- old students.
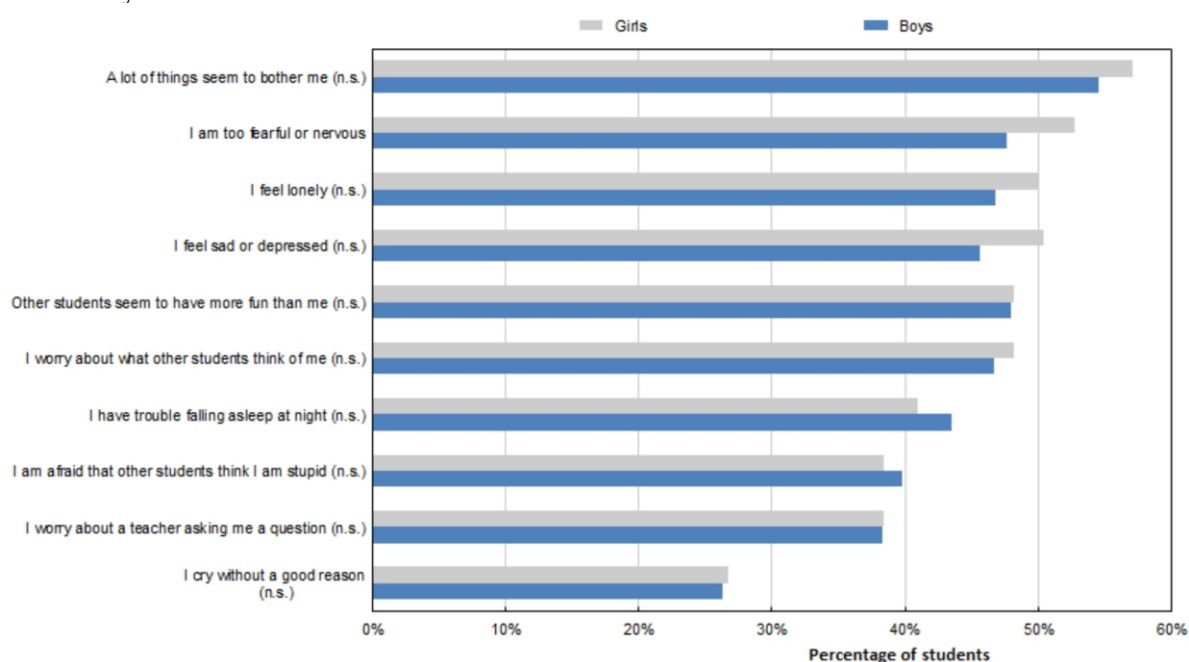
Figure 3.6: Snapshot of students' broader feelings of anxiety and depression

Note: *(n.s) indicates that the gender difference in the incidence of a particular feeling of anxiety and depression is not statistically significant.*

Source: *PISA for Development Database.*

20   On average, 38.4% of students in Zambia reported that they often (i.e. "about once a week" or more frequently) worried about a teacher asking them a question, 50.3% fearful or nervous and 47.4% worry of what other students think of them. Similarly, 48.4% of students reported feeling lonely at least once a week or more, 48.1% of students report feeling sad or depressed while 55.9% report that a lot of things bother them.

21   The relationship between feelings of anxiety and depression and low life satisfaction shows that students' subjective well-being can be severely affected by mental health and behavioural problems, which may have a school-related component to them. At the same time, school approaches that aim only to address mental health and behavioural problems might not devote enough attention to creating the conditions in which children and adolescents can flourish. Helping students find greater satisfaction with their lives, rather than just responding when students exhibit behaviours associated with dissatisfaction with life, can sustain the psychological, social and cognitive development of all students (Suldo and Huebner, 2006[9]).

3.3   Attitudes towards school and learning at age 15

22   School is central to the daily life of many youths in Zambia. Successful students often view schooling as essential to their future well-being, and this attitude is then reflected in their participation in academic pursuits.

23   PISA-D measured students' beliefs about the value of schooling and learning. The questionnaire included both questions about their attitudes towards school activities (whether, for example, students enjoy receiving good grades) and questions about their attitudes towards the outcomes of school and learning (whether, for example, students believe that school has given them the confidence to make decisions).

24   Most of the students who took the PISA test in Zambia in 2017 held positive views about school and what they had learnt. For example, 88.7% of students believed that trying hard at school was important and 85.0% believed that school had taught them things which could be useful in a job.
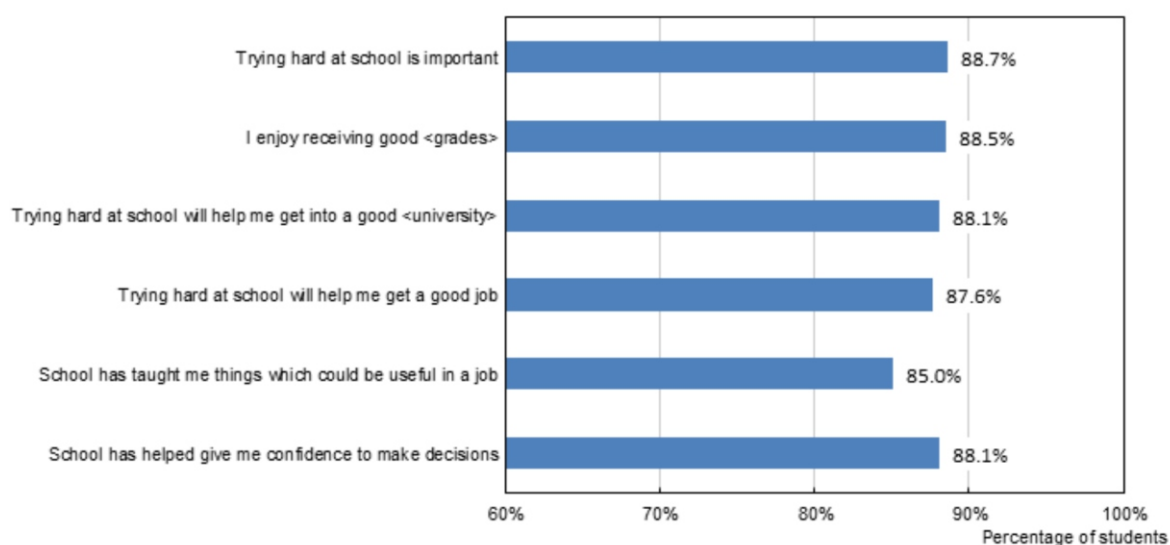
Figure 3.7*: Attitudes towards school and learning at age 15*
Source: *PISA for Development Database*

25 Student responses to questions about their attitudes towards school and learning were also used to create the index of attitudes towards school. The scale of this index was fixed so that a value of 0 corresponds to extreme negative attitude and a value of 1 corresponds to highly positive attitude. Students who score below 5 on this index can be considered to have negative attitudes towards schooling: these students "disagreed" or "strongly disagreed" with at least 3 out of 6 statements (indicating negative attitude towards school). Values above 7 indicate students who strongly agree with at least 4 sentences, and agree with the remaining two reflecting positive attitudes towards school and learning. The mean index for Zambia was 7.1 against the PISA-D mean index of 7.5. On average across Zambia, 31.8% of students held such negative views.

26 The index usefully summarises students' answers when the attitudes towards school and learning are compared across schools, between boys and girls, or across groups of students defined by their family background.

3.4 How life satisfaction and attitudes towards school and learning compare with students in other countries

27 The measure of self-rated health and the supporting health-related questions were new to PISA, and therefore only comparisons with other countries participating in PISA-D in 2017 were possible. In contrast, international comparisons with a wider set of countries were possible for life satisfaction and student attitudes towards school and learning

3.4.1 International differences in life satisfaction

28 Comparing average levels of subjective well-being across countries is challenging. Variations in students' reports of life satisfaction or happiness across countries might be influenced by cultural interpretations of what defines a happy life, and by differences in how life experiences are integrated into judgements of life satisfaction (Diener, Oishi and Lucas, 2003[10]; Park, Peterson and Ruch, 2009[11]; Proctor, Alex Linley and Maltby, 2009[12]). Research, for instance, has documented cultural differences in how people think about "happiness", a construct that is closely related to life satisfaction. In some languages, including Chinese, Estonian, French, German, Japanese, Korean, Norwegian and Russian, happiness is closely associated with luck, while in others, notably Italian, Portuguese and Spanish, definitions of happiness focus on the realisation of one's desires, wishes and goals (Oishi, 2010[13]). Differences in self-presentation can also play an important role. In some cultures, for example, it might not be desirable to say that you are happy, while in others it might be highly desirable to say so.

29 The most meaningful comparisons are therefore with countries that share a common language and whose cultures are closely related and also those with comparable socio-economic status or share the same geographical location. Compared to students in other PISA-D participating countries, students in Zambia reported lower levels of life satisfaction at 6.2 on the scale of 0 to 10 with 0 representing not satisfied and 10 representing very satisfied. An index of 6.2 represents a moderately satisfied population.

3.5   Differences in health, well-being and student attitudes within Zambia

30   Students' health, well-being and attitudes towards school can be influenced by their teachers, their peers and the atmosphere at school; but they are also influenced by their parents and local communities and by the wide range of individual differences and environmental factors that shape the development of children and adolescents over the life course. This section analyses the variation in students' self-reported health and well-being within Zambia, focusing in particular on inequalities related to demographic and socio-economic factors. The following section will analyse the role of schools in shaping students' health, well-being, and attitudes.

3.5.1 Gender differences in health, well-being and student attitudes towards school and learning

31   PISA-D shows significant differences between boys' and girls' physical and psychological well-being, with girls generally having greater likelihoods of reporting poor health and low levels of life satisfaction compared to boys. However, girls tended to have more positive attitudes towards school than boys.
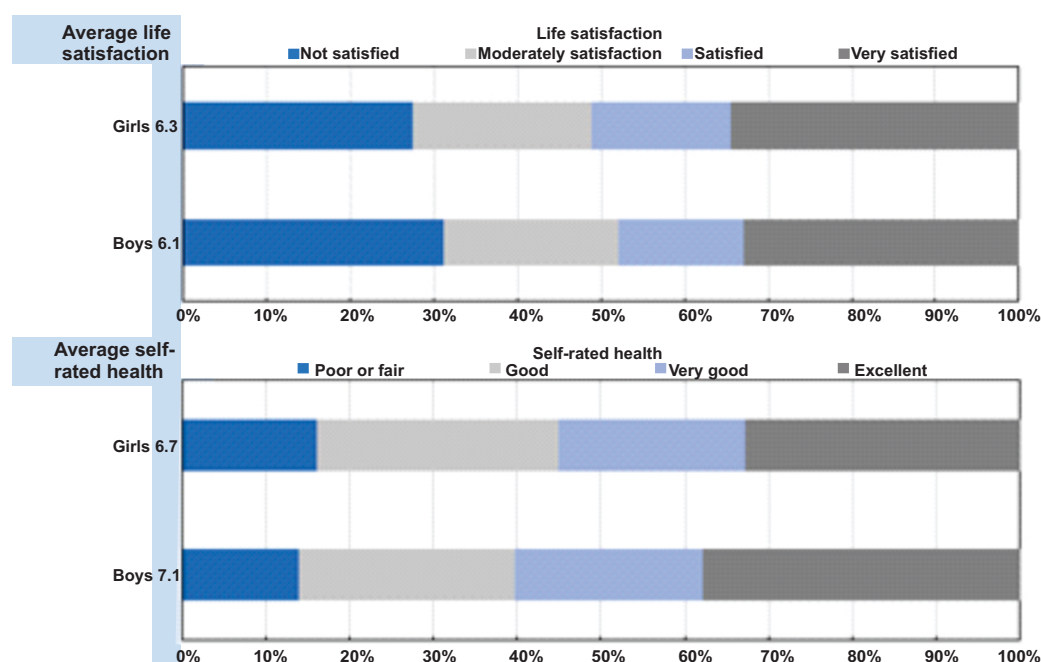
Figure 3.8*: Gender differences in self-rated health and life satisfaction*
Source*: PISA for Development Database*

32   Among 15-year-old students in Zambia, girls are significantly more likely (16.1%) than boys (13.9%) to rate their health as only "poor" or "fair", compared to boys. Similar differences between boys and girls were also found in other countries that participated in PISA-D, and had been previously observed in many European countries that participate in the "Health behaviour in school-aged children" (HBSC) study (WHO, 2017). In the HBSC study such differences were shown to increase between the ages of 11 and 15.

33   In Zambia, as in most countries that participated in PISA-D, girls were also likely as boys to report high levels of life satisfaction (a level of 9 or 10 on the scale), and more likely to report low levels of life satisfaction.

34 Among adults, gender does not seem to play a major role in shaping people's evaluation of their own lives (OECD, 2013). The lower life satisfaction reported by 15-year-old girls in PISA and PISA-D seems linked to the transition from childhood to adulthood, and is possibly a reflection of girls' harsh self-criticism, particularly related to their image of their own bodies, as they undergo dramatic physical changes (Goldbeck et al., 2007[14]; Inchley et al., 2016[7]).

35 PISA-D data for Zambia also showed that girls and boys tended to be equally affected by feelings of anxiety and depression, which could reveal mental health problems (figure 3.6). At the same time, girls reported a higher incidence of cold, flue, and gastrointestinal problems (Figure 3.9).
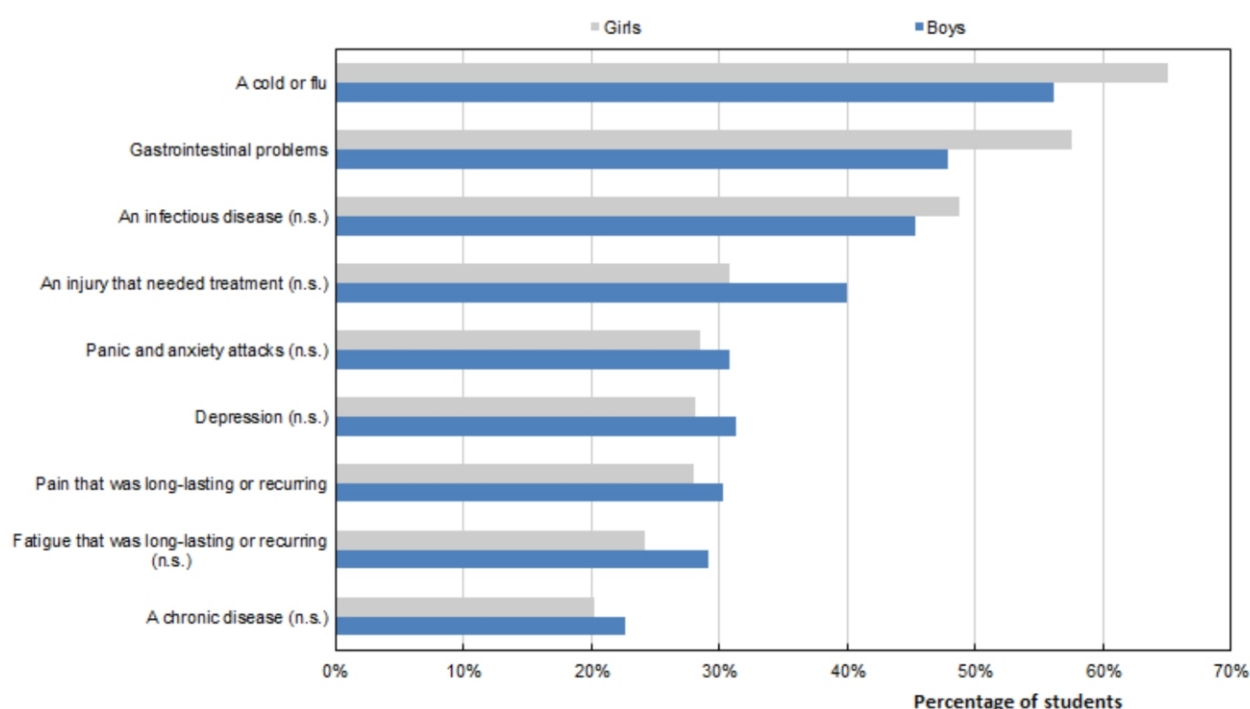
Figure 3.9: Health problems, anxiety and depression, by gender

Note: *(n.s) indicates that the gender difference in the incidence of a particular feeling of anxiety and depression is not statistically significant. Health problems were sorted in descending order of their incidence among 15-year-old students.*

Source: *PISA for Development Database*

36 While general health and life satisfaction tend to be lower among girls, compared to boys, attitudes towards school are often more positive among girls. Just as was observed in most countries that participated in PISA when the question was last asked in 2012 (OECD, 2013[15]), girls in Zambia appear to value school activities and what they learn at school more than boys do (Figure 3.10).
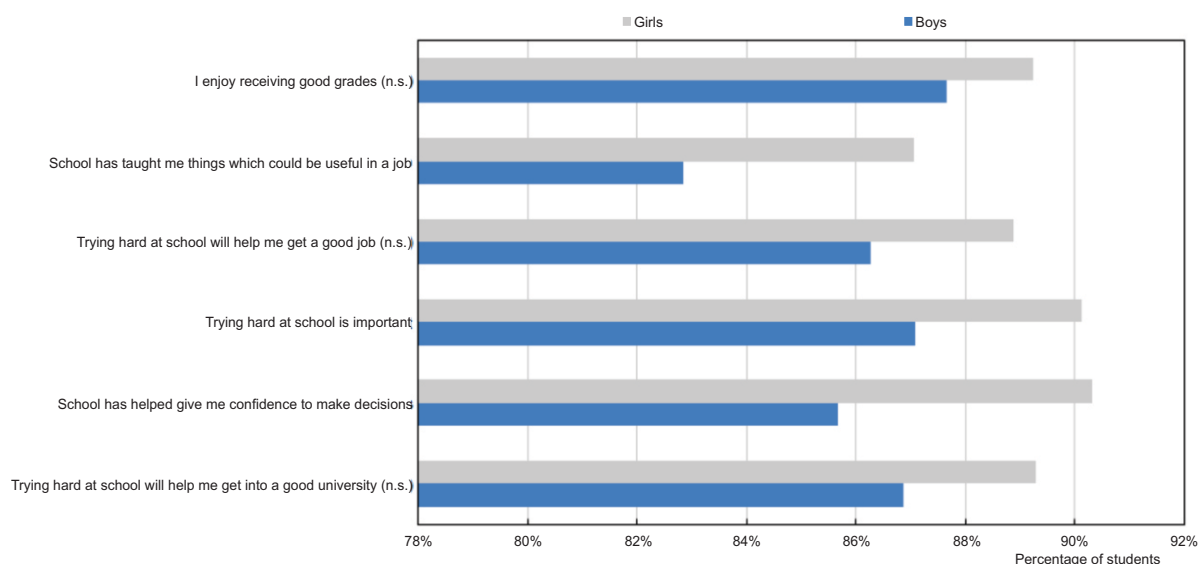
Figure 3.10: Valuing school outcomes, by gender

Note: (n.s) indicates that the gender difference in the incidence of a particular valuing outcome is not statistically significant

Source: PISA for Development Database

3.5.2 *Socio-economic differences in health, well-being and student attitudes towards school and learning*

37 Across all countries that participated in PISA 2015 or in PISA-D, there is no evident relationship between adolescents' life satisfaction and per capita GDP or similar measures of economic development. This finding is markedly different from what is observed among adults, who tend to report greater satisfaction with life if they live in higher-income countries (Deaton, 2008[16]; Helliwell, Layard and Sachs, 2018[17])). In fact, countries where students reported the highest levels of life satisfaction in PISA are not necessarily those where adults were most satisfied with their life (among the countries with available data, the correlation between students' life satisfaction, as measured by PISA, and the life satisfaction reported by adults in the Gallup survey is only 0.2 (OECD, 2017, p. Table III.3.12[1]). This might indicate that 15-year-olds adopt different reference groups and prioritise different needs when forming their subjective evaluations of life satisfaction, compared to adults.

38 While we find no evident relationship between adolescents' life satisfaction and per capita GDP, the socio-economic status of the individual does affect life satisfaction. Differences in life satisfaction related to socio-economic status are marked in the majority of PISA-participating countries and economies. On average across OECD countries, disadvantaged students rate themselves around 0.4 points lower than advantaged students on the 10-point life satisfaction scale. Differences greater than 0.6 point between advantaged and disadvantaged students are observed in the Czech Republic, Estonia, Hungary, Iceland, Latvia, Tunisia, the United Arab Emirates and the United States. Only in Brazil and Colombia did disadvantaged students report higher life satisfaction than advantaged students.

39 In Zambia the picture was similar to but more than that observed in the OECD average with disadvantaged students reporting themselves 1.6 (largest difference among all PISA-D Countries) points lower than advantaged students on the 0-to-10

life-satisfaction scale (Figure 3.11). Students who can be considered "poor" or "severely poor", based on their household possessions, are at much higher risk of reporting low levels of life satisfaction compared to the remaining students.

40 Similar differences were also observed in self-rated health: disadvantaged students reported themselves 1 point lower than advantaged students on the 0-to-10 health scale.
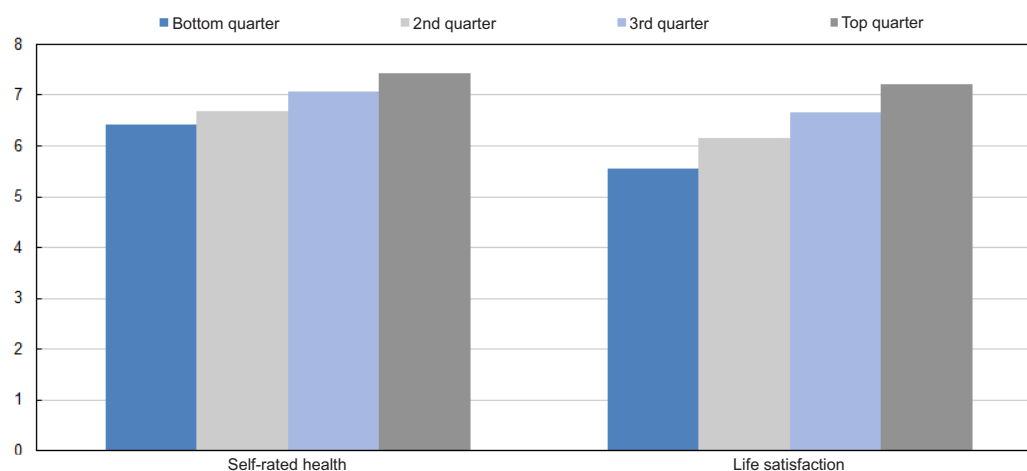
Figure 3.11: *Socio-economic differences in self-rated health and life satisfaction*
Note: *the differences of index between top and bottom quarter is statistically significant*
Source: *PISA for Development Database*

3.5.3 *Rural-urban in health, well-being and student attitudes towards school and learning*

41 Within Zambia there were significant differences in self-reported health and well-being between rural and urban regions. Much of these differences, however, was related to differences in socio-economic conditions and could be explained by average levels of socio-economic status. After accounting for students' gender and socio-economic status, the difference between rural and urban areas in students' reports of health, life satisfaction and attitudes towards school and learning were no longer significant
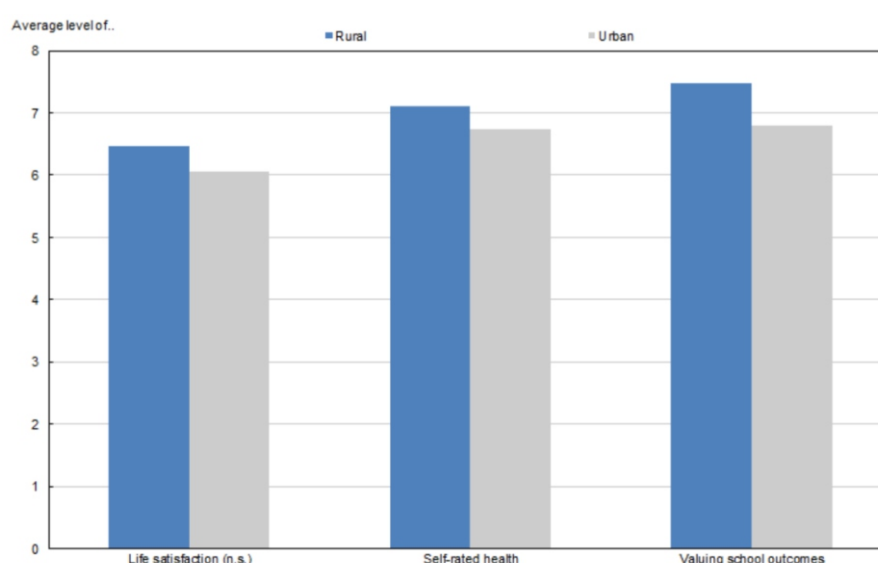
Figure 3.12: *Rural-urban differences in self-rated health, life satisfaction, and valuing school outcomes*
Note: (n.s) *indicates the differences for the index between rural and urban in non- significant.*
Source: *PISA for Development Database*

3.6 School-level factors associated with better health, life satisfaction and attitudes towards school and learning

3.6.1 Between-school differences in health, well-being and in student attitudes towards school and learning

42 All outcomes measured by PISA-D are the cumulative result of many influences over the life-course: the role individual differences at birth, and the influence of parents, local communities, and peers on children's development should not be under-estimated. And while schools have a primary responsibility for students' achievement in reading, mathematics, and science, and for helping students develop positive attitudes towards school and learning, many other institutions play an even bigger role in ensuring that children stay healthy and are happy.
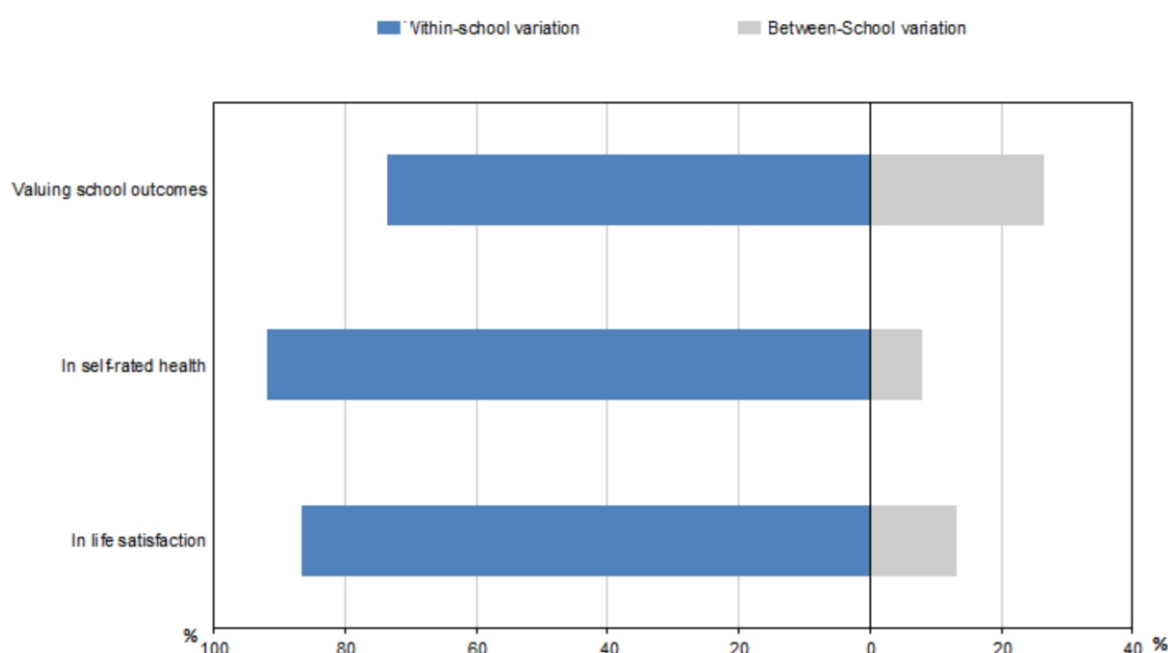
Figure 3.13*: Variation, between schools, in self-rated health, life satisfaction, and valuing school outcomes*

Source*: PISA for Development Database*

43 Figure 3.13 separates the overall variation in students' self-rated health and life satisfaction, as well as in students' attitudes toward school and learning, into a between-school and a within-school component. The overall length of the bars is always equal to 100%. The light part of the bar represents the proportion of those differences that are observed between schools, and the dark part of the bar represents the variation observed on average between students attending the same school (as a proportion of the overall variation between all students in the country). When compared to, Figure 3.13 immediately reveals that the self-reported outcomes analysed in this chapter vary much more within schools, at the individual level, than do results in reading, mathematics and science. This may reflect the relatively weak influence of the current school on these outcomes, in comparison to other institutions and influences; it may also reflect the strong uncertainty about the inter-personal comparability of self-reports.

44 Much of the between-school variation in self-rated health and life satisfaction was related to the socio-economic composition of the school. This implies that schools

play a limited role in shaping students' evaluations of their physical and psychological well-being. In contrast, schools appear to play a bigger role in shaping students' attitudes towards school and learning.

45   The limited between-school differences in life satisfaction, and the larger between-school differences in attitudes towards school and learning, appeared related to particular aspects of the school environment analysed in greater detail in the next chapter. In Zambia, in particular, students in schools where their peers collectively reported higher-than-average life satisfaction and more positive attitudes towards learning, they also reported more positive student-teacher relationships ("most of my teachers listen to what I have to say") and that their teachers held high expectations for students' success ("our teachers encourage students to do their best work").

46   The variation in the psychological well-being of adolescents observed between schools implies that teachers can help students develop a sense of control over their life and resilience in the face of unfavourable situations (Natvig, Albrektsen and Qvarnstrøm, 2003[18]; Suldo, 2016[19]), by meeting adolescents' needs for competence, autonomy and quality relationships (Roeser, Eccles and Sameroff, 2000[20]). A growing research literature has identified the following characteristics common to schools where students feel the most satisfied (Aldridge et al., 2016[21]; Comer et al., 1996[22]; Gilman and Huebner, 2003[23]; Suldo et al., 2013[24]): engaging academic activities; order and discipline; parental involvement; care, respect and trust among students; positive student-teacher relations (i.e. competence and relational ability of teachers); and inclusiveness (i.e. boys and girls of all ethnicities and socio-economic status are treated equally by adults in the school and have access to the same materials, activities and opportunities).

3.7   How health, well-being and student attitudes are related to educational achievement in Zambia

47   Health, well-being and valuing school and learning constitute important outcomes in their own right. Students' self-rated health, life-satisfaction and their attitudes towards school are, in general, only weakly related with educational achievement.

48   The strongest relationship with educational achievement are for attitudes towards school (Figure 3.16) and health (Figure 3.15), both with a significant and positive relationship. In contrast, the relationship between academic achievement and life satisfaction is, in Zambia as in most countries that participated in PISA 2015 and in PISA-D, not significant (Figure 3.14).
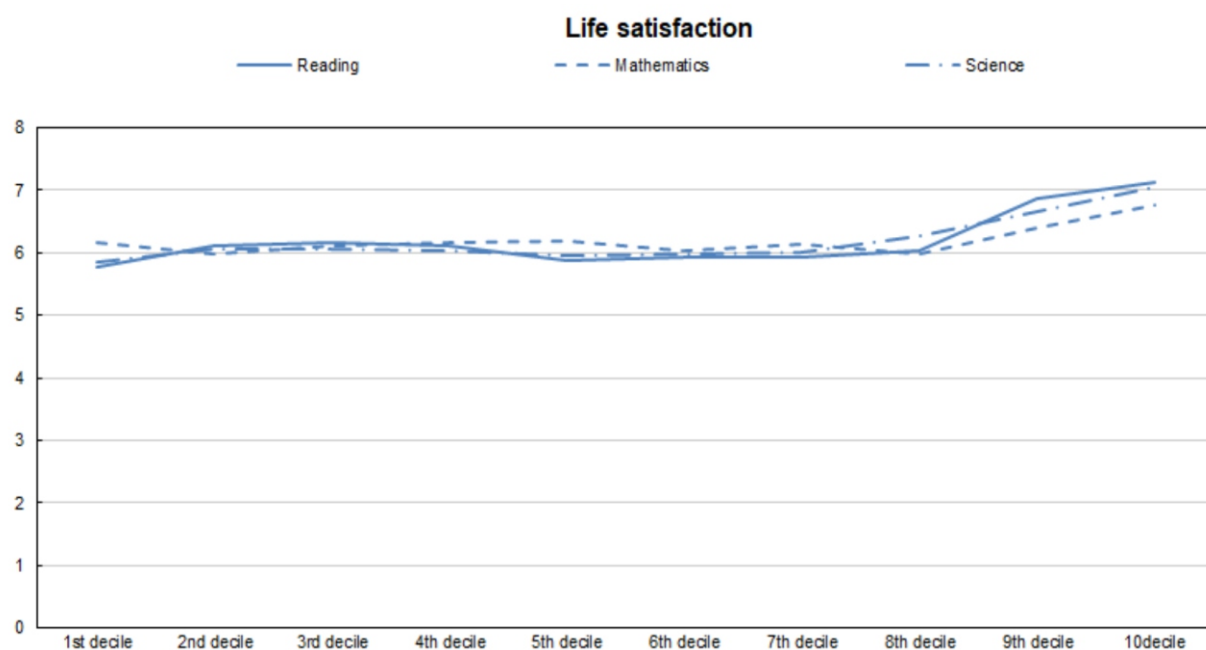
Life satisfaction

Figure 3.14: self-rates life satisfaction by achievement decile

Source: PISA for Development Data base
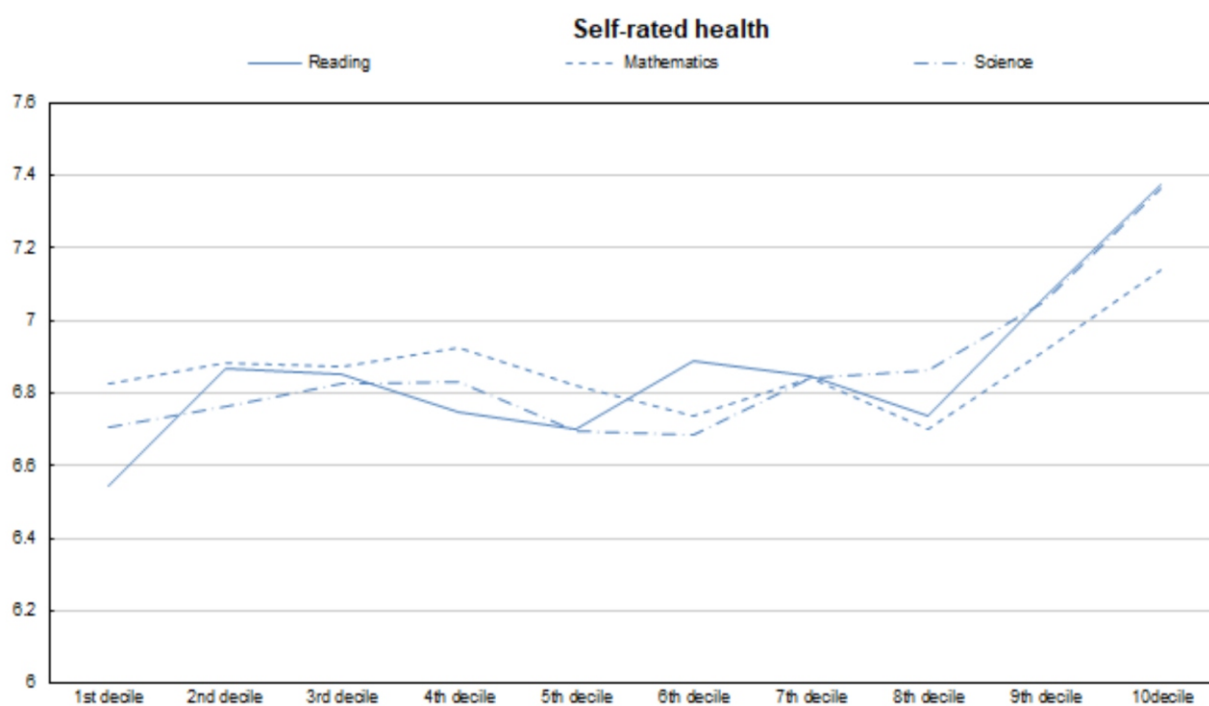
Self-rated health

Figure 3.15: Self-rated health by achievement decile

Source: PISA for Development Data base

Attitudes towards school: valuing school outcomes

— Reading   – – – Mathematics   — · – Science
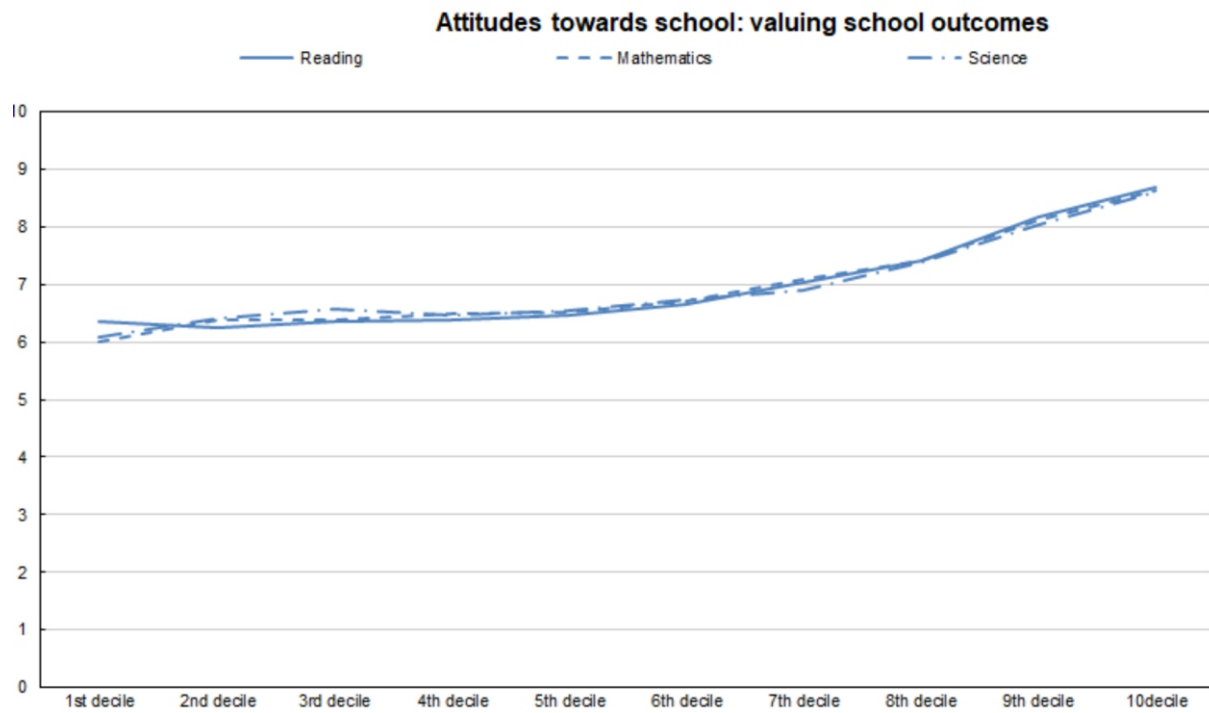
Figure 3.16: attitudes towards school by achievement decile

Source: *PISA for Development Data base*

4

**Foundations for Success
in Zambia: Resources invested
in Education**

In Zambia, a large majority of students (81%) feel that they **belong at school**.

While 85% of students report that they **feel safe at school**, only 75% feel safe on the way home from school. At school, the most frequent threats to safety are theft and physical violence (threats and fights).
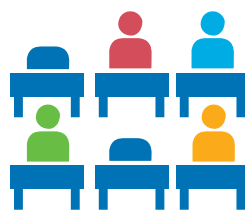
A significant proportion of students report having **missed school for more than 3 months in a row** (24%), with health problems (their own, or those of family members) being often cited as the reason.

Most of the 15-year-old students in Zambia reported **positive views about their teachers:** 78% felt that their teachers are interested in their well-being.

90% of students are in schools where more than one in five students reported that a **teacher did not come for class** during the two weeks prior to the PISA test.

Quality and quantity of instruction is impaired due to a poor **climate of discipline in the classroom:** 31% of students report that students don't start working for a long time after the lesson begins.

49% of students reported that they had **arrived late for school** at least once in the two weeks prior to the test.

49% students report that several times a month or more they **discuss with their parents** how well they are doing at school.

4

Foundations for success in Zambia: Resources invested in education

This chapter examines the resources invested in education in Zambia and makes comparisons with other PISA and PISA-D participating countries and economies. The chapter also looks at how these resources are allocated across schools. The relationship between educational resources, including financial, material and human resources, and student performance is also analysed.

4.1 How resources invested in education compare with other countries

1   This chapter analyses in detail how the resources invested in education in Zambia are distributed across schools, and how they are related to student outcomes. It starts by describing expenditure on education across education systems, how it has changed over the course of PISA cycles and more generally over the past two decades, and its relationship with student performance. It then describes how this expenditure trickles down to the school system in PISA and PISA-D participating countries, including Zambia. The chapter does this by focusing on the availability and quality of the material resources (educational material, computers and school size); and human resources (teachers' salaries, initial training, qualifications and professional development; shortage of human resources; student-teacher ratios and class size). Given the correlational, not causal, nature of the analyses, the chapter only suggests avenues that policy makers in Zambia may explore to allocate resources more fairly and efficiently.

4.1.1 Financial resources

2   Policy makers must constantly balance expenditure on education with expenditure for many other public services, particularly in the face of fiscal constraints. Yet despite the competing demands for resources and the recent economic crisis, expenditure on education has increased over the past few years in almost all countries with the majority of school funding originating at the central government level. Between 2005 and 2013, expenditure per primary, secondary and post-secondary non-tertiary student increased by 6%, on average across OECD countries with data available for both 2005 and 2013 (OECD, 2016b).

3   Globally, public education expenditure was 14.1% of total public expenditure in 2014, and in 2015, the median global public education expenditure was 4.7% of gross domestic product (GDP) (UNESCO, 2017) - these amounts are considered to be insufficient for all countries to achieve the Education Sustainable Development Goal (SDG). In the context of the Education SDG processes being led by UNESCO, efforts are being made to increase education's share of national budgets in low-income countries from an average of 3% to 5% and in middle-income countries from 4% to at least 6% between now and 2030. These increases would

require low-income countries to raise their total investment in education (from all sources) to more than 10% of GDP and lower-middle-income countries to more than 7% by 2030. As at 2016, public education expenditure in Zambia was 16.5% of total public expenditure and this equates to 5.0% (2015) of the country's gross domestic product (GDP) (Zambia Institute for Policy & Research, 2017).

4   Financial resources in education can be allocated to salaries paid to teachers, administrators and support staff; maintenance or construction costs of buildings and infrastructure; and operational costs, such as transportation and meals for students. In Zambia, as per 2016 budgetary allocation to education, 83% went towards personal emoluments (salaries – related costs). The share of personal emoluments at Primary was staggering at 93% while it was at 64% at secondary level (UNICEF, 2016). This left only less than a third of the total budget to non-personal emolument programmes.
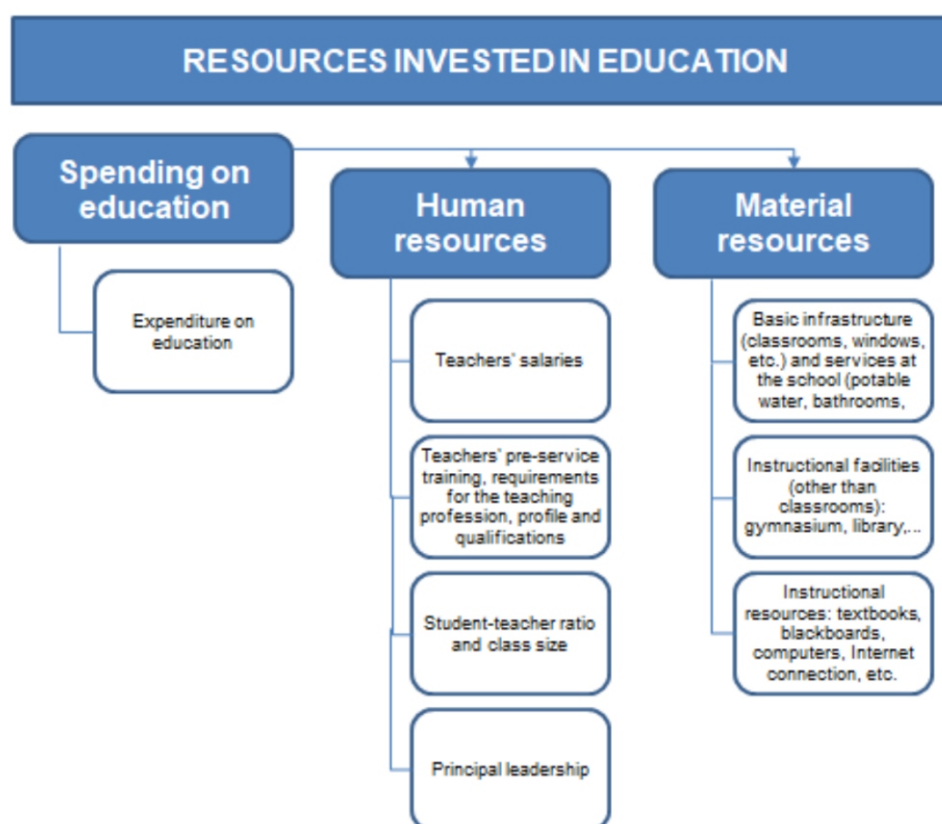
Figure 4.1: Resources invested in education as covered in PISA

Expenditures per pupil versus per-capita GDP

5   In 2013, the average cumulative expenditure by educational institutions per student between the ages of 6 and 15 exceeded the equivalent of USD 100 000 in Austria, Belgium, Denmark, Finland, Iceland, Luxembourg, Malta, Norway, Singapore, Sweden, Switzerland, the United Kingdom and the United States. In Luxembourg, cumulative expenditure per student exceeded USD 180 000. By contrast, in Colombia, the Dominican Republic, Georgia, Kazakhstan and Peru, cumulative expenditure per student over this age period totalled less than USD 25 000. In Zambia, it is not possible to report the cumulative expenditure per student over this age period; given Zambia's GDP per capita and the proportion of GDP that is spent on education, the total expenditure per pupil between the ages of 6 and 15 is certainly below USD 10 000.

6   As would be expected, spending on education and per capita GDP are highly correlated. School systems with greater total expenditure on education tend to be those with higher per capita GDP.

Expenditure per student and performance in PISA

7   A first glance at PISA results gives the impression that students in high-income countries and economies – and countries/economies that can and do spend more on education – perform better. High-income countries and economies (defined here as those with a per capita GDP above USD 20 000) have more resources to spend on education. These countries and economies cumulatively spend USD 89 262 on each student from age 6 to 15, on average, while countries that are not considered to be in that group spend USD -21 307, on average. Students in high-income countries and economies score 111 points higher in mathematics, on average, than students in countries whose per capita GDP is below the USD 20 000 benchmark, including Zambia.

8   Yet the relationship among a country's/economy's income per capita, its level of expenditure on education per student, and its PISA score is far more complex (Baker, Goesling and LeTendre, 2002; OECD, 2012). Among the countries and economies whose cumulative expenditure per student is under USD 50 000 (the level of spending in 18 countries), higher expenditure on education is significantly associated with higher PISA scores. But this is not the case among countries and economies whose cumulative expenditure is greater than USD 50 000, which include most OECD countries (Figure 4.2). It seems that for this latter group of countries and economies, factors other than the level of investment in education are better predictors of student performance. Among the former group of countries and economies, systems whose cumulative expenditure per student is USD 10 000 higher than other systems score an average of 32 points higher in the PISA science assessment.

9   However, among those countries and economies whose cumulative expenditure per student is more than USD 50 000, the relationship between spending per student and performance is no longer observed. Among these countries and economies, it is common to find some with substantially different levels of spending per student yet similar science scores.
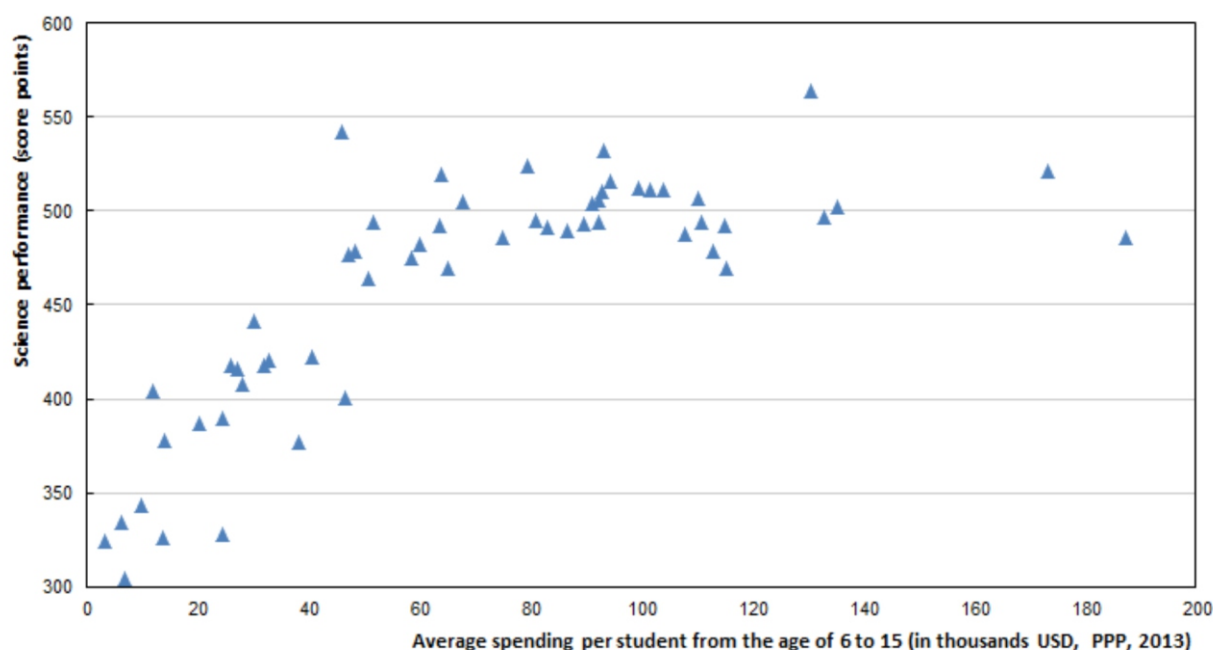
Figure 4.2*: Spending per student from the age of 6 to 15 and mathematics performance*
Source*: PISA 2015 and PISA-D Data base*

10   The fact that the relationship between spending per student and learning outcomes is no longer increasing, at the typical levels of expenditure observed in the countries and economies with larger education budgets, suggests that excellence in education requires more than money. How resources are allocated is just as important as the amount of resources available to be allocated.

4.1.2 Human resources

11   Teachers are an essential resource for learning; but not every teacher attribute is related to student outcomes in the same way. Previous studies have shown, for instance, that teachers' knowledge of the subject they teach and the quality of their instruction have a measureable impact on student performance - stronger than their level of education, experience, qualifications, work status or salaries (Allison-Jones and Hirt, 2004; Hanushek and Rivkin, 2006; Hanushek, Piopiunik and Wiederhold, 2014; Lockheed and Komenan, 1988; Metzler and Woessmann, 2012; Palardy and Rumberger, 2008). The type and quality of the training teachers receive, and the requirements to enter and progress through the teaching profession, shape the quality of the teaching force. Attracting, developing and retaining effective teachers are priorities for public policy (Mourshed and Barber, 2007).

The quantity and quality of human resources

12   Teachers' salaries represent the largest single share of expenditure on education (OECD, 2016b). School systems differ not only in how much they pay teachers, but in the structure of their pay scales. On average, the salaries of teachers with minimum training and 15 years of experience in OECD countries exceed the per capita GDP in their country by 10% for lower secondary teachers and by 16% for upper secondary teachers.

71

13 Relative to their country's national income, lower and upper secondary teachers in Colombia, the Dominican Republic, Germany, Hong Kong (China), Mexico, Qatar, Turkey and the United Arab Emirates earn the most. In these countries/economies, annual earnings of lower secondary teachers with minimum training and 15 years of experience range between 152% and 217% of per capita GDP, while annual earnings of upper secondary teachers with the same qualifications range between 152% and 256% of per capita GDP. By contrast, in the Czech Republic, FYROM, Kazakhstan, Lithuania and the Slovak Republic, annual earnings for lower and upper secondary teachers are less than 60% of per capita GDP. In Zambia, lower secondary teachers with minimum training and 15 years of experience represent about four times (4.09%) the per capita GDP.

14 Class size can affect learning in various ways. Large classes may limit the time and attention teachers can devote to individual students, rather than to the whole class; they may also be more prone to disturbances from noisy and disruptive students. As a result, teachers might have to adopt different pedagogical styles to compensate, and these, in turn, might affect learning. For instance, an often-mentioned benefit of smaller classes is that teachers can dedicate greater attention to individual students, especially to those who need academic support the most. PISA 2015 findings show that, on average across OECD countries, in schools with smaller classes, students were more likely to report that their teachers adapt their lessons to students' needs and knowledge, provide individual help to struggling students, and change the structure of the lesson if students find it difficult to follow.

15 Some studies, particularly those based on the Tennessee STAR experiment, which assigned students randomly to larger or smaller classes, show that smaller classes can improve student outcomes and might be more beneficial for disadvantaged and minority students (Dynarski, Hyman and Schanzenbach, 2013). Chetty et al. (2011) even find long-term effects on college attendance, home ownership and savings. However, other research shows no impact of class size on student performance (Woessmann and West, 2006). For instance, no long-term gains in earnings were observed among students in the Tennessee STAR experiment who attended smaller classes (Chetty et al., 2011); and large classes are found in many Asian countries where average student performance in PISA is high. But given the relatively high cost of reducing class size, the decision to do so or not should ultimately depend on how much it improves student outcomes compared to other, less expensive, policy interventions (Fredriksson, Ockert and Oosterbeek, 2013).

16 PISA-D and PISA 2015 asked school principals to report the average size of language-of-instruction classes in the national modal grade for 15-year-olds. It also asked the total number of teachers and students in their schools, from which the student teacher ratio was computed. According to schools principals, on average across OECD countries, there are 26 students per language-of-instruction class. In B-S-J-G (China), Turkey and Viet Nam, there are 40 or more students per class, while in Belgium, Finland, Iceland, Malta and Switzerland, there are 20 or fewer students. In Zambia there are 44 students on average per language of instruction class.

17   Across OECD countries, the average student attends a school where there are 13 students for every teacher (figure 4.3). Student-teacher ratios range from almost 30 students per teacher in Brazil, Colombia, the Dominican Republic and Mexico, to fewer than 10 students per teacher in Albania, Belgium, Greece, Hungary, Iceland, Luxembourg, Malta and Poland. In Zambia the average student attends a school where there are 43 students for every teacher. Figure 4.3 shows percentiles of the student-teacher ratio among schools participating in PISA.
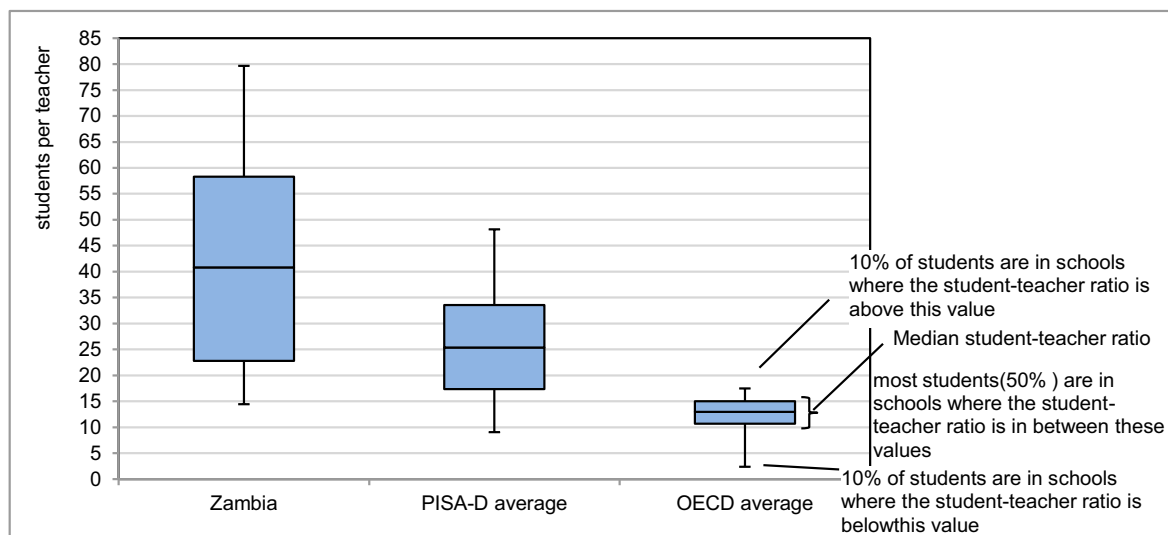
Figure 4.3: *Student teacher ratio in schools attended by 15 year-olds in Zambia*

Source: *PISA 2015 and PISA for Development Database*

18   Across education systems, there is a positive association between class size and student-teacher ratios; but there are several education systems, such as those in B-S-J-G (China), CABA (Argentina), Georgia, Japan and Singapore, that have both large classes and low or average student-teacher ratios. Teachers in these systems may, as a result, have more time to prepare for their classes and for other school responsibilities besides teaching. By contrast, there are also some education systems with small or average classes and high student-teacher ratios, such as those in Germany, Ireland, the Netherlands, New Zealand, the Russian Federation (hereafter "Russia"), the United Kingdom and the United States (Figure 4.4). Zambia is a country that has large class size and high student-teacher ratios.
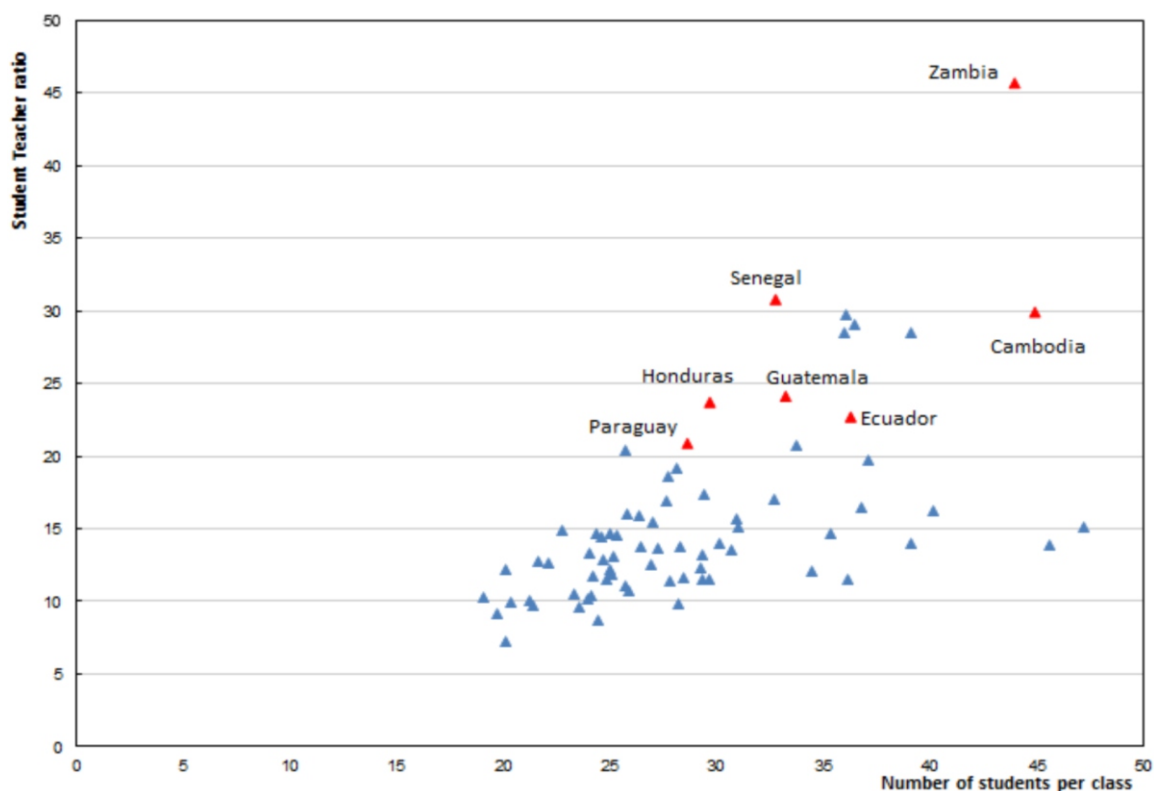
Figure 4.4*: Relationship between class size and student-teacher ratio*
Note: *Each triangle represents a country/economy participating in PISA or in PISA for Development.*
Source: *PISA 2015 and PISA for Development*

Requirements to enter the teaching profession

19   System-level data show that competitive examinations are required to enter pre-service teacher training in Zambia for primary education and secondary education – this is the same picture as 20 other education systems in PISA for primary education and in 19 for secondary education. In some countries, even though competitive examinations are not required for pre-service teacher training, a leaving certificate or the results of exams taken by all students at the end of secondary education are used for admission into teacher education programmes. Pre-service teacher training is longest in Germany and Luxembourg, where such training for lower and upper secondary teachers lasts 6 to 7 years.

Table 4.1: Selected pre-service training requirements for lower secondary teachers in public institutions

	No examination to enter pre-service training	Competitive examination to enter pre-service training
Relatively short duration of pre-service training programme (less than 4.5 years)	Guatemala Argentina Australia Denmark Dominican Republic England (UK) FYROM Malta Montenegro	Cambodia Ecuador Honduras Paraguay Senegal Zambia Brazil Bulgaria Georgia
Relatively long duration of pre-service training programme (more than 4.5 years)	Estonia Hungary Ireland Qatar Slovak Republic Slovenia Spain Sweden	Croatia Czech Republic Finland Hong Kong (China) Portugal Peru

Note: Data refer to 2013
Source: PISA 2015 and PISA for Development Data base

20   While these data describe what is required to become a teacher today (even if, in the presence of teacher shortages, these requirements themselves may not always apply to all categories of teachers), they do not describe the level of education and pre-service training of the current teaching workforce.

21   The mission of the ministry responsive for Education in Zambia is to guide the provision of education for all Zambians so that they are able to peruse knowledge and skills, manifest excellence in performance and moral uprightness, defend democratic ideals in a manner that will benefit society (paraphrased) (Ministry of Education, 1996). Continuous Professional Development (CPD) is a vehicle through which skills enhancement for teachers can be attained. Some of these CPD programmes implemented in Zambia are long term (such as teacher upgrading of qualifications) while some are short term training and still other initiatives are done within the school or in zones (such as the Lesson Study approach). PISA D asked teachers whether they had participated in CPD activities in during the past 12 months before the PISA D assessment. These were 'yes' or 'no' responses.

22   In Zambia, 29.2% of teachers who participated in PISA-D were pursuing teacher qualification e.g. degree programme; 34.8% participated in an activity for teachers formed specifically for professional development of teachers; 39.9% in mentoring and peer observation as part of school formal arrangement; and 65.5% had participated in courses or workshops on teaching methods. There were more teachers participating in CPD activities in rural areas than in urban areas.

23   Skills in teaching methods coupled with knowledge of subject content are ideal for teaching beneficial to students. The low participation levels in school based CPD should be of concern to school managers. Lesson observations and mentoring, for example can have positive impact on teacher delivery as teachers can observe and guide each other on observed weaknesses.

4.1.3 Material and instructional resources

24 While after a certain point, the quality of school buildings and of instructional resources no longer make a difference in students' outcomes, studies based on the Latin American Laboratory for Assessment of the Quality of Education (LLECE) data by Murillo and Román (2011) and Willms and Somers (2001) suggest that in middle- and low-income countries school resources have substantial effects, even after taking into account the socio-economic characteristics of students.

25 PISA-D asked school principals to report on the availability and condition of basic infrastructure (roof, windows, doors, etc.) and services (potable water, sewage services, toilets, electricity) at the school. Teachers, in turn were asked about the availability and condition of instructional facilities (such as a school library, gymnasium, an art and music room) and of instructional resources, from very basic materials such as textbooks and blackboards, through to computers for students and teachers. Finally, both teachers and school principals were asked about the availability of textbooks.

26 In Zambia, and according to school principals' reports, 14.2% of students are in schools where the roof is in bad conditions (or not available); 59.9% of students are in schools without flush toilets; some 25.4% of students are in schools where there is no place with drinkable water, or where such a place is in bad condition. Figure 4.5 shows percentage of students in schools where principals reported the availability and condition of some resources.
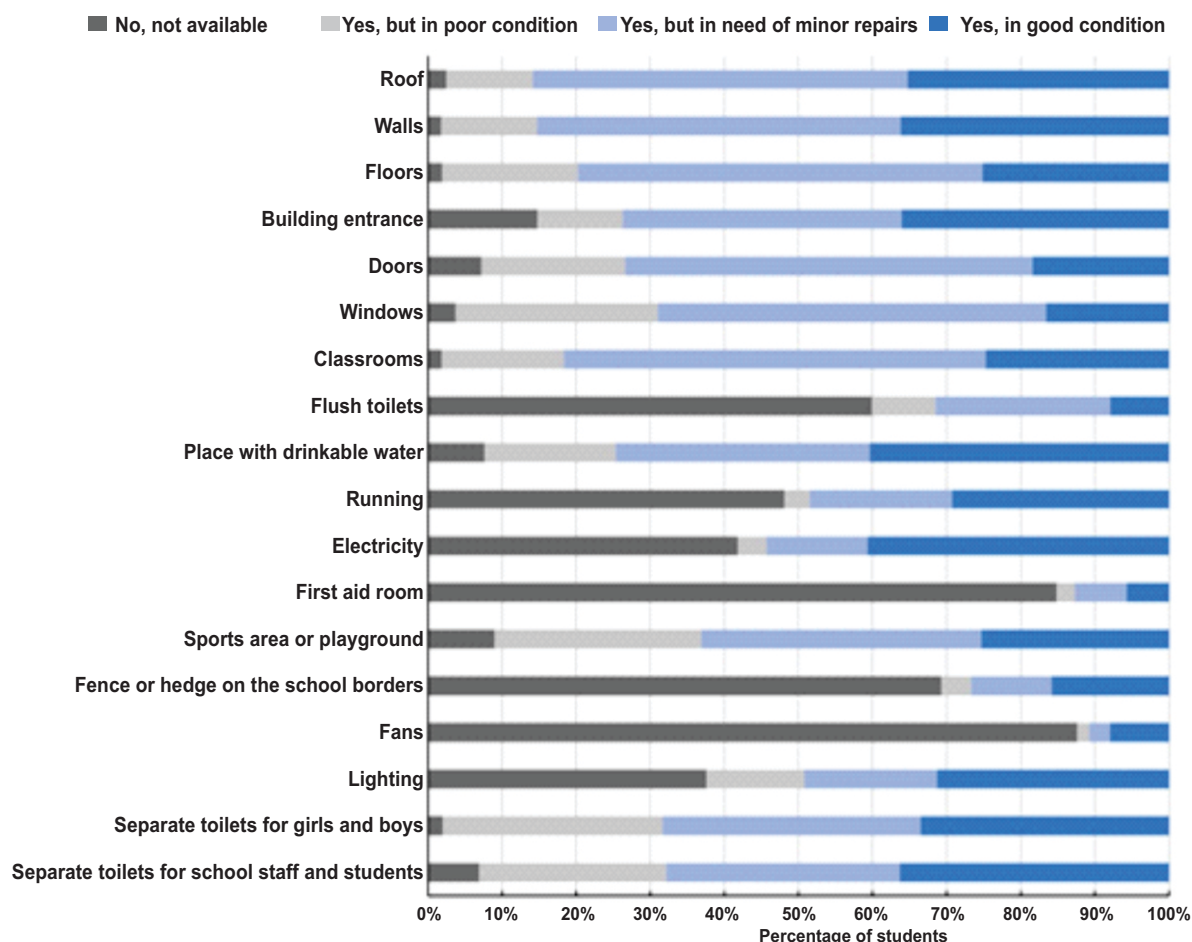
Figure 4.5: *Physical condition of school infrastructure (percentage of students)*
Source: *PISA for Development database.*

27 In addition, a majority of students are in schools where school principals reported that there were not enough textbooks for every student. In mathematics, no student was in a school where there was one textbook available for every student; at the other end, 6.6% of students were in schools where principals reported that there were no mathematics textbooks at all. In 93.3% of schools, students had to share textbooks (sometimes more than two students), as there were not sufficient textbooks for every student to use. The situation was similar for test language textbooks (Figure 4.6).

Percentage of students in schools where principals reported the following about the availability of textbooks for instruction in
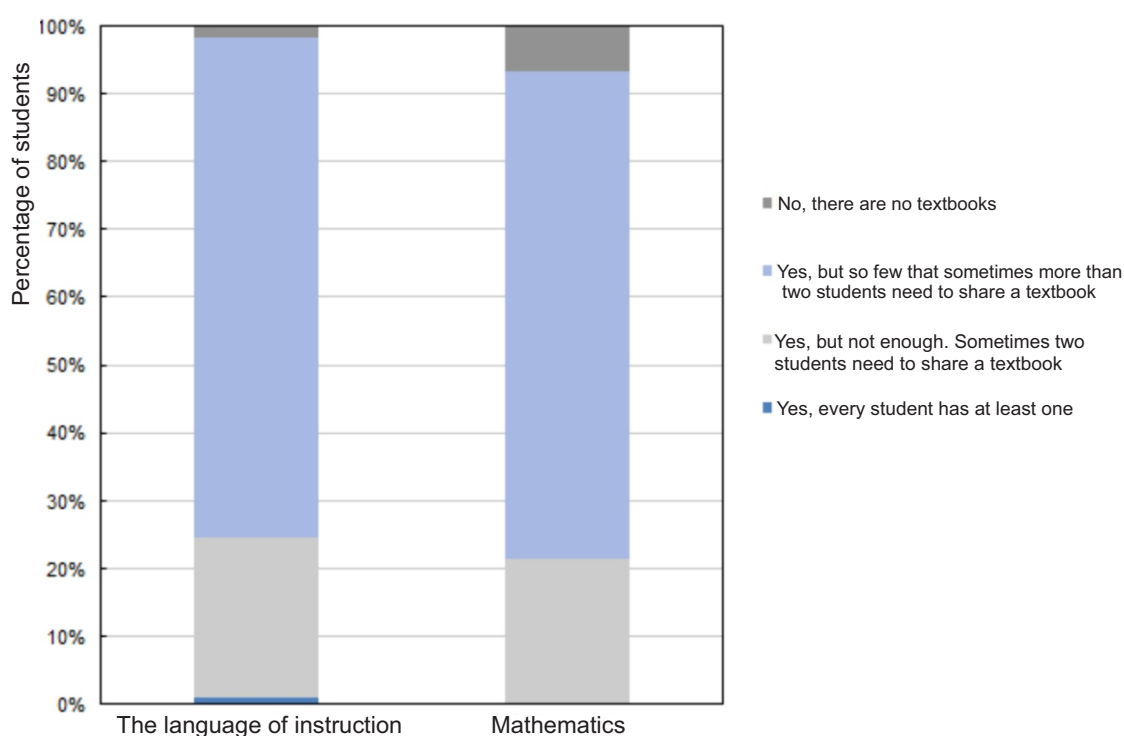
Figure 4.6: Availability of textbooks in test language and mathematics

Source: *PISA for Development database.*

28 The availability of instructional resources and facilities was strongly related to the availability of basic infrastructure and services in schools. According to a 50% or more teachers in Zambia, a large number of 15-year-old students were in schools that had computers for students (70.5%). However, still a large number were in schools without an Internet connection that students could use (89.5%). Even more basic resources and facilities were sometimes lacking: 35.5% of students were in schools where teachers report that no workbooks were available, 26% of students had desks that were not available or in poor condition. (Figure 4.7)

Percentage of students in schools where principals reported the availability and condition of the following resources as follows:
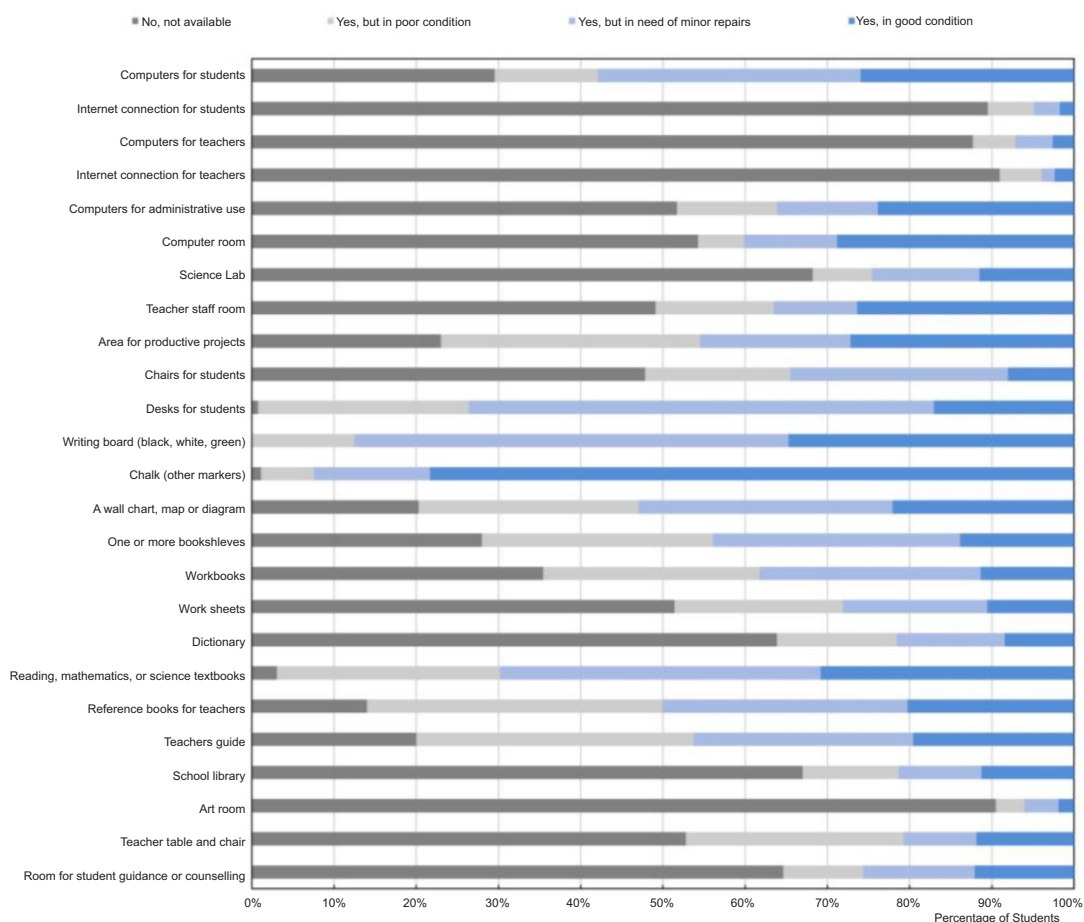
Figure 4.7: *Physical condition of instructional resources*

Source: *PISA for Development database.*

4.2 How resources vary among schools within Zambia

4.2.1 Variation in class size, student-teacher ratios and teacher experience between schools

29 Creating smaller classes, or assigning more teachers for an equivalent number of students, is often a deliberate policy response to the high concentration of student disadvantage in some schools. The availability of teacher resources can also vary due to the combined effect of the population density in a particular area and of the structure of the school in the same area. For example, in many countries, rural schools – i.e. schools located in scarcely populated areas – have smaller classes and smaller student-teacher ratios, because a minimum number of teachers are required per school, even if the number of students is small.

30 School principals in Zambia, and in other countries that participated in PISA and in PISA-D, were asked to report the average size of classes in the typical grade attended by 15-year-old students (grade 9). According to principals, 6% of 15-year-old students were in schools where the average number of students per class was less than 20 students, 8% in schools with between 21 and 30 students per class, 17.1% in schools with between 31 and 40 students per class, and 68.9% in schools with more than 41 students per class. And while the average number of students per teacher was 43, about 25% of students were in schools where the student-teacher ratio was 22.8 or less, and 25% in schools where the student-teacher ratio

was 58.3 or more. Not only the quantity of teachers, but also their characteristics may vary across schools in ways that are not random. In particular, in many countries, teachers who are assigned to remote schools or to schools that concentrate high levels of student disadvantage transfer to another school or drop out of the profession more than on average, and novice teachers with little experience are hired in these schools to replace them; as a consequence, start-of-career teachers are often found more often in schools with difficult working conditions than in others (OECD, 2018). The next section in this chapter will comment on this variation and its association with school advantage, type and location.

4.2.2 Variation in material and instructional resources of schools

31 School buildings also vary significantly across schools in Zambia. To analyse the variation in material and instructional resources across schools, two indices were developed in PISA for development.

32 The index of school material resources varies between 0 (indicating the lack of all basic infrastructure elements and services listed in Figure 4.5) and 10 (indicating that these elements are present and in good condition. Intermediate values indicate the availability of material resources to a varying degree. For example, a school in relatively poor state, with no flush toilets, no roof or a roof that is in poor condition, no place with drinkable water, no lighting and no fans, would typically have an index value between 1.1 and 2.6 (depending on what other elements are present or not). A school with all the above elements (a roof, flush toilets, lighting or fans) in good condition, would typically have an index value comprised between 5.4 and 7.2. Finally, a school that has these elements, but in need of minor repairs, would have an index values of about 4 (between 3.9 and 4.3, in most cases).

33 Similarly, the index of instructional resources varies between 0 (indicating the lack of all instructional facilities and resources listed in Figure 4.7) and 10 (indicating that all these elements are present and in good condition. Intermediate values indicate the availability of instructional resources to a varying degree. For example, schools whose teachers report the availability of, at best, only very basic instructional resources (no wall chart, map or diagram, no gym, no teacher staff room and no computers for students or for teachers) would typically have index values comprised between 2.9 and 3.7. Schools whose teachers, in contrast, report that many instructional resources are available (including computers for students and for teachers, an Internet connection that is in good condition or at worst in need of minor repairs and a teacher staff room that is in good condition) would correspond to index values between 5.3 and 6.4. Finally, schools whose teachers report that basic resources (including chairs and desks for students and a wall chart, map or diagram) are available and at worst in need of minor repairs, but more advanced resources (such as an Internet connection for students) are not available or at best in poor condition, would typically have index values between 4.2 and 4.9.

34 The average level of material resources for schools in Zambia corresponded to an index value of 3.8 on the 10-point scale, while the average level of instructional

resources for schools in Zambia corresponded to an index value of 3.7 on the 10-point scale. The 25% of schools (weighted by their student population) with the worst material resources had, on average, a value of 2.9 on the 10-point-scale of material resources, while the 25% of schools with the best material resources had, on average, a value of 5.0 on the 10-point scale. Similarly, the 25% of schools with the worst instructional resources (according to teachers' reports) had, on average, a value of 2.9 on the 10-point scale, while the 25% of schools with the best instructional resources had, on average, a value of 4.5. Among countries that participated in PISA-D, these values corresponded to one of the lowest level of material and instructional resources.

35 This report also classifies schools in 5 categories of material and instructional resources (extremely low level, severely low level, low level, moderate level and high level of resources). According to these categories, in Zambia, 7.2% of 15-year-old students are in schools with a high level of these basic resources,; 10.4% in schools with a moderate level of resources, 14.2% in schools with a low level of resources, 24.2% in schools with a severely low level of resources and 43.9% in schools with an extremely low level of resources.

36 In Zambia, 9.3% of 15-year-old students are in schools where teachers, on average, report a high level of instructional resources, meaning that both teachers and students in these schools have access to these materials]; 14.0% in schools where teachers report a moderate level of resources, 15.6% in schools with a low level of resources, 23.9% in schools with a severely low level of resources and 37.2% in schools with an extremely low level of resources. Instructional materials are significantly inequitably distributed between rural and urban schools and between advantaged and disadvantaged schools in favour of the former in both cases.

4.3 Equity in the provision of material, instructional and human resources across schools

37 The variation in the provision of material, instructional and teacher resources across schools is not only significant, but also systematically related to geographic and socio-economic differences.   Disadvantaged schools in Zambia and schools in rural areas in particular, tend to have poorer material and instructional resources (figures 4.8 and 4.9). Some of these differences may be driven by private schools (which tend to be located more frequently in urban areas, and concentrate some of the most advantaged students): their materials are considerably better than those of public schools.

38 Non-government dependent private schools in Zambia, which concentrate many of the most affluent students, are typically better resourced than public schools. When only public schools and government-dependent schools are considered, PISA-D data show, however, that access to school resources remains inequitable, and varies significantly between the most advantaged and the most disadvantaged public schools. A number of factors therefore hinder quality learning in disadvantaged schools such as high student- teacher ratio and low supply of material and instructional resources among others.
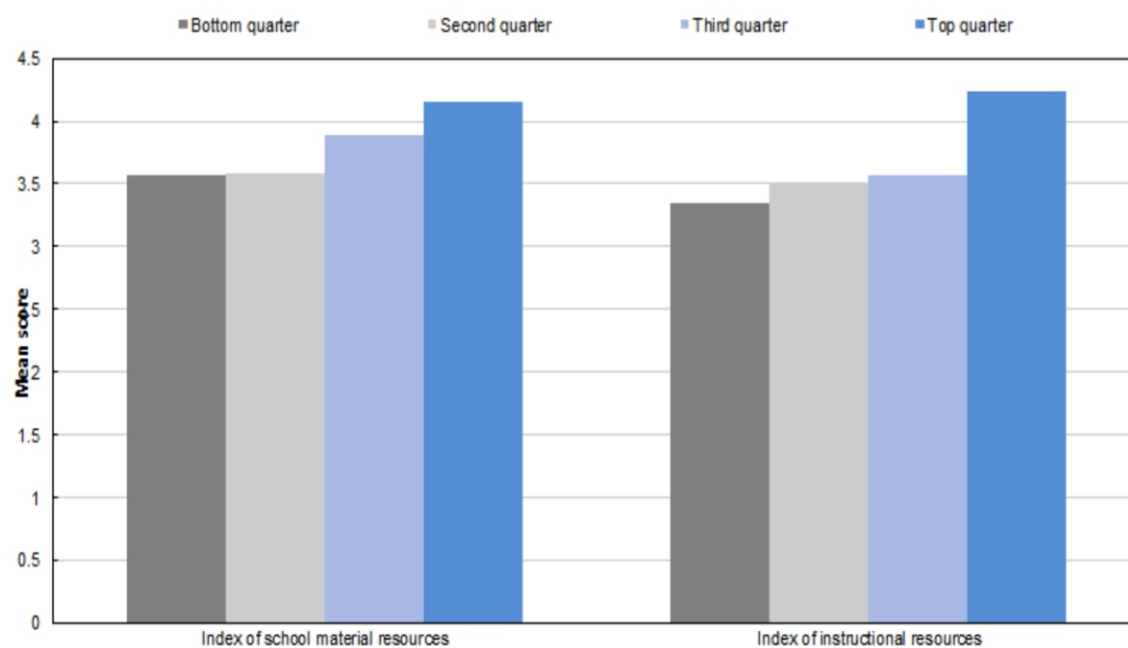
Figure 4.8: *Variation in material resources, by school socio-economic profile*
Note: *all differences between top and bottom quarter are significant.*
Source: *PISA for Development Database.*
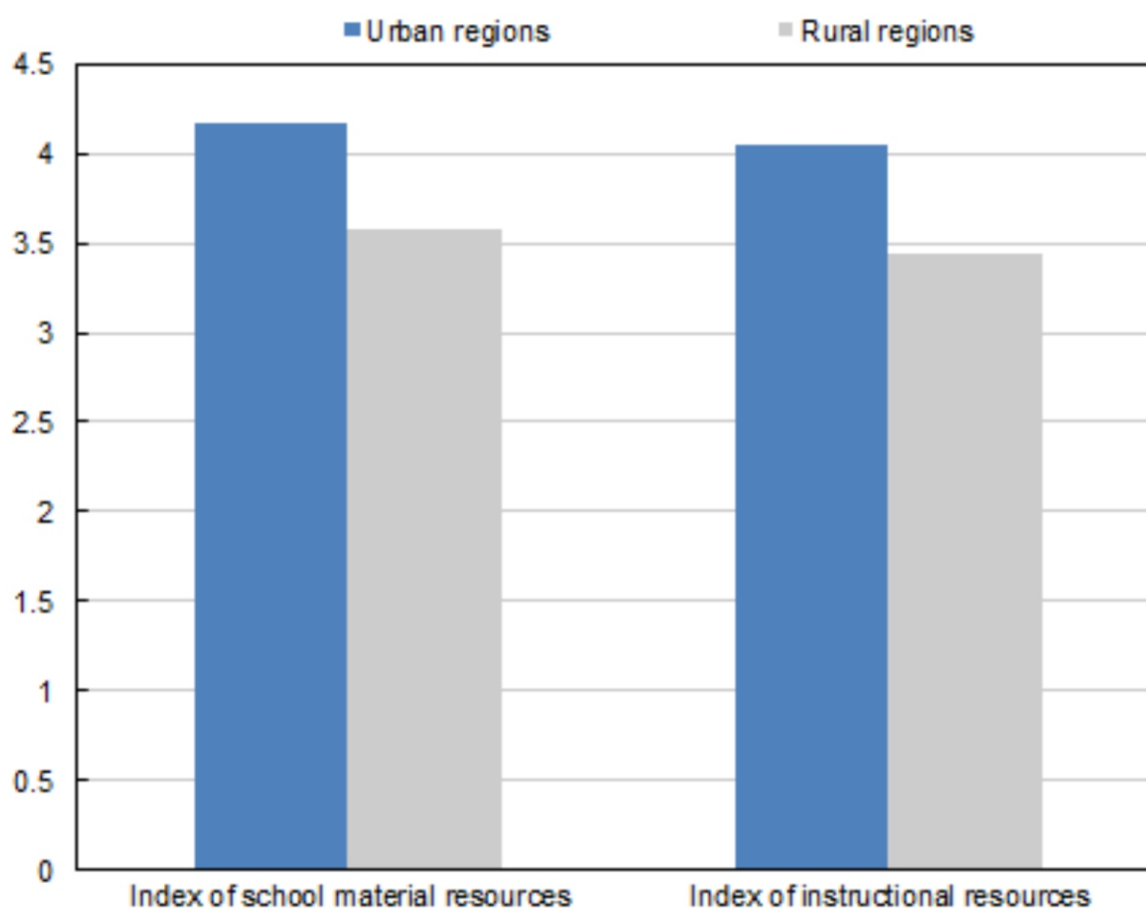
Figure 4.9: *variation in material resources by region*
Note: *the differences between urban and rural are significant.*
Source: *PISA for Development Database.*
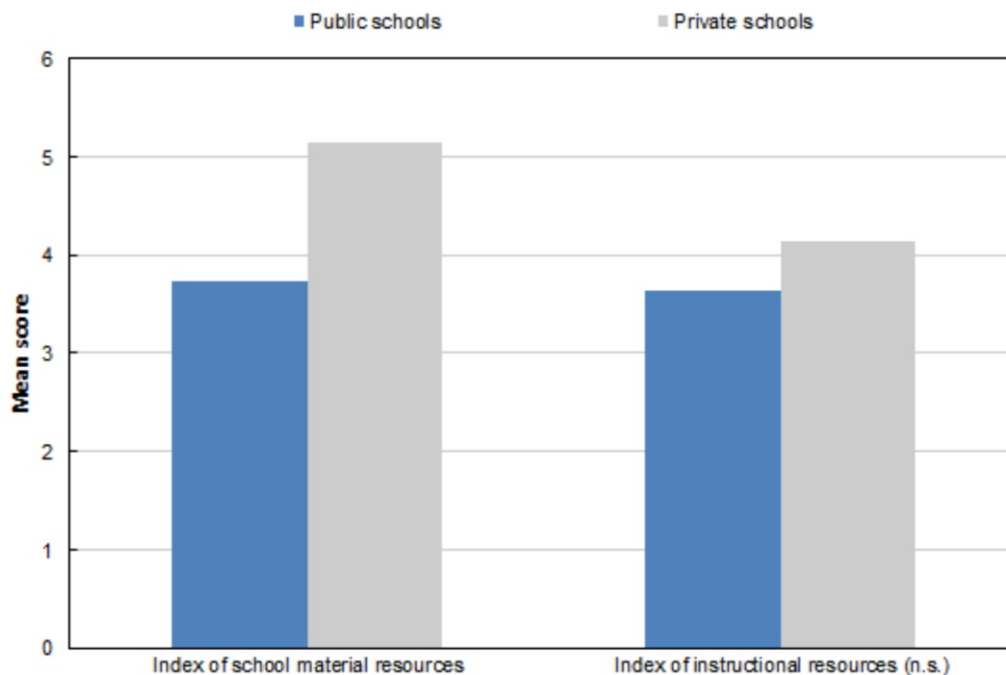
Figure 4.10: variation in material by School Type

Note: (n.s) indicates the difference between public and private school for the indicator in non-significant.

Source: PISA for Development Database

39 The socio-economic profile of children who attend the school also has a strong association with the number and quality of teachers. In Zambia, there were 53 students per teacher in the schools in the bottom quarter of school socio-economic profile, while there were 30 students per teacher in the schools of the top quarter. This makes for a significant difference of more than 23 students per class teacher between socio-economically advantaged and disadvantaged schools.
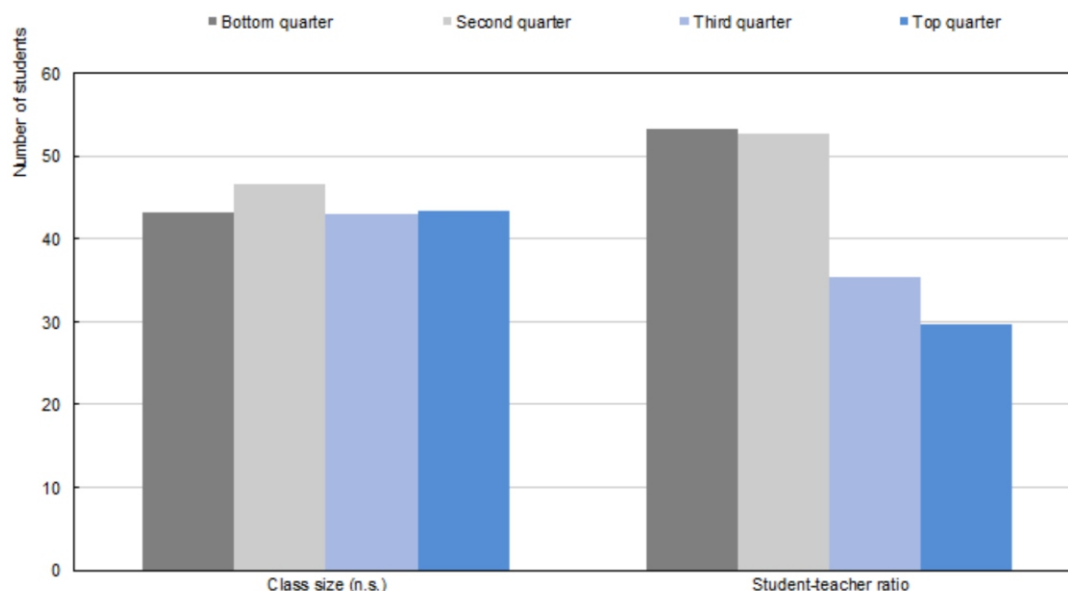
Variation in class size and student teacher ratios, by school socio economic profile

Figure 4.11:   -   -

Note: (n.s.) indicates the differences between top and bottom quarters for the indicator is non-significant

Source: PISA for Development Database.

40   Urban schools tend to have fewer students per teacher than schools located in rural areas. In turn, public schools tend to have more students per teacher than private schools.

41   The difference in school material and instructional resources are similarly pronounced between the most advantaged and the most disadvantaged schools in Zambia. The indices of school material and instructional resources by national quarters of school mean ESCS were significantly lower (by 0.59 for material and 0.90 for instructional resources) in disadvantaged schools.
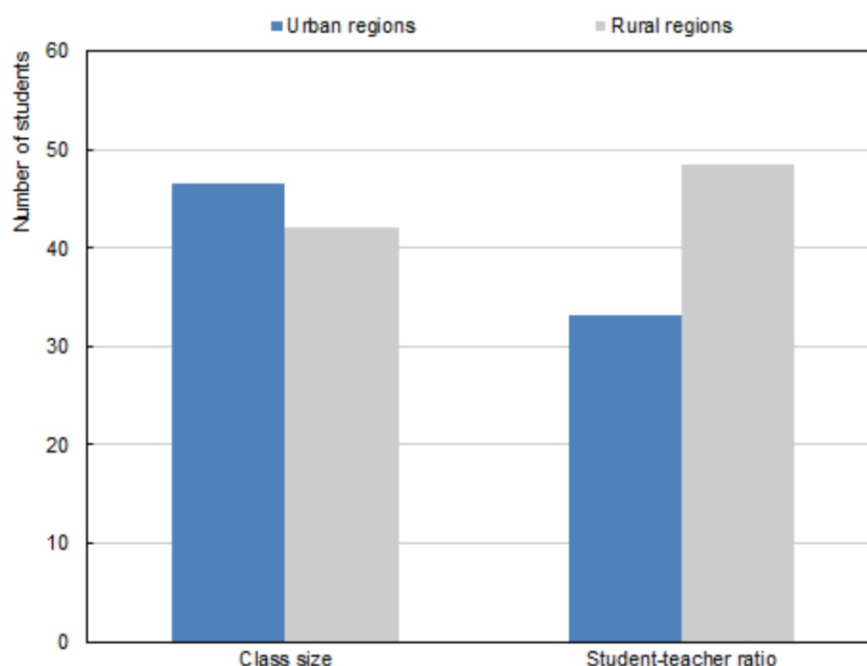
Figure 4.12: *Variation in class size and student-teacher ratios, by region*

Note: *the differences between urban and rural for the indicator are all significant*

Source: *PISA for Development Database*
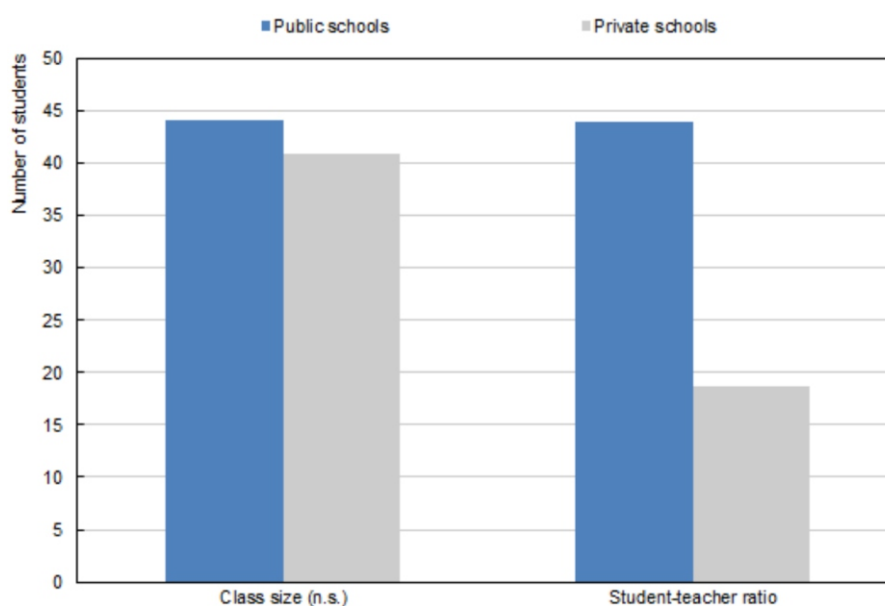
Figure 4.13: *Differences in school resources, by school type*

Note: *(n.s.) indicates the difference between public and private schools for the indicator is non-significant*

Source: *PISA for Development Database.*

42 Finally, the average socio-economic status of students in the school, the schools'
    location and its type (public or private) are also systematically related to the type of
    teachers that teach in the school. Particularly in Zambia, teachers who teach in
    advantaged schools are significantly more likely to have completed at least two
    years of pre-service teacher training than teachers in the most disadvantaged
    schools.
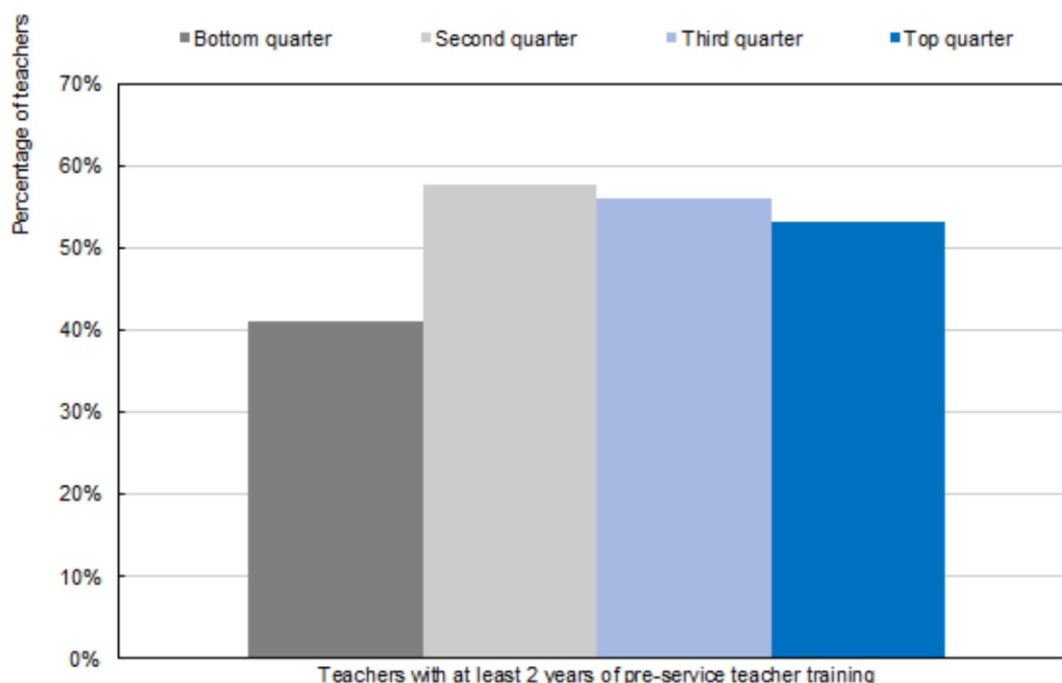
Figure 4.14: variation in teacher quality, by school socio-economic profile
Source: *PISA for Development Database.*

43 Similarly, teachers in urban schools are significantly more likely to have been
    teaching for more 5 years and hence more experienced than teachers in rural areas
    (figure 4.15) while teachers in private schools are less likely to be permanent than
    those teaching in public schools (figure 4.16).
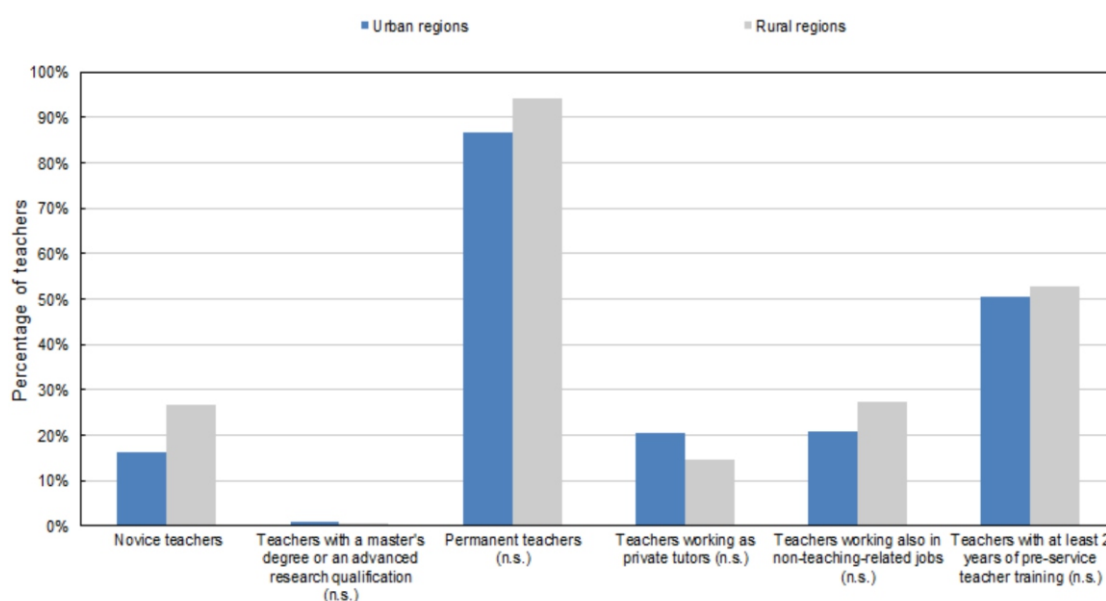
Figure 4.15: Variation in teacher quality, by region

Note: *(n.s.) indicates the differences between urban and rural regions for the indicator is non-significant*

Source: *PISA for Development Database.*
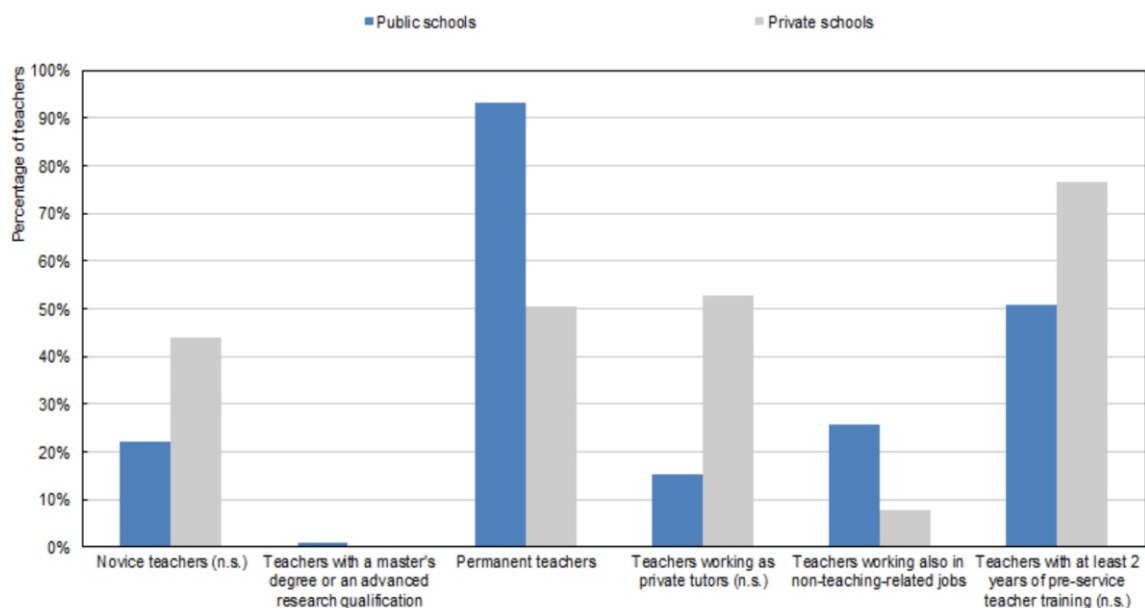
Figure 4.16: *Variation in teacher quality, by school type*

Note: *(n.s.) indicates the differences between public and private schools for the indicator is non-significant*

Source: *PISA for Development Database.*

4.4 Research on the effects of financial, material, instructional and human resources

44 Despite the widely accepted idea that more resources improve student performance, previous research on education has generally shown that, once an adequate level of resources is reached, additional resources may not necessarily contribute to better learning outcomes (Burtless, 1996; Nannyonjo, 2007; Nicoletti and Rabe, 2012; OECD, 2013, 2016a; Suryadarma, 2012; Wei, Clifton and Roberts, 2011). This implies that governments, schools and families should also focus on how educational resources are distributed and used, and which resources actually improve student learning, as well as on how much is spent on education.

45 Each additional dollar can only be spent once, so countries need to decide whether to invest in salary increases, more instruction time for students, more professional development for teachers, improved educational resources or school infrastructure. Equally important, countries need to decide how to distribute resources across schools, and how to align additional resources with socio-economic circumstances and other needs. Some research, for instance, suggests that increasing the educational resources available to disadvantaged students and schools offers good returns, both for student achievement (Bressoux, Kramarz and Prost, 2009; Lavy, 2012; Henry, Fortner and Thompson, 2010; Schanzenbach, 2007; Willms, 2006) and in redressing inequalities in education (Henry, Fortner and Thompson, 2010). PISA also shows that in high-performing education systems, resources tend to be allocated more equitably between socio-economically advantaged and disadvantaged schools (OECD, 2016a). PISA shows that countries differ widely in where they choose to invest their spending on education, so it is worth comparing policies and practices in this area.

85

**Foundations
for success in Zambia:
The School and community
environment**

Zambia allocates 5% of **GDP** and 16.5% of **public expenditure** to education.

25% of students are in schools where there are more than 58 **students per teacher**.
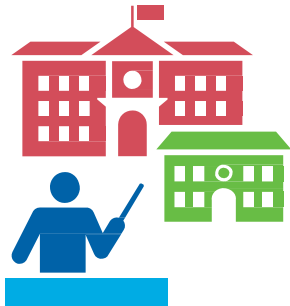
Rural and disadvantaged schools tend to have fewer and less **qualified teachers** than urban and advantaged schools.
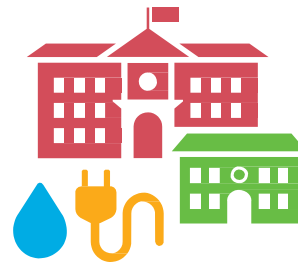
Rural and disadvantaged schools tend to have **school facilities** in worse condition than urban and advantaged schools.

Rural and disadvantaged schools tend to have fewer **instructional materials** than urban and advantaged schools.

5

Foundations for success in Zambia: The school and community environment

This chapter analyses four aspects of the school, family and community environment in which 15-year-olds grow and learn: their inclusive nature, the time devoted to learning, the quality of instruction in school, and the support children and schools receive from families and local communities. The chapter describes, in particular, how the presence of these foundations for educational success varies between students and schools in Zambia.

1   To what extent do children in Zambia find the key drivers of educational success within the schools they attend and within the families and communities in which they grow up? This question lies at the heart of this chapter and will be answered through an exploration of four key aspects or drivers of educational success, namely: the inclusiveness of schools; the time devoted to learning in schools; the quality of instruction in schools; and the level of support children and schools receive from families and local communities. As noted in Chapter 1, PISA-D describes these drivers as "foundations for success", and focuses on those drivers that are most closely associated with the development of children between the ages of 10 and 15. This chapter follows on from chapter 4 which reports on the extent to which resources invested in education- instructional, material and teacher resources in particular- create good conditions for learning, and focuses in particular on the extent students learn in an environment that supports good outcomes for all.

2   The aspects of the learning environment analysed in this chapter are: inclusive environments, and in particular how children's learning and well-being are fostered by supportive peer relationships and by feelings of safety; learning time, and in particular to what extent adolescents miss out on opportunities to learn due to truancy, teacher absenteeism, or other disruptions to the intended instruction and curriculum; quality instruction, and especially how successful teachers are in keeping an orderly discipline in the classroom and in promoting learning through structured teaching and supportive teacher-student relationships; and family and community support, or how the connections between schools, families and local communities create an environment in which children thrive.

3   The School, Teacher and Student questionnaires provide enough information to build many measures related with each aspect of the learning environment. Due to space restrictions, in each case only those measures that were considered to be most relevant to Zambia were chosen to be included in this report.

5.1   Inclusive environments

4   Inclusive environments are classrooms, schools and broader communities that value and support inclusion. Inclusion, in general, "is a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education. It involves changes and modifications in content, approaches, structures and strategies, with a common vision which covers all children of the appropriate age range and a conviction that it is the responsibility of the regular system to educate all children" (UNESCO, 2005, p. 13[1]).

5   The PISA-D measures of inclusive environments focus on the extent to which adolescents themselves feel welcomed and safe at school, and, based on UNESCO's (2009[2]) policy guidelines, on the attitudes of teachers and principals towards students with disabilities and towards the diversity of learners more generally. The measures that have been selected to be included in this report are detailed in Box 5.1.

6   The main measure of inclusive environments is referred to as "students' sense of belonging at school", and reflects students' perceptions of an inclusive school climate. It also constitutes an important indicator of students' social well-being. This section reports on student's sense of belonging at school. It shows that students in Zambia who experiences safety-threatening issues have a low sense of belonging. Students who are in schools where principals and teachers have inclusive attitudes are more likely to have a positive sense of belonging. These associations, together with findings from a larger body of research, provide evidence in support of certain interventions to improve inclusion in schools. Questions about feelings of safety and the role of threats to their safety in decisions to stay out of school are also asked to out-of-school youth and this will be reported on in the second edition of this national report. The section also shows how a strong sense of belonging to school supports student learning, their engagement with school and learning, and their subjective well-being.

Box 5.1. The measures of inclusive environments used in this report

The PISA-D measures of inclusive environments used in this report are based on student, teacher and principal responses to the following questions.

Student questionnaire

Students were asked to report, on a four-point scale with the answering categories "strongly agree", "agree", "disagree", and "strongly disagree", their agreement with the following statements:
- I feel like an outsider (or left out of things) at school;
- I make friends easily at school;
- I feel like I belong at school;
- I feel awkward and out of place in my school;
- Other students seem to like me;
- I feel lonely at school.

Students' responses to these questions were used to construct the index of sense of belonging that is comparable to the corresponding PISA 2015 index. The scale values range between -3.8 and 3.5, and, as in PISA 2015, the value of 0 corresponds to the average value of the index across OECD countries, and the standard deviation across OECD countries was set equal to 1. A value above 1 on this index typically corresponds to students who agree or strongly agree with all positive indicators of sense of belonging, and disagree or strongly disagree with all negative indicators of sense of belonging. Values above -0.5 typically correspond to students who agree (or strongly agree) with a majority of the positive indicators of sense of belonging and disagree (or strongly disagree) with a majority of the negative indicators of sense of belonging. Values below -2 indicate the lowest levels of sense of belonging, reached by students who disagree (or strongly disagree) with all positive indicators of sense of belonging, and agree (or strongly disagree) with all negative indicators of sense of belonging.

Teacher questionnaire

Teachers in schools attended by 15-year-olds in Zambia were asked to report, on a four-point scale with the answering categories "strongly agree", "agree", "disagree", and "strongly disagree", their agreement with the following statements:

- Teachers should try to teach the curriculum, even to students who do not have the basic reading and numeracy skills.
- Students with disabilities should be taught in special schools.
- Teachers waste their time trying to support teen mothers to remain in school.
- Students who lag behind should be placed in special classes.

Teachers who disagreed with these statements display their willingness to address and respond to the diversity of needs of all learners and reduce exclusion within and from education. Teachers were also asked about their agreement with the following statements:

- Teachers should adjust the curriculum to the cultural diversity in their classes
- Teachers should be able to teach classes with students with differing levels of ability.
- In this case, a positive attitude towards inclusion is reflected in teacher's agreement with these statements.

School questionnaire

Similarly, school administrators in schools attended by 15-year-olds in Zambia were asked to report, on a four-point scale with the answering categories "strongly agree", "agree", "disagree", and "strongly disagree", their agreement with the following statements:

- Teachers should try to teach the curriculum, even to students who do not have the basic reading and numeracy skills.
- Students with disabilities should be taught in special schools.
- We need more special classes for students who lag behind.
- Teachers are able to teach classes with students with differing levels of ability.

5.1.1 Sense of belonging at school among 15-year-old students

7   A sense of belonging is defined as feeling accepted and liked by the rest of the group, feeling connected to others and feeling like a member of a community (Baumeister and Leary, 1995[3]; Maslow, 1943[4]). Human beings in general – and teenagers in particular – desire strong social ties and value acceptance, care and support from others. In school, a sense of belonging gives students feelings of security, identity and community, which, in turn, support academic, psychological and social development.

8   In Zambia, a large majority of students (80.7%) feel that they belong at school, and only 32.2% of reported feeling lonely at school. On average, students reported a strong sense of belonging at school and positive relationships with their peers across all six statements that were included in the PISA-D questionnaire to measure these aspects (Figure 5.1). However, within Zambia, a sizeable number of students report negative relationships with their peers and low feelings of belonging at school. Boys in Zambia felt lonelier than girls (percentage-point difference of 6.1).

Students who agree with the following statements

Statement	Percentage
I feel like I belong to school	80.7%
Other students seem to like me	79.8%
I make friends easily at school	79.5%

Students who disagree with the following statements

Statement	Percentage
I feel lonely at school	67.8%
I feel awkward and out of place in my school	64.5%
I feel like an outsider (or left out of things) at school	65.3%

Percentage of sudents

Figure 5.1 Sense of belonging at school among students in Zambia

Source: PISA for Development Database

5.1.2 How students' sense of belonging compares internationally

9   Students in Zambia reported a slightly lower sense of belonging at school compared to students in other countries. This finding stems from a comparison of the findings of Zambia's PISA-D results with other PISA participating countries. While the PISA-D measure of sense of belonging was also used in PISA 2015 (as well as in earlier cycles of PISA), comparisons of students' self-reported sense of belonging across countries are subject to the same uncertainty as the well-being indicators discussed in Chapter 3, due, in particular, to the subjective nature of the indicators and to possible reporting biases (see Box 3.2).

5.1.3 *Threats to inclusion: sexual harassments and violence at school*

10 According to the classical theory on the "hierarchy of needs" (Maslow, 1943[4]), the human need for social belonging can only be met if more basic needs for safety and security are also fulfilled. Feeling safe at school is a pre-condition for forming positive relationships with peers and therefore for a strong sense of belonging at school. In this section, school safety is discussed with respect to general feelings of safety ("I feel safe at school/on my way to school/on my way home from school"), as well as with respect to students' exposure to specific threats to their safety and security (sexual harassment and school safety).

11 A large proportion of students (85%) reported feeling safe at school, and only slightly fewer students reported feeling safe on the way to school (78%) or on the way home from school (75%) (Figure 5.2). Feelings of unsafety, however, were not significantly different between girls and boys on their way going to school and back home from school. The difference was in safety in school premises where girls felt safer than boys. It appears the girl child protection measures put in place by government and stakeholders promoting safety of especially girl children is bearing positive results. However, every student needs to feel safe at school if they are to optimize their potential. It is therefore important that child protection sensitization mechanisms be strengthened so as to achieve 100% feeling of safety in schools by students.

Percentage of students who agreed or strongly agreed with the following statements:
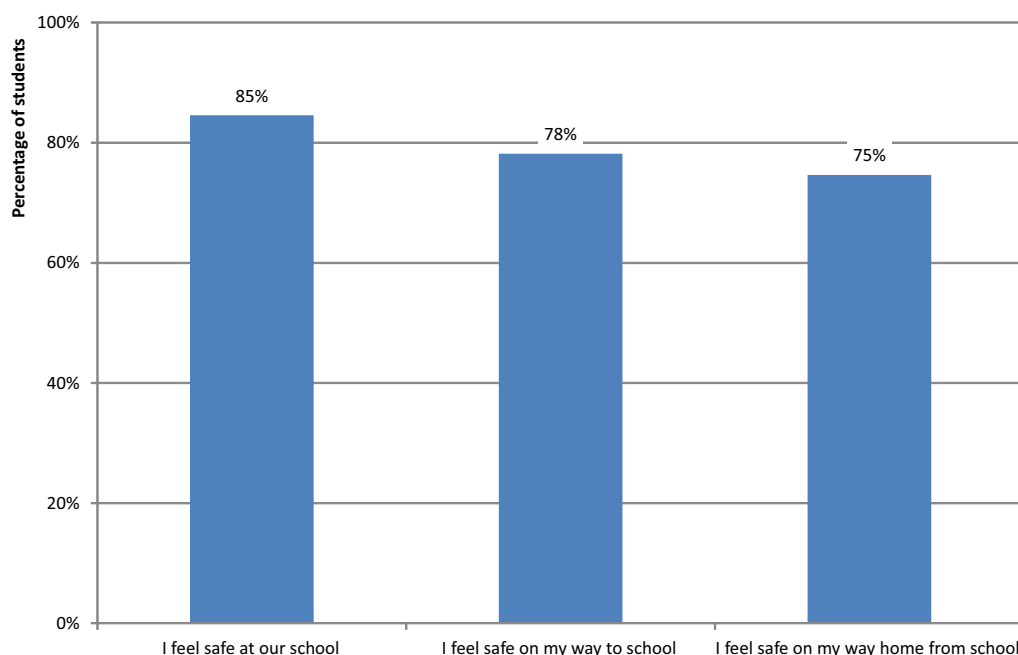
Figure 5.2: *feelings of safety at school amongst students in Zambia*
Source: *PISA for Development Database*

12 Unsafety in or around schools is also a threat to an inclusive environment. The consequences of school violence are grave, as extreme cases have led to the loss of human lives. Other effects of school violence include vandalism and loss of property – especially school facilities, poor human capital development, increase in crime rate, erosion of cultural values and bad reputation for schools as well as societies.

13 PISA-D asked students whether any of the following happened in the four weeks prior to the assessment:

- I was in a physical fight on school property
- I stayed away home from school because I felt unsafe
- Our school was vandalised
- I gave money to someone at school because they have threatened to hurt me
- I witnessed a fight on school property in which someone got hurt
- I saw gangs in and around the school
- I heard a student threaten to hurt another student
- Someone stole something of mine at school
- I saw a student carrying a gun or knife at school

14 The students' responses to these items were simply 'yes' or 'no'. Overall, 75.2% of students in Zambia reported that there was at least one unsafe event in or around their school in the four weeks prior to the assessment. In total, at least 98.4% of 15-year-old students in Zambia were in schools where at least 20% of students surveyed in PISA reported an unsafe episode in or around school in the four weeks prior to the assessment. Attending such schools and having experienced school unsafety personally, are both associated with lower levels of sense of belonging, and with poorer achievement and well-being outcomes.

Percentage of 15-year-old students in schools where more than 20% of students reported having experienced the following school safety issue within the last 4 weeks:
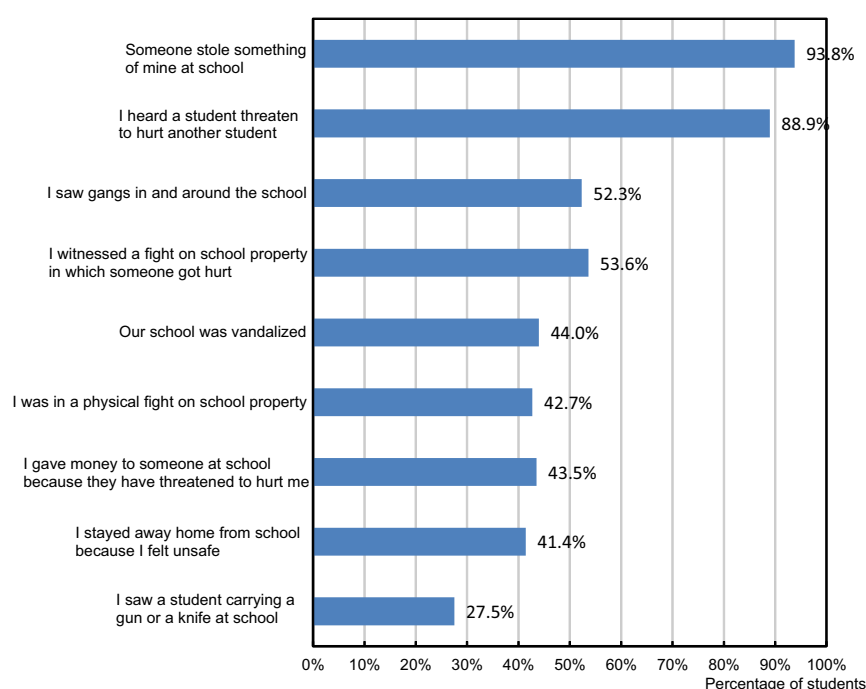
Figure 5.3: *Student exposure to violence in or around school*
Source: *PISA for Development Database*

15 As the questions on school safety were not included in prior PISA questionnaires, these percentages could only be compared to those observed in other countries that participated in PISA-D. Such comparisons revealed that unsafety in school was a particularly significant threat to an inclusive environment in Zambia and across all PISA-D countries.

16 Zambia was ranked 22nd out of 52 in child protection in the African Report on Child Wellbeing (Save the Children, 2010). Among the concerns of the well implemented child safety concerns had been lack of data on child safety and forms. PISA-D has added to the body of knowledge, aspects that threaten child development and wellbeing from the school perspective. The presence of the National Child Policy under the Ministry of Sport, Youth and Child Develop ment lays the foundation for an all-round child safety and wellbeing in Zambia. However, there is need for comprehensive collaboration between the Ministries and departments if the goal is to be achieved.

5.1.4 Principals' and teachers' attitudes towards inclusion

17 An important aspect of inclusive education is ensuring that educators are prepared and willing to address the diversity of learners, and particularly to respond to the special needs of students with disabilities and of students with learning difficulties; and that they see it as their responsibility to educate all children, rather than to tear children apart and exclude some from the benefit of a regular education that leads to a minimum level of proficiency in core subjects. PISA-D used the questionnaires for teachers and principals to measure teachers' attitudes and beliefs with respect to inclusion in education.

18 On average across Zambia, 75.8% of 15-year-olds were in schools whose principals agreed or strongly agreed that teachers should try to teach the curriculum, even to students who do not have the basic reading and numeracy skills; similarly large shares of 15-year-olds had principals that reported that teachers were able to teach classes with students with differing levels of ability (90.2%) while a small proportion agreed that because students learn at different rates, school programs should be ungraded (36.4%).

Percentage of students in schools whose principals agreed or strongly agreed with the following statements:
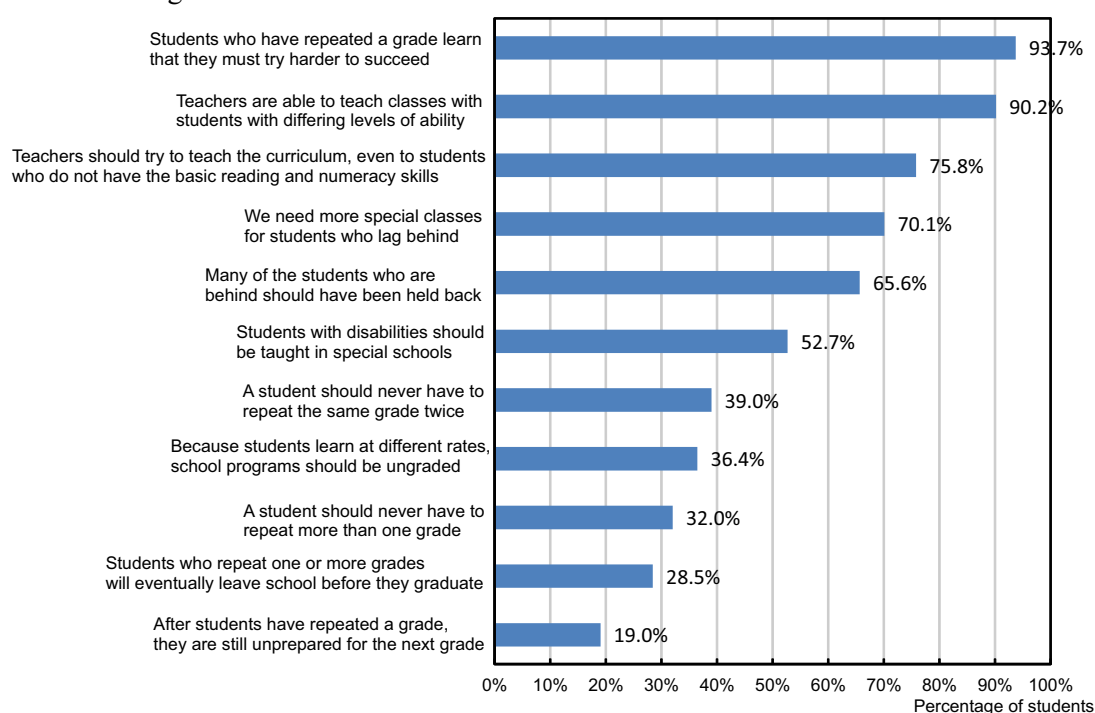
Figure 5.4: Student exposure to violence in or around school

Source: PISA for Development Database

94

Percentage of students in schools whose teachers agreed or strongly agreed (or disagree or strongly disagree) with the following statements:
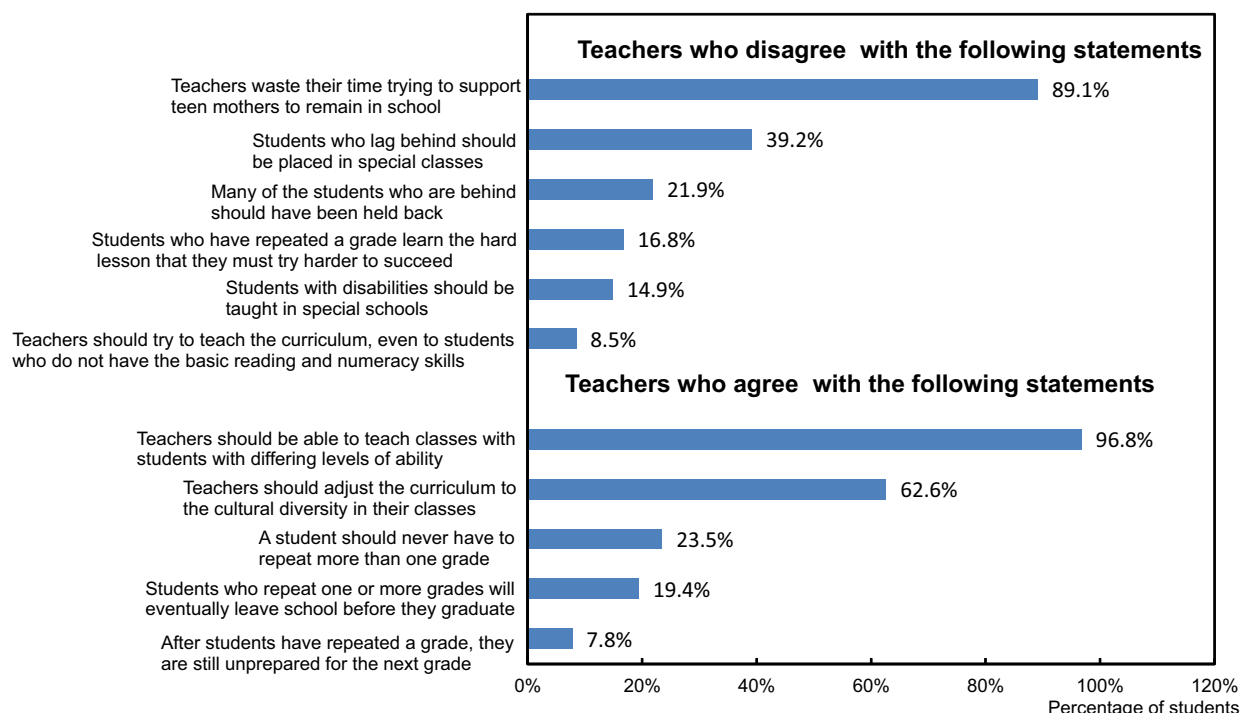
Figure 5.5: *Teacher attitudes towards inclusion*

Source: *PISA for Development Database*

19 At the same time, a large number of 15-year-olds were in schools whose principals expressed views that were in contrast with the goal of promoting inclusiveness in education: for example, they agreed or strongly agreed that students with disabilities should be taught in special schools (52.7%); or that more special classes are needed for students who lag behind (70.1%).

20 Similarly, on average across Zambia, 91.5% of 15-year-olds were in schools where 2 out of 3 teachers agreed or strongly agreed that teachers should try to teach the curriculum, even to students who do not have the basic reading and numeracy skills; and similar shares of 15-year-olds were in schools where teachers agreed that teachers should be able to teach classes with students with differing levels of ability (96.8%) or that teachers should adjust the curriculum to the cultural diversity in their classes (62.6%), thereby displaying positive attitudes towards inclusion.

21 Encouragingly, 86.7% of students are in schools that organise remedial classes at school to help students who lack basic reading skills (Figure 5.6). Almost all students are in schools where students who need it receive extra support from staff at the school. Percentage of students in schools where more than 2 out of 3 teachers report that the following happens to students who lack the reading or numeracy skills to learn the curriculum*:*
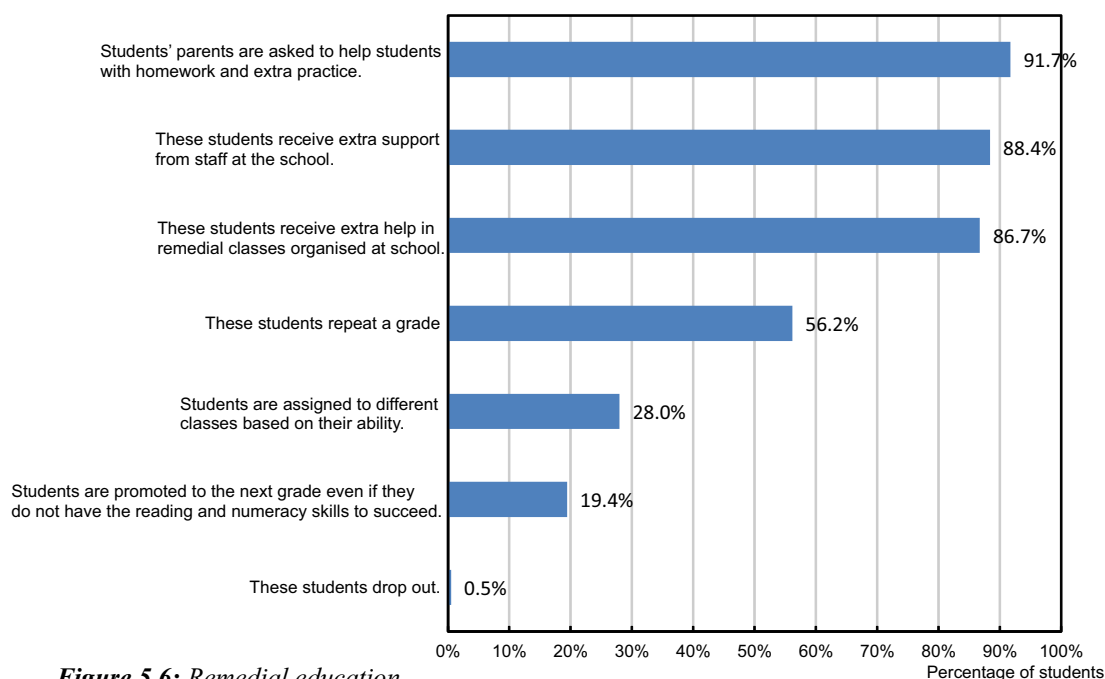
Figure 5.6: *Remedial education*

Source: *PISA for Development Database*

22 A substantial number of 15-year-olds were in schools where many teachers (two out of three) expressed views that were in contrast with the goal of promoting inclusiveness in education: they agreed or strongly agreed that students with disabilities should be taught in special schools (85.1%); that teachers waste their time trying to support teen mothers to remain in school (10.9%); or that students who lag behind should be placed in special classes (60.8%).

5.1.5 Research on the effects of feelings of inclusion

23 There are many reasons why policy makers, teachers and parents should care about students' sense of belonging at school. First, there is an association between feelings of belonging at school and academic achievement. Adolescents who feel that they are part of a school community are more likely to perform better academically and be more motivated in school (Battistich et al., 1997[5]; Goodenow, 1993[6]). Research examining this association generally shows a positive circular relationship: a sense of belonging leads to higher academic achievement, and high academic achievement leads to greater social acceptance and sense of belonging (Wentzel, 1998[7]). In most countries participating in PISA, students who report a strong sense of belonging at school and positive relationships with their peers tend to score above students who report a weaker sense of belonging. In Zambia too, students who report a strong sense of belonging at school and positive relationships with their peers tend to score above students who report a weaker sense of belonging. Score-point difference between top and bottom quarters of the index of sense of belonging at school.
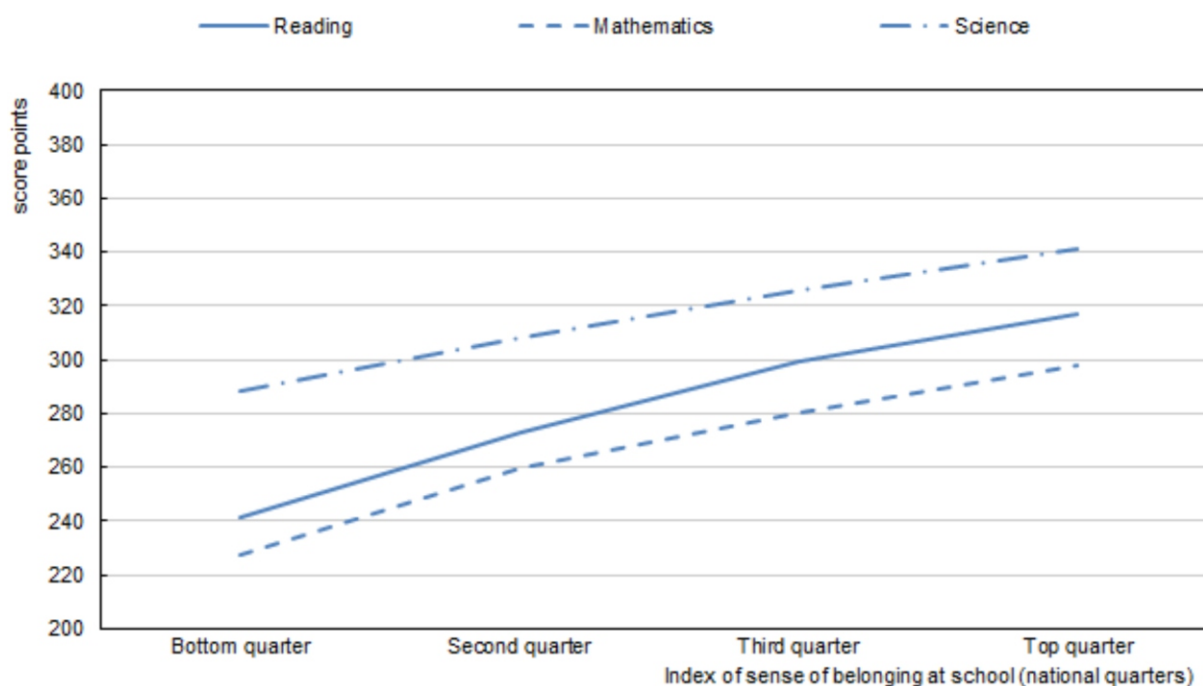
Figure 5.7: Feeling *like an outsider at school and performance in reading, mathematics and science*

Note: *all differences in score-point between students in the top quarters and students in the bottom quarter of sense of belonging index are significant.*

Source: *PISA for Development Database*

24   Irrespective of its association with academic achievement, a sense of belonging and acceptance at school is important for adolescents' sense of self-worth and overall satisfaction with life (Juvonen, 2006[9]). When children and adolescents feel a connection with school, they are less likely to engage in risky and antisocial behaviour (Catalano et al., 2004[10]; Hawkins and Weis, 1985[11]). Students with strong and rewarding social ties at school are less likely to drop out of school and never return (Lee and Burkam, 2003[12]), or to engage in substance abuse and truancy (Schulenberg et al., 1994[13]). Furthermore, researchers find that an absence of a feeling of connectedness at school is an antecedent of depression among adolescents (Shochet et al., 2006[14]).

25   PISA data show for example that there is a strong relationship between the likelihood of reporting low satisfaction with life and feeling like an outsider at school (OECD, 2017, p. 124[15]). Students in Zambia that reported a strong sense of belonging at school (top 25%) also reported significantly higher life satisfaction compared to students who reported a weak sense of belonging at school (bottom 25%) (Figure 5.8). Average life satisfaction, by national quarters of the index of sense of belonging at school
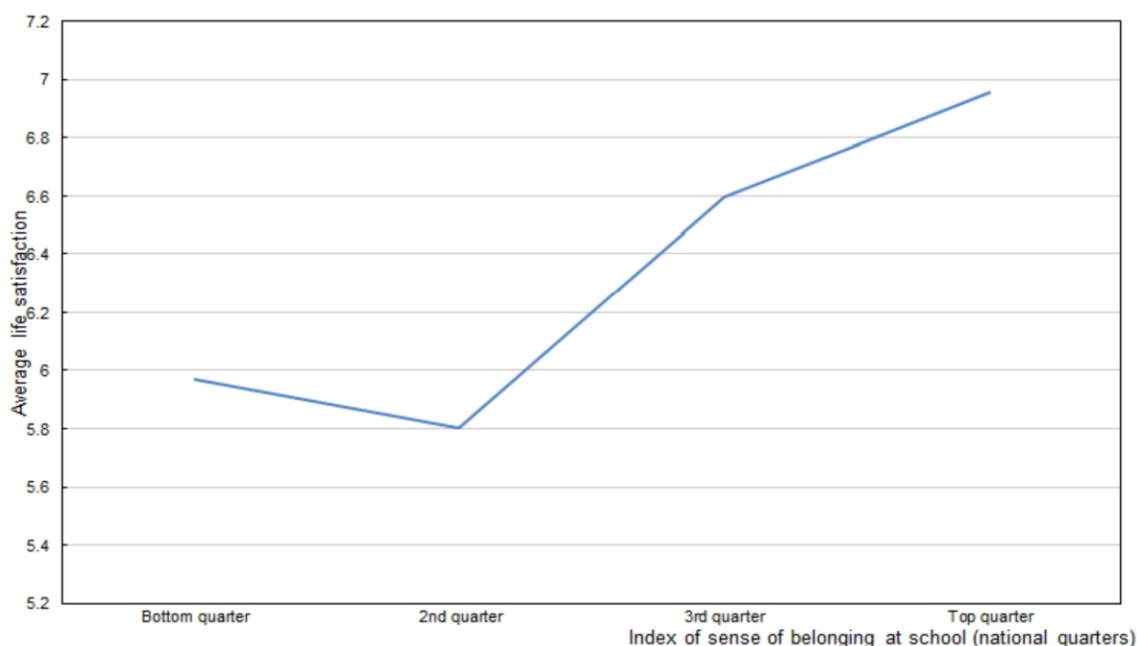
Figure 5.8: *Increased likelihood of reporting low satisfaction with life for students who feel like an outsider at school*

Note: *All differences in life satisfaction between students in the top quarters and students in the bottom quarter of the sense of belonging index are significant.*

Source: *PISA for Development Database*

5.2   Learning time

26   That any important learning requires effort and time is a notion so deeply enshrined in school systems and confirmed by abundant research that it almost requires no discussion. In every school system, for example, the curriculum and school programmes not only describe, for the different ages and grade levels, the learning goals and the material that students should be taught, but also the overall amount of time devoted to instruction.

27   In Zambia, the total intended instruction time for students up to age 14 - an estimate of the number of hours during which students are taught both compulsory and non-compulsory parts of the curriculum, as per public regulations – is 7 800 hours. This compares to an average, across OECD countries, of 7677 hours of instruction in primary and secondary education (up to age 14). Most of this instruction time is compulsory (OECD, 2016b, p.Table II.6.53[16]). The number of instruction hours in Zambia is slightly above the PISA-D average (7, 654). Zambia is third in terms of number of instruction hours among PISA-D countries after Ecuador (9, 333) and Honduras (9, 000).

Hours of instruction in primary and secondary school education (up to age 14)
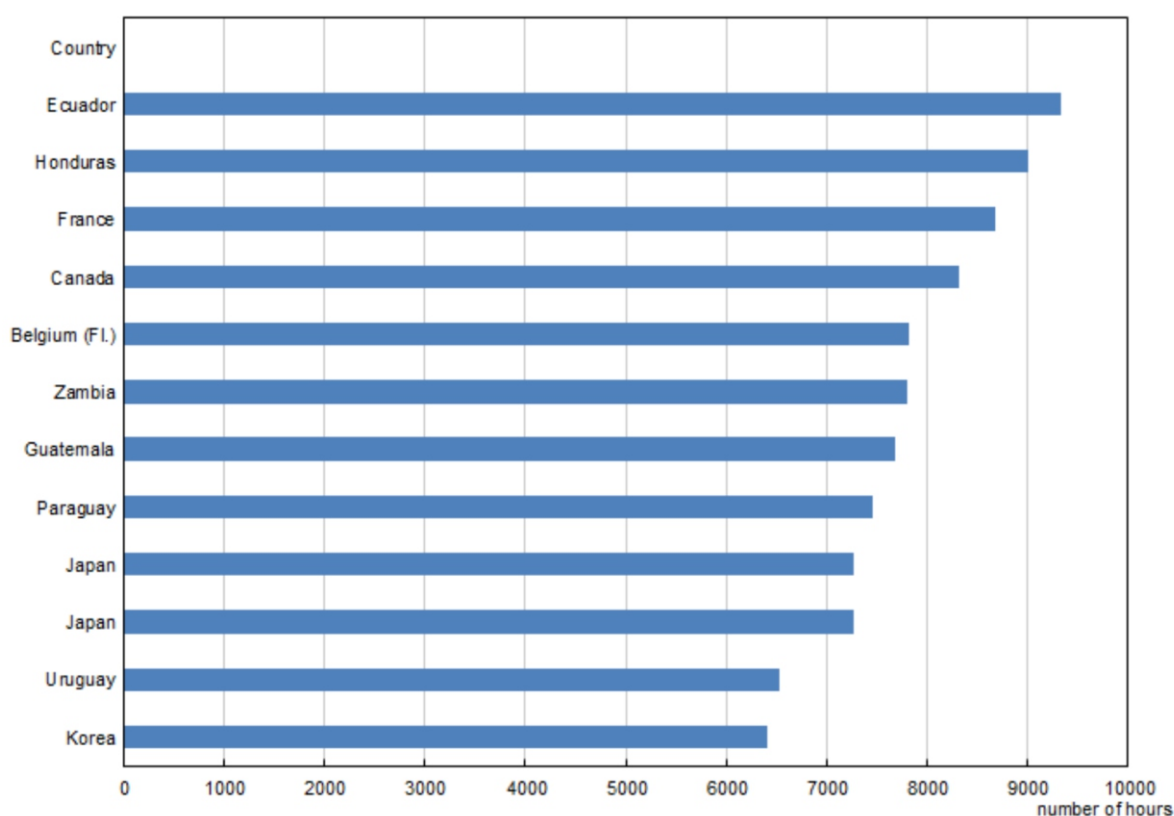
Figure 5.9: *Total intended instruction time in Zambia and comparison countries up to age 14*

Source: *PISA 2015 and PISA for Development Database*

28 While this theoretical amount of instruction time is, in the intentions of curriculum planners, sufficient for good learning outcomes, in real schools and classrooms, much of it happens to be lost to learning. The actual time that students spend learning may differ from the intended instruction time for a variety of reasons. The most visible causes include student absenteeism, tardiness, and a variety of reasons for which schools may be closed or deviate from the regular curriculum on days that count as instruction days (including teacher absenteeism, natural disasters, etc.). These causes for the loss of learning time in Zambia are discussed in the present section; the measures of "learning time" included in this report are presented in Box 5.2. Furthermore, even when classes are held and students are present, class time is often lost to learning because of poor discipline, which means that teachers spend time keeping order rather than helping students learn. The extent to which noise and disorder disrupts students' learning is discussed in the following section on quality instruction.

Box 5.2. Measures of learning time used in this report

The PISA-D measures of learning time used in this report are based on student and principal responses to the following questions.

Student questionnaire

Students were asked to report whether, in the last two weeks at school, any of the following things occurred ("never", "one or two times", "three or four times", "five or more times"):

- [The student] <skipped> a whole school day.
- [The student] <skipped> some classes.
- [The student] arrived late for school.

Students were also asked to report whether, in the last two weeks at school, any of the following things happened (the response options in this question were simply "yes", "no"):

- One or more classes were cancelled.
- School was cancelled.
- One of my teachers was late for class.
- One of my teachers did not come for class.
- There was a teacher strike.
- My teacher worked at the computer during class time.
- My teacher answered personal calls during class time.
- My teacher attended a meeting during class time.

School questionnaire

Principals, in turn, were asked whether, during the month prior to the PISA test, the school was confronted with the following teacher behaviours (the answer categories were "never", "once or twice", and "every week")

- Teachers arriving late at school
- Absenteeism (i.e., unjustified absence)
- Skipping classes

5.2.1 Loss of learning time in Zambia: student absenteeism, truancy and tardiness

29 In Zambia, 32.5% of students reported that they had skipped at least one day of school in the two weeks prior to the PISA test, 32.7% of students reported that they had skipped a class at least once, and 49.4% that they had arrived late for school at least once. Missing days of school, skipping classes are behaviours that are observed more frequently among students from rural areas as compared to those from urban areas, among severely poor students than those who are not poor, and

among immigrant students than the non-immigrants. Immigrant students in Zambia were 2.4 times more likely to miss classes than non-immigrants.

Percentage of students reporting that the following occurred at least once in the two weeks prior to the PISA test:
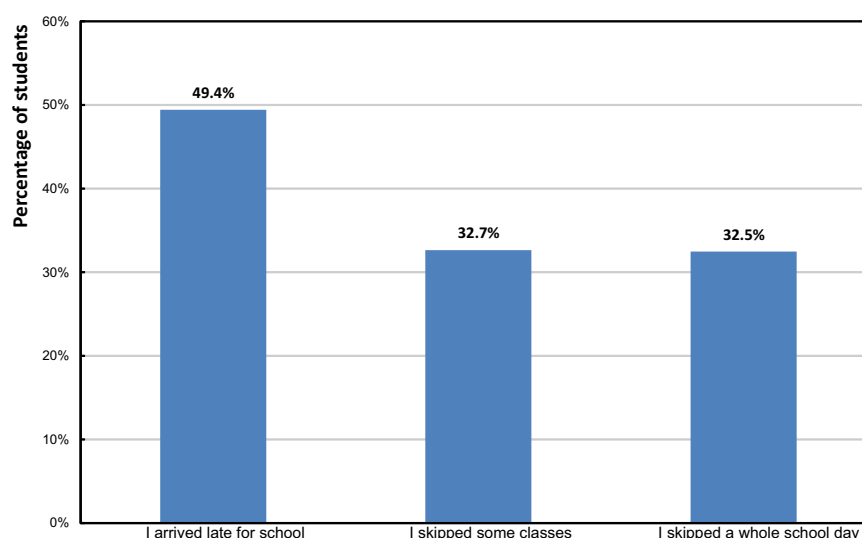
Figure 5.10: *Students skipping days of school, skipping classes and arriving late for school in Zambia*

Source: *PISA for Development Database*

30 PISA-D also asked students to report whether, over their entire school career, they had ever missed school for more than three months in a row ("no", "yes, once", or "yes, twice or more"). Some 23.5% of students reported having missed school for more than three months in a row, with the most frequent reasons being health problems (their own, or those of family members) and the inability to pay school fees.
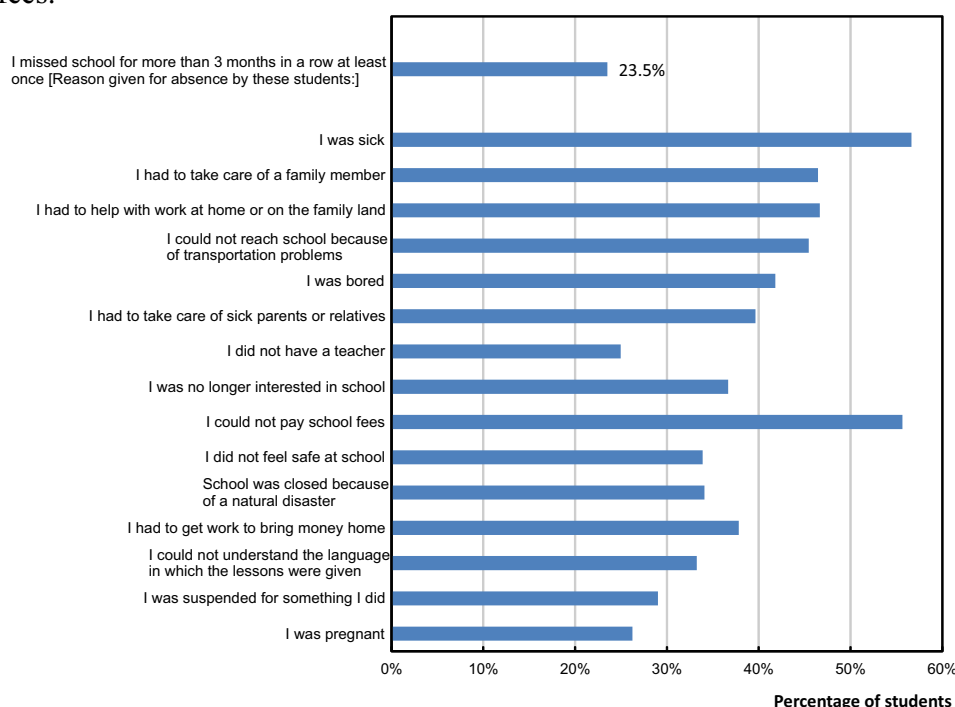
Figure 5.11: *Percentage of students who reported that they had missed school for more than three months in a row and reasons given for absence*

Source: *PISA for Development Database*

101

5.2.2 Loss of learning time in Zambia: teacher absenteeism and effort

31   High rates of teacher absenteeism are an important problem in many developing countries (Duflo, Hanna and Ryan, 2012[17]; Glewwe and Muralidharan, 2016[18]; Banerjee and Duflo, 2006[19]). If schools are closed on instructional days, classes are not held, or teachers invest more effort in other tasks than in teaching, the value of education is undermined, students may not learn the curriculum, but also, and teachers fail to demonstrate the importance of effort and perseverance for educational success.

32   Some 28.3% of 15-year-old students reported that "one or more classes were cancelled"; in total, at least 64.9% of 15-year-old students in Zambia were in schools where more than 20% of students surveyed in PISA reported that one or more classes were cancelled during the two weeks prior to the assessment. Most concern, 89.6% of students reported that a teacher did not come for a class during the two weeks prior to the PISA test. Student reports of days or classes lost, and of teachers that were late or did not report for class, were more frequent in public and Grant -Aided than in private and Community schools and comparable between rural and urban schools. The reasons attributed to losing time among students in urban schools were that the teacher was going late for class or did not report for class. In rural areas, it was more frequent for students to report that school was cancelled and that the teacher was working on a computer during class time.
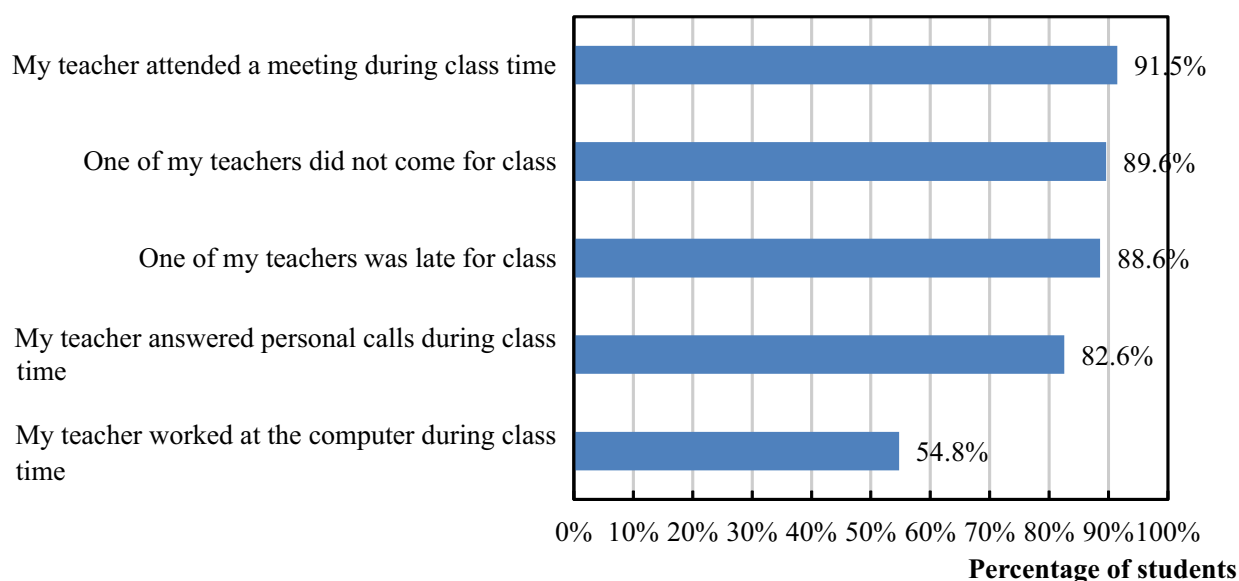
Figure 5.12: *Loss of learning time for students in Zambia*

Source: *PISA for Development Database*

33   PISA-D also asked teachers whether they had been prevented from going to work during the month prior to the assessment: 83.4% of 15-year-old students were in schools where more than one third of teachers reported that during one month prior to PISA test, they had been prevented from going for work. The reasons given by teachers for not going to work ranged from experiencing a physical illness to facing extreme weather or a hazard, such as heavy rain. However, the most common reasons given were family-related problems (such as sickness of a family member, someone in the family needed care, and attending funerals).

34   Principals, in turn, were asked whether, during the month prior to the PISA test, the school was confronted with teachers arriving late at school, being absent without justification, or skipping classes (the answer categories were "never", "once or twice", and "every week").

35   On average, 5.0% of 15-year-old students were in schools where teacher absenteeism occurred regularly (every week), and 41.6% in schools where teacher absenteeism occurred more occasionally (once or twice).

Percentage of 15-year-old students in schools where principals reported the following problematic teacher behaviours at least once during the month prior to the PISA test
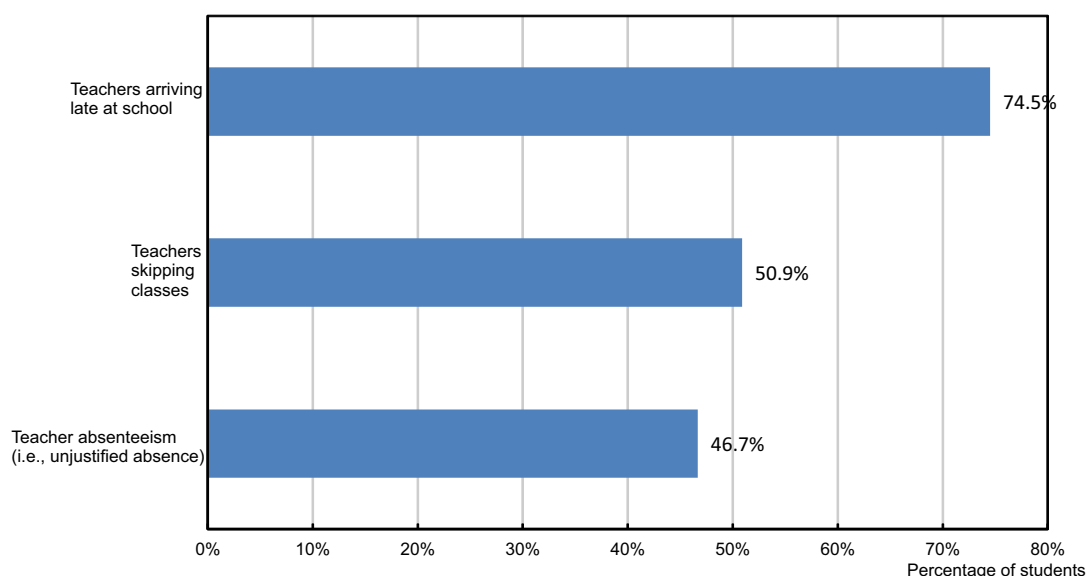
Figure 5.13: *Teacher absenteeism (principal reports)*
Source*: PISA for Development Dataset*

5.2.3 *How student absenteeism, truancy and tardiness compare internationally*

36   On average across OECD countries, 26% of students said they had skipped classes at least once and 20% reported that they had skipped a whole day of school at least once. In some education systems, however, students skip school relatively frequently. For instance, in the Dominican Republic, Italy, and Uruguay, more than one in two students had skipped a day of school at least once in the two weeks prior to the PISA assessment, and similar numbers had skipped some classes during that period (OECD, 2016b[16]). Among PISA-D participating countries on average, 33.3% of students reported skipping whole school day while 30.2% and 46.2% reported skipping some classes and arriving late for class respectively. Cambodia and Senegal had significantly lower incidences of students missing whole school day or missing classes.

37   A comparison of Zambia students' level of absenteeism, truancy and tardiness with the PISA-D and OECD averages suggests that these were significant problems in Zambia. Although the proportions of student absenteeism, truancy and tardiness were comparable to PISA-D average, comparison to individual countries had challenges in these aspects. The main challenge among students, however, was arriving late for classes with 49.4% of students in Zambia reporting that they were late for class at least once during the two weeks prior to PISA-D test.
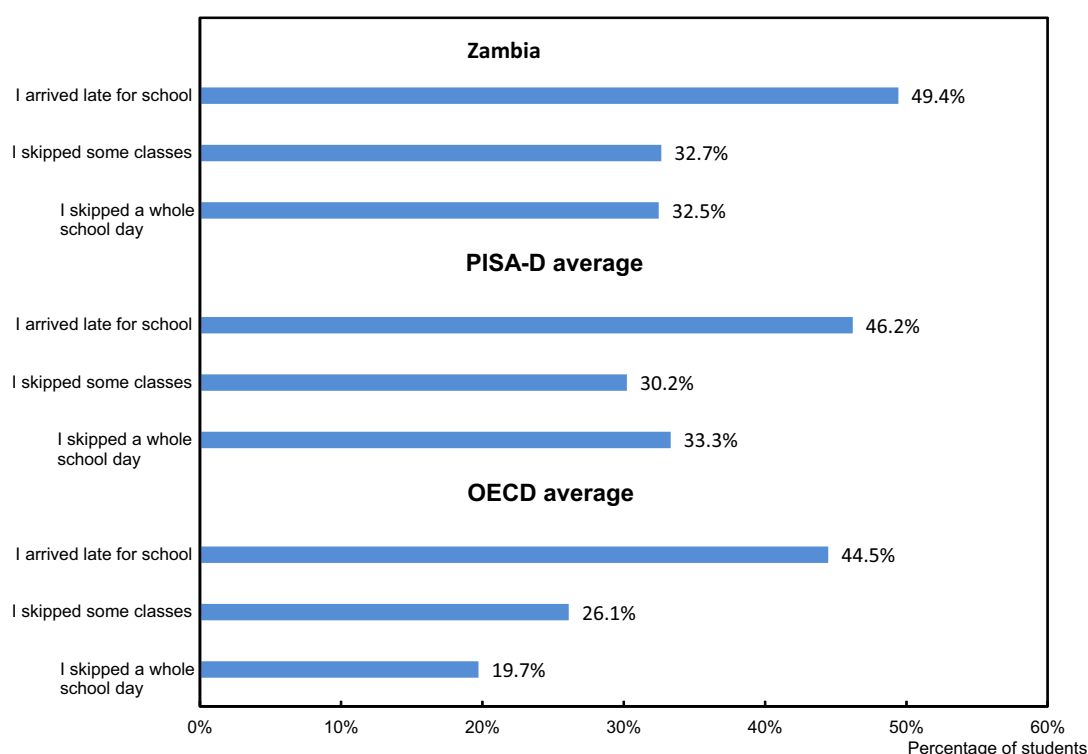
Figure 5.14: *How students' absenteeism compares internationally ((Zambia and PISA-D and OECD averages)*

Source: *PISA 2015 and PISA for Development Database*

5.2.4 *How student absenteeism, truancy and tardiness vary among schools within Zambia*

38   Skipping days of school, single classes or arriving late for school are all behaviours that appear to be concentrated in particular types of schools. When the number of 15-year-old students who reported that they arrived late for school is compiled across all schools, more than 50% of these students are found in schools that account for only 24.3% of the total enrolment of 15-year-olds in Zambia.

39   In most countries that participated in PISA 2015, skipping a whole day of school was more common in disadvantaged schools than in advantaged schools, while students in rural and urban schools were equally likely to have skipped a day of school, and those in public schools were more likely than students in private schools to have done so.

40   In the case of Zambia, skipping a whole school day was more common among students in rural areas than in urban. Other factors that were associated with truancy and tardiness were poverty and migrant status; socio-economically advantaged students reported higher incidences of skipping some classes (35%) than the disadvantaged (22.7%) while immigrant students reported higher incidences (50.0%) of missing whole school day than the non-immigrants (29.5%).

41   Students were also more likely to skip days of school in schools in which some students reported that, over the two weeks prior to the PISA test, some classes were cancelled; or in schools where the principal reported that (some) teachers were late for class or absent without justification, over the month prior to the PISA test.

5.2.5 *Research on the effects of student and teacher absenteeism*

42 Every school day in Zambia, many students are missing learning opportunities because they skip school or arrive late for school. Regular truancy can have adverse consequences for students: truants are more likely to drop out of school, wind up in poorly paid jobs, have unwanted pregnancies, abuse drugs and alcohol and even become delinquent (Baker, Sigmon and Nugent, 2001[20]; Meece and Eccles, 2010[21]; Hallfors et al., 2002[22]; Henry and Huizinga, 2007[23]; Juvonen, Espinoza and Knifsend, 2012[24]; Office for Standards in Education, 2001[25]). If pervasive, student truancy can also hurt the entire class.

43 Students who play truant, are absent and arrive late at school frequently need extra assistance, which may negatively affect the flow of instruction, particularly for those students who work closely with truants, who are often asked to help them catch up. Truants might also generate resentment among students who attend class regularly – and sympathy among others who may realise that they too can skip classes (Wilson et al., 2008[26]).For these and other reasons, missing days of school may adversely affect the academic performance not only of the truant himself/herself, but also of other students in the same school.

44 Teacher absenteeism has serious impact on learning and learner achievement. Repeated or chronic teacher absenteeism reduces students' performance (Finlayson, 2009; Obeg-Denteh, 2011). Some studies have found out that each additional 5% increase in teacher absenteeism reduce learning by 4 to 8 percent of a year's learning for a typical student (Das, et al, 2007). Secondly, teachers, as role models may impact negative behavioural tendencies in students who may think that attending school is not important (Mehara, 1999). Such tendencies may also be transferred to other teachers through interactions.

5.3 Quality instruction in the classroom

45 Teachers are the most important resource in today's schools: in education, teaching is "where the rubber hits the road", and there is hardly any intervention to improve student learning that does not rely on teachers for its proper implementation (Darling-Hammond et al., 2017[29]). Most goals of school education are achieved – or not – by the way students and teachers interact in classrooms. Improving the effectiveness, efficiency and equity of schooling depends, in large measure, on ensuring that competent people want to work as teachers, that their teaching is of high quality and that high-quality teaching benefits all students.

46 While it is widely recognised that the quality of instruction is the most important driver of student success, quality of instruction is also the most difficult foundation of success to define and measure. Many aspects of teacher quality are indeed difficult to observe, and researchers agree that there is no single best way of teaching (OECD, 2009[30]). PISA-D focuses on some of the most visible markers of effective teaching, rather than on more indirect determinants of it. The PISA-D measures of the quality of instruction focus in particular on those aspects that can be easily observed by students, irrespective of their own level of skill. However, there is limitation to a measure of quality of instruction in students' observations;

the ability to discern clarity, structure, and support may itself be a function of students' literacy level.

47 Virtually all of the contemporary models of effective instruction (Anderson, 2004[30]; Klieme, Pauli and Reusser, 2009[31]; Coe et al., 2014[32]) highlight the importance of goal-oriented, structured teaching and conceive teaching as an interpersonal exchange. Goal-oriented, structured teaching refers to the fact that when delivering lessons, teachers are aware of, understand and actively pursue goals that are concerned directly or indirectly with student learning, and are able to achieve clarity and order in large classrooms. The importance of interpersonal exchanges implies that quality instruction is characterised by a supportive, student-oriented classroom climate, which puts learners and their needs at the centre. The PISA-D measures of quality instruction consequently focus on the quality of student-teacher relationships, on the classroom disciplinary climate, and on the clarity and structure achieved by mathematics teachers (Box 5.3).

Box 5.3. PISA-D measures of quality instruction used in this report

The PISA-D measures of learning time used in this report are based on student responses to the following questions.

Student questionnaire

Students were asked to think about the teachers at their school, and to report, on a four-point scale with the answering categories "strongly agree", "agree", "disagree", and "strongly disagree", their agreement with the following statements, indicating supportive student-teacher relationships

- I get along well with most of my teachers.
- Most of my teachers are interested in my well-being.
- Most of my teachers listen to what I have to say.
- If I need extra help, I will receive it from my teachers.
- Most of my teachers treat me fairly.

Students' answers to these statements were summarised in an index of teacher support, which varies between 0 and 10 (where 10 indicates the highest level of agreement with all statements).

Students were also asked to report their agreement with the following statements, indicating teacher expectations of success for all students:

- The teachers show an interest in every student's learning.
- The teachers give students an opportunity to express opinions.
- Our teachers expect us to work hard.
- Our teachers encourage students to do their best work.
- Our teachers expect us to do our homework on time.
- Students understand what is expected of them for their <courses>.

Students' answers to these statements were summarised in an index of teacher expectations of success which varies between 0 and 10 (where 10 indicates the highest level of agreement with all statements).

To measure the classroom disciplinary climate, students were asked to indicate how often ("every lesson", "most lessons", "some lessons", "never or hardly ever") the following things happen in their classroom:

- Students don't listen to what the teacher says.
- There is noise and disorder.
- The teacher has to wait a long time for students to quiet down.
- Students cannot work well.
- Students don't start working for a long time after the lesson begins

Students' answers to these statements were summarised in an index of disciplinary climate. The scale values range between -2.9 and 2.3: the scale is aligned with the corresponding scale in the PISA 2015 database, which was set so that a value of 0 corresponds to the average across OECD countries. Values above 1 on this index correspond to students who report that most of these

things never happen (with one or two things at most happening only in some lessons); values below 0 on this index correspond to students who report every type of disruption to happen at least in some lessons; values below -1, in turn, typically correspond to students who report that, in most lessons or in every lesson, all kinds of disruptions happen.

Finally, to measure the clarity and structure of teaching, students were asked to report how often the following things happen in their mathematics lessons:

At the beginning of a lesson:

- The teacher explains the purpose of the lesson.
- The teacher reviews what we learned in previous lessons.

During a lesson:

- The teacher shows us how to solve problems.
- The teacher provides examples of successful work.
- The teacher gives clear answers to students' questions.
- The teacher gives a formal lecture on the topic.
- The teacher explains mathematical concepts.
- The teacher gives us work to do at our desk.
- The teacher talks with students about their work.

At the end of the lesson:

- The teacher summarises what we have done that day.
- The teacher gives us homework to practise what we have learned.

Students' answers to these statements were summarised in an index of structured lessons in mathematics which varies between 0 and 10 (where 10 indicates that all aspects of a structured lesson happen with the highest frequency).

5.3.1 *Quality of instruction in mathematics (structured lessons)*

48 Many effective instructional practices are difficult for students to observe and assess; and researchers agree that there is no single, well-defined best way of teaching (OECD, 2009[33]). Nevertheless, the key aspects of "direct instruction" (close monitoring, adequate pacing and classroom management as well as clarity of presentation, well-structured lessons and informative and encouraging feedback) have generally been shown to have a positive impact on student achievement and constitute the most visible aspects of effective teaching (OECD, 2009[33]). In PISA-D, students were asked about the extent to which these aspects were present in their mathematics lessons.

49 In Zambia, 77.1% of students reported that, at the beginning the lesson, their teacher explains the purpose of the lesson; and 72.8% of students reported that the teacher reviewed what they had learned in previous lessons (percentages refer to the share of students who answered "in most lessons" or "in every lesson"). Some 82.4% of students reported that, during the lesson, their teacher provided examples of successful work; and 75.3% of students reported that their teacher talked with

students about their work. Finally, 74.8% of students reported that, at the end of the lesson, the teacher summarised what they had done.

Index of structured lessons in mathematics
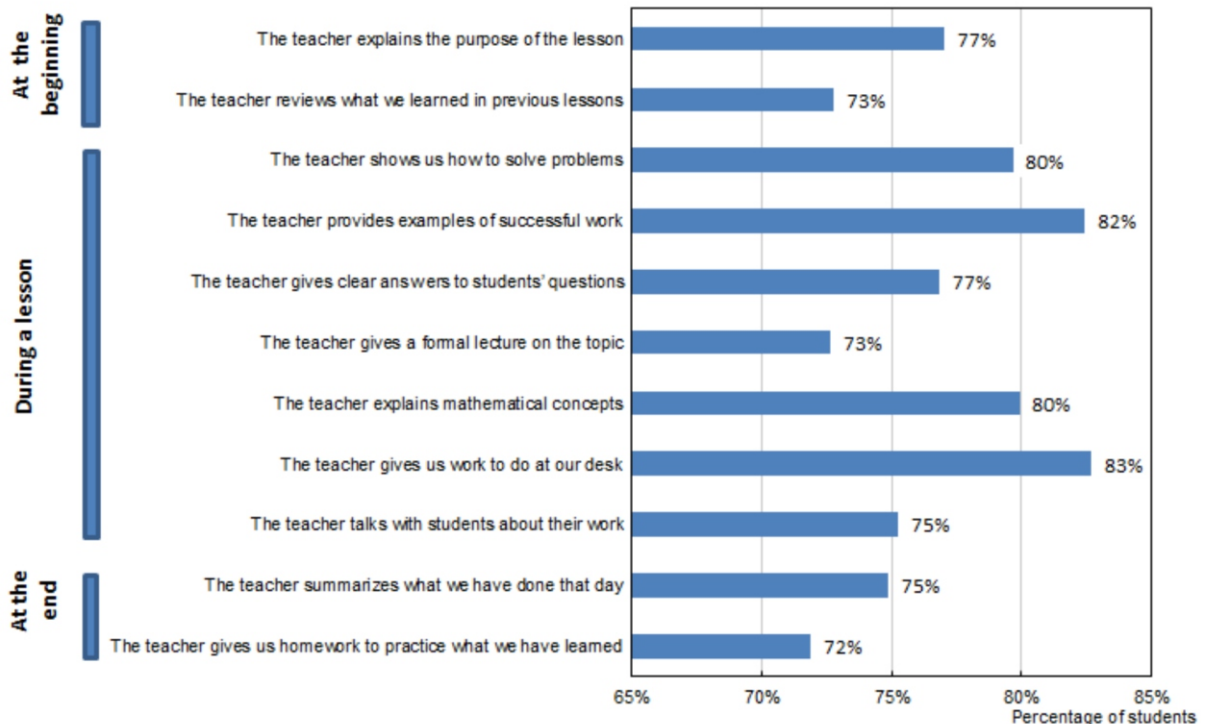
Figure 5.15: *Structured lessons in mathematics*

Source: *PISA for Development Database*

50 The various aspects that define a clear and structured mathematics lesson were summarised in an index, such that students who report more frequent practices of structured, direct instruction in their mathematics lessons have larger values on the index. The average total variation in structured lessons in mathematics for PISA-D was 7.4. In Zambia, the total variation was 7.0. Students in disadvantaged schools rated lessons in mathematics as clear and structured (mean index = 7.4) more than those in advantaged schools (mean index= 7.0).

5.3.2 Disciplinary climate in the classroom

51 Goal-oriented teaching also requires that teachers create a classroom environment that is conducive to learning. This requires, first and foremost, keeping noise and disorder at bay, and making sure that students can listen to what the teacher (and other students) say and can concentrate on learning tasks. Meaningful and visible learning is more likely to happen in these learning environments (Ma and Willms, 2004[34]).

52 In Zambia, the most common disciplinary problems during lessons (among those included in the student questionnaire) were when students did not listen to what the teacher said and when there was noise and disorder in the classroom. For example, about one in three students reported that, in every or most lessons, students did not listen to the teacher or that there was noise and disorder; 31.8% of students also reported that the teacher had to wait a long time for students to quiet down in every or most lessons; and one in four students or fewer reported that, in every or most lessons, they could not work well or had to wait for a long time to do so.

Percentage of students reporting that the following things happen "in every lesson" or "in most lessons"
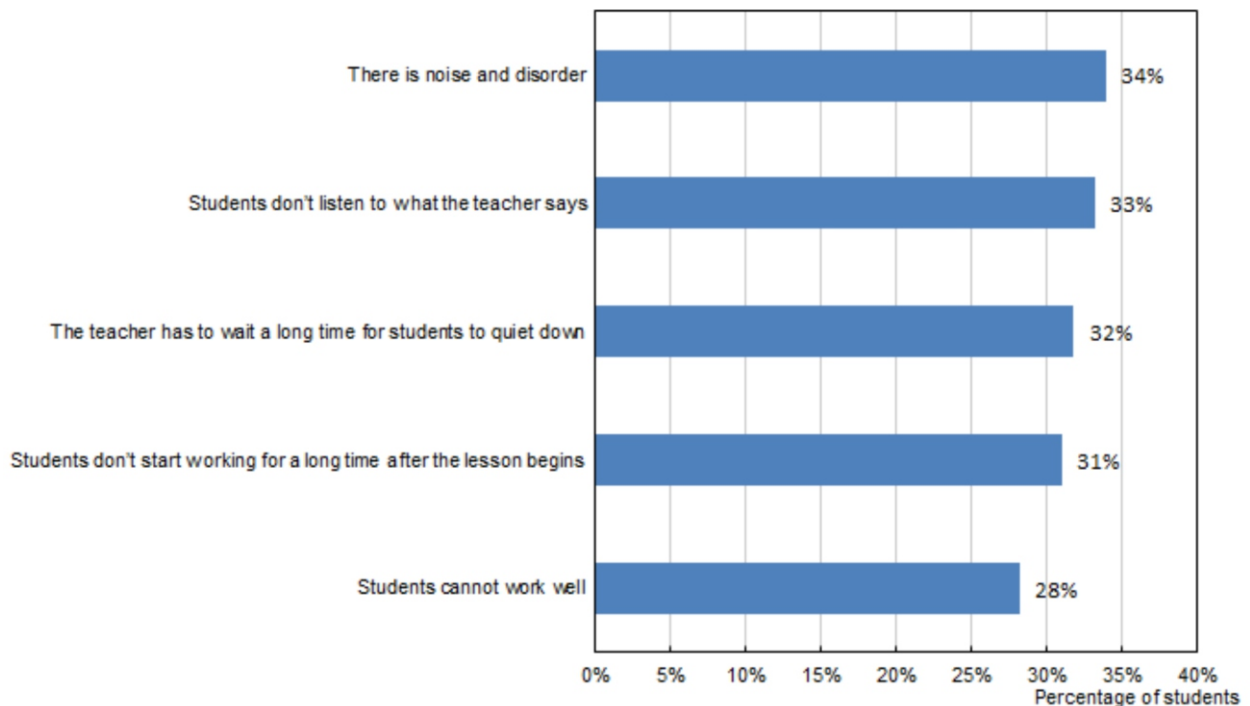
Figure 5.16: *The classroom disciplinary climate*

Source: PISA for Development Database

5.3.3 *Teacher support and expectations of success reported by students*

53 Students need support from school staff, particularly from their teachers, if they are to make the most of the learning opportunities available to them (Klem and Connell, 2004[35]).

54 Most of the 15-year-old students in Zambia reported positive views about their teachers. Some 80.5% reported that they got along well with most of their teachers, 78.1% felt that their teachers were interested in their well-being, and 79.7% reported that if they needed extra help, they could receive it (percentages refer to the share of students who agreed or strongly agreed with each statement). Student reports on these and other similar statements (see Figure 5.17) were summarised in an index, such that students with more positive views about their teachers had higher values. PISA-D had an average mean index of 6.6 and the overall mean index for Zambia was 6.0. The total variation in the index of supportive student-teacher relationship at school in Zambia was 4.4; 0.8 between school and 3.5 lied within school. A comparison of mean index scores between student groups within Zambia shows that, in general students with lower economic status (6.6) and disadvantaged schools (6.6) perceive greater support from their teachers than those with higher economic status (5.9) and from advantaged schools (5.9).

110

Percentage of students who agree or strongly agree with the following statements:
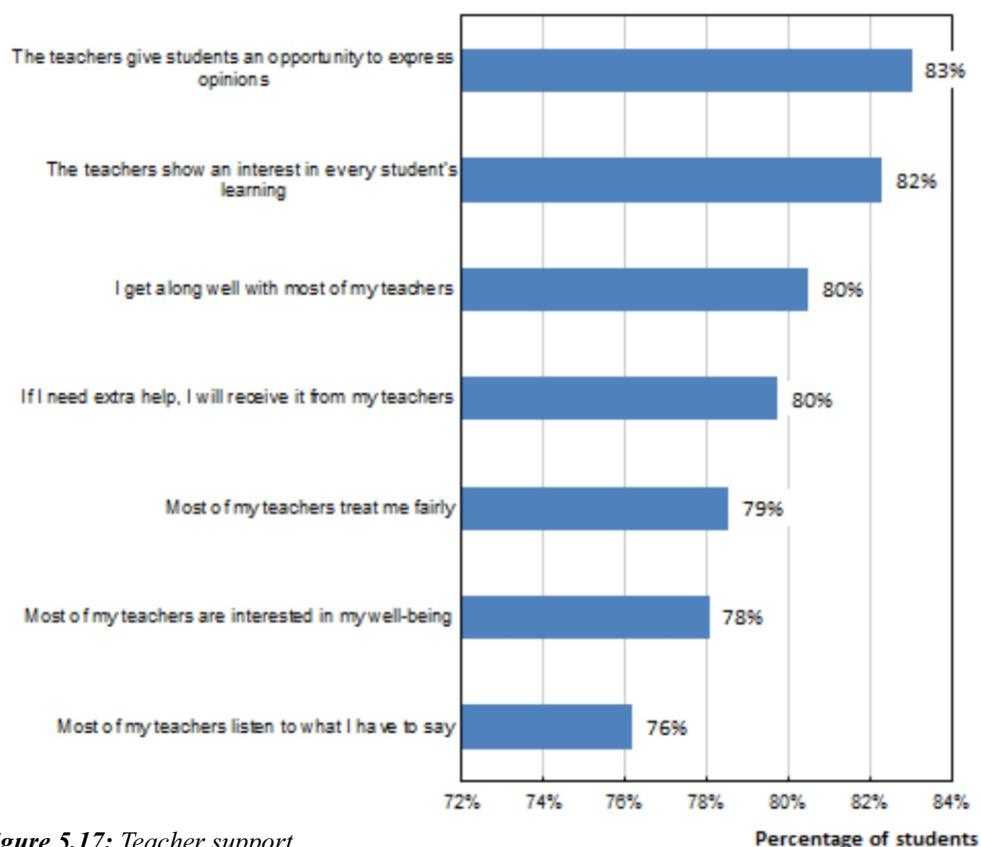
Figure 5.17: Teacher support
Source: PISA for Development Database

55 Many 15-year-olds in Zambia also reported that teachers held high expectations for the success of every student in the school: 88.4% of students reported that teachers encourage students to do their best work, and 82.3% of students reported that teachers show an interest in every student's learning. Student reports on these and other similar statements (see Figure 5.18) were summarised in the index of teacher expectations of success, such that students who perceive their teachers as holding fair expectations for the success of every students have a higher value on this index. Students in urban areas had a higher index (6.9) on teacher expectation of success than those in rural areas (6.3).

Percentage of students who agree or strongly agree with the following statements:
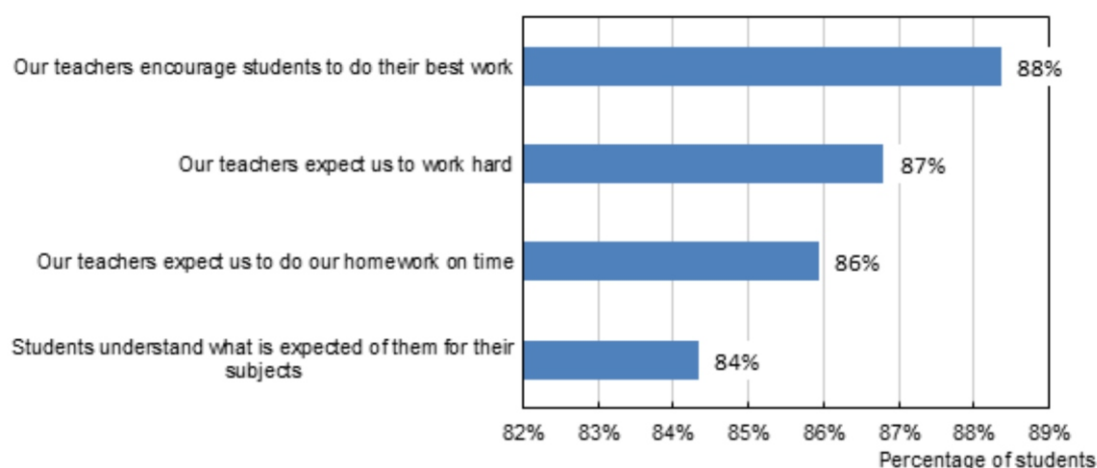
Figure 5.18: Teacher expectations of success
Source: PISA for Development Database

111

5.3.4 How the classroom disciplinary climate compares internationally

56   While differences in student reports of the disciplinary climate, across different contexts and countries, are subject to considerable uncertainty (for example, what counts as "noise" in one context may be perceived as normal in another context), PISA as well as other international surveys suggest that a larger amount of lesson time is lost to learning due to poor student behaviour and poor teacher classroom management in Zambia than in most PISA-D countries.

5.3.5 Research of the effects of quality instruction

57   The effectiveness of teachers in ensuring that students are engaged and learn during lessons depends critically on their ability to manage student behaviour and keep their teaching focused on the learning of every student. PISA 2015 data show for example that in the vast majority of countries and economies, students who reported a better disciplinary climate in their science lessons perform better in science, after accounting for the socio-economic status of students and schools (OECD, 2016b, p. 89[16]).

58   When the classroom discipline is poor, and teachers have insufficient classroom management skills, students miss out on the learning opportunities they so critically need. Out of every hour of lesson, for example, only a fraction of the time is really dedicated to learning. Over a few school years, these differences can create a substantial gap between students. A classroom environment that is not conducive for learning harms, in particular, disadvantaged students who lack the family and community resources to compensate for a poor learning environment at school. To break the circle of disadvantage and underperformance, schools must ensure that the conditions that would enable better learning are met, particularly in schools that concentrate high levels of student disadvantage.

59   A good disciplinary climate and supportive student-teacher relationships are important not only for learning, but is also strongly associated with other positive outcomes, such as student and teacher wellbeing. For example, teachers' job satisfaction is higher in schools where students, on average, report a better disciplinary climate, even after accounting for student performance and socio-economic status (Mostafa and Pál, 2018[37]); student's'' sense of belonging at school is also positively related both to students' perception of supportive teacher-student relationships, and to the average disciplinary climate in the classroom reported by students in the school (OECD, 2017, pp. 122-129[15]). These relationships are consistent with research studies showing that the quality of teacher-student relations can influence students' engagement with school and their socio-emotional development (Anderman, 2003[38]; Battistich et al., 1997[5]; Chiu et al., 2016[39]; Ma, 2003[40]), and that teachers who are effective at keeping an good school discipline contribute not only to students' academic achievement, but also to student's sense of belonging at school (Arum and Velez, 2012 [41]; Chiu et al., 2016[39]; OECD, 2003[42]) Teachers and school staff can promote students' healthy social and emotional development by creating a caring and respectful learning environment (Battistich et al., 1997[5])

60   Research also shows that students, including those with at-risk profiles, show more positive attitudes and higher academic motivation if their teachers care about them, provide them with help when they need it, and let them express opinions and decide for themselves (Pitzer and Skinner, 2017[43]; Ricard and Pelletier, 2016[44]).

5.4   The wider learning environment: families and communities

61   For children, few relationships in life are as significant and enduring as the relationship with their parents or the adults who raised them. The nature and extent of family and community support differs among countries; but families – whether small, nuclear families, or extended families – invariably are the first social unit in which children learn and develop. And while good parenting can take different forms and be shaped by various social and cultural forces, it always involves providing children with the support, care, love, guidance and protection that set the conditions for healthy physical, mental and social development.

62   The PISA-D questionnaires ask students about the frequency with which their parents or other family members engage in exchanges and activities with them, typically in their homes, that indicate a caring relationship and support for their engagement at school and with learning. PISA-D questionnaires also ask teachers about the typical school-based involvement activities of the parents of students they teach, and ask principals whether members of the local community, or parents, contribute to the maintenance of the school building and enrich the school's offer of education services. Box 5.4 details the measures of family and community support used in this report.

Box 5.4. The measures of family and community support used in this report

The PISA-D measures of family and community support used in this report focus on parental behaviours, at home and at school, which indicate involvement with education. They are based on student and teacher responses to the following questions.

Student questionnaire

Students were asked to think about their parents (or those persons who are like a mother and father for them), and to report how often their parents did the following things with them ("never or hardly ever", " a few times a month", "about once a month", "several times a month", "several times a week"):

- Discuss how well you are doing at school.

- Eat the main meal with you.

- Spend time just talking with you.

- Talk to you about the importance of completing secondary school.

- Talk to you about any problems you might have at school.

- Ask you about how well you are getting along with kids at school.

- Encourage you to get good grades.

- Take an interest in what you are learning at school.

- Talk to you about your future education.

- Ask you what you did in school that day.

Teacher questionnaire

Teachers in schools attended by 15-year-olds were asked how often ("never or almost never", "sometimes", "often", "always or almost always") family members of students in their class did the following things:

- Attend parent-teacher meetings.

- Ask for personal meetings to discuss the progress of their child.

- Ask for personal meetings to discuss other school matters.

- Participate in school fundraising events or campaigns.

- Help in their class.

- Volunteer after school with helping students do their homework.

5.4.1 Parental involvement at home

63 PISA-D asked students how often their parents, or other family members, engaged in activities such as "eating the main meal with them" or "spending time just talking with them" that often characterise a quality relationship with their primary care-takers. If children are deprived of frequent opportunities to talk and exchange views with parents (or with other relatives who act as their primary care-takers), their development may suffer. Parents however may struggle to find quality time for their 15-year-old children because of busy work schedules, or because their poor health or lack of economic security limit their ability to provide care, guidance and protection for their children.

64 On average in Zambia, 26.6% of 15-year-olds reported that their parents (or someone in their family) eat the main meal with them several times a week, and 20.8% reported that their parents spend time just talking with them several times a week. While these low figures show that most children do not regularly spend quality time with their parents, there are significant differences by socio-economic status and poverty and across urban and rural regions. Students in urban areas reported that parents spent time just talking to them more times than their rural counterparts. In like manner, a higher proportion of students (30.2%) in urban areas reported that parents ate the main meal several times a week than students in rural areas (24.2%). In typical rural Zambia, however, elderly people do not eat meals with children. Results on this variable may have been influenced by such norms.

Percentage of students reporting that their parents, or someone in their family, do the following things several times a week or more often
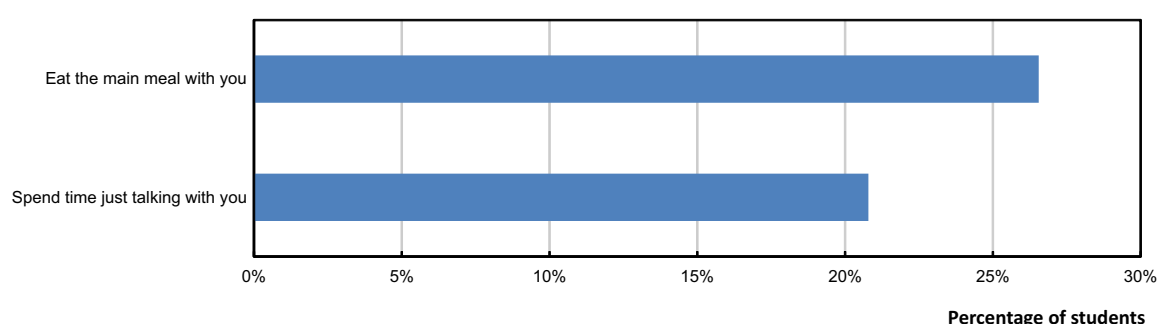
Figure 5.19*: General parental support in Zambia*

Source*: PISA for Development Database*

65 PISA-D also asked students about the frequency and nature of parent-child communications more directly related to their school and learning activities. Parents, and other adult care-takers, can influence students' engagement with school and learning either by devoting time and interest to their own learning activities, thereby modelling their children's behaviour; or by reinforcing students' own engagement with school and learning through questions and exchanges that signal praise, encouragement, interest and attention for their child's learning and school activities (Hoover-Dempsey et al., 2005[50]; Hoover-Dempsey and Sandler, 1997[51]; Avvisati, Besbas and Guyon, 2010 [52]). Several questions included in PISA-D questionnaire allow for a description of the extent to which students benefit from this kind of exchanges and parental support.

66 On average in Zambia, 49.3% of 15-year-olds reported that their parents (or someone in their family) regularly discuss how well they are doing at school; 71.7% reported that their parents regularly encourage them to get good grades; 71.2% reported that their parents talk to them about their future education. However, there were large differences between students by socio-economic status and poverty, and across urban and rural regions, etc. As observed from figures, there are still a substantial proportion of parents who are not concerned about/are too busy for/ their children's education.

Percentage of students reporting that their parents, or someone in their family, do the following things about once a month or more often (first 6 statements) and several times a month or more often (last 2 statements):
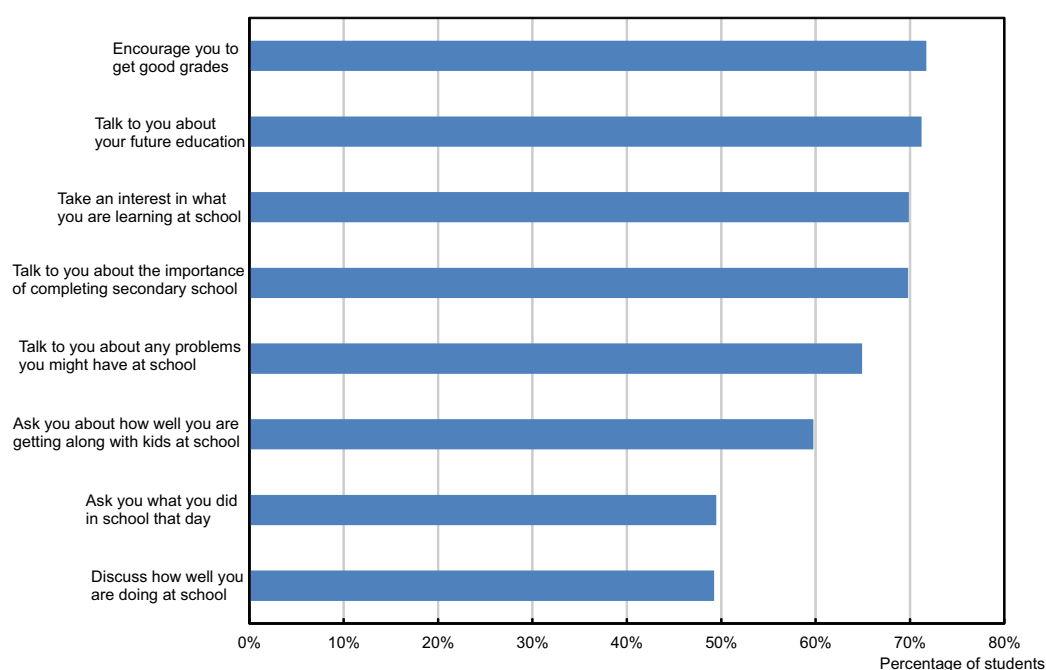
Figure 5.20: *Home-based parental involvement with school and learning in Zambia*
Source: *PISA for Development Database*

5.4.2 Parental involvement at school

67 Parental involvement activities that take place at school were measured, in PISA-D, through the teacher questionnaire. In particular, PISA-D asked teachers about the typical activities of the parents of students they teach. School-based parental involvement can take the form of personal or group meetings with their children's teachers, or providing volunteer work to help teachers in their class or help students do their homework.

68 On average in Zambia, 25.5% of 15-year-old students are in schools where a majority of teachers who responded to the teacher questionnaire (at least 2 out of 3) said parents attended the parent- teacher meetings; 5.2% in schools where parents asked for personal meetings to discuss the progress of their child or other matters (4.5%).

69 It is not common in Zambia for parents to contribute to instruction with volunteer work at school. Only 10.6% of students are in schools where parents "often" (or "always") volunteer after school with helping students do their homework, and less than 1% are in schools where parents "often" help in class.

Percentage of students in schools where more than 2 out of 3 teachers report that family members of students in their class do the following things "often" or "always or almost always":
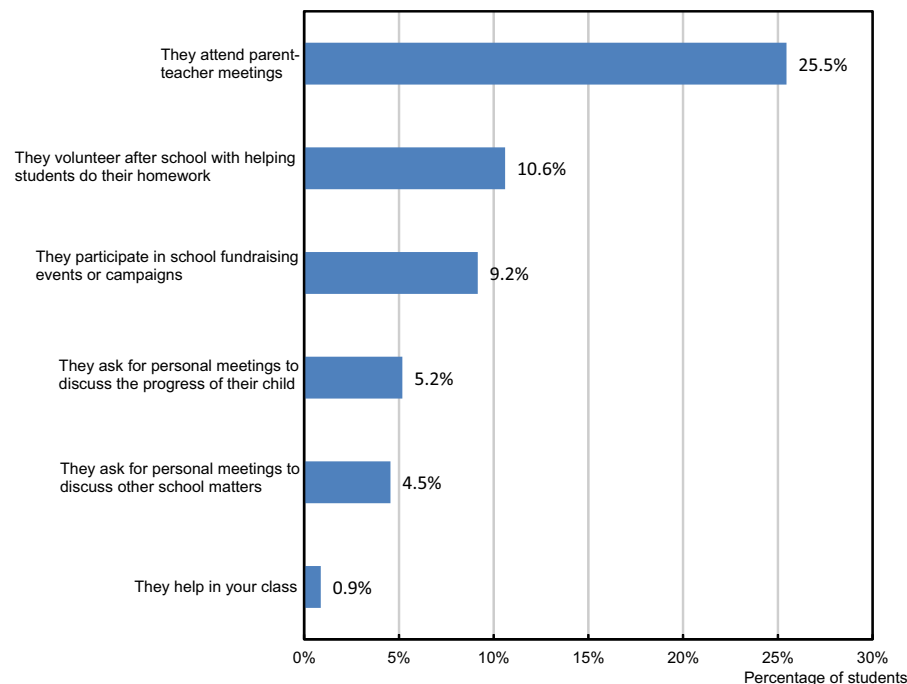
Figure5.21: School-based parental involvement with school and learning in Zambia
Source: PISA for Development

5.4.3 Community involvement in the provision of schooling

70 In Zambia, parental involvement with the provision of schooling is quite significant. On average, 63.7% of 15-year-olds were in schools where parents were involved in building school facilities such as classrooms or teachers' houses; 55.2% in schools where parents were involved in maintaining or repair school facilities such as teachers' houses and classrooms; 31.2% in schools where parents assist teachers in addressing the needs of students with disabilities.

5.4.4 Research on the effects of family and community support

71 The literature consistently documents positive associations between a range of home- and school-based parental activities related to the child's education and children's educational achievement. This positive relationship holds in various disciplines, across ethnic groups, gender and over time (Bogenschneider, 1997[53]; Catsambis, 2001[54]; Fan and Williams, 2010[55]; Kaplan Toren and Seginer, 2015[56]; Keith et al., 1998[57]; Shumow and Lomax, 2002[58]). The most effective forms of parental involvement are a function of the child's age; in late childhood and adolescence, they often do not involve direct help or instruction, but rather rely on modelling positive behaviours (such as perseverance in the face of difficulties) and showing, in particular through oral communication, interest in the child's learning.

72 PISA 2015 data also show that parental activities that characterise, more generally, a caring family environment – and in particular, "spending time just talking" and "eating the main meal" with their child- are positively related not only to academic achievement, but also to other areas of their life, such as how satisfied students are with their own life (OECD, 2017, p.162 [15]).

73   Parents' involvement not only provides additional support to their child's learning; it can also bring greater accountability to education systems. In practice, however, the extent to which this leads to positive outcomes is disputed (Banerjee et al., 2010[59]). In some cases, accountability initiatives that increase parental involvement in school seem to moderate the impact of school resources: having parents serve on school boards, for example, can ensure that school resources are used in the interest of children, rather than of school staff (Duflo, Dupas and Kremer, 2015[60]). But in many cases, community monitoring initiatives that increased the information on the quality of services provided by schools (e.g. on teacher absenteeism, or on student achievement levels) did not lead to significant improvements (Glewwe and Muralidharan, 2016[18])

6

Looking forward
Policy options for Zambia

6

Looking forward: Policy options for Zambia

This chapter discusses policy options for Zambia. It highlights summary findings for PISA-D in respect of outcomes (attainment and achievement levels, health and well-being and student engagement) and the foundations for success in any educational system (inclusion; quality instruction; learning time; material resources, family and community support). The chapter also outlines policy options in light of the findings which could be considered.

6.1   Summary of findings of PISA-D

1   The summary of findings from PISA-D for Zambia is presented below in two sections. The first section deals with the four core outcomes of education at age 15: student attainment; student achievement in key subjects; subjective health and well-being; and attitudes towards school and learning. The second section presents the findings related to the foundations for success in any educational system, namely: inclusion; quality instruction; learning time; material resources, family and community support.

6.1.1 Four core outcomes of education at age 15

Attainment & Achievement – a learning crisis

2   Educational attainment is low in Zambia compared to most other countries, with only a minority of 15-year-olds being eligible to participate in PISA (i.e., being in school, in grade 7 or above). At age 15, many boys and girls in Zambia no longer attend school. And those who are attending have in most cases fallen behind track. About 43% of students who participated in PISA-D testing in Zambia were on track or ahead of track in their education; they were in grade 9 or above. This includes 38% of the boys and 48% of the girls. Grade repetition was higher with boys than it was with girls – boys are more likely than girls to have repeated a grade in Zambia. However, grade repetition cannot easily be tracked in Zambia as students do not have national identity numbers until exiting primary education (Grade 7). The national testing in Zambia occurs in their 7th grade when they sit for the grade 7 composite examination; an assessment meant for selection into secondary education and certification. However, there are end of term school-based tests given to students across all grade levels.

3   Students in Zambia performed poorly in the PISA test, compared to internationally agreed standards of basic literacy and in comparison with other countries. In Zambia, 5% of students achieved the minimum level of proficiency in reading and

2% in mathematics. The achievement levels were below the PISA-D means in all PISA domains: reading, mathematics and science. The mean scores were 275 (for reading), 258 (for mathematics) and 309 (for science); all below the PISA-D averages of 346 (for reading); 324 (for mathematics); and 349 (for science). About 95% of students have reading skills below the baseline (level 2). Achievement in mathematics and science is equally low with 97.7% (mathematics) and 94.2% (science) of students performing below the baseline. While results are poor in all domains, mathematics represented the weakest domain among the three subjects assessed in PISA-D, not only in Zambia but also in other countries. About 40.1% of students failed to solve (or attempt to solve) even the most basic tasks included in the PISA test.

4   Girls outperformed boys in reading by 14.0 points while performance in mathematics did not differ. Students of urban schools outperformed students of rural schools in reading with a performance difference of 56.0 score points – the equivalent of more than a year of schooling. Advantaged students are 14.4 times more likely than disadvantaged students to attain the baseline level of proficiency in mathematics. The results indicated large between-school performance variations in reading and mathematics; 30.8% and 34.2% respectively.

Health and Well-Being – not as good as it should be

5   Food insecurity is high in Zambia, with more than half of the students reporting being hungry, or lack of food, at least once over a one-month period. Most students rated their health as good to excellent (85.0%) although a substantial proportion (15.0%) rated it as poor or fair. Gastro-intestinal problems, infectious diseases, fatigue, and mental health problems not only affect self-reported health negatively, but have a relatively high incidence on students in Zambia. The most prevalent problems reported by students were colds and flu (60.8%), gastrointestinal problems such as heartburn, stomach pain, constipation, and diarrhoea (52.9%) and infectious diseases such as malaria, cholera, and tuberculosis (47.0%). Girls rated their health poorer than boys.

6   Students in Zambia rated themselves moderately satisfied with life (6.2 on a 0 to 10 index). About 29.3 per cent of the students were not satisfied with life. Disadvantaged students are 2.1 times more likely than more advantaged ones to report low life satisfaction.

Attitudes toward School and learning – should be better

7   On average in Zambia, almost one third of students hold negative attitudes towards school. Students in urban areas had more positive attitudes towards school than their rural counterparts. Attitude towards school and learning outcomes is significantly associated with performance across the three PISA-D subjects with the means index difference of 1.9 in reading; 2.3 in mathematics; and 1.8 in science, all in favour of high achievers.

8   Low education attainment levels have been a challenge for the Zambian education system. The main reasons have been late school enrolment and grade repetition. For instance, the 2010 Census data shows that 47% of school aged boys and girls had not been enrolled in school (UNESCO, 2013). In 2011 School Census, 56% of students in Zambia were in the wrong grade for their age (Ibid). The grade repetition rate was at 6% in Zambia in 2011 (Ibid).

9   Low achievement levels in Zambia have been highlighted in other national and international assessments conducted in previous years. The 2014 Early Grade Reading and Early Mathematics assessment (EGRA/EGMA) results show that 80% and 44% of students in grade 2 got a zero mark in reading comprehension and mathematics level 2 sub-tasks respectively (USAID, 2014; unpublished article). The national assessment of learning achievements at grade 5 has, since inception in 1998, always recorded the mean score of less than 36% in reading (ECZ, 2016 unpublished article). SACMEQ results have consistently indicated that most of the students in grade 6 are operating at level 2 in both reading and numeracy; though registered in grade 6, they were functionally in grade 3 (SACMEQ, 2010). An understanding of the cumulative development of children therefore, must be at the core of interpreting these results. Policies need to consider the system and not just learners in the upper grades.

6.1.2 Foundations for success

Resources – not enough and not allocated effectively enough

10   Zambia's expenditure on education is low, though much higher than some of the countries in the region. In Zambia, 16.5% of government expenditure (5% of GDP) goes towards education. Although some studies have shown that expenditure levels do not always translate into student performance (UNESCO, 2016), countries that have invested in education and allocated resources prudently have yielded positive outcomes.

11   Investments in education should not only be viewed in terms of the quantity of resources, but also in terms of how these resources are allocated. The government of the Republic of Zambia has made efforts to prioritise education as one of the key factors in economic development and in the transformation of the country into middle income status by 2030. While public expenditure on education was over 16% of the total public expenditure in the 2016 budgetary allocation, over two-thirds of this was spent on personal emoluments; leaving less than one-third for other non-emolument related programmes such as provision of material and instructional resources.

12   School materials and instructional resources in Zambia were lower than observed in other PISA-D participating countries. The low material and instructional resources also varied significantly between rural and urban schools (in favour of urban schools) and between advantaged and disadvantaged schools (in favour of advantaged schools).

13 When it comes to human resources, the quantity and quality of teachers are critical issues. With regard to quantity, the government of the Republic of Zambia has annually been recruiting teachers. However, the student-teacher ratio has remained relatively high (43:1). The student-teacher ratio varies between advantaged and disadvantaged schools, with a teacher in a disadvantaged school having 53 students as compared to 31 in an advantaged one. It also varies between rural (51:1) and urban (35:1) schools.

14 The class size is also large (44 students per language of instruction) in Zambia as compared to OECD (26 students per language of instruction) and PISA-D (36 students per language of instruction) averages. The average class size is bigger in urban areas (47 students per language of instruction) than in rural areas (42). However, evidence from other PISA studies has revealed that class size is not always associated with performance.

15 Most of the schools in Zambia have poor infrastructure. For instance, 48.1% of students are in schools where principals reported that their schools do not have running water, 60% do not have flashing toilets and 42% have no electricity. Disadvantaged schools tend to have school facilities in worse condition than advantaged schools. The investment in schools' acquisition of computers is evident, with 71% of students in schools where teachers reported that schools had computers for students. However, 90% of students are in schools that do not have internet connectivity and this could be a hindrance to quality teaching and learning as teachers and learners cannot conduct research.

Inclusion- students have a low sense of belonging at school

16 The majority of students in Zambia (81%) feel that they belong at school. Students in Zambia generally have a lower sense of belonging at school than reported in other PISA-D participating countries. About one third of the students in Zambia reported that they felt lonely at school. Boys reported lower sense of belonging at school than girls. There is an association between performance and sense of belonging at school. The difference in mean score points between the bottom and top quarters of sense of belonging is 86 (in reading), 73(in mathematics), and 52 (in science).

17 While 85% of students report that they feel safe at school, only 75% feel safe on the way home from school. At school, the most frequent threats to safety are theft and physical violence (threats and fights). In Zambia, girls felt safer at school than boys. However, 20% and 15% of students reported feeling sexually harassed by fellow students and by a teacher or member of staff respectively, in the period four weeks prior to PISA-D assessment.

18 Whilst a substantial proportion of principals and teachers were in support of the inclusive learning environment, there were still others with different views. For instance, 15% of students in Zambia are in schools where teachers believe that it is a waste of their time trying to support teen mothers to remain in school; or that those students who lag behind should be placed in special schools.

Learning Time – quantity and quality is insufficient

19   Truancy and tardiness are challenges in the Zambian education system. About 11% of students are in schools where teacher arriving late at school occurred regularly (every week) and 63% where it occurred occasionally (once or twice). About 5% of students are in schools where unjustified teacher absenteeism occurred regularly while 42% are in schools where it occurs occasionally.

20   Pupil absenteeism is equally a challenge in Zambia. More than 23% of students indicated that they had missed class 3 months in a row and one third of students had skipped a school day in the 2 weeks before PISA D assessment. Health problems (their own or those of family members) and the inability to pay school fees are among the most cited reasons for long-term absenteeism. Students in rural areas are more likely to skip the whole school day, or skip some classes than those in urban areas. Truancy and tardiness have implications on both quality and quantity of learning time.

Quality Instruction - need for improvement

21   Three quarters of students in Zambia rated the quality of instruction by their teachers as good. For instance, in mathematics, 77.1% of students reported that, at the beginning the lesson, their teacher explained the purpose of the lesson; and 72.8% that the teacher reviewed what they had learned in previous lessons, 82.4% that, during the lesson, their teacher provided examples of successful work; 75.3% that their teacher talked with students about their work and 74.8% that, at the end of the lesson, the teacher summarised what they had done. However, there was still about a quarter of students who did not report the occurrence of these markers of quality instruction. There were variations between student from advantaged and disadvantaged schools in rating quality instruction with the latter rating high structured lessons in mathematics.

Disciplinary Climate in the classroom - low classroom management skills by teachers

22   About one in three students in Zambia reported that, in every or most lessons, there was noise and disorder in class and that the teacher had to wait a long time for students to quiet down. Noise and disorder do not only hamper quality instruction but also reduces instruction time when the teacher awaits for students to settle down.

23 Families and communities play important roles in the learning of students; the more parents and communities are involved in learning activities the more likely the students are to improve on educational engagement. Unfortunately, 51% of students reported that they never or hardly ever discussed with their parents how well they were doing at school. On average in Zambia, there were low levels of parental and community participation in educational activities of the students. For example, only about one in five students reported that their parents spent time just talking with them several times a week. Half of the students reported that their parents or someone in their family enquired regularly on how well they were doing at school while one in three students reported that their parents talked to them regularly about the future of their education. The differences in parental involvement were apparent by socio-economic status: with students from lower socio- economic status reporting low levels of parental involvement.

6.2 Establishing foundations for success and improving educational Outcomes in Zambia

24 Zambia faced major challenges to establish, in its education system, the five foundations for success highlighted in this report, namely: inclusive learning environments; quality instruction; adequate learning time; sufficient material resources, and high levels of family and community support. It was clear from the evidence presented in this report that unless Zambia could go further towards establishing these foundations for success, she would not achieve the desired outcomes of education at age 15, namely, all students:

- on track in respect of attainment;
- achieving at least minimum levels of proficiency in key subjects;
- healthy and satisfied with their lives; and
- having positive attitudes towards school and learning.

25 This second section of the sixth chapter highlights policy options that Zambia might consider in order to move further towards establishing the foundations for success in its education system and improving the educational outcomes that have been highlighted in this report, particularly for those students that are most disadvantaged.

26 The current results mirror some of the efforts that government has put in place. Zambia experienced a period of decline in educational delivery and performance between 1980 and 2001 (UNESCO, 2016). This resulted in considerable policy development and reform such as the Free Basic Education policy which was introduced in 2002, the Re-entry policy and bursary bail-out of orphans and vulnerable children. From such policy initiatives, results show that the gender differences in achievement levels are not great, and sometimes, in favour of girls (such as achievement levels in reading). Enrolment has increased and girls' participation in education has equally improved. This progress can be built upon in the ways suggested in the remainder of this chapter.

Existing policies and programmes that can make a difference

27   The Zambian government already has in place several policies and programmes that should help move further towards establishing the foundations for success in its education system. These existing strategies aimed at improving the foundations for success are summarised below:

    1   The Ministry of General Education has put in place a homework policy. This policy, if well implemented, has two potential benefits: remediation for students, especially low achievers and parental involvement in the education of the students. There is, therefore, need to strengthen the monitoring of policy implementation.

    2.   The Ministry has also introduced a catch –up strategy to provide remediation to slow learners. Through this strategy, teachers are having more time with such learners. When scaled up, the catch- up program can reduce the incidences of grade repetition.

    3.   Improved teacher quality, infrastructure and better provision of instructional materials (text books) are the main objectives of the World Bank funded Zambia Education Enhancement Project (ZEEP). The objectives of ZEEP are to improve teacher quality and supply of instructional materials such as text books to schools in Zambia. In addition, the ZEEP will expand access to education at secondary school by building schools in selected parts of the country. The status quo may change with the successful implementation of the project.

    4   The Lesson Study programme introduced by the Ministry with support from the Japanese International Cooperation Agency (JICA) aims at improving lesson delivery among teachers. Through observations, teachers share the best practices on how to teach particular lessons; especially those that are challenging to students.

6.2.1 New policies that do not cost much, and can have a positive impact on the Zambian Education system

28   While the existing policies and programmes mentioned above will make a positive contribution to Zambia's education system, they may not be sufficient to establish fully the foundations for success in the country's education system. There is a need for Zambia to consider additional policies and programmes to improve further the foundations for success. Some new policies that do not cost much and can have a positive impact on Zambia's education system are summarised below.

29   *Strengthening Family and Community support:* parents can be a source of motivation if they show interest and take an active role in their children's education. While Parent Teachers Association (PTA) and School Community Partnership (SCP) are some of the avenues schools are linked to parents and communities at large, these are more of governance in nature. There is need to engage parents and communities for them to discuss with children on learning-related matters. If well implemented, the home work policy could be an ideal avenue for such engagements.

6.2.2 Long term policies that can have impact in the long run

30 The existing policies and strategies and the quick wins suggested above, if implemented successfully, will undoubtedly move Zambia further towards establishing the foundations for success in its education system. However, there remain several intractable challenges that the country will need to address if it is to achieve the educational outcomes it is aiming for and needs. Some necessary policies and conditions are set out below that are required for longer term achievement and sustainability of higher levels of student attainment and achievement, as well as better student health and well-being and increased engagement of Zambian students.

31 *Improve resource allocation particularly for rural and disadvantaged schools:* using the existing minimum school standards to base resource allocation on these standards such that schools that have attained those standards receive less. Resources include financial, human, school materials and instructional resources (such as textbooks).

32 There is need for the Ministry of General Education to continue lobbying for an increased budgetary allocation. For some years, the budgetary allocation towards education has been around 16% of the total public expenditure; most of which (approximately 80%) goes towards personal emolument-related activities. Increasing the budget towards education to about 20% of the total public expenditure with a widened non- personal emolument share would improve other aspects of education. For instance, Senegal has allocated about 23% of total public expenditure towards education.

33 *Strengthen Teacher Recruitment Policy:* There is also need for the Ministry of General Education through the Directorates of Planning and Information, and Human Resource and Administration to strengthen the teacher recruitment policy. Whilst government has been recruiting teachers annually, disadvantaged and rural schools have (i) large teacher- pupil ratios and; (ii) a large proportion of novice teachers. Further, making working in rural areas attractive, and strengthening teacher transfer policy could help mitigate shortage of teachers in rural and disadvantaged schools.

34 *Reform the textbook procurement policy:* The procurement could be decentralised to districts and schools so that instructional resources are procured as need arises and are demand-specific.

35 *Improve attainment by reducing the school entry age and strengthening remediation for students who lag behind to reduce grade repetition:* The students in Zambia are already behind in terms of attainment by grade 1. Some students, especially in rural areas enter schooling when they are older than 7 years (UNICEF, 2013). The National Assessment findings and examinations results have consistently shown a relationship between age and performance with younger candidates performing better than the elderly ones. All the PISA-D participating countries have primary school entry age of below seven years. This was also the trend in the OECD countries (OECD, 2015). The Directorate of Planning and Information may rethink the school entry policy by ensuring that: (i) all children

who attain the school entry age are enrolled in school and (ii) reducing the school entry age to six years as learners could have already been exposed to schooling before the age of six through early childhood education.

36 The Directorate of Standards and Curriculum could enhance the monitoring and evaluation of formative assessments and remedial work given to students. Schools in Zambia conduct regular formative assessments with the view of evaluating learning. School-level monitoring of formative assessment results would help diagnose students' weaknesses and inform the teachers in areas where students were failing to grasp the concepts. Through such assessments, remediation could be enhanced and learners who lag behind helped and hence reducing grade repetition.

37 *Scaling up investment in early childhood education:* pre-school and early childhood education improves learning outcomes in later years of schooling as well as social benefits. However, what is more important is the suffic ient quality to achieve beneficial child outcomes. There is need for Zambia to invest in terms of teacher quality, school materials and instructional resources to improve teaching in foundational stages of the student learning.

38 *Strengthening teacher training through enhanced monitoring mechanism:* Colleges of Education in Zambia follow varying curricula. Those affiliated to universities follow curricular of universities they are affiliated to while others follow the Examinations Council of Zambia curriculum. It would be ideal if colleges followed standardized curriculum with similar content coverage. In this way, the country would be ensured of standardized processes which trained teachers undergo before being recruited to teach in schools. The Ministry of General Education and the Ministry of Higher of Education may need to collaborate and put in place mechanisms that will ensure that teachers undertook similar training regardless of the college they were trained from.

Conclusion

39 The persistent problem of low learning achievement levels by Zambian learners has been empirically documented since the late 1990s when the first National Assessment Survey (NAS) was conducted. Subsequent surveys have repeatedly pointed to the problem of low learner achievement over the years. At regional level, SACMEQ results have equally confirmed the persistence of low learning achievement levels by learners in Zambian schools, to the extent that the country compared poorly even in the sub-region.

40 What is even of greater concern has been the fact that the results from all the surveys have been disseminated to relevant stake holders such as policy makers. Despite the specific disseminations, the status quo has remained largely unchanged in terms of how the provision of education has been done over the years.

41 Low learning achievement has equally been documented from the results of Zambia's first-ever participation in the PISA-D. Students in Zambia performed poorly in all the three domains- Reading Mathematics, and Science.

42 Going forward, it is most critical that policy makers at the highest level of education provision in Zambia, took a more pragmatics and time- bound approach to addressing critical and specific recommendations that have been repeatedly reported in the various National Assessment Surveys (NAS) reports, SACMEQ reports; most recently, the PISA-D.

Abbreviations

CPD: Continuous Professional Development

CSO: Central Statistics Office

ECZ: Examinations Council of Zambia

EFA: Education for All

ESCS: Economic, Social and Cultural Status

FPE: Free Primary Education

GDP: Gross Domestic Product

LLECE: Latin American Laboratory for Assessment of the Quality of Education

MESVTEE: Ministry of Education, Science, Vocational Training and Early Education

MOGE: Ministry of General Education

NAS: National Assessment Survey

PISA: Programme for International Students Assessment

PISA-D: Programme for International Students Assessment for Development

SACMEQ: Southern and East African Consortium for Monitoring Educational Quality

OECD: Organization of Economic Cooperation and Development

SDG: Sustainable Development Goals

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNICEF: United Nations Children's Fund

USD: United States Dollar

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Annex: Released items

A set of released items, such as reading components, will be included to illustrate student performance on particular tasks and show what PISA items look like.

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