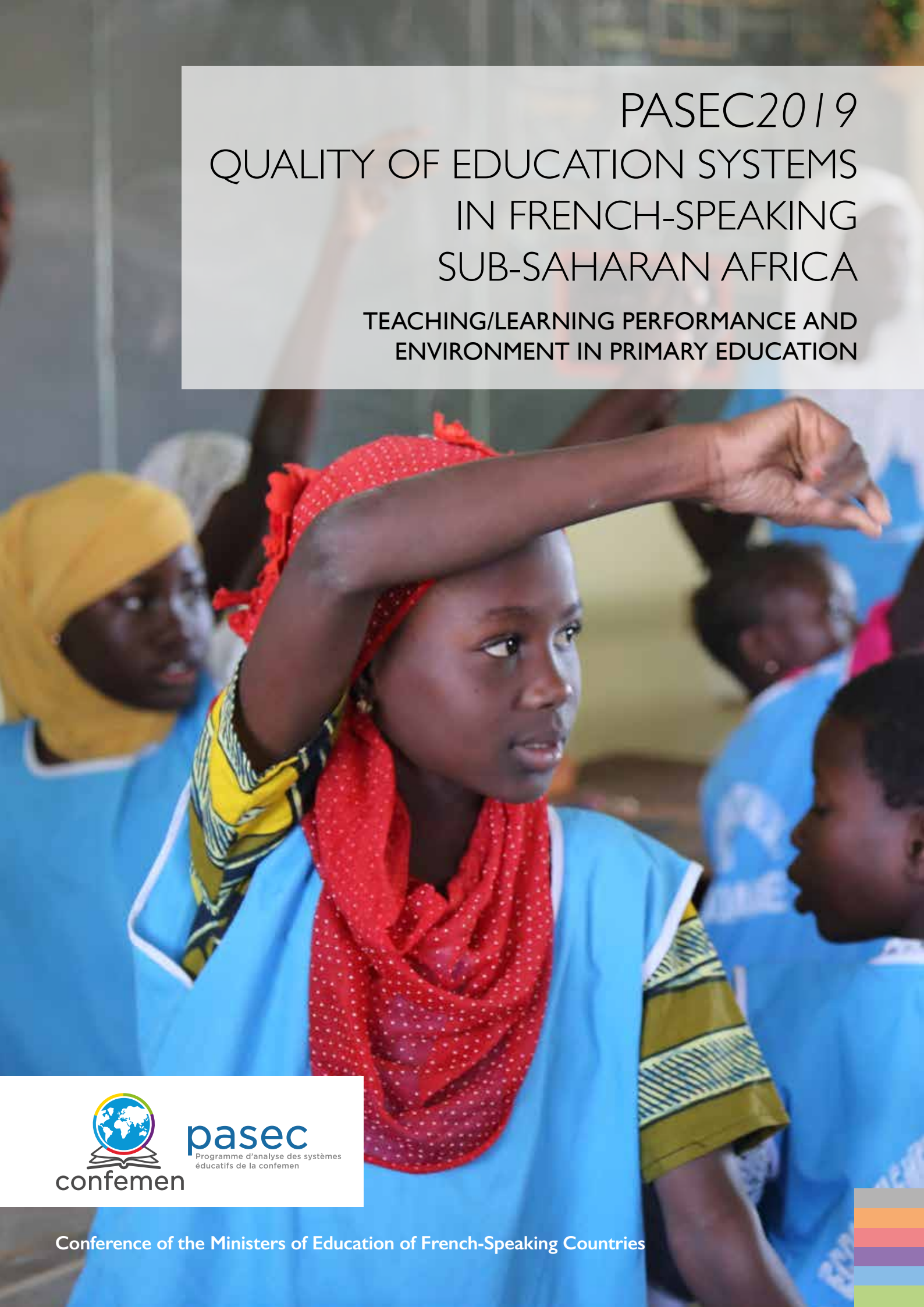

PASEC2019
QUALITY OF EDUCATION SYSTEMS IN FRENCH-SPEAKING SUB-SAHARAN AFRICA

TEACHING/LEARNING PERFORMANCE AND ENVIRONMENT IN PRIMARY EDUCATION

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Abbreviations and acronyms

AFD	Agence Française de Développement (French Development Agency)
CESA	Continental Education Strategy for Africa
CONFEMEN	Conference of the Ministers of Education of French-Speaking Countries
DDC	Direction du développement et de la coopération Suisse (Swiss Agency for Development and Cooperation)
DRC	Democratic Republic of Congo
DRO	Document de Réflexion et d'Orientation (Reflection and Orientation Document)
EFA	Education for All
ERNWACA	Educational Research Network for West and Central Africa
GDP	Gross domestic product
GNP	Gross national product
GPE	Global Partnership for Education
HDI	Human Development Index
INSERM	Institut National de la Santé et de la Recherche Médicale (French National Institute of Health and Medical Research)
IRT	Item response theory
ISU	UNESCO Institute for Statistics
MCQ	Multiple choice question
MDG	Millennium Development Goal
NGO	Non-governmental organisation
OECD	Organisation for Economic Cooperation and Development
OQE	Observatory for the Quality of Education
PASEC	Programme d'analyse des systèmes éducatifs de la CONFEMEN (CONFEMEN Programme for the Analysis of Education Systems)
PCA	Principal component analysis
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
SDG 4	Sustainable Development Goal 4
SDR	Secondary data review
UNDP	United Nations Development Programme

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The second cycle of collective assessment of learning outcomes conducted by CONFEMEN's Programme for the Analysis of Education Systems (PASEC), which resulted in this report, benefited from the political support of the ministers of education and the effective involvement of the national teams of the 14 participating countries.

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- Françoise CRÉPIN and Annick FAGNANT *for assistance with updating tests, validating tools and developing proficiency scales for students and teachers*

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Foreword

In 2020, the Conference of the Ministers of Education of French-Speaking Countries (CONFEMEN) celebrates its sixtieth anniversary. During these sixty years, CONFEMEN has placed improving the quality of education at the heart of its actions and its deliberations at meetings of its bodies (the ministerial conference, the working group of national correspondents, the administrative and financial committee) and at ad hoc events (panel discussions, thematic seminars, meetings of policy-makers, etc.). This has also been demonstrated through its use of the data and analyses that have been produced concerning the performance of education systems: since the setting up of CONFEMEN's Programme for the Analysis of Education Systems (PASEC) in 1991, a number of French-speaking countries in sub-Saharan Africa, the Indian Ocean, the Middle East and South-East Asia have taken advantage of the assessment of learning outcomes to define the direction of their education policies.

Following an initial period (1991–2012) during which national assessments, thematic assessments and cohort monitoring were organised in different countries, PASEC has, since 2012, focused its energies on implementing five-yearly cycles of comparative international assessments of learning outcomes at the start and end of primary education, using a methodology consistent with international standards. The aim of these assessments is to provide participating countries with robust comparable data on learning outcomes and the learning environment in order to support the management of their education systems.

With this goal in mind, in 2014 PASEC conducted its first standardised assessment, PASEC*2014*, in which ten sub-Saharan African countries took part: Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, Côte d'Ivoire, Niger, Senegal and Togo. The international report produced on this occasion highlighted the fact that most students had not acquired the necessary skills in language of instruction and mathematics. Ten contextualised national reports presenting the results of the assessment at country level were then prepared and published, with a number of proposals concerning lines of reflection and measures to steer national education policies. In addition, the data from this first assessment were used as an input for the indicators of SDG4 and for several international reports on education; they were also used to perform secondary analyses in research papers produced by partners, academics and others.

The present assessment, PASEC*2019*, is PASEC's second cycle of international assessments. The first point to note about this assessment is that the number of countries involved has increased to 14. To the ten countries assessed in 2014, four others have been added: Gabon, Guinea, Madagascar and the Democratic Republic of Congo. Another new departure in PASEC*2019* is that it includes a survey of primary school teachers' subject knowledge and teaching skills in language of instruction and mathematics. The findings from this survey are presented in the hope that they will contribute to the development of suitable education and in-service training programmes for primary school teachers, ultimately with a view to improving the quality of learning outcomes.

For the ten countries that participated in PASEC*2014*, this report also presents an analysis of the trends observed between 2014 and 2019. For all PASEC*2019* countries, comparative analyses of the data on learning outcomes in language of instruction and mathematics with contextual data on the learning environment provide information relevant to policy-making concerning quality of education. In the same way as for PASEC*2014*, this diagnosis is offered together with lines of reflection to guide the development of education policies or reforms, complementing the analyses and deliberations of CONFEMEN within the Observatory for the Quality of Education (OQE). All these analyses contribute to the overall improvement of educational provision and quality of learning.

Over the years, PASEC assessments have become a benchmark in the field of assessment of learning outcomes in French-speaking sub-Saharan Africa.

These assessments reflect the emphasis placed by the international community, through Sustainable Development Goal 4 (SDG 4), on quality of learning and equity. In order to measure progress and ensure proper monitoring of SDG 4, countries need precise data and indicators. PASEC's international assessments are therefore essential in this context.

It should be noted that the conduct of this important assessment was made possible by the technical and financial involvement of the governments of the 14 participating countries and the much appreciated financial support of two technical and financial partners: the French Development Agency (AFD) and the Swiss Agency for Development and Cooperation (DDC). The members of PASEC's steering committee and scientific committee were also key contributors to the success of this excellent undertaking. The outstanding work carried out by PASEC's coordinator and advisers and by all members of CONFEMEN's Permanent Technical Secretariat (STP) was another vital factor in the project's success.

We wish to thank everyone for their work on behalf of the education systems of the French-speaking sub-Saharan African countries.

Professor Abdel Rahamane BABA-MOUSSA
Secretary-General of CONFEMEN

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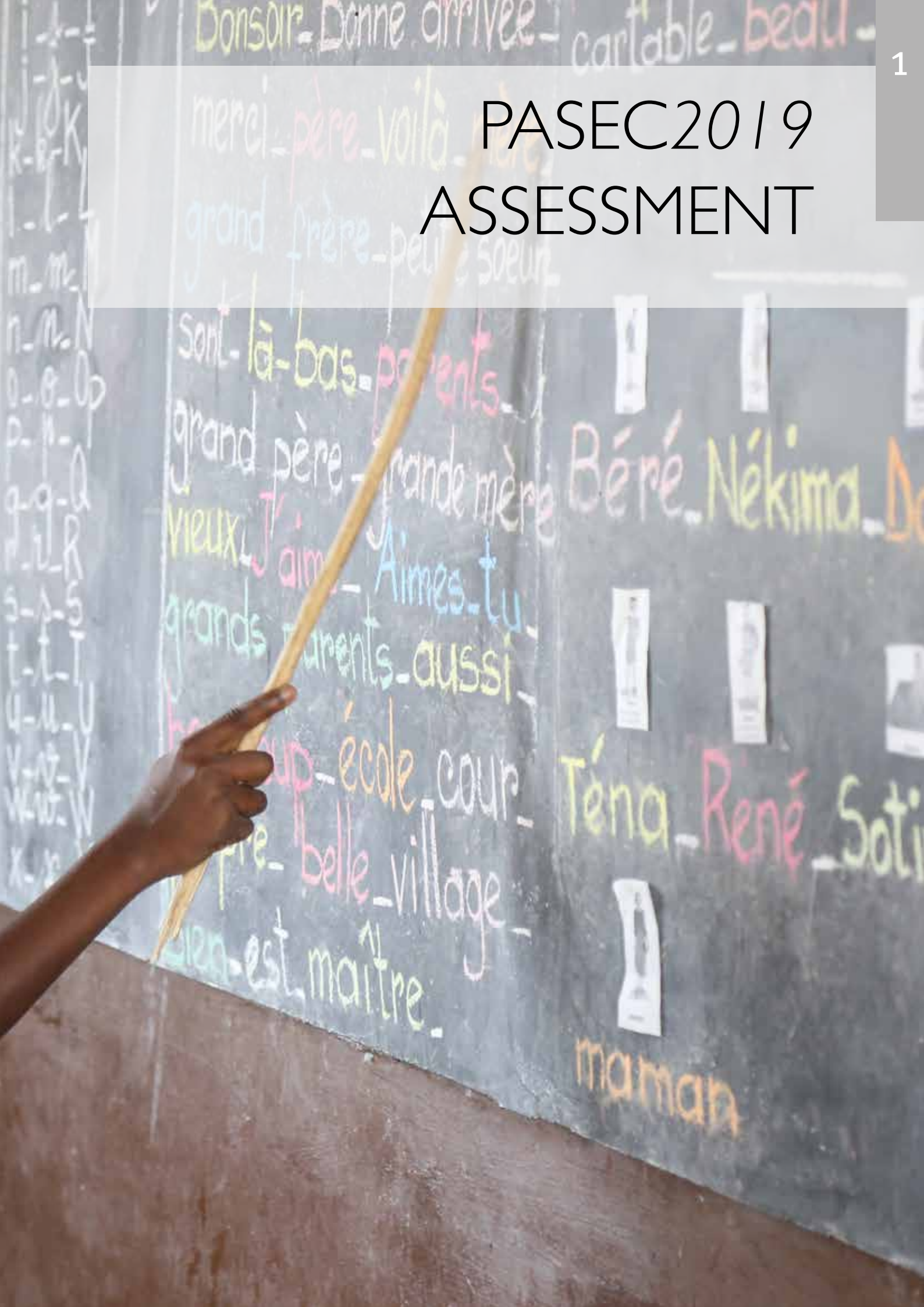
PASEC2019 ASSESSMENT



The year 2013 was a decisive turning-point in the reorientation of the methodology of CONFEMEN'S Programme for the Analysis of Education Systems (PASEC)[1]. Since that date, the PASEC assessment has performed five-yearly measurements in CONFEMEN member countries of students' level of knowledge and skills in mathematics and in their language of instruction at the beginning and end of primary education. This measurement of student achievement constitutes an input for the diagnosis of the quality of education systems through the analysis of their efficiency and equity in the national context and in the context of international comparison.

PASEC*2019* was thus the second edition of an international periodic survey, the inaugural phase of which – PASEC*2014* – focused on 10 countries in Francophone sub-Saharan Africa: Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, Côte d'Ivoire, Niger, Senegal and Togo. The PASEC*2019* assessment covered the 10 countries of the first edition, to which a further four were added: Gabon, Guinea, Madagascar and the Democratic Republic of Congo.

The PASEC survey also makes it possible to relate data on student achievement to the respondents' personal characteristics and certain contextual aspects of education systems. This analytical approach increases the survey's relevance to education policy by providing information on factors that contribute to the strongest performance, on the performance differences between different profiles of students, schools and regions/ departments/ provinces, and finally on policy approaches that will contribute to the efficiency and equity of the education systems.

This second edition of the assessment allows the participating countries of PASEC*2014* to track their progress over time towards quality equitable education for all. It also provides a diagnosis of the quality of the education systems in the four new participating countries.

Above all, this assessment introduces a major innovation in the diagnosis of education system quality by including a new survey component relating to teachers' knowledge in mathematics, in the language of instruction, and in teaching these two subjects. This teacher survey responds to a request from the educational community of sub-Saharan CONFEMEN member countries for a better understanding of teachers' pre- and in-service training needs, so that action can be taken through more effective education policies.

While the quality of its contribution to the measurement of learning outcomes is recognised, PASEC is aware of the limits of its technical and scientific resources, which prevent it from covering all dimensions of the diagnosis of education system quality. The assessment methodology provides quantitative data that can be used as an input for indicators and to define the direction of educational policies. The assessment does not throw light on questions such as the implementation and take-up of curricula in education systems, the impact of the pedagogical approaches conveyed by those curricula on system quality or the analysis of teaching practices; however, this is inherent to the constraints of a large-scale, standardised international assessment.

1. Following the recommendations of an external assessment of PASEC in 2011, the bodies in charge of CONFEMEN recommended a reform which was defined in detail during a seminar held in Saly (Senegal) from 18 to 28 February 2013. The aim of this meeting, attended by PASEC's technical advisers and the national teams of the PASEC assessment countries, was to present, discuss and validate the new methodology in accordance with international standards.

1.1. Methodology

The PASEC survey seeks to study the level of efficiency and equity of education systems, as well as changes in the achievement of these objectives in the countries concerned. The methodology[2] adopted to do this makes it possible, among other things, to assess students' performance levels and to identify the school and extracurricular factors likely to influence the teaching and learning process.

With a view to assessing the achievement of the objectives of efficiency and equity, PASEC's methodological model is based on the measurement, first, of students' knowledge and skills in the language of instruction and in mathematics at the beginning and end of primary education[3], and second, of teachers' knowledge in reading comprehension, mathematics and the didactics in these two areas of learning. Data are collected from a sample of students that is representative of the school population at the surveyed levels in each country and from teachers in the surveyed schools.

Box 1.1: The concepts of efficiency and equity are to be understood in the context of this report in terms of the characteristics and objectives of the PASEC survey

An efficient education system *enables all children to acquire the expected skills and attitudes (set out in school curricula) by the end of primary education. A system is regarded as efficient when it enables all children, or at least a critical mass, to tackle certain basic skills: at the start of primary education, those which need to be acquired in order to continue primary education successfully; and at the end of primary education, those which are essential for children to continue their education on a positive basis.*

An equitable education system *tends to reduce inequalities in terms of enrolment and school success between different student profiles, types of school and regions. A fair distribution of educational resources between regions and among schools within regions is a first step towards this objective.*

The PASEC*2019* assessment also collected a large amount of contextual information about students, teachers, principals, classes and schools in order to assess the profiles of learners and teachers, judge the level of resource distribution and understand school practices with a view to relating these factors to student performance (see Table 1.1).

Identifying the links between this information and success in the PASEC tests provided some pointers regarding efficiency and equity in education systems. Tests, questionnaires, survey procedures and data analyses were standardised across all countries and throughout the assessment process to ensure the comparability of results between countries and over time.

2. For more information on PASEC's methodology, see the Technical Report on the PASEC*2019* assessment and the frameworks for the survey instruments.

3. Apart from Gabon, which provides five years of primary education, all the other countries assessed by PASEC*2019* provide six years of primary education. The early primary tests are therefore administered to second-grade students, and the late primary tests to sixth-grade students (fifth-grade in the case of Gabon).

Table 1.1: Structure of the PASEC*2019 assessment*

	Instruments	**Areas analysed**
Student proficiency scale	*Student tests*	Students' level of knowledge, skills and competencies
Teacher proficiency scale	*Teacher tests*	Teachers' level of skills and knowledge of the subject contents and associated teaching methods
Characteristics of students and their family environment	*Questionnaire for students*	Families' socio-economic and cultural status; educational resources and learning opportunities at home; students' personal characteristics; students' educational career; physical learning conditions; perception of school and appetite for learning
Characteristics of the school, class and local community	*Questionnaire for teachers and principals*	Classroom infrastructure, equipment, functioning and resources; truancy and classroom learning opportunities; teachers' personal and professional characteristics; teachers' teaching practices and perceptions; school infrastructure, equipment, functioning, resources and control; local community's resources and involvement in the school; principal's personal characteristics and professional profile; principal's administrative and educational practices and perceptions; learning support practices in the school and perceptions of those involved.
Characteristics of the country, its education system and its education zones	*Exploratory study with a view to the introduction of a common framework of competencies for the CONFEMEN countries / National education policy documents and international databases on education*	Socio-economic and geographical context; curricula and official schooling time; multilingualism and language of instruction; learning assessment policy; education model and schooling

1.1.1. PASEC*2019* tests and questionnaires

The PASEC tests were constructed based on:

i. the different learning stages for reading and mathematics[4], the mechanisms involved in this learning and the difficulties encountered by students[5];
ii. the main areas of teaching in reading and mathematics in the participating countries' curricula;
iii. reading and mathematics measurement standards[6] commonly used at international level.

The tests, as indicated by their characteristics presented above, did not specifically assess the extent to which students have acquired the knowledge and skills prescribed by national curricula; rather, they helped to assess students' abilities to achieve more general objectives (the 'key skills') based on a common framework for language-reading and mathematics which is universal and adapted to the present-day challenges faced by schools and society (LMTF[7], 2013).

The PASEC assessment thus constitutes an external, international measure complementing national assessments, which set their own standards according to the specific objectives of national education systems. To this end, PASEC is supporting several countries in establishing and developing national assessment systems incorporating large-scale assessments.

The teacher survey instruments were designed to firstly assess the skills that students are expected to have acquired by the end of primary education, regardless of the class supervised by the teacher. This principle behind this choice was that primary teachers must be able to teach at all levels of primary education, as they may be assigned to a class at a different level at any time. A further consideration was that all teachers need to be aware of the skills profile of a student at the end of primary education. Secondly, the teacher tests assessed a specific dimension of the profession: the use of didactic knowledge in the exercise of two key professional skills:

- Planning a learning situation
- Identifying types of student errors.

The tests were developed through a scientific process reflecting the standards of international assessments. The test items were designed in French[8] by PASEC in collaboration with the PASEC national teams from all the countries participating in the PASEC*2019* international assessment. The items were then validated by the PASEC Scientific Committee. A committee of experts in educational science from the Universities of Liège and Geneva, together with national experts, contributed to the introduction of these measurement instruments.

Two separate cognitive workshops were held – one in Togo on the student test instruments, and one in Niger on the teacher survey instruments – in order to observe, pre-test and fine-tune these instruments.

All these procedures were carried out in collaboration with national and international experts, in strict compliance with standards on technical quality and international comparability.

The translation and adaptation[9] of the tests into languages other than French[10] were carried out by a group of translators from participating countries with guidance and support provided by an agency[11] specialising in the linguistic adaptation of items for international assessments. The adaptation process involved independent verification and final validation by each country.

4. The skills assessed by PASEC largely follow the recommendations of the Learning Metrics Task Force (2013).

5. Cf. the summaries of INSERM, National Reading Panel, Giasson

6. International measurement standards refer to the procedures for constructing, administering and analysing tests.

7. Learning Metrics Task Force, a think tank which brings together several international organisations (including CONFEMEN, ISU, Brookings and others) with the aim of defining learning metrics to measure student progress and assist with the transition from simple access to education to access plus learning.

8. The source language for item design.

9. The tests were not directly translated but adapted, so that the nature of the question approximated as closely as possible to that of the source version in French.

10. For PASEC*2019*, the test was adapted into Kirundi for Burundi, English for English-speaking Cameroon, Malagasy for Madagascar, Hausa and Zarma for Niger and Arabic for Chad.

11. CAPSTAN was entrusted with the linguistic adaptation of the PASEC*2019* tests.

The procedures for taking the tests and the functioning of the items in all language versions (French, English, Arabic, Hausa, Zarma, Kirundi, Malagasy) were tested during the field trial organised in April 2018 on a small sample of 20 schools in each participating country. The purpose of this phase was to assess the individual functioning of the items and the overall consistency of the tests at the national and international levels. Defective items were adjusted or eliminated on the basis of their psychometric characteristics. The analysis of the data resulting from the field trial led to the selection of the items and context questions included in the final tests. These final tests were validated in November 2018 and then administered in all countries between April and May 2019 in a nationally representative sample of schools. As in the trial phase, the items were analysed to assess the tests' overall consistency and the individual functioning of the items at the national and international levels. The items that were kept following the psychometric analyses were integrated into the PASEC*2019* international score scales.

1.1.1.1. Early primary tests

The PASEC*2019* early primary tests were administered to students in the 2nd grade of primary school to measure the skills acquired during their early learning of the language of instruction and mathematics. This was done to conduct a first assessment of their fundamental skills as early as possible. The test also made it possible to identify the learning difficulties that students generally face at the start of primary education. The average length of the tests was around 30 minutes per subject.

- Language of instruction test

At the end of the 2nd grade of primary education, which in most countries corresponds to the end of a first stage of learning, the curricula state that all learner readers in the CONFEMEN countries should be able to read and understand a short, simple and familiar message. This means that students will have gained a basic decoding ability that enables them to recognise familiar words, acquire the automatic habits involved in decoding text and have a sufficient level of oral comprehension in the language of instruction. These different abilities were assessed in this test.

The PASEC*2019* test assessed three key areas:
1. Listening comprehension;
2. Reading-decoding;
3. Reading comprehension (see Table 1.2).

Each of these areas was assessed in turn and in phases, through a series of exercises, each of which consisted of an example and a set of items.

Table 1.2: Areas assessed by PASEC2019 in language of instruction – Early primary

Composition of test	Areas assessed	Exercises and skills assessed
37.2%	**Listening comprehension:** *Listening comprehension was assessed with oral messages combined with isolated words and sentences and texts. Developing skills in this area enables students to expand their vocabulary and thus achieve fluency when decoding a text by making links between oral and written language.*	1. Understanding vocabulary 2. Recognising vocabulary 3. Recognising word families 4. Understanding a text
27.9 %	**Reading-decoding:** *Reading-decoding was assessed through exercises requiring graphophonological identification (letters, syllables, words) and simple letter and word reading activities. Developing skills in this area enables students to achieve reading fluency so that they can focus on the meaning of words and sentences, and thus expand their vocabulary.*	5. Reading letters 6. Recognising syllables 7. Reading words
34.9 %	**Reading comprehension:** *Reading comprehension was assessed through exercises requiring students to read isolated words and sentences as well as texts, and then find, combine and interpret information. Developing skills in this area enables students to read autonomously in a variety of everyday situations and thus develop their knowledge and participate in society.*	8. Decoding the meaning of words 9. Reading and understanding sentences 10. Understanding a text

• Mathematics test

The PASEC mathematics tests reflected the processes which are essential to the acquisition of fundamental skills in arithmetic, geometry, space and measurement, enabling the student to move from an analogy-based, intuitive understanding to a symbolic understanding of mathematical concepts[12]. The aim was to identify the stages in the acquisition of basic skills at which students experience difficulties, to help steer education policies in implementing remediation or modifying curricula and teaching practices.

The PASEC*2019* mathematics test measured students' basic skills in two key areas:
1. Arithmetic;
2. Geometry, space and measurement (see Table 1.3).

The test was primarily concerned with arithmetic and geometry, which provide the foundations for acquiring broader knowledge, as well as being the most widely taught areas of mathematics in the early years of primary education. Some measurement skills were also assessed. Measurement is usually associated with arithmetic; however, in the 2nd-grade PASEC test, measurement referred to more general concepts such as weight, size and volume, and was distinguished from arithmetic, which only referred to quantities of objects or to numerical quantities.

12. The skills assessed by PASEC largely follow the recommendations of the Learning Metrics Task Force (2013), except for students' ability to solve 'pattern problems'. PASEC did not assess this skill in the mathematics test because the results of the field trial were inconclusive for the logic items. This raises the question of whether pattern problems should be included in tests for the countries assessed by PASEC and, in following, of how to adapt such items to African national contexts.

Table 1.3: Areas assessed by PASEC*2019 in mathematics – Early primary*

Composition of test	Areas assessed	Exercises and skills assessed
72.5 %	**Arithmetic:** *Arithmetic was assessed through exercises involving counting, enumerating and handling quantities of objects, operations, number series and problem-solving. Developing skills in this area enables students to progress from an intuitive to a symbolic understanding of numbers.*	1. Counting to 100 2. Recognising figures and numbers 3. Quantifying objects 4. Distinguishing quantities of objects 5. Arranging numbers in order - (the largest) 6. Arranging numbers in order - (the smallest) 7. Completing number series 8. Adding and subtracting 9. Solving problems
27.5 %	**Geometry, space and measurement:** *Measurement was assessed through the recognition of geometric shapes, and the concepts of size and location in space. Developing skills in this area enables students to progress from an intuitive to a symbolic understanding of geometry, space and measurement.*	10. Recognising geometric shapes 11. Determining spatial location 12. Appraising sizes

1.1.1.2 Late primary tests

The PASEC*2019* late primary tests assessed the knowledge and skills in reading and mathematics that students need to pursue quality secondary or vocational education. They also assessed students' ability to use their skills to understand, learn and adapt to situations encountered in daily life. The tests consisted of multiple-choice questions (MCQs) and lasted for up to two hours in each subject.

- Language of instruction test

The PASEC*2019* late primary test assessed knowledge and skills in reading comprehension based on two categories of written materials presented to students: (i) narrative texts (ii) informative texts and documents. This classification of written materials is based on the work of Werlich (1976) and other more recent researchers (Crinon, Lectaire-Halté and Virot-Goeldel, 2017), as well as on international experiences in assessment. The activities of decoding isolated words and sentences were of minor importance at this stage (see Table 1.4).

Table 1.4: :Areas assessed by PASEC2019 in reading – Late primary

Composition of test	Areas assessed	Written materials
16%	**Comprehension of isolated words and sentences:** *Comprehension of isolated words and sentences was assessed through reading exercises focusing on discovering the explicit meaning of isolated words and sentences. Developing skills in this area enables students to achieve reading fluency to gradually understand the meaning of sentences and texts and expand their vocabulary. The level of these tasks was very basic and reflected the objectives of curricula for early primary education.*	Isolated pictures, words and sentences
84%	**Reading comprehension:** *Reading comprehension was assessed through exercises requiring students to read narrative and informative texts as well as documents, and then extract information, perform simple inferences, and interpret and combine information. Developing skills in this area enables students to read autonomously in a variety of everyday situations and thus develop their knowledge and participate in society.*	Narrative texts (39%) and informative texts and documents (45%)

• Mathematics test

The mathematics tests reflected the processes which are necessary for the acquisition of fundamental skills in arithmetic, geometry, space and measurement, enabling the student to move from an analogy-based, intuitive understanding to a symbolic understanding of concepts. The aim was to identify the stages in the acquisition of basic skills at which students experience difficulties, to help steer education policies in implementing remediation or modifying curricula and teaching practices.

Table 1.5: Areas assessed by PASEC2019 in mathematics – Late primary

Composition of test	Areas assessed
47.6%	**Arithmetic:** *Arithmetic skills were assessed with reference to the understanding of numbers: knowledge and understanding of the sequence[13] of operations and of the properties of the four operations; and operations on numbers such as adding, subtracting, multiplying and dividing. They were also assessed through the understanding of decimals and percentages.*
35.7%	**Measurement and size:** *Skills relating to measurements and sizes were assessed with reference to the knowledge and understanding of units of measurement for length, mass, capacity, angle and duration, and the conversion of these measurement units. They were also assessed through calculations of size (length, duration, mass, capacity, angle, area, volume) in different contexts, in particular using plane geometric figures (triangles, rectangles, squares, parallelograms, disks) and solids (cubes or rectangular parallelepipeds).*
16.7%	**Geometry and space:** *Skills relating to geometry and space were assessed through exercises involving recognition of the properties of two or three-dimensional geometric shapes, geometric relations and transformations, and spatial position and representation.*

13. The sequence of operations is a convention that establishes the order to be followed when performing calculations involving several operations.

1.1.1.3. Teachers' survey instruments

Versus PASEC*2014*, the 2019 assessment introduced an additional module for teachers to assess at the international and national scale their mastery of the contents taught at primary level in reading comprehension and mathematics and their level of knowledge of teaching methods for these subjects.

• Language of instruction assessment instruments

The language of instruction instruments was used to measure and compare, at national and international levels: (i) teachers' degree of familiarity with the subject knowledge taught at primary level and (ii) their level of knowledge in the didactics of reading comprehension.

Table 1.6: Areas assessed by PASEC*2019 in reading comprehension and reading comprehension didactics*

Composition of test	Areas assessed
72.2%	**Reading comprehension:** *Reading comprehension skills were assessed with reference to proficiency in the language of instruction, understanding of the meaning of the text, and knowledge of the structures of the language.*
27.8%	**Reading comprehension didactics** *Skills in reading comprehension didactics were assessed through the analysis of a reading comprehension learning situation: the ability to identify the objectives, make choices to ensure a good fit between a learning objective and an exercise, and then identify and analyse types of errors in students' work in this area.*

• Mathematics instruments

The mathematics instruments were used to measure and compare, at national and international levels: (i) teachers' degree of familiarity with the mathematics knowledge taught at primary level and (ii) their level of knowledge in the didactics of mathematics.

Table 1.7: Areas assessed by PASEC*2019 in mathematics and the didactics of mathematics*

Composition of test	Areas assessed
86.1%	**Mathematics:** *Knowledge and skills in mathematics were assessed through exercises in arithmetic, sizes and measurements, and geometry and space; proficiency in these areas enables primary-level mathematical knowledge to be acquired and the reasoning capacity to be developed for solving the situational problems that may be set for primary students.*
13.9%	**The didactics of mathematics:** *Knowledge of mathematics didactics was assessed through the analysis of a mathematics learning activity: the ability to identify the objectives, make choices to ensure a good fit between a learning objective and an exercise, and then identify and analyse types of errors in students' work.*

1.1.2. The PASEC*2019* context questionnaires

Contextual data were gathered during the PASEC*2019* assessment to better understand the relationship between students' family and school environments and their performance. This information was gathered from the students, teachers and principals of the sampled schools. The PASEC questionnaires used the most relevant questions[14] for each country, the analysis of which yielded useful and reliable data and indicators that were comparable in space and time. Using these instruments, the survey described educational resources and practices at different levels of the system. Students' performance in the PASEC tests was linked to these different items of contextual data about the determinants of learning and of teaching processes.

The contextual questionnaires of the PASEC*2019* assessment represented a step forward, guided by the findings from the PASEC*2014* questionnaires and consultation with the CONFEMEN countries and partners.

The work of updating the questionnaires led to the simplification of the Student Questionnaires. The Teacher Questionnaire was renamed the Teacher/Class Questionnaire. This questionnaire focused on teachers – the reason why they were included in the survey in the first place – but also gathered information about the class. The questionnaire was administered to all teachers in the sampled schools.

The Headmaster Questionnaire was renamed the Principal/School questionnaire, reflecting the fact that its focus was on the school environment and that the number of items about the principal had been reduced. The purpose of focusing on schools was to throw light on the learning conditions of the students tested.

1.1.3. The samples

As was the case with PASEC*2014*, the international PASEC*2019* survey targeted all students in the early (2nd grade) and late (5th/ 6th grade) stages of primary education, regardless of the type of school (public, private, etc.) and its location (rural/ urban). Data were collected from a nationally representative sample of primary schools with the targeted levels of education.

The PASEC sample made it possible to estimate with some precision schooling outcomes in the countries participating in the assessment without having to survey all students in school. Quality control standards and mechanisms were implemented throughout the assessment process to ensure sample completeness and comparability of results across countries and over time.

The sampling procedure used to select schools was conducted by PASEC in collaboration with the countries. Schools were sampled in each country based on the most recent sampling frame of schools, providing detailed information about the schools. Schools were selected in each country according to a standardised procedure: systematic sampling proportional to the total number of students in early (2nd grade) and late (5th/ 6th grade) primary education.

The standard size of the school sample in the PASEC*2019* survey for the assessment of late primary students was 180. A larger sample of schools was selected when a country wished to cover specific educational issues in the survey. In this case, PASEC over-sampled schools in some areas of the country concerned, so that the results for this large sample could be disaggregated to the level of the sub-group concerned. Given the specificity of the early primary survey, a sub-sample was taken from the late primary school sample and used as the sample for the early primary part of the survey.

Within each of the schools selected for both the early and late primary education survey, a single class at the target level was selected using a simple random procedure at the time of data collection. A sample of 25 students was selected from each sampled late primary class, and 16 from each sampled early primary class.

14.The PASEC questionnaires favour a contextual approach tailored to the countries, since certain educational inputs and transformation processes are country-specific and affected by the level of poverty in the geographical areas concerned. For example, the use of 'double-session' schooling is specific to developing countries, in response to demand for education where there is a shortage of classrooms and teachers..

1.1.4. Administration of tests and questionnaires

Through the national teams, the participating countries implemented the assessment within the framework of the administrative procedures established by PASEC. The test administrators, who had been recruited by the national PASEC teams beforehand, were responsible for collecting data at school level. They were trained, supervised and controlled by the national teams. To ensure the comparability of the collected data, a standard survey protocol was introduced by PASEC. The administrators were required to adhere strictly to the standardised guidelines contained in this protocol.

The early primary tests were administered individually to students by an administrator. They were taken over four mornings by a maximum of 16 students divided into two sub-groups from the same class for each of the selected schools.

Administration of the late primary tests began with the contextual questionnaire. The reading and mathematics tests were taken over the next two days, lasting up to 2 hours each, with a 10-minute break after 1 hour. PASEC adopted the use of booklets with a rotating design to deal with the large volume of information implied by the specification tables in Section 1.1.1.2 of this chapter. Four booklets were created, copies of which were handed out at random to the selected students in each class.

For the teacher survey, data collection in the school was performed by a test administrator from all teachers in the school on the fourth day of the survey. The entire teacher survey (tests and contextual questionnaire) was administered in each school in one morning. Four booklets were also created for this survey and handed out at random according to the principles of the rotating design booklet.

1.1.5. Data quality assurance

The quality assurance procedures were applied throughout the PASEC*2019* assessment under the control and subject to the validation of the PASEC scientific committee. The implementation of the different stages in the design and selection of assessment items (cognitive workshops and field-trialling of instruments) in strict compliance with standards represented a first means of ensuring the quality of the assessment data. The technical standards of the PASEC*2019* assessment specified how the assessment should be implemented in each country. PASEC thus prepared test administrator's manuals setting out in chronological order all the stages in the administration of the survey and the relevant instructions. A pairing consisting of a PASEC technical adviser and a member of the PASEC national team oversaw the process of administering the assessment in each country and ensured adherence to the agreed protocols. Members of the national teams conducted quality control of field operations by means of unannounced visits to survey schools to observe the administration of tests and compliance with procedures.

PASEC involved an international agency with a quality control track record in large international assessments to ensure the linguistic quality and equivalence of the various instruments. The survey material was designed in French, and the adaptation in English, Arabic, Hausa, Kirundi, Malagasy and Zarma was ensured according to the required standards (double translation, reconciliation, verification and validation in each country).

Based on their experience in similar surveys, knowledge of education and non-involvement in teaching during the survey year, test administrators were recruited and trained to ensure a high-quality collection procedure in each country. They were divided into two groups: one to administer the early primary test and the other to administer the late primary test plus the teacher survey. The two groups received separate training in view of the differing characteristics of the survey targets. The most effective administrators were selected at the end of training based on their performance in a test and their observed practical proficiency. Those involved in the data collection process signed a confidentiality agreement regarding the tests and data.

In each country participating in the PASEC*2019* international assessment, the data collected from the field were arranged by language version, level surveyed, and data-collection instrument type and in ascending order of PASEC identifier (school and student or teacher identifier).

A coding guide was provided to the national teams responsible for recruiting and training coders. The latter signed a confidentiality clause and worked under the direct supervision of the national team members.

The data-collection instruments and the computers used for data entry were kept in a room with controlled access to protect the security and confidentiality of the data collected.

With a view to ensuring strict compliance with coding and data entry procedures and the deadlines for data provision, the coding and data entry phases were monitored by PASEC during a support visit to each of the participating countries.

In general, to guarantee the production of scientifically robust data, PASEC favoured a participatory approach to the implementation of the assessment, involving national teams and national and international experts at the various stages of the process through remote work and international workshops.

1.2. PASEC*2019* assessment countries

The PASEC*2019* assessment covered 14 sub-Saharan African countries that are members of CONFEMEN: Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, Democratic Republic of Congo, Gabon, Guinea, Côte d'Ivoire, Madagascar, Niger, Senegal, and Togo.

Table 1.8 below provides information on the participating countries' demographic and socio-economic characteristics. The table shows that the mean annual population growth rate of these countries is less than 3%; the average for Africa as a whole is 2.8%. In addition, the percentage of the population aged 0-14 years varies between 37% (Gabon) and 50% (Niger), which puts great pressure on educational provision and creates the need for adequate financial investment (CONFEMEN, 2017).

With regard to the Human Development Index (HDI), three categories of countries participating in PASEC*2019* emerge from the data in Table 1.1: 1) one country with a high HDI (Gabon, 115th), 2) two countries with a moderate HDI (Congo, 138th and Cameroon, 150th), 3) countries with a low HDI (all other countries). In addition, three categories also emerge in the updated classification of countries based on their income established by the World Bank: 1) one upper middle-income country (Gabon), 2) five lower middle-income countries (Benin, Cameroon, Congo, Côte d'Ivoire, and Senegal), 3) seven low-income countries (Burkina Faso, Chad, DRC, Guinea, Madagascar, Niger, and Togo).

The funding situation in the PASEC*2019* countries shows just as much variety as the socio-economic characteristics. Six countries (Cameroon, Gabon, Guinea, Madagascar, DRC and Chad) spend less than 4% of their GDP on education, with this percentage varying between 2.1% (DRC) and 2.9% (Chad). The other eight countries spend between 4% (Benin) and 5.1% (Senegal) of their GDP on education. In addition, the percentage of public spending on education allocated to primary education varies between 29.2% (Gabon) and 64.1% (Togo), while spending per student as a percentage of GDP per capita fluctuates between 6.3% (Chad) and 16.5% (Niger). These data confirm that primary education is the priority educational sub-sector in the assessed countries as well as in all low- and middle-income CONFEMEN member countries (CONFEMEN, 2017; OQE, 2019).

15. https://blogs.worldbank.org/opendata/new-country-classifications-income-level-2018-2019

Table 1.8: Demographic and socio-economic characteristics of the participating countries

	Population			GDP	Public spending on education			HDI[16]
	Total (in millions)	% of 0-14 year-olds	Annual growth rate	(in USD billion)	% of GDP	% allocated to primary	Spending per primary student (% of GDP/ head)	Rank (out of 189 countries)
Year	*2019*	*2018*	*2018*	*2017*	*2016*	*2016*	*2016*	*2018*
Benin	11.8	42.4	2.7	25.4	4.0	49.8	10.3	163
Burkina Faso	20.3	44.9	2.9	35.9	4.2	57.9	16.1	182
Burundi	11.5	45.5	3.2	8.0	4.7	45.4	12.9	185
Cameroon	25.8	42.6	2.6	89.5	2.7	33.9	5.4	150
Congo	5.3	41.8	2.6	29.4	4.6	--	11.7	138
Côte d'Ivoire	25.7	41.9	2.6	97.2	5.4	44.5	15.8	165
Gabon	2.1	37.0	2.6	36.7	2.7	29.2	4.7	115
Guinea	12.7	43.9	2.8	28.0	2.5	40.5	6.8	174
Madagascar	26.9	40.7	2.7	39.9	2.8	--	6.6	162
Niger	23.3	50.0	3.8	21.9	4.1	50.7	16.5	189
DRC	86.7	46.2	3.2	68.6	2.1	61.6	7.2	179
Senegal	16.2	43.1	2.8	54.8	5.1	31.3	11.8	166
Chad	15.9	47.1	3.0	28.6	2.9	--	6.3	187
Togo	8.0	41.3	2.4	13.0	5.0	64.1	16.2	167

Source: UIS database, http://data.uis.unesco.org/?lang=fr, consulted in February 2020; UNDP database (http://hdr.undp.org/en/2019-report) for HDI, consulted in February 2020; CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/) - 1 January 2018 version for GDP, and World Bank database (http://donnees.banquemondiale.org/) for the other indicators, consulted in February 2020

In order to achieve the 2030 Agenda, which sets the Sustainable Development Goals (SDGs) and in particular SDG4 concerning education, significant financial resources are needed (Focus2030, 2018). Thus, USD 340 billion per year is needed to enable low- and lower middle-income countries to achieve SDG4 (UNESCO, 2015). Moreover, even if 6.56% of GDP were spent on education, this would still leave a gap of USD 39 billion, including USD 21 billion for low-income countries (UNESCO, 2015). Given that education spending in PASEC*2019* countries is less than 6% of GDP, further efforts are needed to achieve the goal of inclusive quality education for all.

Table 1.9 shows a mean primary school age population of approximately 3.4 million, although this figure disguises substantial differences between Gabon (around 250,000 students), Niger (around 4 million) and the DRC (over 14 million). Gross primary school enrolment rates vary greatly, ranging from less than 80% for Niger (74.4%) to more than 100% for several countries, including Benin (121.9%) and Madagascar (142.5%). In addition, the education systems of PASEC*2019* countries appear to be relatively equitable, with gender parity indices close to 1 in almost all countries, except for Guinea (0.81), Niger (0.86) and Chad (0.77). Lastly, there is considerable uniformity in the language of instruction, which is still French, except in Burundi (Kirundi), Madagascar (Malagasy), Cameroon (English) and Chad (Arabic).

16. The HDI (Human Development Index) is a composite index based on life expectancy at birth, adult literacy rate, gross primary school enrolment rate and the base-10 logarithm of GDP per capita at purchasing power parity. It is calculated by the UNDP.

Table 1.9: Primary enrolment indicators

	Primary age population	Gross enrolment rate[17]	Completion rate[18]	Gender parity index[19]	Languages of instruction	Youth literacy rate
Year	*2019*	*2018*	*2018*	*2018*	*2019*	*2018*
Benin	1 868 668	121.9%	47.6%	0.93	French	60.9%
Burkina Faso	3 420 701	96.1%	----------	0.98	French	58.2%
Burundi	1 859 892	121.4%	53.3%	1.01	French and Kirundi	88.2%
Cameroon	4 160 744	103.4%	73.6%	0.90	French and English	85%
Congo	858 816	----------	80.0%	----------	French	82%
Côte d'Ivoire	3 991 298	99.8%	56.7%	0.92	French	58.4%
Gabon	250 029	----------	----------	----------	French	89.8%
Guinea	2 052 385	91.5%	53.7%	0.81	French	46.3%
Madagascar	3 467 514	142.5%	----------	1.00	French and Malagasy	81.2%
Niger	4 015 255	74.7%	----------	0.86	French[20]	----------
DRC	14 684 467	108%	68.9%	0.93	French	85%
Senegal	2 646 357	81.0%	50.1%	1.11	French	69.5 %
Chad	2 767 970	86.8%	27.3%	0.77	French and Arabic	30.8%
Togo	1 274 448	123.8%	61.3%	0.96	French	84.3%

Source: UIS database, http://data.uis.unesco.org/?lang=fr, consulted in February 2020, CONFEMEN 2017

Gross primary school enrolment rates have stagnated or declined in most of the assessed countries over the past five years, as the UIS database shows. Aside from the various socio-economic, political and security issues facing the region, this situation means that the expansion of access to schooling has been slower than the rate of population growth in these countries.

In this context, achieving SDG4[21] remains a very difficult challenge for many of these countries. The goal of inclusive quality education for all requires not only schooling and quality universal learning but the retention of students in the education system, but according to the UIS database, more than half of the countries have failed to improve their completion rates over the past five years. It is also notable that few countries have made significant progress in improving their gender parity index or in reducing disparities and inequalities in education between rural and urban areas (UNDP, 2017).

17. Gross primary enrolment rate: the primary student population, regardless of age, as a percentage of the population of official primary school age. This rate may exceed 100% as a result of the schooling of children who are younger or older than the normal age.

18. Primary completion rate: by convention, new enrolments in the final grade of primary education, regardless of age, as a percentage of children of the corresponding official age.

19. Gender parity index: the ratio of girls to boys in primary enrolments.

20. In Niger, Hausa and Zarma are not yet official languages of instruction, unlike Kirundi and Malagasy in Burundi and Madagascar respectively. As the extension of languages of instruction in Niger's education system is currently in a trial phase, in the context of PASEC*2019* the country assessed student achievement in a sample of schools using only French.

21. Among the Sustainable Development Goals, which set out a roadmap to a better and more sustainable future for all, SDG4 aims to ensure that everyone has access to quality education on an equal basis and to promote lifelong learning opportunities.

With regard to literacy, which is one of the components of the HDI, despite continuous improvement in its indicators[22] around the world, the literacy rate is still relatively low in sub-Saharan Africa (UNESCO, 2018). The number of illiterate young people aged 15 to 24 remained constant in this part of Africa in 2019, whereas it decreased in North Africa and West Asia (UNESCO, 2018).

Despite the persistent issue of education for all as a challenge for the countries in the region, the emerging concern is about making the transition from access to success in education. The challenge of providing quality education – a key political commitment – has led in the region to a particular interest in relevant teaching content, and more broadly in a curriculum adapted to the actual needs and expectations of population.

Chart 1.1: Map of countries participating in the PASEC*2019 assessment*

Note: Four countries (Gabon, Madagascar, Guinea, DRC) were added to those assessed in 2014.

22. According to UNESCO, the adult literacy rate continues to improve gradually and reached 86% worldwide in 2017. This means that 750 million adults were illiterate. Regionally, the rate ranges from roughly 65% in sub-Saharan Africa to almost 100% in Europe and North America.

1.3. Curriculum policy trends in the PASEC*2019* assessment countries

The education systems of the PASEC*2019* assessment countries share significant common characteristics, as is clear from their official curricula (CONFEMEN, 2018).

In terms of curriculum policy and the structure of school systems, it is noticeable that these countries have defined education and curriculum policies over the past two decades that are intended to form a break with previous policies. The new policies seem more concerned with the quality of student learning and are marked by their pronounced focus on providing an effective framework for schooling. In all the countries in the PASEC survey, and in different ways, a set of documents (CONFEMEN 2018) testifies to this focus, characterised by certain constants: an interest in primary education, the purposes of schooling and the coherence of schooling, and more particularly a widespread concern with knowledge and skills (CONFEMEN 2017, Cros et al., 2010).

Official curricula in PASEC assessment countries are tending to move towards schooling which aims to impart skills, and not just knowledge, to students. Thus curriculum reforms over the last two decades have largely converged on a skills-based approach – with 'skills' being understood in a broad sense to include knowledge, culture, attitudes and values – with an emphasis on cross-disciplinary skills that were previously neglected because of the traditional stress on content or academic knowledge.

National and regional policies emphasise the central role of teacher training in the effort to provide quality equitable education for all. The training systems and curricula prescribed in almost all the assessment countries reveal a determination to move towards practices centred on students' needs, both in classroom activities and in daily life. These practices seek to give students an active role in their own learning, which automatically means teaching based on active learning.

Teachers are prepared to teach the curricula using documents in the form of teaching guides.

Pre-service teacher training is provided in most countries through training institutes or teacher training colleges. The training curricula of these institutions, which in some cases have been overhauled, are poorly aligned with those of basic education, or have not yet undergone such alignment. Aligning teacher training with educational practice in basic education remains a challenge in almost all French-speaking sub-Saharan countries.

In-service training is present in many countries, with the introduction of educational conferences, training days, educational resource and development units and training modules. Some training courses also involve a combination of training and work experience or are accelerated for contract employees.

Despite the existence in some countries of pedagogical guides that accompany the curricula, achieving the aim of making teacher training consistent with the new emphases of curricula remains problematic.

In terms of the assessment of student achievement in the countries, it should be noted that at the end of the teaching and learning process, the arrangements for examinations and progression to higher levels have generally remained relatively unaffected by curriculum changes. The analysis of texts relating to assessment and examination practices (CONFEMEN, 2017) reveals first of all the contradiction that exists in most countries between policies designed to welcome all children into basic education and various problems with regulating the intake of secondary education. Practices such as grade repetition on the basis of annual assessments still remain important instruments for regulating student flow, yet run counter to the concept of educational progress or even of continuous schooling.

An approach based on penalisation seems more prominent than one based on the certification and capitalisation of imparted skills.

Although attention to skills is found in almost all curriculum texts, it is not to be found in examinations.

In addition, the curricula of several sub-Saharan countries show a political ambition to abolish examinations that determine student progression, in particular between primary and secondary school, yet there is little sign in the formal texts of this ambition being realised.

Linguistically, in all the PASEC*2019* assessment countries, French coexists as the language of instruction with national or local languages, or even with English in Cameroon and Arabic in Chad. The general texts refer to encouraging school bilingualism (with languages sometimes referred to as national and sometimes as regional) and the introduction of English from primary school onward.

Looking at knowledge and skills in the field of teaching of the language of instruction in the countries concerned, a wide range of different language policies can be observed. However, in many cases the reality is even more complex than the texts of national standards suggest.

In most of the education systems assessed, there are plans to introduce school bilingualism, with French and national languages being used as mediums of instruction. This initiative, which is presented as beneficial in terms of learning for students (IUL and ADEA, 2010; ELAN Afrique, 2015), involves a gradual linguistic transition, in which students start with the national languages or languages of socialisation in the early years of learning before French is introduced as a language of instruction as the curriculum progresses. This approach is being tested or extended in many of the PASEC*2019* assessment countries.

The PASEC*2019* assessment kept the programme's methodology for group assessment, with survey instruments that were updated in a participatory approach involving all countries. Fourteen sub-Saharan countries participated. These countries differ in the size of their population and economy and have relatively diverse characteristics with regard to education; these differences will be borne in mind as efficiency and equity of learning outcomes are analysed throughout this report.

The report shares the results of the unprecedented survey of teachers' professional skills and the first analyses of the change in education system performance over time.

Reader's guide

The construction of the PASEC performance scales

In 2014, the PASEC reading and mathematics performance scales were constructed so as to obtain an international mean of 500 and a standard deviation of 100. In order to track changes in the performance of education systems, all the cognitive items from the PASEC*2014* assessment tests were included in the PASEC*2019* assessment tests. These common items, usually referred to as trend items, enabled the results for 2019 to be equated with the 2014 scales.

The data from the PASEC*2019* assessment were thus calibrated according to an item response model, as in 2014, then converted so that they could be equated with the 2014 scales, to estimate the change in students' average performance.

The definition of "minimum proficiency' levels

As in 2014, for each proficiency scale a 'minimum proficiency' level was used to determine the proportion of students who were more likely to achieve (above the level) and not to achieve (below the level) the knowledge and skills deemed essential to continuing their schooling normally and without difficulty.

The levels were defined based on the concepts assessed in the PASEC tests and according to the priority objectives for language/reading and mathematics set in curricula at the beginning and end of primary education.

The construction of the contextual indices

Several questions administered to students, teachers and principals were synthesised into indices. An index combines and synthesises several items of observed information (variables) which are considered to measure the same construct. For example, the index of families' socio-economic capital used students' self-reports about the possession of various goods: the number of books in the home, electricity, a television, a computer, a radio, a telephone, a freezer, an air-conditioner, a car, a tractor, a moped, a water tap, flush toilets, etc. Like the performance scales, these indices were constructed based on item response theory (the Rasch model). To facilitate the interpretation of these indices, the scores were reported on an international scale with an average of 50 and a standard deviation of 10.

Estimation, standard error and significance of differences

All results published in this report are based on observations collected from samples, not from populations as a whole. They therefore constitute what in statistics are conventionally called estimates of population parameters, since the results would have been slightly different if other samples of the same size had been used. They therefore do not correspond exactly to the values that could have been observed if all the students in a country had been surveyed by PASEC. The differences in results that could be observed from one sample to another are quantified by the standard error. This is used to build confidence intervals around the estimated parameters within which the population values under investigation probably lie, although there is a small risk of values lying outside such intervals. The higher the risk, the narrower the interval, and the lower the risk, the greater the interval. Generally, human scientists work with a risk of no more than 5%. The comparison of means tests and the analyses are therefore carried out at the 1% and 5% levels. The symbols ** and *** are used to indicate levels of significance of less than or equal to 5% and 1% respectively.

Standard errors are presented next to each estimate in the tables in the annexes. The standard error plays an important role in determining, for example, whether the estimated means of two countries differ. For instance, suppose the estimated mean performance of Country A is 5 points higher than the mean of Country B. In this case, the standard error addresses the probability of drawing two samples (one per country) with mean values that differ by at least 5 points if the mean value of the two populations concerned is in fact identical. If this probability is high, we accept that the means are the same. If it is low (less than 0.05), we reject this possibility: as it is very unlikely that two samples would be drawn from identical populations that would give us a difference of at least 5 points, we conclude that the populations are different.

In the figures published in this report, if the difference between two means is said to be significant, it is represented by a dark colour. Use of a pale colour indicates that the differences are not significant. The comparison of means tests are carried out at the 1% and 5% levels.

Deviations and score distribution among students

In some countries, students' scores may be concentrated around the mean, while in others the spread of scores may be very wide. This differing variability is generally used as an indicator of equity. Thus the further that scores are spread from the mean, the greater the differences in scores between high-performing and lower-performing students and the more inequitable the education system will be considered to be. Conversely, the more a country succeeds in limiting differences in performance between these two groups of students, the more it is considered equitable. The spread in performance is usually quantified by the standard deviation. We can also, as in this report, present the difference between the 90th percentile (the score which separates the highest-performing 10% of students from the 90% below them) and the 10th percentile (the score which separates the lowest-performing 10% from the 90% above them).

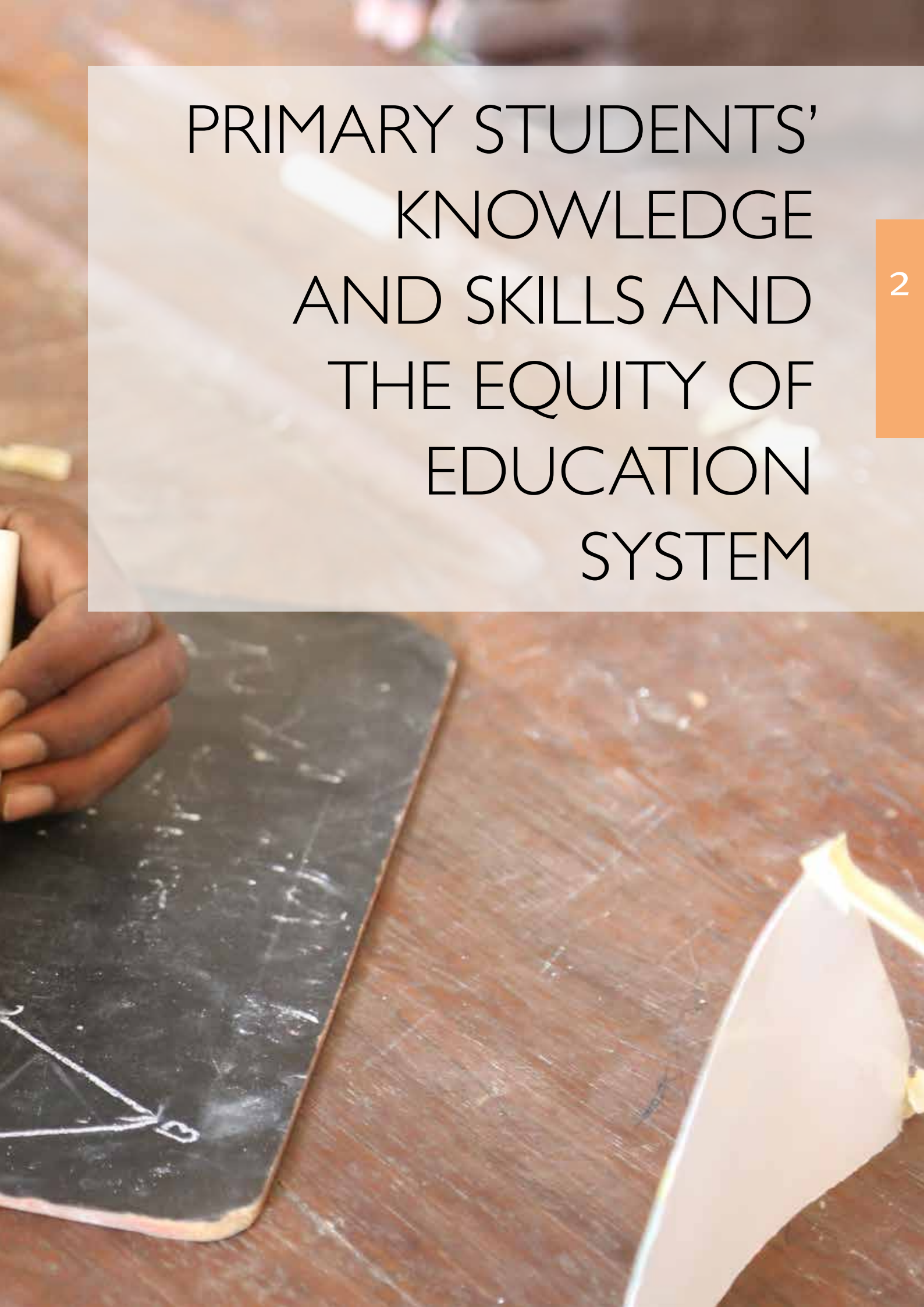
Raw effects and relations between scores and contextual variables

Various links between contextual variables and student performance are presented in this report. However, these contextual variables are often closely related to each other. Thus, parents with high levels of qualification generally have a better occupational situation, often resulting in greater material comfort, better command of the language of instruction, more books in the home, etc. Hence when we look at the effect of the number of books in the home on reading comprehension, this contextual variable also implies some of the other variables mentioned above. It is therefore important not to overinterpret the results. To ascertain the net effect of the number of books, for example, the other contextual variables need to be inserted into the model. The effect of the number of books at home will then be described as X, controlling for the other modelled variables. Implicitly, the question that has been asked is what the effect of the number of books at home would be if the students tested were completely the same with respect to all other variables included in the model. This problem does not only concern student variables. For instance, schools in urban areas are generally better equipped than rural schools, but are also attended on average by more privileged students. A simple comparison between rural and urban schools therefore involves all these other differences. It is therefore important to take account of the effect of other contextual factors which could moderate, eliminate or amplify the identified links. In statistical terms, comparisons between two or more groups are not made with 'all other things being equal' for the purposes of this report.

Rounding

All values are rounded to one decimal place. The values presented are calculated and then rounded. There may therefore be tiny differences between the total and the sum of the values as shown in a table.

PRIMARY STUDENTS' KNOWLEDGE AND SKILLS AND THE EQUITY OF EDUCATION SYSTEM



More effective steering of education systems depends on detailed analysis of students' knowledge and skills to introduce suitable new education policies or reinforce those already in place.

Student achievement at the beginning and end of primary schooling in core subjects (language/reading[1] and mathematics) with respect to the basic skills – reading, writing and counting – is a key indicator of the quality and equity of today's education systems. The international community started to act in the 2000s based on the Millennium Development Goal (MDG) of education for all. While this led to an increase in the primary enrolment rate, there was less emphasis on quality. The PASEC*2014* assessment showed that many children lacked sufficient skills to continue their education, while studies conducted by the World Bank point to the phenomenon of 'learning poverty[2]'.

As set out in the Education 2030 Agenda, the international community has committed to developing inclusive quality education through Sustainable Development Goal 4 (SDG4[3]). As part of this, ten targets 'aim to support learning, in all its shapes and forms, which can influence people's choices to create more just, inclusive and sustainable societies'[4]. More specifically, Target 4.1 is about ensuring that all students learn the basic skills during their schooling. Progress has been made since 2015 in making indicators worldwide more comparable using data from various national and international assessments[5]. The data from the PASEC assessments constitute an important source of information for monitoring certain SDG4 indicators.

At the heart of the PASEC survey is the measurement of students' performance in mathematics and their language of instruction. This chapter describes students' levels of proficiency based on their results in the PASEC*2019* language and mathematics tests. It presents different performance profiles showing what students are capable of at each proficiency level, based on the results obtained in each of the 14 participating countries. It also shows the percentage of students at each proficiency level, analyses student performance with respect to various specific aspects of language of instruction and mathematics, and presents performance characteristics by country. Finally, the results observed in the countries make it possible to estimate the degree of inequality of learning outcomes in each country.

The analysis of student achievement in this chapter does not attempt to establish any connection between performance at the start and end of primary education in the different countries. This is largely due to differences in the cohort at these two educational levels. Performance at the start of primary education is primarily influenced by the system's current characteristics, whereas that at the end of primary education shows the effects of teaching, pedagogical, social and educational policy factors throughout the cohort's educational career. Finally, any links identified between these two levels may be distorted by the skimming effect that has come into play by the end of primary education in systems where grade repetition is practised. Such systems are characterised by very different performance characteristics between the beginning and the end of primary education, because grade repetition, though intended to improve individual learning outcomes, causes students to drop out from the system and thus leads to increasing losses from the student population in the course of primary education. This policy, which leads to a situation where students at the start of primary education are less proficient than students at the end, means that a like-for-like comparison of performance is impossible.

1. The assessment included a language test in early primary education (listening, reading/decoding and reading comprehension) and a reading/comprehension test in late primary education.

2. According to the report 'Ending Learning Poverty: What will it take?', the baseline learning poverty rate is 53% among students in low- and middle-income countries.

3. SDG4 aims to 'ensure that everyone has access to quality education on an equal basis and to promote lifelong learning opportunities.

4. https://inee.org/system/files/resources/369009eng_0.pdf

5. The ISU organised a workshop in Paris in September 2018 attended by various educational assessment programmes and agencies, including PASEC, one of the purposes of which was to reach a consensus on proficiency scale levels. The workshop identified the proficiency levels to be used in describing progress towards achieving SDG 4.1.1. It created proficiency descriptors for reading and mathematics for each level, and recommended an appropriate minimum proficiency level that the ISU should use to judge whether or not countries are making sufficient progress towards achieving SDG 4.1.1.

Box 2.1: Definition of the language/reading and mathematics proficiency scales

The PASEC2019 proficiency scales were developed based on item response theory (IRT) analyses by measurement and assessment specialists and were submitted to validation teams. The design of these scales aimed, in line with the approach to designing the tests (see Chapter 1), to take account of school curricula, the relevance of the selected material, clarity of wording, conciseness, consistency within each level, and the ability to differentiate between proficiency levels.
The results for 2019 are presented on the same scales as those for 2014, thanks to the use of common items between the two assessments. The scales have four levels of skills for language of instruction and three levels of skills for mathematics at the start and end of primary education, plus an additional level of critical performance. These proficiency levels correspond to tasks of increasing difficulty. They are defined by tasks that share common conceptual, content or statistical characteristics, so that the tasks associated with each level meet certain defined technical specifications.
Thus, in addition to the information given by the mean scores6, the description of student performance levels makes it possible to understand the tasks that students can complete correctly or carrying out at a given level of the proficiency scale. Each level corresponds to precise score intervals (see scales) and the levels are hierarchical, so that a student performing at a particular level is also very likely to be able to complete tasks at lower levels correctly. In other words, the tasks involved at lower levels of the scale for a subject are less complex than those at the higher levels.

Students who do not reach Level 1 struggle with the most basic knowledge and skills that the PASEC survey seeks to measure. However, it should not be inferred that these students have no skills at all in the assessment subject: rather, they have serious difficulties. At the other extreme, the highest level of the scale does not have an upper limit, as some students may have skills that exceed those measured in the PASEC survey.

Defining proficiency levels in language of instruction and mathematics makes it possible both to establish a hierarchy of student performance and to describe students' abilities. Each level has a number of tasks associated with it. These share certain characteristics and requirements and are generally distinct from tasks associated with lower or higher levels. The tasks' degree of difficulty is theoretically estimated through their categorisation into assessed areas of subject knowledge and cognitive processes and has been validated empirically from the results of students in the participating countries.

The PASEC scales have, since the 2014 assessment, included a 'minimum proficiency level'. Students with scores above this level are considered by PASEC to have the knowledge and skills essential for continuing their education in the right conditions. Below this level, students lack the prerequisites for continuing their education.
They are more likely to become discouraged and drop out due to their lack of understanding of the language of instruction and/or mathematics, or to experience even greater difficulties later in their education if they do continue.

2.1. Students' results at the start of primary education

2.1.1. Performance profile in language in start of primary education

2.1.1.1. Performance profile on the reading proficiency scale

Students' results in the PASEC assessment provide useful information about the strengths and weaknesses of the education systems assessed. It should be borne in mind that the quality of a country's learning outcomes depends on the distribution of its students at the different levels of the proficiency scale. Countries with more students at the top of the scale tend to have a lower proportion of students at or below Level 1.

When comparing the performance of education systems, it is also important to take account of the economic and social context of students' results.

6. For the overall scores for each country, see Annexes B2.7, B2.8, B2.11 and B2.12.

Table 2.1 shows the PASEC*2019* language of instruction proficiency scale at the start of primary education. This scale reflects the performance of all participating countries in the language test. It shows the score intervals for each level and the distribution of students across the levels and describes the corresponding knowledge and skills. Students at any given level are likely to perform tasks well at that level, less well at higher levels and better at lower levels. The minimum level in language of instruction is marked with a red band in the table[7].

Table 2.1: PASEC*2019 language of instruction proficiency scale – Early primary*

Level	Score	Percentage of students at that level	Description of skills
Level 4	> 610 points	23.5%	**Intermediate reader: moving towards independent reading and understanding sentences and texts** Students at this level have achieved a level in the decoding of written text and in listening comprehension that enables them to understand explicit information in short sentences and texts. They are able to combine their decoding skills and their command of spoken language to piece together the literal meaning of a short text.
Level 3	Between 540 and 610 points	21.0%	**Learner reader: moving towards the perfecting of decoding skills, listening skills and understanding of written words** Students at this level have perfected their listening comprehension and decoding skills, enabling them to focus on understanding words. In listening comprehension, they are able to understand explicit information in a short text which uses familiar vocabulary. They are gradually developing links between spoken and written language and thus improving their decoding skills and expanding their vocabulary. In reading comprehension, students are able to identify the meaning of isolated words.
Minimum proficiency level			
Level 2	Between 540 and 610 points	21.0%	**Learner reader: moving towards the perfecting of decoding skills, listening skills and understanding of written words** Students at this level have perfected their listening comprehension and decoding skills, enabling them to focus on understanding words. In listening comprehension, they are able to understand explicit information in a short text which uses familiar vocabulary. They are gradually developing links between spoken and written language and thus improving their decoding skills and expanding their vocabulary. In reading comprehension, students are able to identify the meaning of isolated words.
Level 1	Between 399 and 469 points	18.3%	**Emergent reader: towards developing decoding skills and strengthening listening comprehension skills** Students are able to understand very short-spoken messages that use isolated words and refer to familiar objects. They have great difficulty with decoding the written word and with graphophonological identification (letters, syllables, graphemes and phonemes).
Below Level 1	< 399 points	8.7%	Students below Level 1 do not sufficiently demonstrate the skills measured by this test in the language of instruction. These students struggle with the knowledge and skills of Level 1.

Scores for proficiency levels other than those at the upper and lower ends of the scale fall within an interval. The lower boundary of one level thus becomes the upper boundary of the previous level.

As the data in Table 2.1 show, nearly 44.5% of students were above the minimum proficiency level. By contrast, 55.5% of students did not meet the reach the minimum proficiency level in language of instruction. Students in this second category struggle to improve their decoding skills, listening skills and understanding of written words.

7. This minimum level for language of instruction corresponds to the lower limit of Level 3 of the international proficiency scales, i.e. at least 540 points for the language scale at the start of education.

• Knowledge and skills Level 4

The top level of the PASEC language proficiency scale at the start of primary school describes a set of abilities corresponding to what can be called an 'intermediate reader'. Readers at this level are starting to use the skills that lead to independent reading to understand sentences and texts. Students at Level 4 of the early primary language proficiency scale demonstrate skills in the decoding of written text and in listening comprehension that enable them to understand explicit information in short sentences and texts. They are able to match letters, letter combinations and syllables to the corresponding phonological elements; they can also decode words – in other words, they know the sounds made by sequences of letters. They are able to combine their decoding skills and their command of spoken language to piece together the literal meaning of a short text.

On average across the PASEC*2019* countries, less than a quarter (23.5%) of students reached Level 4 on the language proficiency scale at the start of primary education.

• Knowledge and skills Level 3

Students at this level are consolidating their abilities in the decoding of written text, listening comprehension and written word comprehension. Students at this level have adequate abilities at listening comprehension and decoding, allowing them to focus on understanding words. In listening comprehension, they succeed in understanding explicit information in a short text which uses familiar vocabulary. They are gradually developing links between spoken and written language and thus improving their decoding skills and expanding their vocabulary. In reading comprehension, students are able to identify the meaning of isolated words.

On average, nearly 44.6% of students across the assessment countries attained at least Level 3 and were thus above the minimum proficiency level: 21.1% at Level 3 and 23.5% at Level 4.

• Knowledge and skills Level 2

Students at this level are beginning to develop abilities to decode written text and to strengthen their listening comprehension abilities. They are able to identify words which relate to the same concept. They are developing the first elementary links between spoken and written language, and are able to perform basic decoding, recognition and graphophonological identification tasks (letters, syllables, graphemes and phonemes).

On average, 28.5% of students in PASEC*2019* countries were at Level 2 on the language proficiency scale.

• Knowledge and skills Level 1

Students at this level are only able to complete the least complex tasks in the PASEC tests. The skills shown by these students relate to the level of initial contact with spoken and written language. They are able to understand very short-spoken messages that use isolated words and refer to familiar objects. They have great difficulty with decoding the written word and with graphophonological identification (letters, syllables, graphemes and phonemes).

In the assessment countries as a whole, an average of 18.3% of students were at this level of the language proficiency scale.

• Below knowledge and skills Level 1

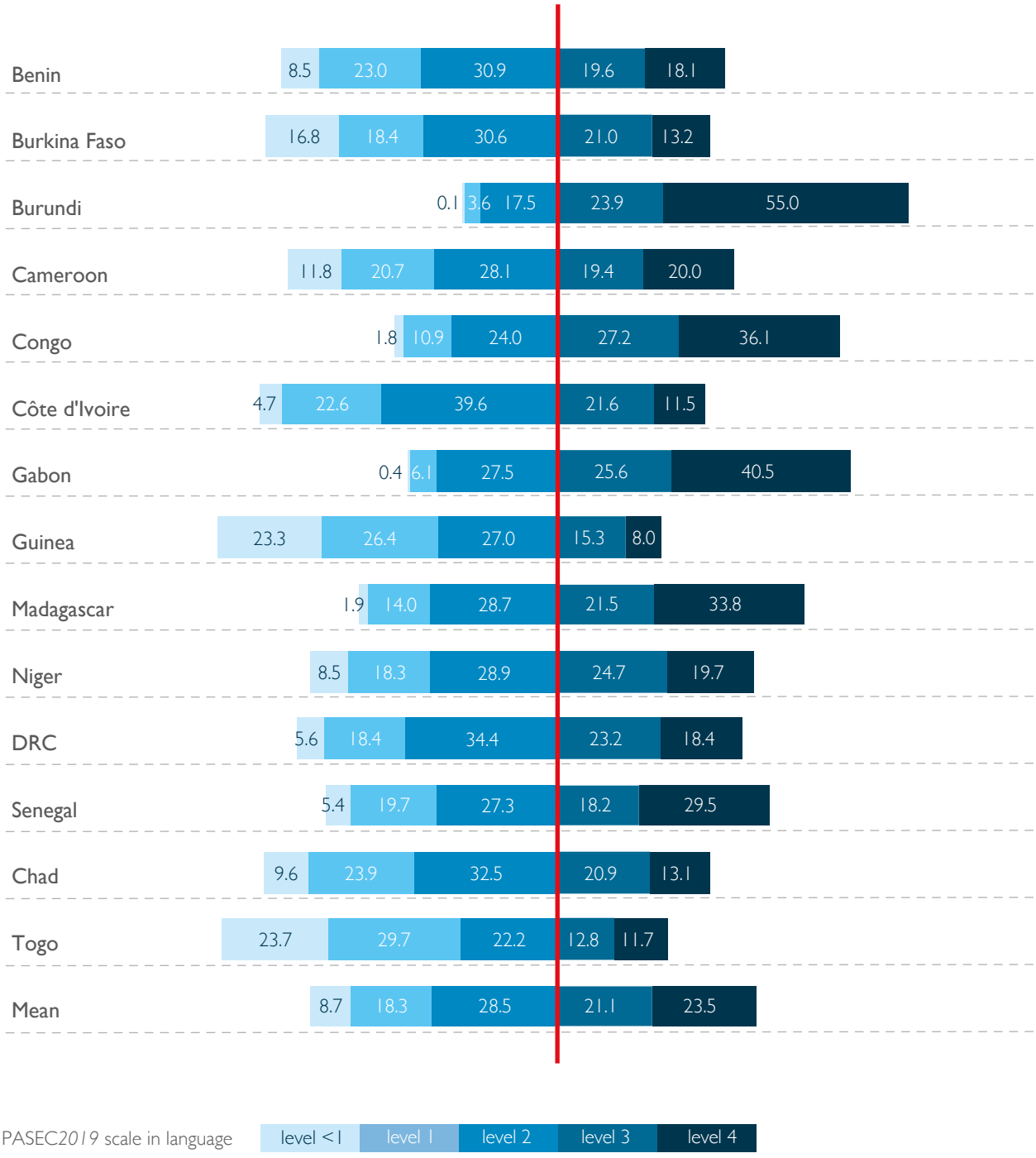
Students scoring less than 399 points do not reach Level 1 on the language proficiency scale. This means that they are routinely unable to apply the most basic knowledge and skills that the PASEC survey seeks to measure. However, this should not be taken to mean that these students have no language skills. Their difficulties are such that they are unable to solve more than half of the items in tests consisting exclusively of Level 1 tasks; this explains why they are placed below Level 1. They find it very hard to use the language of instruction to extend and improve their knowledge and skills in other areas and may have great difficulty in continuing their educational career.

Nearly 8.7% of students across the PASEC*2019* countries were at this level.

2.1.1.2. Distribution of students across the different proficiency levels in language of instruction by country

Figure 2.1 shows, for each country, the percentage of students per language proficiency level. The percentages are distributed on either side of the minimum proficiency level, shown as a red line on the figure. The figure also shows the percentage of students reaching each level on the proficiency scale.

Figure 2.1: Percentage of students per language of instruction proficiency level - Early primary



Analysis of this figure reveals the following points:

- Countries where the majority of students were above the minimum language proficiency level:

Burundi (78.9%), Gabon (66.1%), Congo (63.3%) and Madagascar (55.3%) all had a significant proportion of students above the minimum proficiency level for language of instruction in the PASEC*2019* assessment. Across these four countries, most students who had reached the minimum proficiency level were at the highest level of the scale. The percentage of students above the minimum level was even more remarkable in Burundi, where more than half (55.0%) of the students assessed were at the highest level.

- Countries where most students were below the minimum language proficiency level:

A significant proportion of students in ten out of the 14 countries in the PASEC*2019* assessment did not attain the minimum proficiency level in language of instruction.

Among these countries, Senegal (52.4%), Niger (55.7%) and the DRC (58.4%) had a small majority below the minimum level. By contrast, large proportions of students in Guinea (76.7%), Togo (75.6%), Côte d'Ivoire (66.9%), Chad (66%), Burkina Faso (65.8%), Benin (62.4%) and Cameroon (60.6%) lacked the skills that would allow them to continue their schooling without difficulty. However, across all of these ten countries, at least a quarter of students were at or below Level 1 of the proficiency scale. Large proportions of students have great difficulty learning the language of instruction in these countries. Those falling below Level 1 of the scale do not sufficiently demonstrate the most basic skills measured in the language of instruction.

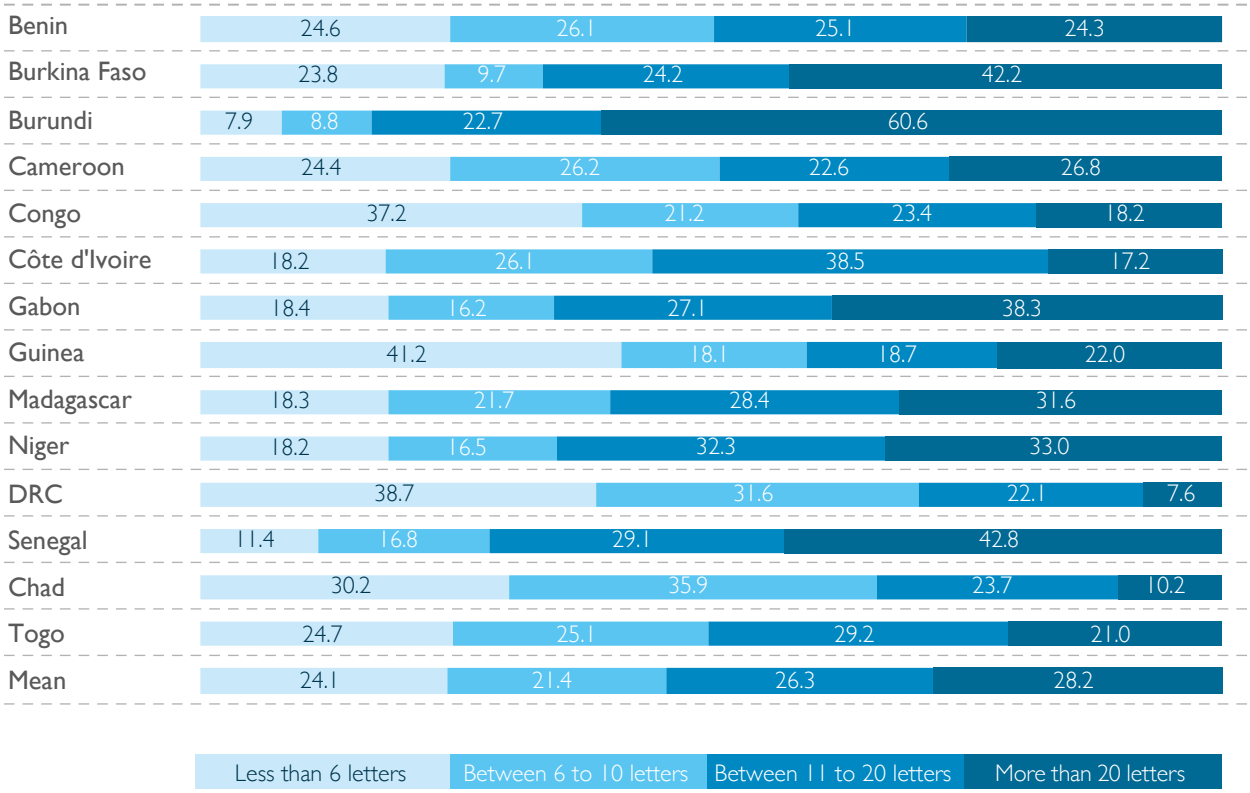
2.1.1.3. Student performance in two key language skills

2.1.1.3.1. Reading the letters of the alphabet with easet

Knowledge of the letters and the ability to name them rapidly are among the cognitive skills which are defined as positive factors for the development of reading (Foulin, 2005; Bowers & Newby-Clark, 2002). Letter identification has been recognised for decades as the skill most closely associated with reading success at age seven (Blatchford, Burke et al., 1987). At the start of primary education, knowledge of the letters of the alphabet is the first form of learning that links the written and spoken units of language. Learning the letters' names also provides numerous clues for deducing their sounds and thus establishing the first grapheme-phoneme correspondences (Treiman, 2006).

Fluency in reading the letters of the alphabet was measured in the PASEC*2019* assessment. Knowing the letters and being able to read them with ease is an essential prerequisite for further learning in the language of instruction. Unsurprisingly, it is also linked to students' overall performance in language, as students who cannot read the letters of the alphabet will be unable to understand the meaning of words, sentences or texts.

Figure 2.2: Percentage distribution of students by the mean number of letters read correctly in 1 minute - Early primary



As shown in Figure 2.2, nearly 72% of students at the start of primary education across the PASEC*2019* countries were unable to read more than 20 letters in 1 minute with ease. This trend was even more pronounced in half the countries in the assessment, where more than 75% of students were in this position: DRC (92.4%), Chad (89.2%), Côte d'Ivoire (82.8%), Congo (81.1%), Togo (79%), Guinea (78%) and Benin (75.7%). Research has shown that the failure to master at least 80% of the alphabet is a major obstacle to the acquisition of reading skills (Seymour et al., 2003).

However, student performance was significantly better in countries such as Burundi (60.6%), Burkina Faso (42.2%) and Senegal (42.8%), where large proportions of students could read more than 20 letters per minute with ease. These students had reached a level of fluency in reading letters that allowed them to focus their attention on more complex decoding activities and on the meaning of what they were reading (INSERM, 2007; National Institute of Child Health and Human Development, 2000).

2.1.1.3.2. Reading familiar words with ease

Reading relies on the fundamental process of identifying written words. This is done by associating letters or letter groups (graphemes) with sounds of the language (phonemes) which combine to form syllables and words, recognised from their oral form. The ability to read therefore implies that the identification of words through decoding is sufficiently automated to enable understanding. This automation, known as reading fluency, relies on the ability to read words quickly and accurately in a given time (Fuchs, Fuchs & Hosp, 2001). Fluency in reading aloud is recognised as a direct predictor of good reading comprehension (Woods, 2006; Reschly, Busch et al., 2009). To assess this at the start of primary education, PASEC assigns a fluency score, i.e. the number of isolated[8] and familiar[9] words read correctly in a minute. Students are asked to read each word within a maximum time of five seconds. This time constraint limits the decoding of words by the sublexical route[10] and aims to identify students who have already reached a level of decoding of written text that enables them to use the lexical route[11]. The automation of the reading of common words during reading comprehension instils and sustains the desire to read in students..

Figure 2.3: Percentage distribution of students by the mean number of words read correctly in 1 minute - Early primary

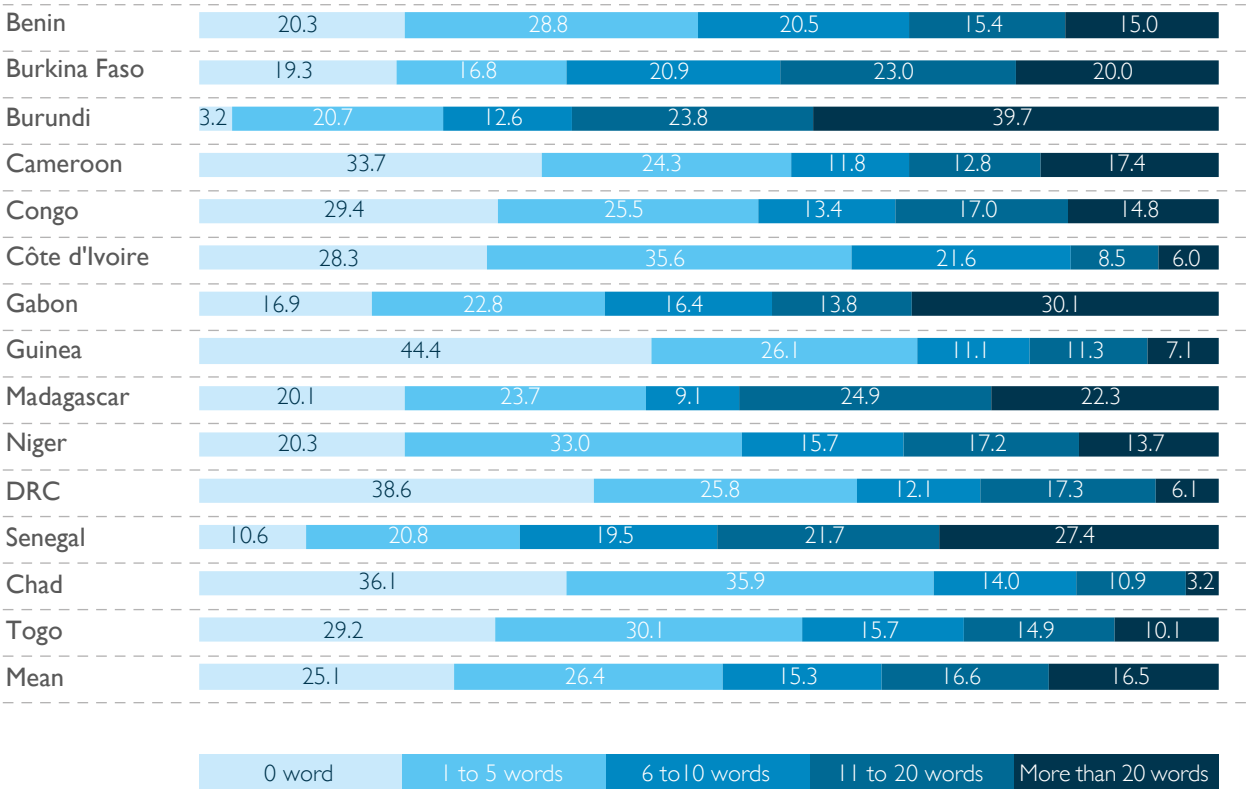


Figure 2.3 shows the distribution of students nationally and internationally by the number of words read in 1 minute. On average across the countries, more than 51% of students were unable to read more than five words correctly in the allotted time. More than 25% of students were unable to read any of the familiar words in the test (you - one - go - man - the - and - she - boy - his). This finding was even more marked in four countries where more than a third of students were unable to read a single word in the test correctly: Guinea (44.4%), DR Congo (38.6%), Chad (36.1%) and Cameroon (33.7%).

8. Preventing students from picking up clues in a text in order to read the word.

9. The words most commonly encountered at school.

10. The sublexical route is used for reading new words using correspondences between phonemes and graphemes.

11. The lexical route is used for the automated reading of familiar and irregular words. It makes fluent, rapid reading possible, enabling the reader to concentrate on understanding the text.

However, in five countries in the assessment, students demonstrated genuine beginner reading skills: in Burundi (63.5%), Senegal (49.1%), Madagascar (47.2%), Gabon (43.9%) and Burkina Faso (43%), more than 40% of students were able to read at least 11 to 20 words correctly in a minute.

Overall, the results of the students across all countries highlighted their difficulties with a basic skill which is required at the start of primary education, namely reading familiar words with ease. This poor level of decoding ability calls for reflection about the teaching and pedagogical factors that may affect the learning of reading in the PASEC assessment countries.

It can be seen that the highest-scoring countries had the highest percentages of students who could read more than 20 words, for example, with ease.

2.1.2. Mathematics performance profile at the start of primary education

2.1.2.1. Performance profile on the mathematics proficiency scale

Table 2.2 shows the PASEC*2019* mathematics proficiency scale at the start of primary education. The minimum proficiency level in mathematics is marked with a red band in the table.

Table 2.2: PASEC*2019 mathematics proficiency scale – Early primary*

Level	Score[12]	Percentage of students at that level	Description of skills
Level 3	> 577 points	37.5%	Students are familiar with the verbal number sequence (they can count up to 60 in two minutes) and are able to read numbers, compare numbers, complete number series and perform operations (addition and subtraction) on numbers greater than 50. They can use reasoning in basic problems involving numbers less than 20.
Level 2	Between 489 and 577 points	33.7%	Students can read numbers, compare numbers, complete logical series and perform operations (addition and subtraction) on numbers less than 50. They can work with the concepts of location in space (e.g. in front of, on top of, etc.). They are beginning to develop reasoning skills in basic problems involving numbers less than 20. They can also identify most simple geometric shapes.
Minimum proficiency level			
Level 1	Between 400 and 489 points	21.5%	Students are gradually developing their knowledge of mathematical language: they are beginning to read the first numbers (less than 10) and have an initial understanding of quantity (counting, comparison) with numbers less than 20. They show awareness of the relative size of objects and are beginning to identify the first simple geometric shapes.
Below Level 1	< 400 points	7.3%	Students at this level do not sufficiently demonstrate the skills measured by this test in mathematics. These students struggle with the knowledge and skills of Level 1.

12. The scores for each level on the scale are presented as an interval. For example, for the level called 'below level 1', students have a score of less than 400 points.

In mathematics, 28.8% of students across the 14 countries did not achieve the minimum proficiency level. These students are more likely than those above the minimum level to lack the mathematical skills necessary for reading numbers, comparing numbers, completing logical series and/or performing operations (addition and subtraction) on numbers less than 50.

The description of each level of the scale can be summarised as follows:

• Knowledge and skills Level 3

At the highest level of the mathematics proficiency scale at the start of primary school, students are comfortable as they discover the numbers. They can count to 60 in two minutes, and are able to engage in reading numbers, counting objects, comparing and recognising a pattern in an organised series of numbers which they can correctly complete. They are able to add and subtract with numbers greater than 50. They can use reasoning in basic problems involving numbers less than 20.

On average, in all PASEC countries, 37.5% of students reached Level 3 on the mathematics proficiency scale. Level 3 accounted for the largest share of students on the proficiency scale. This proportion of students at the top of the proficiency scale indicates good overall performance in the basic mathematics skills at the start of schooling in the assessment countries.

• Knowledge and skills Level 2

This is the first level above the minimum proficiency level on the mathematics scale. Students at this level can read numbers, compare numbers, complete logical series and add and subtract numbers less than 50.

They have a good understanding of the concepts of location in space. They have acquired reasoning skills in basic problems involving numbers less than 20. They can also identify most of the basic geometric shapes.

On average, across all the countries in the assessment, 71.2% of students reached at least Level 2 and demonstrated the baseline skills for learning mathematics at the start of primary education. This percentage includes students at Levels 3 and 2 of the mathematics proficiency scale.

• Knowledge and skills Level 1

The most basic mathematical items on the PASEC assessment at the start of primary education are those at Level 1. Students at this level are only able to perform the least complex mathematical tasks. They are beginning to acquire mathematical language: they can read the first numbers (less than 10) and have an initial understanding of the expression of quantity involving numbers less than 20. They are able to distinguish the relative size of objects and are beginning to identify the first simple geometric shapes.

On average, across the assessment countries, 21.5% of students were at the lowest level on the mathematics proficiency scale. These students, who are located below the minimum proficiency level, have skills that could be described as 'weak' at the start of schooling. Care must be taken to prevent them from encountering significant difficulties as their education progresses.

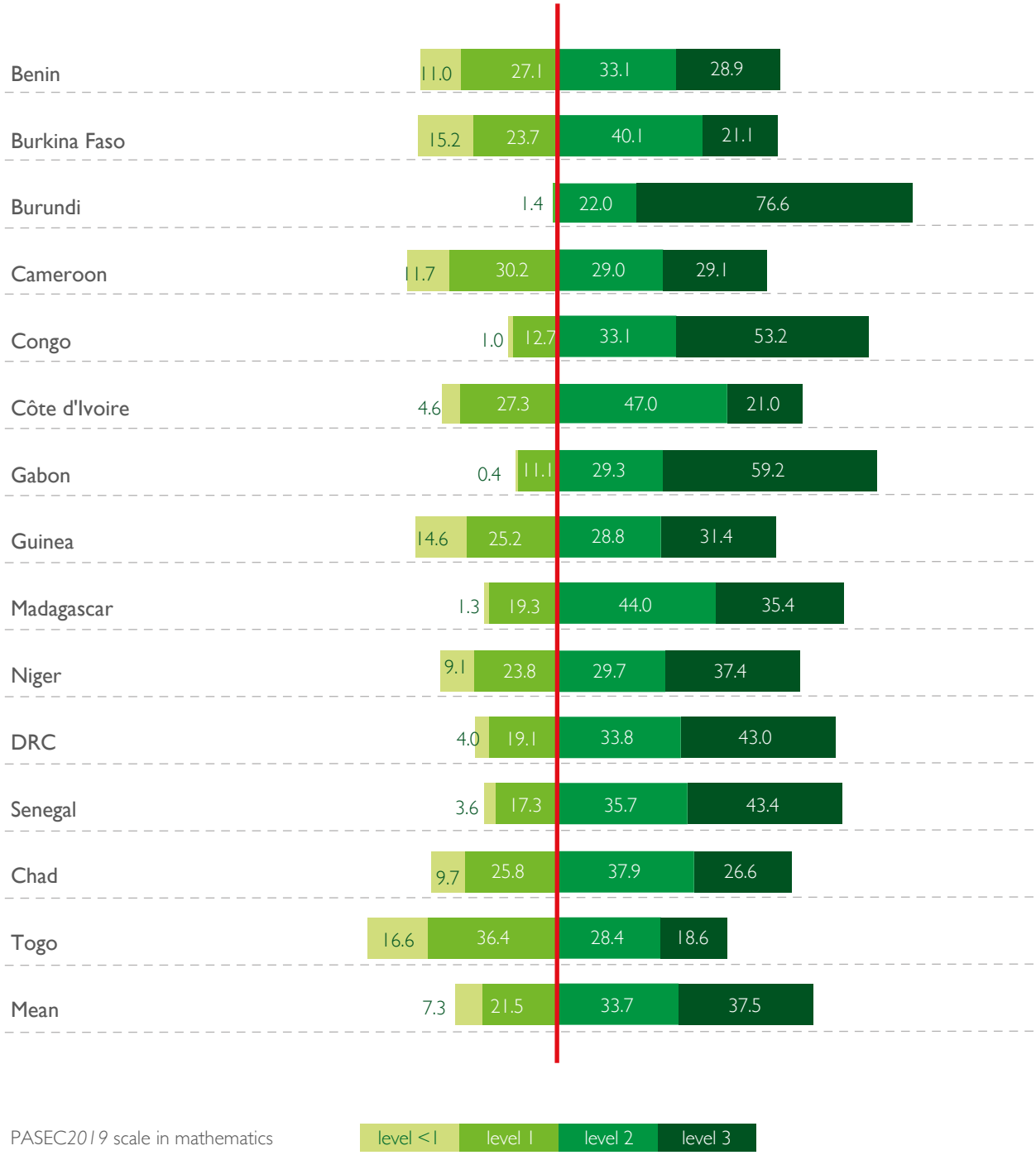
• Below knowledge and skills Level 1

These students do not sufficiently demonstrate the mathematics skills measured by PASEC in the language of instruction. However, this should not be taken to mean that they have no mathematics skills. They are placed below Level 1 because their performance indicates that they would be unable to solve more than half of the items in tests consisting exclusively of PASEC Level 1 tasks. These students therefore have very few mathematical skills at the start of schooling. They need sustained help in order to catch up and engage properly in the early years of school learning. Overall, 7.3% of students across the PASEC*2019* countries were below Level 1.

2.1.2.2. Distribution of students across the different proficiency levels in mathematics by country

Figure 2.4 shows, for each country, the percentage of students per mathematics proficiency level. The percentages are distributed on either side of the minimum proficiency level, shown as a vertical red line. The figure also shows the percentage of students reaching each level on the proficiency scale.

Figure 2.4: Percentage of students per mathematics proficiency level - Early primary



The vast majority of countries assessed had more students in the higher part of the scale, above the minimum proficiency level. Burundi in particular stood out from the other countries, with 98.6% of students above the minimum proficiency level.

It was followed by five countries with a relatively high percentage of students above the minimum level: Gabon (88.5%), Congo (86.3%), Madagascar (79.4%), Senegal (79.1%) and DRC (76.9%).

In a second group of countries (Côte d'Ivoire, Niger, Chad, Benin, Burkina Faso, Guinea and Cameroon), between 58.1% and 68.1% of students were above the minimum level.

Togo was the only country where less than 50% of students were above the minimum level.

2.1.2.3. Student performance in two key mathematics skills

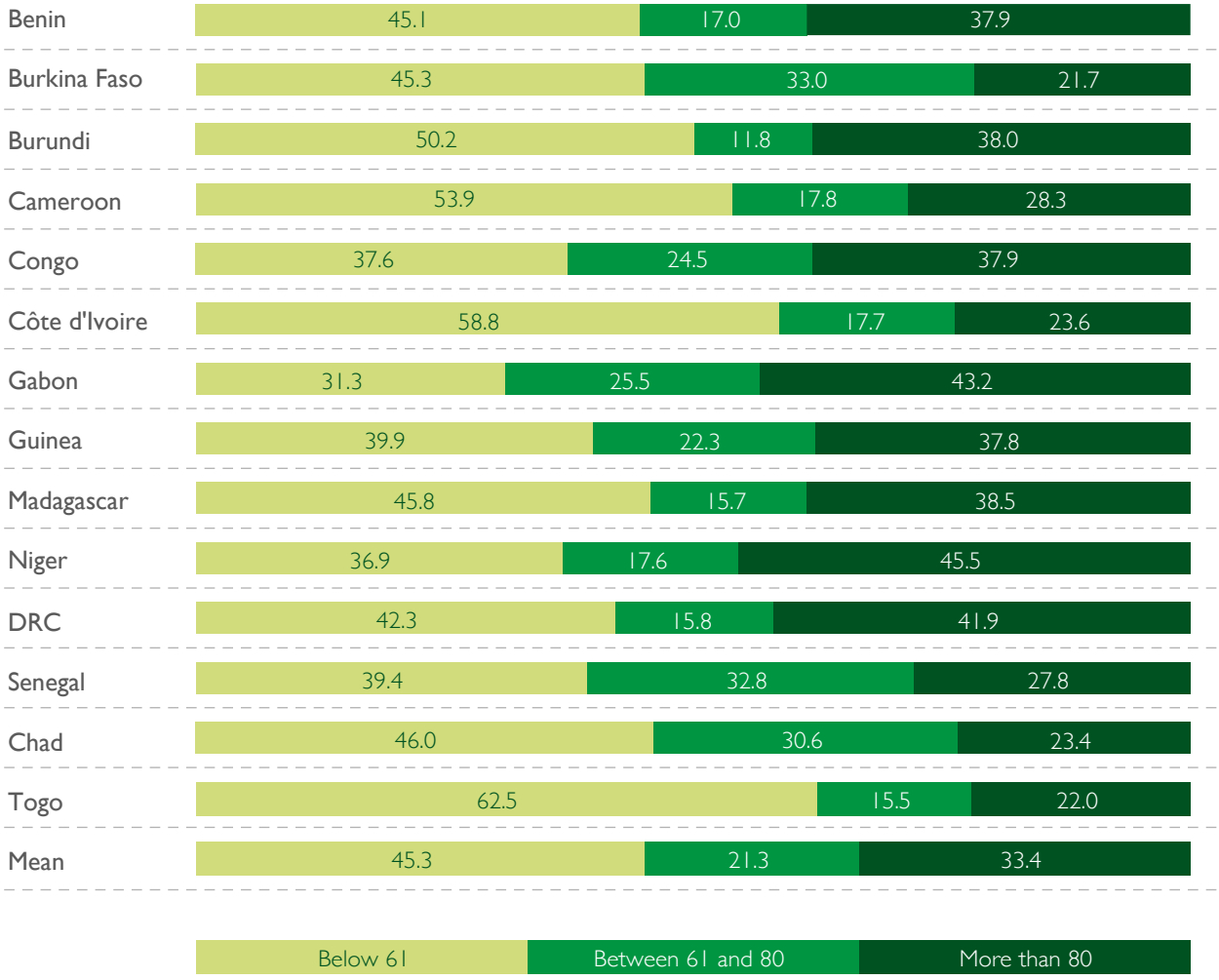
2.1.2.3.1. Counting to 100

Verbal knowledge of the numbers up to 100 in the correct order is usually achieved by the start of the second grade of primary school (Fuson and Hall, 1983; Fuson, Richard and Briars, 1982), around the age of 7 (Meyer, 2015). Recitation of the verbal number sequence is defined as one of the basic components in counting and is a fundamental cognitive and linguistic prerequisite for the development of arithmetic skills (Pesenti and Rousselle, 2001). PASEC measures the ability of students at the start of primary school to count aloud to 100 in two minutes in the language of instruction.

Learning the verbal number sequence is usually a slow and difficult process for children. It requires memorisation skills, familiarity with the numbers and an understanding of how the number sequence is organised. Intercultural studies carried out in the 1990s showed that the regularity and length of time spent learning and memorising the chanted number sequence were both factors in the degree of difficulty experienced in acquiring this skill. The difficulty of learning to count may vary with the regularity and length of the names of the numbers in different languages (Fayol, 2005), but also with the transparency of the additive (and multiplicative) logic in the verbal number sequence[13]. The numerical vocabulary in French is defined as complex and irregular in this sense[14] (Fayol, 2002).

13. For example, this additive logic is only found in the French language from the number 17 onwards; the words for smaller numbers have to be memorised.
14. For example, 11, 12, 70 and 90 are irregular numbers in French.

Figure 2.5: Percentage distribution of students by the highest number reached in counting out loud - Early primary



As shown in Figure 2.5, 45.3% of students across the assessment countries could not count up to 61. More than half of students in Togo (62.5%), Côte d'Ivoire (58.8%), Cameroon (53.9%) and Burundi (50.2%) had not mastered the verbal sequence of numbers up to 60. However, in a small majority of countries, more than a third of students could count to over 80: Niger (45.5%), Gabon (43.2%), DRC (41.9%), Madagascar (38.5%), Burundi (38%), Benin (37.9%), Congo (37.9%) and Guinea (37.8%).

Students' results varied both from country to country and within countries, but revealed difficulties with learning the verbal number sequence. These difficulties raise questions about teaching and learning conditions and practices about quantities and numbers in early primary education. However, any analysis should take account of the regularity and length of number names in the languages of instruction, and of students' level of comprehension and oral expression in those languages.

2.1.2.3.2. Solving addition and subtraction problems

At the start of primary education, students can find it hard to make the transition from an analogical approach using representations to a symbolic approach which is more abstract and uses codes, logic and reasoning. Most students who have difficulty in mathematics show weakness in abstraction about symbolic numbers, whole numbers, number relationships, and number operations. Some students have a tendency when performing calculations to make use of 'immature' methods[15] which derive from their analogical conception of numbers, and this can pose problems for more complex operations later on (Fayol, 2012). Students' ability to solve basic addition and subtraction problems provides an indication of their progress in handling numbers and the rules of calculation operations (Fayol, 2002). These components, the learning of which is partly based on knowledge of the number sequence (Carpenter, Moser & Romberg, 1982; Fuson, 1982) are assessed by PASEC.

Table 2.3: Percentage of correct answers to addition and subtraction problems - Early primary

	Nature of operation					
	8+5	**13-7**	**14+23**	**33+29**	**34-11**	**50-18**
Benin	63.4	40.2	45.7	27.0	34.8	21.0
Burkina Faso	66.4	55.6	43.5	27.2	40.0	25.9
Burundi	88.3	72.4	73.3	57.3	62.6	38.5
Cameroon	60.3	39.6	34.9	19.3	29.1	17.2
Congo	86.3	70.0	71.0	48.5	62.8	36.5
Côte d'Ivoire	71.1	58.1	49.5	18.3	16.5	10.6
Gabon	82.6	58.0	58.2	33.3	48.6	19.1
Guinea	62.9	40.7	39.2	21.8	27.7	18.3
Madagascar	75.2	53.2	43.7	25.2	34.3	17.5
Niger	68.0	50.1	47.5	31.5	38.3	18.5
DRC	68.2	52.8	37.6	23.5	32.2	27.8
Senegal	77.9	62.5	56.5	36.6	49.5	34.7
Chad	68.8	47.7	45.1	23.1	37.6	20.4
Togo	53.0	22.5	33.1	18.9	17.5	7.6
Mean	*70.9*	*51.7*	*48.4*	*29.3*	*37.9*	*22.4*

15. Counting on the fingers.

Table 2.3 shows the percentage of students in each country who managed to solve each of the addition and subtraction problems in the test within a defined time period.

After at least two years of schooling, across all countries, more than 70% of students were able to complete a simple addition (e.g. 8+5) involving numbers under 10 and with a result below 20 within 1 minute. However, more than half of the students (51.6%) could not solve an addition problem involving numbers above 20, even when no regrouping was required (e.g. 14+23). Less than 30% could perform this type of addition when regrouping was required (e.g. 33+29).

For subtraction, across the countries as a whole, almost half the students (48.3%) were able to complete an operation involving regrouping with numbers above 10 (e.g. 13-7). 37.9% could complete subtractions without regrouping with numbers above 20 (e.g. 34-11), and 22.4% could solve a subtraction problem correctly involving regrouping with numbers above 20 (e.g. 50-18).

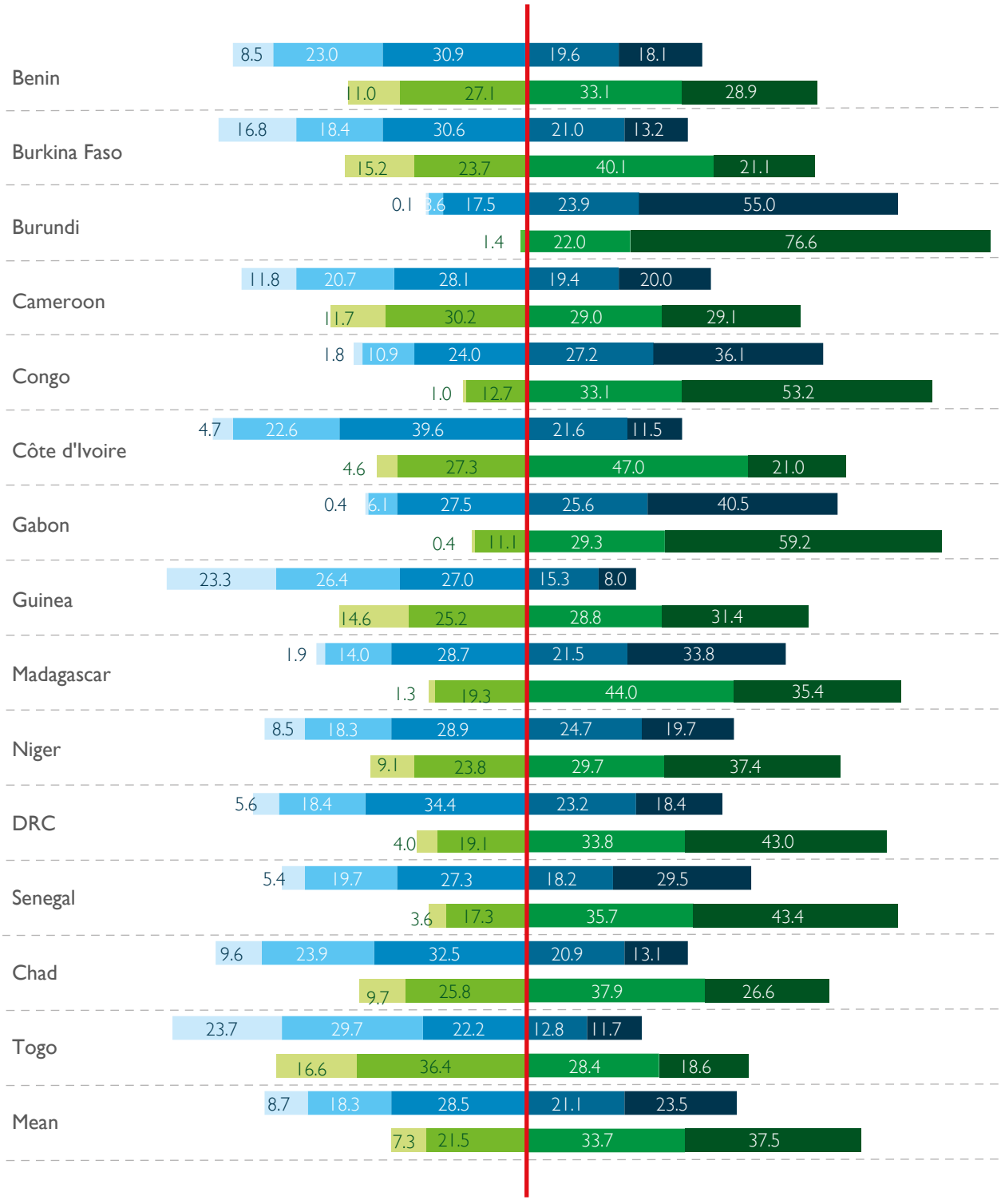
Students' performance varied by country and the nature of the operation. However, they generally found it harder to solve problems involving numbers above 20. They had even more difficulty when these operations involved regrouping.

Students' poor mastery of skills required for simple arithmetic calculations (addition and subtraction) is a challenge to education systems. It suggests that more reflection and action is needed to ensure coherence between school curricula, teaching/learning conditions and practices in mathematics at the start of primary education, the development of students' initial skills in mathematics in their first language and the transfer of these skills to the language of instruction.

Figure 2.6 shows the percentage of students per level of proficiency achieved in language of instruction and mathematics. The blue bars show the percentage of students who reached a particular level in language; the green bars show the percentage reaching a particular level in mathematics[16]. The vertical red line indicates the minimum proficiency level.

16. To make the illustrations in this report easier to read, this colour code will be used for all figures.

Figure 2.6: Percentage of students per language and mathematics proficiency level - Early primary



Analysis of this figure shows that the distribution of students on the proficiency scales was much better in mathematics than in language of instruction. Although more than 50% of students in Burundi, Congo and Gabon exceeded the minimum proficiency level in language, the distribution of students on the language scale gave more cause for concern in the other countries.

2.1.3. Student performance differences in language and mathematics at the beginning of primary education

In the first part of this chapter, the quality of learning outcomes in the different countries has been presented in terms of the distribution of students on the proficiency scales in language of instruction and mathematics at the start of primary education. The mean scores are given in Tables B2.7 and B2.8 of the annex to this report. This aspect of the results hides certain differences, the analysis of which will give a better idea of countries' degree of efficiency. In this part, the aim is to examine the difference in students' proficiency levels in early primary education not just in terms of the performance gaps between the top- and low-performing students in language and mathematics, but also in a more general manner through international comparison. Greater or lesser homogeneity may arise not only from the characteristics of schools and/or students, but from the capacity of education systems to reduce or amplify the differences in performance between students in the early years of primary education.

2.1.3.1. Mean performance and score differences at the beginning of primary education

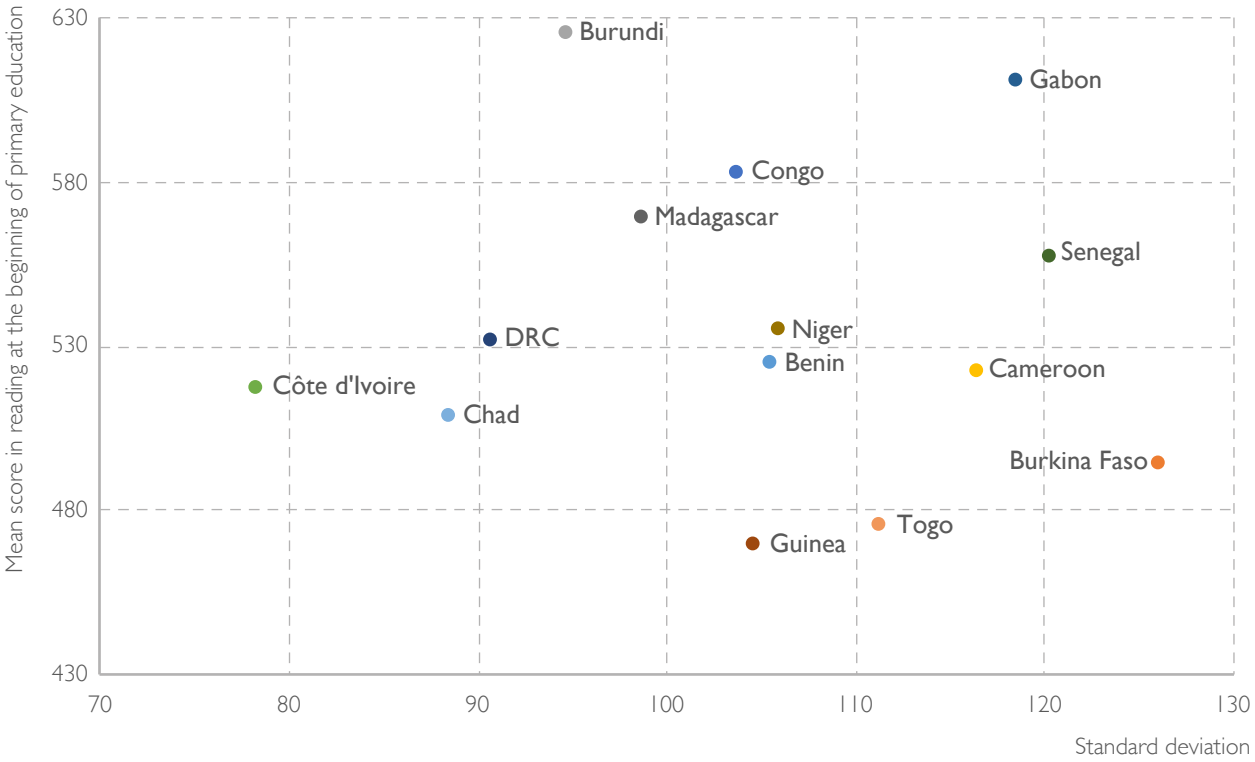
The relationship between the mean score and its standard deviation reflects the variation of student scores around the national mean, which also gives a picture of the education system's equity, especially in comparison with the situation in other countries.

Thus, a high mean score with a low standard deviation would result from an education system that is both effective and equitable, with students performing close to the national mean. Conversely, a high mean score and a high standard deviation would reveal an education system that performs strongly but is not very equitable. A low mean score with a low standard deviation would show students performing consistently weakly around the national mean. All the students would thus be implicated in the country's weak performance.

In Figure 2.8, therefore, countries with an effective and equitable education system should be found in the upper left quadrant, while those with an absolute equity problem will appear in the right half quadrant.

Figures 2.7 and 2.8 present countries' performance coupled with the variation of student scores around the mean. These figures are intended to give a general idea of the homogeneity of students' results in language and mathematics in early primary education; more in depth analysis will be provided in Chapter 3 in an attempt to identify possible factors to explain these inequalities..

Figure 2.7: Link between mean language of instruction scores and standard deviations - Early primary

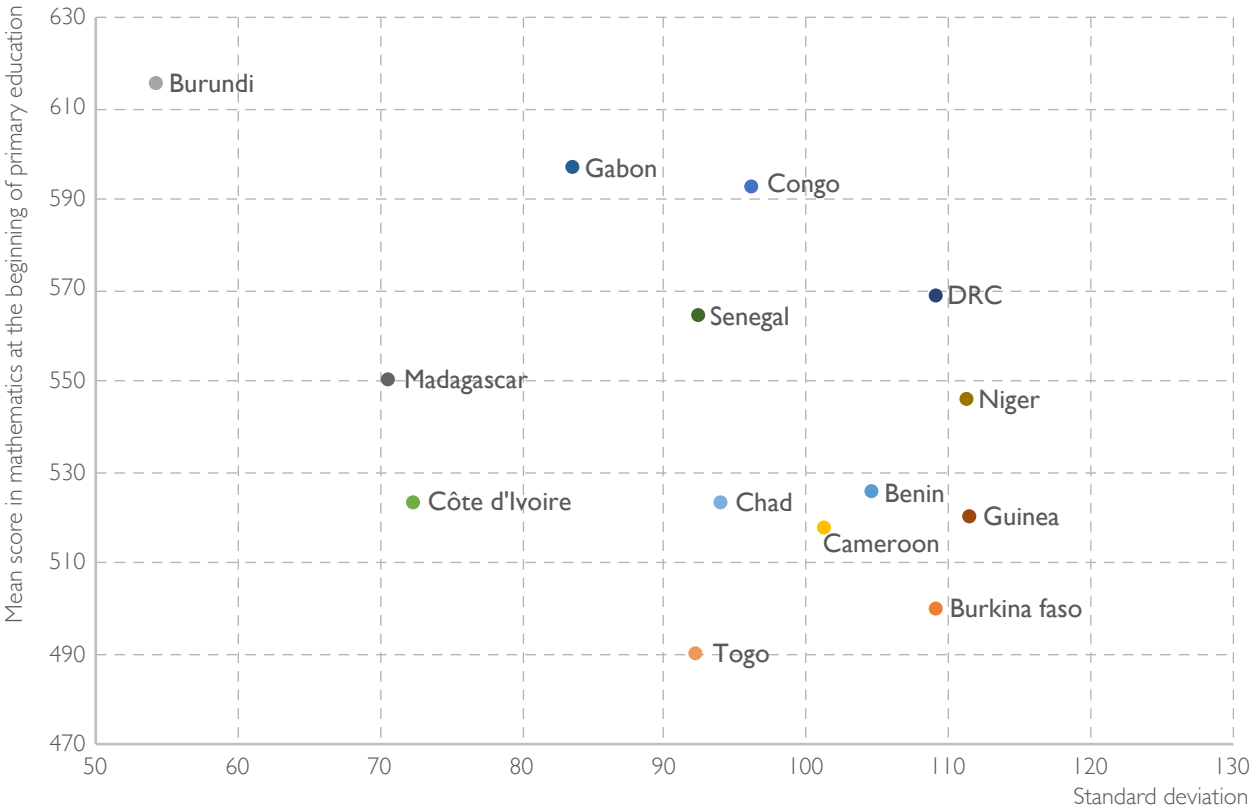


Among the countries that performed strongly in language of instruction, the scores of students in Burundi (625 points), Congo (582.4 points) and Madagascar (568.8 points) were more centred around the national mean at the start of primary education (with standard deviations of 94.7, 103.8 and 98.8 respectively) than countries such as Gabon (610.3 points) and Senegal (557.1 points) which, despite their high mean performance in language, were among the countries where the heterogeneity of students' scores was also very high (with standard deviations of 118.7 and 120.4 respectively).

For countries with a mean performance below the international mean (537 points with a standard deviation of 114), several profiles in terms of score variation emerged:

- with very low mean scores in language of instruction, Guinea (469.0 points), Togo (474.9 points) and Burkina Faso (493.5 points) had a relatively high level of score variation: 104.7, 111.4 and 126.2 respectively;
- Cameroon (522.2 points) and Côte d'Ivoire (516.6 points) were particularly different in student score variation in language: while students' scores were more centred around the national mean in Côte d'Ivoire with a standard deviation of 78.4 (the lowest value of any participating country), they were more heterogeneous in Cameroon (522.2 points) with a standard deviation of 116.6. Cameroon came after Burkina Faso, Senegal and Gabon in terms of student score variation.
- Niger (534.7 points) and Benin (524.8 points) were like one another both in the level of national mean performance and in the degree of homogeneity of their students' scores. At an equivalent level of performance, the two countries had standard deviations of 106.1 and 105.6 respectively.

Figure 2.8: Link between mean mathematics scores and standard deviations - Early primary



In mathematics, Burundi (614.4 points) stood out with the highest mean score of any country participating in the PASEC*2019* assessment and a significantly lower standard deviation of 54.4.

Gabon (595.9 points) and Congo (591.9 points), which had relatively high mean scores, were also marked by a moderate level of variation, reflecting low heterogeneity in students' scores.

Both Senegal (563.4 points) and Madagascar (549.7 points) outperformed the overall mean in mathematics of PASEC*2019* participating countries (544.5 points). However, the standard deviation of mean student scores was more marked in Senegal (92.2) than in Madagascar (70.6). The same level of variation as in Madagascar was found (to within 2 units) in Côte d'Ivoire (522.5 points), which performed below the PASEC*2019* mean.

Benin (525.1 points), Chad (522.4 points) and Cameroon (516.7 points) had mean performances similar to that of Côte d'Ivoire, but their scores were more widely scattered around the mean. Thus, students from Benin had more heterogeneous mean scores than those from Cameroon and Chad, with standard deviations of 104.7, 101.4 and 94 points respectively.

In contrast to Burundi, Togo had a lower mean performance (489.4 points), with a variation of student scores reflected in a standard deviation of 92.2 points.

The DRC (567.8 points), Niger (544.9 points), Guinea (519.3 points) and Burkina Faso (498.7 points), while differing in terms of mean level of proficiency, presented very similar levels of variation. These were the countries with the highest standard deviations, ranging from 109.2 in DRC to 111.5 in Niger and Guinea.

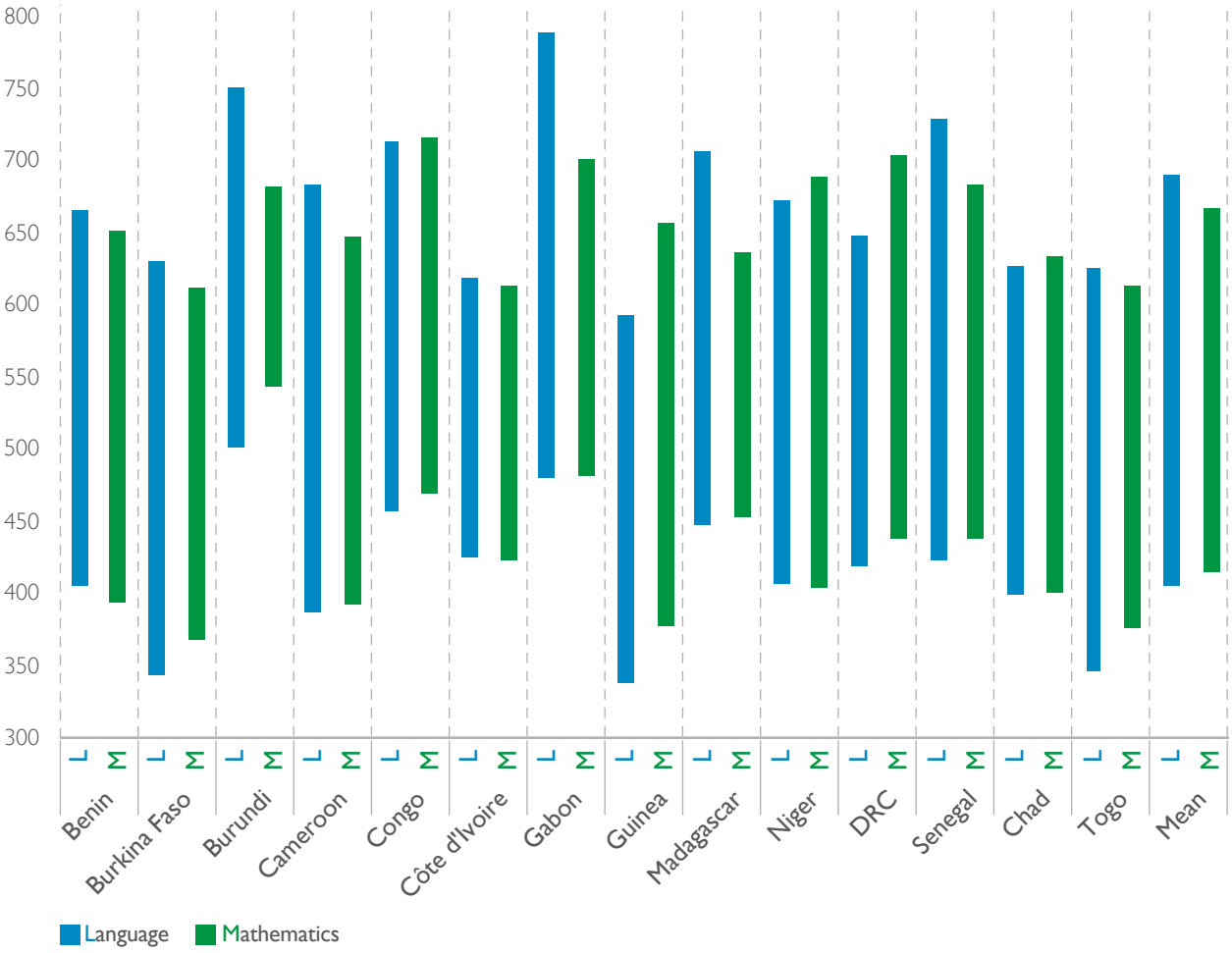
2.1.3.2. Performance gap between the top-and low-performing students in language of instruction and mathematics at the beginning of primary education

The difference in student performance is analysed here in terms of the difference between the score of students at the 90th percentile (the top performers) and those at the 10th percentile (the low performers).

This performance difference between top and low performers may be due to several factors, including socio-economic status. In analysing the performance gaps between students and/or analysing the factors involved in their achievement, the link between socio-economic status and performance is examined closely at times – an approach generally referred to as 'social determinism' – as this will provide pointers for education policies to help struggling students from disadvantaged socio-economic backgrounds. For example, Monseur and Baye (2015) analysed the link between social and cultural origin and performance in the low- and top-performing 10% of students.

Figure 2.9 shows the performance gap observed between the top-performing and low-performing students. The data illustrate the differences between the performance of countries' top performers (90th percentile) and low performers (10th percentile) in language of instruction (blue segments) and mathematics (green segments).

Figure 2.9: Performance gap between the top- and low-performing students in language of instruction and mathematics - Early primary



Note: The scores are presented on the yaxis in this figure. The blue (language) and green (mathematics) segments show the gap between the 90th percentile at the higher end and the 10th percentile at the lower end of the scale. For each subject, the top-performing 10% of students in each country score at or above the top of the bar, while the low-performing 10% in each country score at or below the bottom of the bar. The longer the bar, the greater the difference in score between the top- and low-performing students, and vice versa

In language of instruction, almost all countries showed large gaps between the top and low performers. Apart from Côte d'Ivoire, where there was a gap of 193.3 points, all the other countries had gaps of more than 220 points.

The performance gaps were most pronounced in Gabon (308.2 points), Senegal (305.4 points), Cameroon (296.2 points), Burkina Faso (286.7 points) and Togo (278.6 points). The other countries had gaps ranging between 265.5 points for Niger and 227.7 points for the DRC and Chad.

Burundi, which had the highest performance in language and mathematics of any country, had a gap of 250.2 points, while Gabon, which came just after Burundi in terms of performance, showed the greatest level of variation (308.2 points) of any country.

In mathematics, Burundi was the country with the smallest gap (138.2 points) between the low- and top-performing students, followed by Madagascar (183.2 points) and Côte d'Ivoire (190.5 points).

The performance gaps between the low- and top-performing students were most pronounced in Niger (284.2 points) and Guinea (280.3 points). The other countries had gaps ranging between 218.4 points for Gabon and 266.0 points for the DRC.

In both subjects (language of instruction and mathematics), Burundi was the country with the highest performance and the one with the smallest performance gaps between the top- and low-performing students.

It can also be seen that students in Senegal outperformed those in Burkina Faso, but the two countries had an almost identical performance gap between the low- and top-performing students.

2.1.4. Mean scores in language of instruction and mathematics at the beginning of primary education

Comparing countries' mean scores per subject in the PASEC*2019* assessment on a common continuum makes it possible to appraise the mean level of performance of a country not only in relation to the other countries participating in the survey but also in relation to the PASEC*2019* mean performance. The colour codes on the international score scales in Figure 2.10 show for each country whether its mean score was close to, higher or lower than the mean of the PASEC*2019* country scores.

Figure 2.10, below, shows the position of the average score of each country, by subject, relative to the average score of the 14 countries participating in the PASEC*2019* assessment. However, these comparisons provide no information about the level of significance of the differences between the countries' scores, and there-fore cannot be used systematically to compare countries' performances.

Figure 2.10: Position of countries' mean scores relative to the international mean in language of instruction and mathematics - Early primary

Note : La barre horizontale rouge indique le Level de la Mean calculée sur les 14 pays.

In language of instruction, five out of the 14 countries participating in the PASEC*2019* assessment had a mean score above the international mean of 537.1 points at the beginning of primary education. These were Burundi (625 points), Gabon (610.3 points), Congo (582.4 points), Madagascar (568.8 points) and Senegal (557.1 points).

Niger's mean score of 534.7 points was close to the mean of the 14 participating countries.

The mean scores of the DRC (531.0 points), Benin (524.8 points), Cameroon (522.2 points), Côte d'Ivoire (516.6 points), Chad (508.5 points), Burkina Faso (493.5 points), Togo (474.9 points) and Guinea (469.0 points) were below the international mean, with Togo and Guinea achieving very low mean scores.

In mathematics, six countries had a mean score above the PASEC*2019* international mean of 544.5 points. The five countries with high language scores were joined by the Democratic Republic of Congo, with a performance level slightly higher than that of Senegal (563.4 points).

Niger's mean score of 544.9 points was close to the mean of the 14 countries that participated in the PASEC*2019* assessment.

Benin (525.1 points), Chad (522.4 points), Côte d'Ivoire (522.5 points), Guinea (519.3 points), Cameroon (516.7 points), Burkina Faso (498.7 points) and Togo (489.4 points) had mean scores lower than the mean of the 14 countries surveyed in 2019, with those of Burkina Faso and Togo being the lowest.

In addition to the results shown in Figure 2.10, the information presented in Tables 2.4 and 2.5 below provide more detailed comparisons of countries' mean scores. They present the results of the multiple pairwise comparison of the countries' mean scores, first among themselves, and then relative to the PASEC*2019* international mean.

Table 2.4: Countries' mean language of instruction scores and multiple comparisons between countries - Early primary

Reference country	Average score en Language 2A	Burundi 625 (4.5)	Gabon 610.3 (14.5)	Congo 582.4 (7.5)	Madagascar 568.8 (6.9)	Senegal 557.1 (9.3)	Niger 534.7 (7.2)	DRC 531 (10.5)	Benin 524.8 (7.7)	Cameroon 522.2 (8.4)	Côte d'Ivoire 516.6 (5.4)	Chad 508.5 (7.8)	Burkina Faso 493.5 (9.7)	Togo 474.9 (7.2)	Guinea 469 (10.3)
Burundi	625 (4.5)		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Gabon	610.3 (14.5)	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Congo	582.4 (7.5)	▼	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Madagascar	568.8 (6.9)	▼	●	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲
Senegal	557.1 (9.3)	▼	▼	▼	●		●	●	▲	▲	▲	▲	▲	▲	▲
Niger	534.7 (7.2)	▼	▼	▼	▼	▼		●	●	●	●	▲	▲	▲	▲
DRC	531 (10.5)	▼	▼	▼	▼	●	●		●	●	●	●	▲	▲	▲
Benin	524.8 (7.7)	▼	▼	▼	▼	▼	●	●		●	●	●	▲	▲	▲
Cameroon	522.2 (8.4)	▼	▼	▼	▼	▼	●	●	●		●	●	▲	▲	▲
Côte d'Ivoire	516.6 (5.4)	▼	▼	▼	▼	▼	●	●	●	●		●	▲	▲	▲
Chad	508.5 (7.8)	▼	▼	▼	▼	▼	▼	●	●	●	●		●	▲	▲
Burkina Faso	493.5 (9.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●		●	●
Togo	474.9 (7.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●		●
Guinea	469 (10.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	

Mean score in language significantly ■ higher than ■ similar to ■ lower than the PASEC*2019* mean

▲ significant difference in scores in favour of the reference country relative to the compared country: the reference country has a higher mean than that of the compared country

● no significant difference in scores between the reference country and the compared country

▼ significant difference in scores to the disadvantage of the reference country relative to the compared country: the reference country has a lower mean than that of the compared country

In language of instruction, the scores of countries where the mean score was significantly higher than the PASEC*2019* international mean differed little from one another. For example, the mean score in Gabon did not differ significantly from that in Burundi or Congo. Madagascar had a mean score that was statistically the same as Congo and Senegal. However, these relations are not associative: the mean performance recorded in Burundi was statistically superior to that of the other countries participating in the survey (except for Gabon), and in particular those of

Congo, Madagascar and Senegal, with which it shared the same profile (countries whose mean language score was significantly higher than the PASEC*2019* mean) in the table. Congo had a mean score significantly lower than that of Burundi and higher than that of the 11 other countries.

Niger, DRC, Benin, Cameroon and Côte d'Ivoire had similar scores to one another and higher scores than Burkina Faso, Togo and Guinea. The mean scores for these three countries did not differ significantly and were the lowest recorded in this assessment.

Table 2.5: Countries' mean mathematics scores and multiple comparisons between countries - Early primary

Reference country	Average score en Mathematics 2A	Burundi 614.4 (2.4)	Gabon 595.9 (9.4)	Congo 591.9 (6.3)	DRC 567.8 (8.2)	Senegal 563.4 (6.1)	Madagascar 549.7 (3.8)	Niger 544.9 (6.4)	Benin 525.1 (7.2)	Côte d'Ivoire 522.5 (4.1)	Chad 522.4 (6.8)	Guinea 519.3 (9.4)	Cameroon 516.7 (8)	Burkina Faso 498.7 (8.2)	Togo 489.5 (5.3)
Burundi	614.4 (2.4)		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Gabon	595.9 (9.4)	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Congo	591.9 (6.3)	▼	●		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
DRC	567.8 (8.2)	▼	▼	▼		●	▲	▲	▲	▲	▲	▲	▲	▲	▲
Senegal	563.4 (6.1)	▼	▼	▼	●		●	▲	▲	▲	▲	▲	▲	▲	▲
Madagascar	549.7 (3.8)	▼	▼	▼	▼	●		●	▲	▲	▲	▲	▲	▲	▲
Niger	544.9 (6.4)	▼	▼	▼	▼	▼	●		▲	▲	▲	▲	▲	▲	▲
Benin	525.1 (7.2)	▼	▼	▼	▼	▼	▼	▼		●	●	●	●	▲	▲
Côte d'Ivoire	522.5 (4.1)	▼	▼	▼	▼	▼	▼	▼	●		●	●	●	▲	▲
Chad	522.4 (6.8)	▼	▼	▼	▼	▼	▼	▼	●	●		●	●	▲	▲
Guinea	519.3 (9.4)	▼	▼	▼	▼	▼	▼	▼	●	●	●		●	●	▲
Cameroon	516.7 (8)	▼	▼	▼	▼	▼	▼	▼	●	●	●	●		●	▲
Burkina Faso	498.7 (8.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		●
Togo	489.5 (5.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	

Mean score in mathematics significantly ■ higher than ■ similar to ■ lower than the PASEC*2019* mean

▲ significant difference in scores in favour of the reference country relative to the compared country: the reference country has a higher mean than that of the compared country

● no significant difference in scores between the reference country and the compared country

▼ significant difference in scores to the disadvantage of the reference country relative to the compared country: the reference country has a lower mean than that of the compared country

In mathematics, there was statistical equality of mean scores between Burundi and Gabon, between Gabon and Congo, between DRC and Senegal, and between Senegal and Madagascar, all of these countries having a mean performance that was statistically higher than the PASEC*2019* mean. However, as with language, equality of scores is not associative: the mean score of the DRC was significantly higher than that of Madagascar although Senegal had a similar mean score to each of these two countries.

The mean scores of Burundi, Gabon and Congo were significantly higher than those of other countries participating in the PASEC*2019* assessment.

Niger, a country whose mean performance was close to the average of the 14 countries participating in the survey, had a mean score statistically similar to that of Madagascar.

Benin, Côte d'Ivoire, Chad, Guinea and Cameroon had mean scores which were similar to one another but lower than the PASEC*2019* mean.

Burkina Faso and Togo also had the same mean performance level, which was lowest among all participating countries.

2.2. Students' results at the end of primary education

2.2.1. Performance profile in reading at the end of primary education

2.2.1.1. Performance profile on the reading proficiency scale

Table 2.6 shows the PASEC*2019* reading proficiency scale at the end of primary education. This scale reflects the performance of all participating countries in the late primary test. It provides information about the scores and the distribution of students across the levels, and a description of the corresponding knowledge and skills. Students at each level are likely to perform tasks well at that level, less well at higher levels and better at lower levels.

Table 2.6: PASEC*2019 reading proficiency scale – Late primary*

Level	Score	Percentage of students at that level	Description of skills
Level 4	> 595 points	26.1%	Students can process narrative and informative texts and documents at a general level. They are able to combine and interpret multiple implicit ideas in such material, drawing on their own experience and knowledge. When reading literary texts, students are able to identify the author's intention and determine the implicit meaning of a story. When reading informative texts and documents, they are able to link pieces of information and compare data in order to make use of them.
Level 3	Between 518 and 595 points	21.8%	Students are able to combine two explicit pieces of information in a document or to make simple inferences in a narrative or informative text. They can extract implicit information from written material by giving meaning to implicit connectors, anaphoras and referents. Students are able to locate explicit information in long texts and documents with discontinuous text.
Minimum proficiency level			
Level 2	Between 441 and 518 points	25.1%	Students have improved their decoding skills so that they can understand isolated words derived from their daily life and isolated sentences. They are also able to locate explicit information in short and medium texts by taking cues from the text and the questions. Students are able to paraphrase explicit information from a text.
Level 1	Between 365 and 441 points	21.1%	Students have developed decoding skills and are able to use them to understand isolated words derived from their daily life or very short isolated sentences, but have difficulty understanding the meaning of short and simple texts.
Below Level 1	< 365 points	5.9%	Students at this level do not sufficiently demonstrate the skills in the language of instruction measured by this test. These students struggle with the knowledge and skills of Level 1.

As the data in Table 2.6 show, 52.1% of students were below the minimum reading proficiency level. For example, such students have difficulty combining two explicit pieces of information in a document or making simple inferences in a narrative or informative text.

• Knowledge and skills Level 4

PASEC*2019* students at Level 4 are able to perform difficult reading tasks such as combining and interpreting multiple implicit ideas, drawing on their own experience and knowledge. In addition, in the process of interpretation they draw on their knowledge of texts, language and culture to explore possible meanings of the texts they read. They thus succeed in identifying the author's intention, which gives them useful hints about what information to use and how to organise it (Zwiers, 2008: 34). Finally, by reading informative texts and documents, they are able to combine pieces of information and compare data in order to make use of them. This skill relates to the use and processing of information that is immediately practical in nature.

The students at the highest levels of the PASEC scale in the 14 participating countries represent a pool of talent in sub-Saharan primary education with the potential to influence those countries' development.

A mean of 26.1% of students across the PASEC*2019* countries attained Level 4.

• Knowledge and skills Level 3

Students at this level of the scale have abilities that are less developed than at Level 4, but sufficient for understanding texts in late primary education. Thus, they are able to combine two explicit pieces of information in a document or to make simple inferences in a narrative or informative text. They succeed in making explicit information that is only mentioned or assumed to be known, by giving meaning to implicit connectors, anaphoras or referents. When presented with long texts and documents with discontinuous text, these students can at least perform relatively simple tasks involving the finding of explicit information.

This level was chosen to align different countries' performances, because it represents the minimum level on the late primary reading proficiency scale at which students start to display the skills that will allow them to continue their studies in this area without difficulty. On average, nearly 48% of students across the assessment countries attained at least Level 3: 21.8% at Level 3 and 26.1% at Level 4.

• Knowledge and skills Level 2

Students at Level 2 have better decoding skills that enable them to understand isolated words derived from their daily life and isolated sentences. They are also able to perform basic reading tasks such as locating explicit information in short and medium texts by taking cues from the text and the questions. Students are able to paraphrase explicit information from a text.

On average, 25% of students across the PASEC*2019* countries achieved proficiency Level 2 on the reading comprehension scale and 73% of students achieved at least this level.

• Knowledge and skills Level 1

Students at this level are only able to perform the less complex tasks in the PASEC exams, such as locating a single piece of information, identifying the main subject of a text or establishing a simple relationship with knowledge from daily life.

Although these students have developed decoding skills that they successfully use to understand isolated words derived from their daily life or very short isolated sentences, they have difficulty understanding the meaning of short and simple texts.

On average, 21% of students across all assessment countries were limited to this level of the reading comprehension proficiency scale.

• Below knowledge and skills Level 1

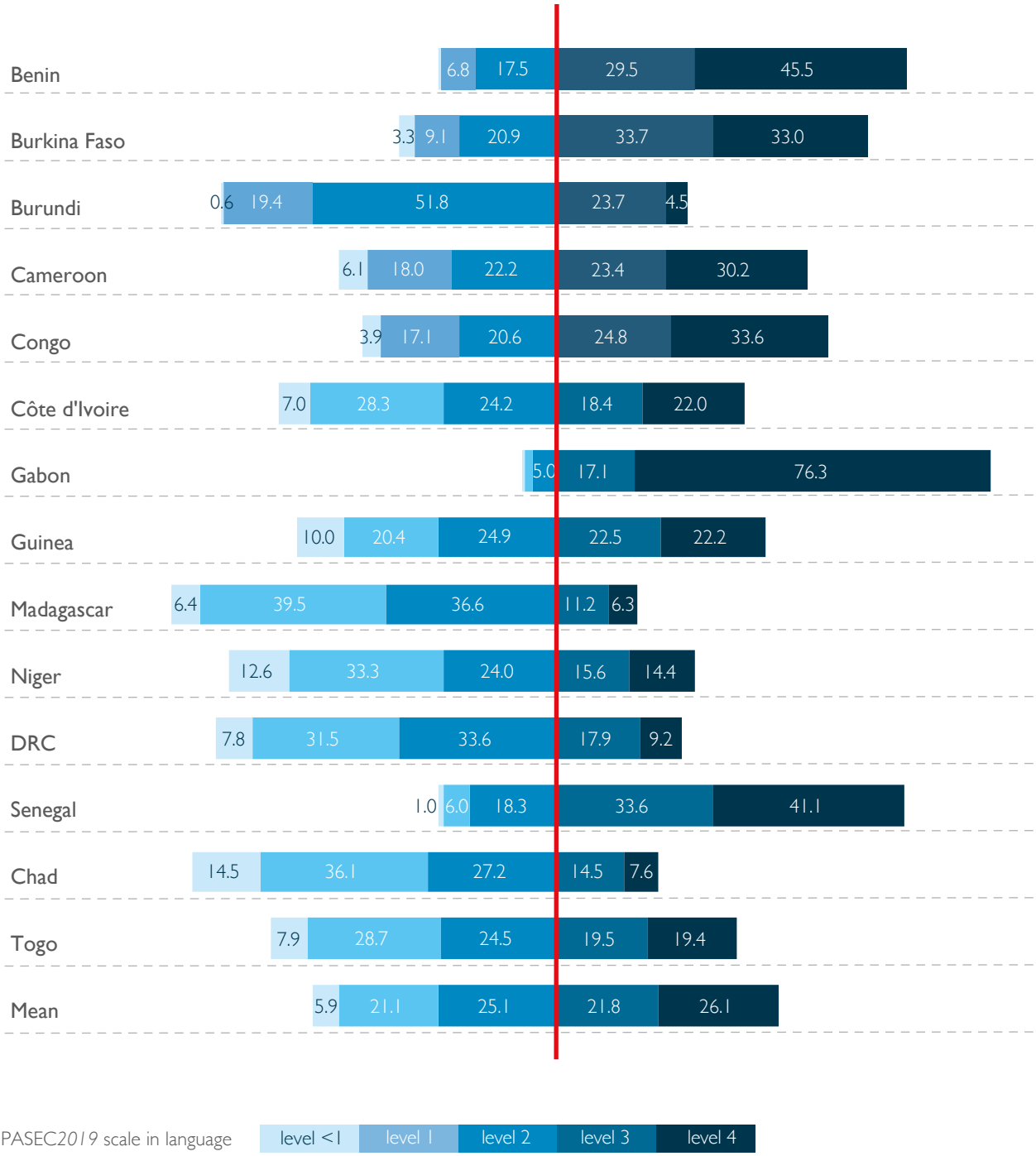
These students have not reached Level 1 on the proficiency scale. This means that they are routinely unable to apply the most basic knowledge and skills that the PASEC survey seeks to measure. However, it does not mean that these students have no reading skills. They are placed below Level 1 because the consistency and regularity of their reading performance indicates that they would be unable to solve more than half of the items in tests consisting exclusively of Level 1 tasks. Students with reading comprehension skills below Level 1 find it very hard to use reading comprehension to extend and improve their knowledge and skills in other areas and may have great difficulty in continuing their educational career.

A mean of nearly 6% of students across the PASEC*2019* countries were at this level.

2.2.1.2. Breakdown by country of late primary students at the different reading proficiency levels

Figure 2.11 shows, for each country, the percentage of students per reading proficiency level.

Figure 2.11: Percentage of students per reading proficiency level - Late primary



By the end of primary education, on average, more than half of students failed to attain the minimum proficiency level for reading. Two country performance categories could be identified, highlighting the differences between countries:

- Countries where most students were above the minimum reading proficiency level:

Gabon stands out among these countries: almost all its students (93.4%) were positioned above the minimum reading proficiency level. Benin (75%), Senegal (74.7%), Burkina Faso (66.7%), Congo (58.4%) and Cameroon (53.7%) also performed satisfactorily in the PASEC reading assessment, with most of their students being positioned above the minimum level. In all these countries apart from Burkina Faso, the larger share of students who attained the minimum proficiency level in fact achieved the highest level of the proficiency scale: 76.3% in Gabon, 45.5% in Benin, 41.1% in Senegal, 33.6% in Congo and 30.2% in Cameroon.

Cameroon and Congo were the two countries in this group with a relatively high share of students at Level 1 of the scale.

- Countries where the majority of students were below the minimum reading proficiency level:

The weak performance at the end of primary education in these countries is clear from the high proportion of students who failed to attain the minimum proficiency level for reading. Madagascar (82.5%), Chad (77.8%), DRC (72.9%), Burundi (71.8%), Niger (69.9%), Togo (61.1%), Côte d'Ivoire (59.5%) and Guinea (55.3%) had the highest proportions of students who did not demonstrate adequate reading skills. In most of these countries, at least a quarter of students were at or below the lowest level of the proficiency scale: Chad (50.6%), Madagascar (45.9%), Niger (45.9%), DRC (39.3%), Togo (36.6%), Côte d'Ivoire (35.3%) and Guinea (30.4%).

It should be noted that in Chad (14.5%), Niger (12.6%) and Guinea (10%), significant proportions of students were below Level 1 of the proficiency scale and were struggling with reading.

2.2.2. Mathematics performance profile at the end of primary education

2.2.2.1. Performance profile on the mathematics proficiency scale

Table 2.7 shows the distribution of students in late primary education across the different levels of the mathematics proficiency scale in the assessment countries, with the corresponding scores and description of knowledge and skills.

Table 2.7: PASEC2019 mathematics proficiency scale – Late primary

Level	Scores	Percentage of students at that level	Description of skills
Level 3	> 609 points	12.5 %	Students are able to solve problems in which a situation, usually presented in the form of a short text of 2 to 3 lines, needs to be analysed in order to identify the procedure(s) to be used. In the area of numbers and operations, they can solve direct proportionality problems and problems involving fractions or decimals. Their understanding of fractions is still growing (they understand the comparison of fractions and the relationship between fractions and decimals). In the field of quantities and measures, they can solve various problems involving calculations of area or perimeter, presented without visuals and sometimes requiring two stages of reasoning (e.g. finding the area of a square once its perimeter is known, or carrying out conversions involving data provided in ares or hectares). They can also perform calculations and conversions involving hours, minutes or seconds.
Level 2	Between 521 and 609 points	25.6 %	Students are able to answer short questions using the three assessed processes: knowledge, application and problem-solving. While most questions require factual knowledge or a specific procedure, some require analysis of the situation to determine the appropriate approach. In the area of numbers and operations, students perform operations with decimals; they have an increasing understanding of fractions (they can identify them in less typical situations and have started to be able to use them to perform simple operations) and are familiar with the concept of percentage. They have also begun to solve simple problems, usually involving a single operation. In the area of quantities and measures, students are able to read the time and can convert units of measurement with or without a conversion table. They are also able to solve initial simple problems involving calculations of perimeters and area, usually accompanied by a visual. In the field of solids and figures, they are able to use their basic knowledge to solve problems that require situation analysis (e.g. locating x triangles in a set of figures or identifying parallel lines in a bundle of lines).
Minimum proficiency level			
Level 1	Between 433 and 521 points	35.7 %	Students can answer very short questions that require factual knowledge or a specific procedure. In the area of numbers and operations, they are able to perform the four basic operations with whole numbers, including those requiring a written calculation with regrouping. They have also begun to develop an initial understanding of fractions and can identify them when they are presented in a conventional way (e.g. a pie divided into x parts). In the field of quantities and measures, they can identify the usual conventional units (e.g. m, m^2, m^3 and kg). In the field of solids and figures, they have some basic knowledge of various geometrical objects (e.g. identifying a disc or a cylinder, locating a right angle or parallel lines).
Below Level 1	< 433 points	26.1 %	Students at this level do not sufficiently demonstrate the skills measured by this test. These students struggle with the knowledge and skills of Level 1.

At the end of primary schooling, more than 50% of students fell below the minimum mathematics proficiency level. For example, such students have difficulty answering short questions using the three assessed processes: knowledge, application and problem-solving. In the field of numbers and operations, they have difficulty performing operations with decimals.

• Knowledge and skills Level 3

At the top of the scale, students are able to identify information in short texts and deduce the procedures necessary to solve problems. Students at this level can solve direct proportionality problems and problems involving fractions or decimals. They demonstrate a more refined understanding of fractions, including understanding the relationship between fractions and decimals.

In terms of sizes and measurement, students are able to complete measurement activities involving area or perimeter calculations. They are presented with visuals in these problems, and often need to use a sequential process of reasoning to solve them. Level 3 students can also perform calculations and conversions of units of time (hours, minutes and seconds).

On average, in all PASEC countries, only 12.5% of students reached Level 3 on the mathematics proficiency scale. This low proportion of students at the top of the scale suggests that the average pool of highly qualified individuals at the end of primary school is small in the participating countries.

• Knowledge and skills Level 2

Level 2 of the mathematics proficiency scale was chosen to align different countries' performances, because it represents the minimum level at which students start to display the baseline skills to continue their learning in mathematics without serious difficulty.

Students at this level can answer short questions relating to the different cognitive processes assessed (knowledge, application and problem-solving).

In the field of numbers and operations, they can perform calculations with decimals, and demonstrate knowledge of fractions and the concept of percentage. Their problem-solving skills are mainly related to simple subjects usually requiring a single operation.

In the area of quantities and measures, students are able to read the time and convert units of measurement with or without a conversion table. They demonstrate simple problem-solving skills, including perimeter and area calculations, with supporting visual material.

In connection with solids and figures, these students are able to complete tasks which require an analysis of the situation drawing on their basic knowledge.

A mean of nearly 38% of students across the assessment countries attained at least Level 2. This percentage includes students at Levels 3 (12.5%) and 2 (25.6%) of the mathematics proficiency scale.

• Knowledge and skills Level 1

The simplest late primary mathematics tasks in the field of numbers and operations, quantities and measurement, and geometry are those at Level 1. Students at this level are only able to complete the least complex tasks of the PASEC late primary mathematics assessment. These students respond correctly to short, simple items requiring factual knowledge or a specific procedure. In the area of numbers and operations, they can add, subtract, multiply and divide whole numbers, using written calculations with regrouping. They have also begun to develop an initial understanding of fractions and can identify them when they are presented in a conventional way (e.g. a pie divided into x parts). In the field of quantities and measures, they can identify the usual conventional units (e.g. m, m^2, m^3 and kg). In the area of solids and figures, they have some basic knowledge of various geometrical objects.

On average, across the assessment countries, the highest proportion of students (35.7%) were at the lowest level on the mathematics proficiency scale. It is important to pay attention to these students in order to prevent them from encountering significant difficulties which could hamper the rest of their schooling.

• Below knowledge and skills Level 1

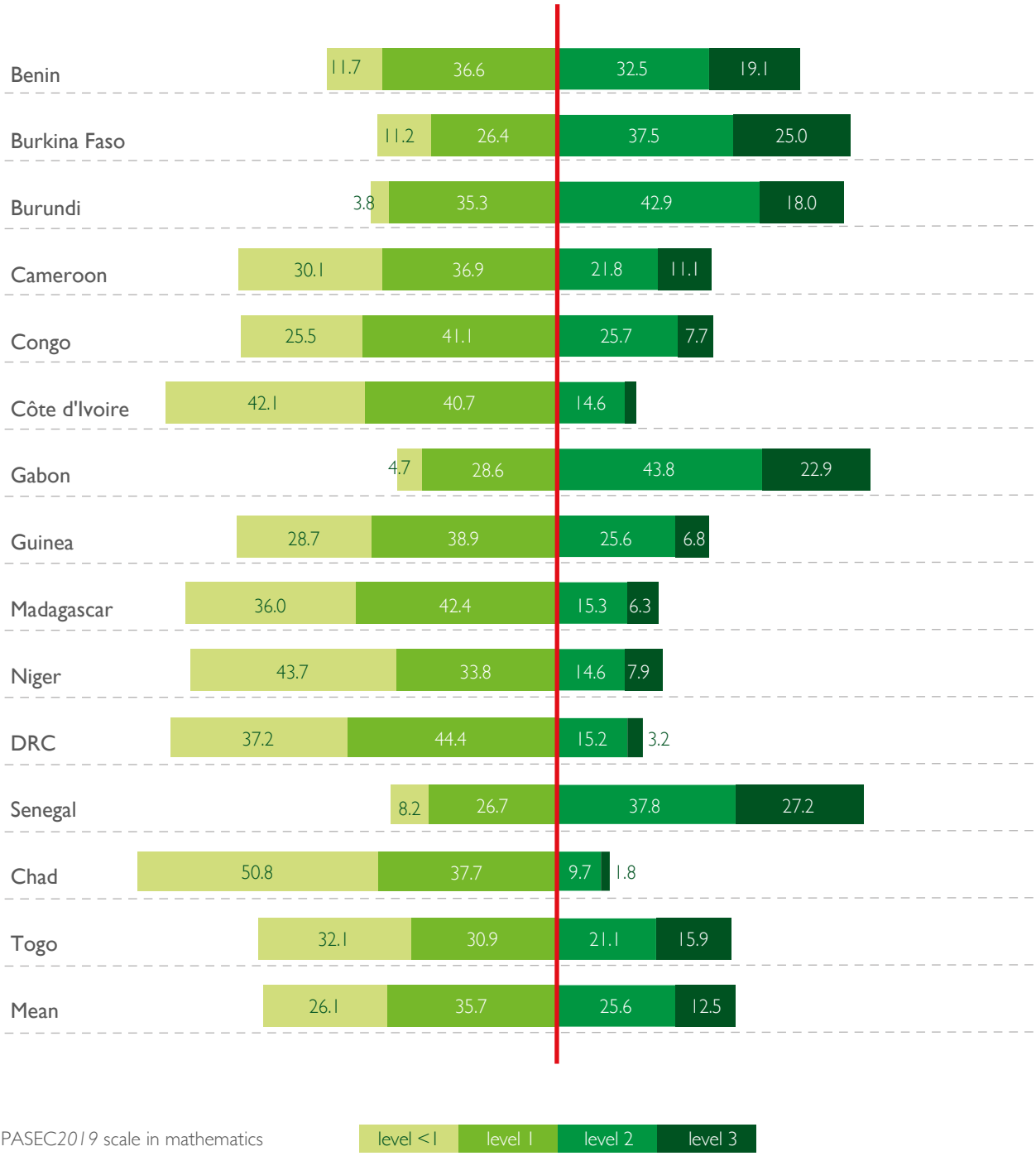
Students scoring less than 433.3 points did not reach Level 1 on the mathematics proficiency scale. These students do not sufficiently demonstrate the mathematics skills measured by PASEC. However, this should not be taken to mean that these students have no mathematics skills. They are placed below Level 1 because analysis of their performance in the assessment indicates that they would be unable to solve more than half of the test items consisting exclusively of PASEC Level 1 tasks. These students are likely to experience great difficulty with mathematics later in their educational career.

A mean of nearly 26% of students across the 14 PASEC*2019* countries were at this level.

2.2.2.2. Comparison of countries' mathematics performance at the end of primary education

Figure 2.12 describes an overall profile of mathematics skills at the end of primary education for each country.

Figure 2.12: Percentage of students per mathematics proficiency level - Late primary



Analysis of the figure reveals two main groups.

- Countries raising a large majority of their students above the minimum proficiency level in mathematics:

Less than a third of the countries participating in the assessment had a significant proportion of students above the baseline level on the mathematics proficiency scale in late primary education. Gabon (66.7%), Senegal (65%), Burkina Faso (62.5%) and Burundi (60.9%) were the countries in this group.

In all these countries, however, the greater proportion of students who had reached the baseline proficiency level were still at Level 2 of the scale. Senegal (27.2%) and Burkina Faso (25%) were the only countries where at least a quarter of students were at the bottom level of the proficiency scale.

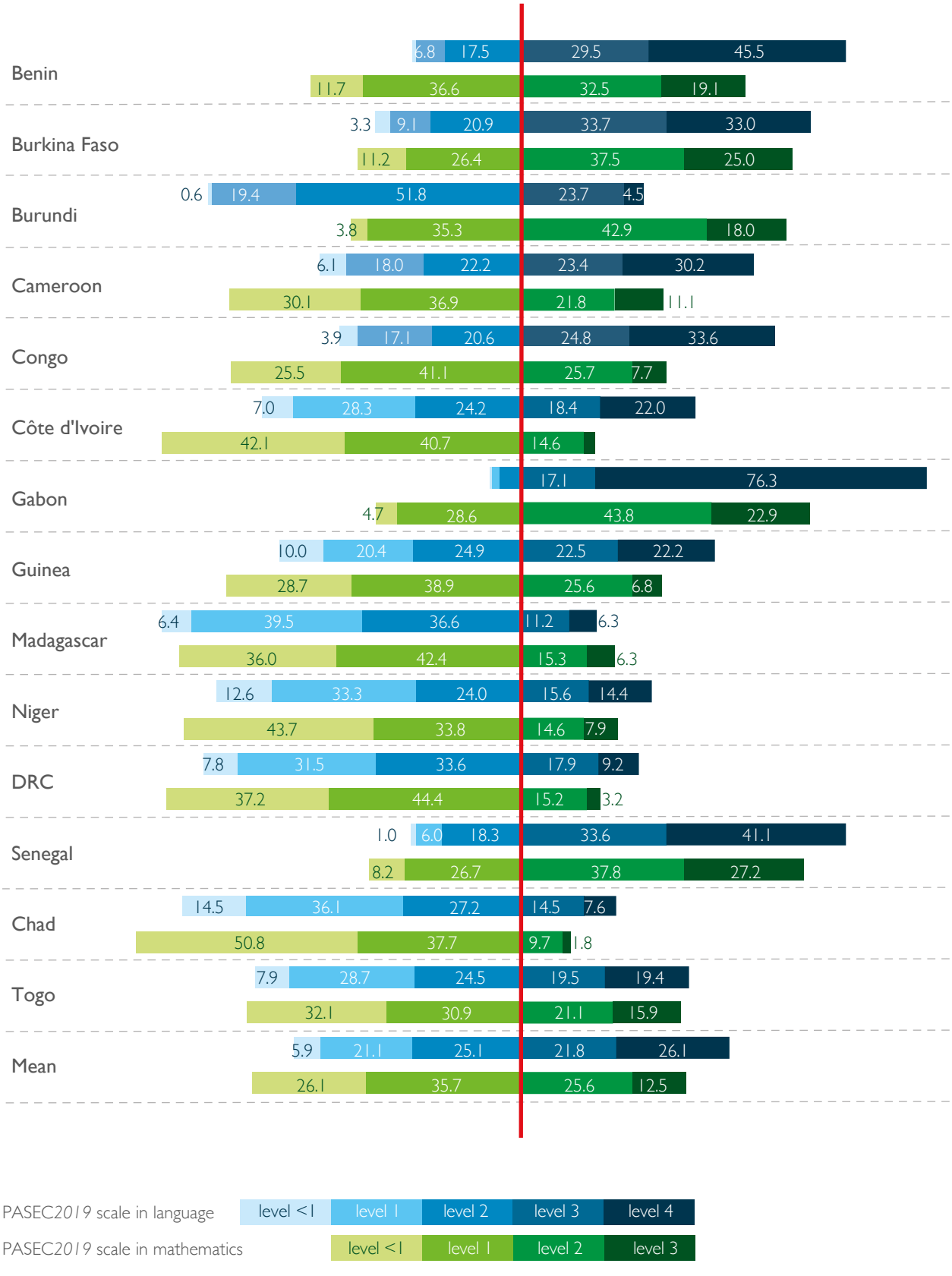
Benin's overall performance on the mathematics proficiency scale at the end of primary education contrasted with that of the other countries, with relatively similar proportions of its students on either side of the minimum proficiency level.

- Countries where most students are below the minimum level on the mathematics proficiency scale:

Nine of the fourteen PASEC*2019* countries had very high proportions of students below the baseline level on the mathematics proficiency scale at the end of primary education: Chad (88.5%), Côte d'Ivoire (82.8%), DRC (81.1%), Madagascar (78.4%), Niger (77.5%), Guinea (67.6%), Cameroon (67%), Congo (66.6%) and Togo (63%). The proficiency scale shows that such students are likely to experience significant difficulties in continuing their education, and also indicates that the large numbers of them who are below Level 1 on the scale have serious difficulties in mathematics that put them at risk of dropping out of school. This last point concerns around a third of students in most of these countries: Chad (50.8%), Niger (43.7%), Côte d'Ivoire (42.1%), DRC (37.2%), Madagascar (36%), Togo (32.1%) and Cameroon (30.1%).

Figure 2.13 shows the percentage of students by level of proficiency achieved in reading and mathematics. As at the early primary stage, the bars indicate the percentage of students achieving a given level: blue for reading and green for mathematics.

Figure 2.13 Percentage of students per reading and mathematics proficiency level - Late primary



This figure shows that the countries with more students at the higher levels of the reading scale were almost the same as those with the most students at the higher levels in mathematics.

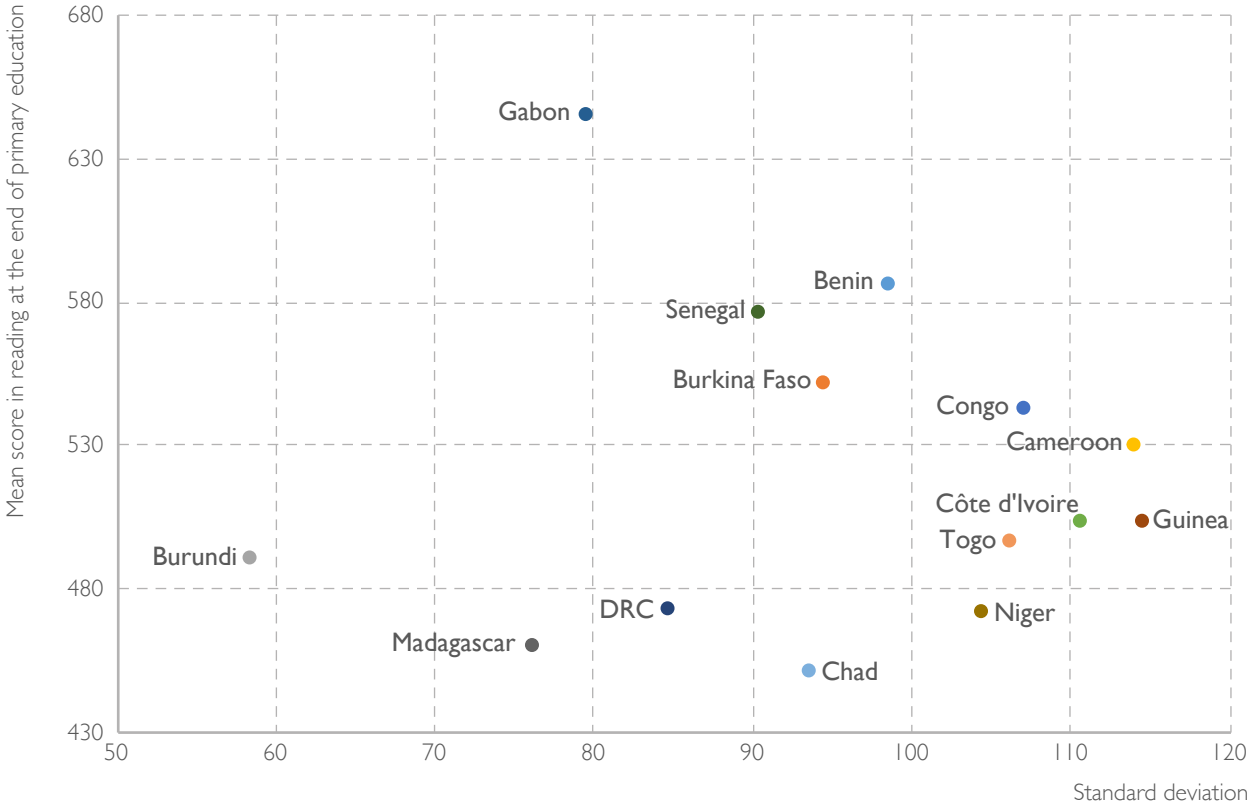
2.2.3. Student performance differences in reading and mathematics at the end of primary education

Tables B2.11 and B2.12 in the annex present students' performance levels at the end of primary education and associated differences by country. Analysis of these differences gives a more detailed picture of the degree of efficiency in each country. As at the start of primary education, in this part we examine these differences – not just between the performance of the top- and low-performing students in reading and mathematics, but also between different countries.

2.2.3.1. Mean performance and score differences at the end of primary education

The figures below present countries' mean performance coupled with the level of variation in students' scores. These figures are intended to give a general idea of the homogeneity of students' results in reading and mathematics in late primary education; more in-depth analysis will be provided in Chapter 3 in an attempt to identify possible factors to explain these inequalities..

Figure 2.14: Link between mean reading scores and standard deviations - Late primary



In reading, among the countries with a mean score above the international mean, the variation in student scores was greatest in Cameroon (529.7 points) and Congo (542 points).

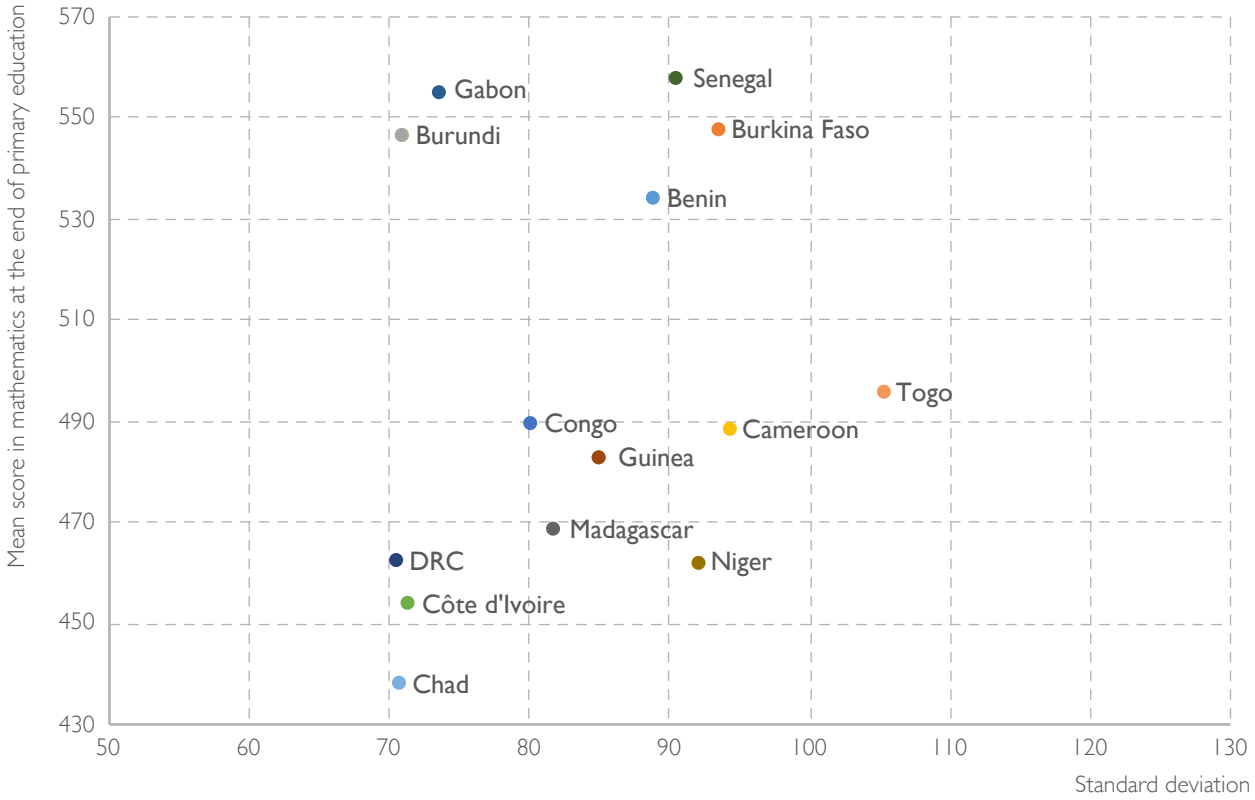
Gabon (644.7 points) obtained the highest mean score in reading at the late primary stage but also had a relatively low level of variation. Benin scored 585.7 points, Senegal 575.9 points and Burkina Faso 551.5 points; the level of variation in student scores in these countries was reflected in standard deviations between 90 and 100 points.

Côte d'Ivoire (502.8 points), Guinea (502.9 points) and Togo (496.1 points) were characterised by a relatively low mean score but a high degree of heterogeneity in student scores.

Burundi (489.9 points) showed the lowest variation in student scores around the mean among the 14 countries participating in this assessment; it also had a relatively low mean performance.

With 450.9 points, Chad obtained the lowest mean, with a level of variation in student scores similar to that of Burkina Faso.

Figure 2.15: Link between mean mathematics scores and standard deviations - Late primary



In mathematics, Senegal (557.6 points), Gabon (554.6 points), Burkina Faso (547.2 points), Burundi (546 points) and Benin (533.8 points) stood out from the other countries for the superiority of their mean performance.

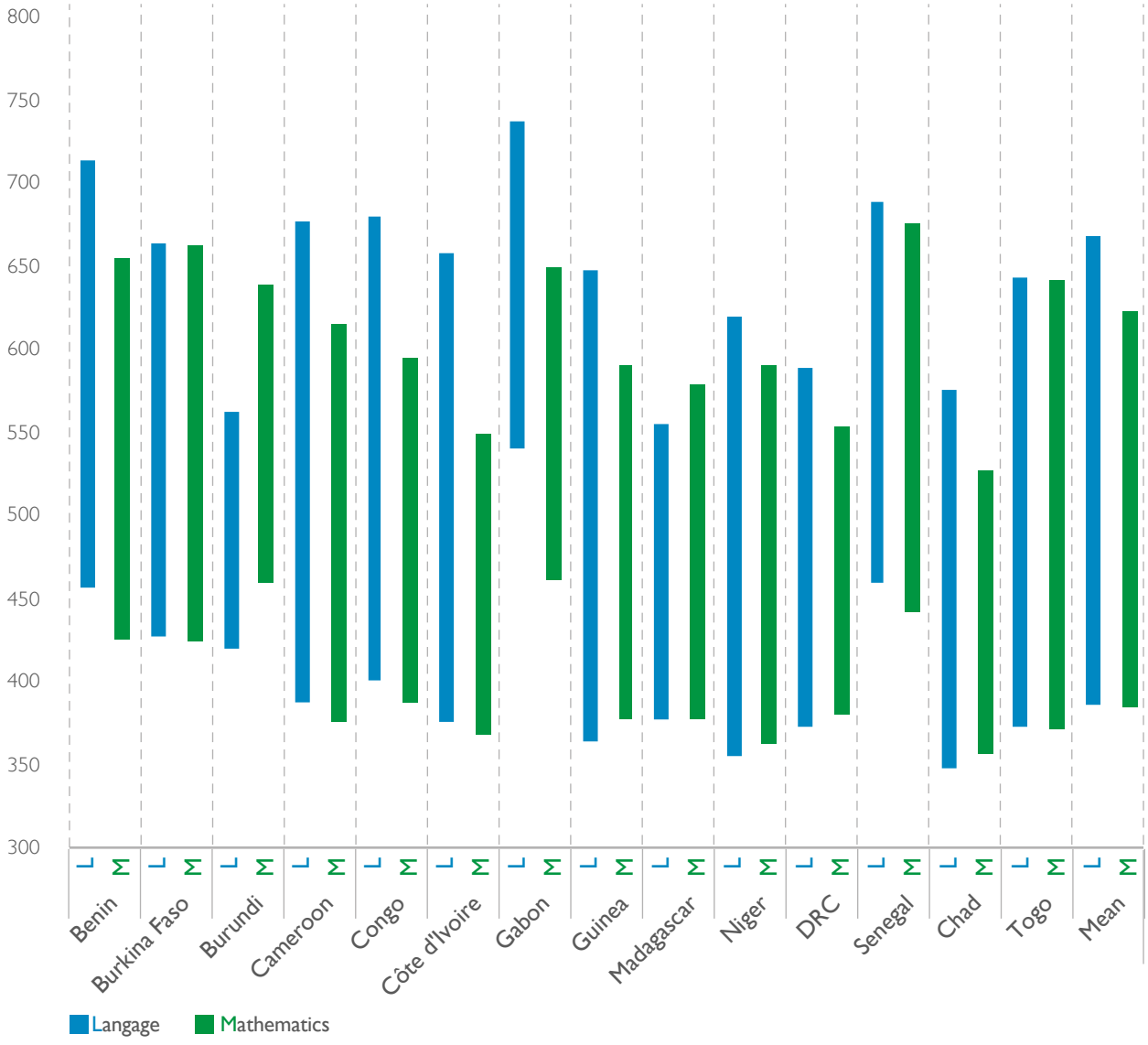
The mean performances of Togo (495.4 points), Congo (489.1 points), Cameroon (488.1 points) and Guinea (482.3 points) were similar; the level of score variation was reflected in standard deviations ranging from 80.1 points in Congo to 105.4 points in Togo.

The DRC (462.1 points), Côte d'Ivoire (454 points) and Chad (437.8 points) had a similar level of score variation to Burundi but a low level of mean performance. Chad had the lowest mean score of the 14 countries participating in the PASEC*2019* assessment.

2.2.3.2. Performance gap between the top- and low-performing students in reading and mathematics at the end of primary education

Figure 2.16 presents a number of differences observed between student performance in the various education systems for each subject. The data illustrate the differences between the performance of countries' top-performing students (90th percentile) and low-performing students (10th percentile) in reading (blue segments) and mathematics (green segments).

Figure 2.16: Performance gap between the top-performing and low-performing students in reading and mathematics - Late primary



Note: The blue (language) and green (mathematics) segments show the performance gap between the 90th percentile at the higher end and the 10th percentile at the lower end of the scale for each subject: the top-performing 10% of students in each country score at or above the high end of the bar, while the low-performing 10% in each country score at or below the low end of the bar. The longer the bar, the greater the difference in score between the top- and low-performing students, and vice versa.

Analysis of the performance gaps reveals several points.

In reading, the smallest differences between the top and low performers, indicative of greater equity, were recorded in Burundi (143.0 points), Madagascar (178.3 points) and Gabon (198.2 points).

The performance gaps were more pronounced in the other countries. Cameroon (290.5 points) had the largest gap, followed by Côte d'Ivoire (282.6 points), Congo (281.2 points), Togo (272.0 points), Niger (264.3 points), Benin (259.1 points), Burkina Faso (237.9 points), Senegal (229.7 points), Chad (229.5 points) and DRC (217.1 points).

In mathematics, the smallest differences between the top and low performers were recorded in Chad (171.3 points), DRC (174.0 points), Burundi (180.3 points), Côte d'Ivoire (181.1 points) and Gabon (189.7 points). Two of the countries in this list (Burundi and Gabon) also had the least pronounced differences in reading.

The performance gaps between the low- and top-performing students were greater in Togo (272.3 points), Cameroon (240.4 points), Burkina Faso (238.6 points), Senegal (235.0 points), Benin (229.6 points), Niger (228.6 points), Guinea (214.8 points), Congo (208.7 points) and Madagascar (202.1 points).

Looking at the two subjects (reading and mathematics) together, Gabon was the highest-performing country in reading and among the highest-performing in mathematics; its performance gaps between students were also less pronounced than in other countries.

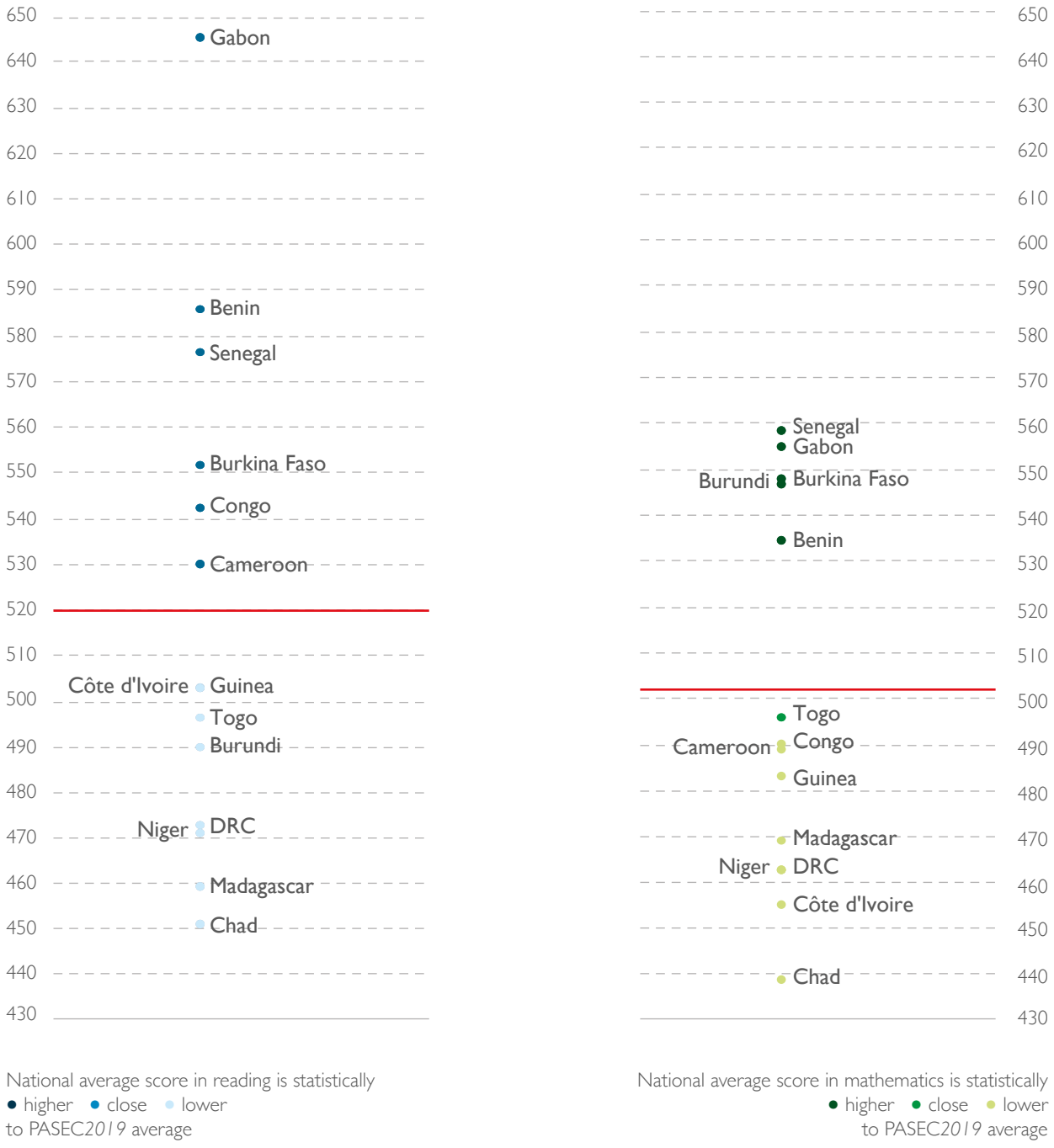
Others such as Senegal, Benin, Burkina Faso were among the highest performers, but this was associated with significant gaps between students. For example, Senegal had the highest performance in mathematics, but its performance gap in this subject was greater than that of Benin.

In turn, Benin outperformed Niger, but the two countries had an almost identical performance gap between the top and low performers.

2.2.4. Mean scores in reading and mathematics at the end of primary education

Figure 2.17 below shows the position of the average mean of each country, by subject, relative to the international mean for the PASEC*2019* assessment. However, these comparisons provide no information about the degree of significance of the differences between countries' scores, and therefore cannot be used for systematic comparison of their performance.

Figure 2.17: Position of countries relative to the international mean scores in reading and mathematics - Late primary



Note: The horizontal red line indicates the mean across the 14 countries.

In reading, six countries (Gabon, Benin, Senegal, Burkina Faso, Congo and Cameroon) participating in this assessment recorded a mean performance above the in-ternational mean of 519.7 points at the end of primary education. Gabon stood out clearly from the other countries, with a mean score of 644.7. No country had a mean score close to the international mean.

The mean scores for Guinea, Côte d'Ivoire, Togo and Burundi were lower than the international mean for the PASEC*2019* assessment, lying between 489.9 and 502.9 points. The mean scores for the DRC, Niger, Madagascar and Chad were all less than 472.7 points.

In mathematics, Senegal, Gabon, Burkina Faso, Burundi and Benin stood out from the other countries with the highest mean scores recorded in the PASEC*2019* assessment – above the international mean in each case. Only Togo had a mean score close to the PASEC*2019* international mean.

Congo, Cameroon and Guinea had mean scores below the mean of the 14 countries, as did Madagascar, DRC, Niger, Côte d'Ivoire and Chad, which had the lowest mean performance in mathematics.

In addition to the results shown in the figures above, the information presented in Tables 2.8 and 2.9 below provide more detailed comparisons of mean scores per country.

They present the results of the multiple pairwise comparison of the countries' mean scores[17], first among themselves, and then relative to the PASEC*2019* international mean.

Table 2.8: Countries' mean reading scores and multiple comparisons between countries - Late primary

Reference country	Average score en Language 6A	Gabon	Benin	Senegal	Burkina Faso	Congo	Cameroon	Guinea	Côte d'Ivoire	Togo	Burundi	DRC	Niger	Madagascar	Chad
	Country compared	644.7 (3.7)	585.7 (6.4)	575.9 (4.9)	551.5 (3.6)	542 (4.9)	529.7 (5.5)	502.9 (6)	502.8 (5.5)	496.1 (3.7)	489.9 (2.7)	472.7 (4.8)	471 (5.4)	459.5 (5)	450.9 (5.7)
Gabon	644.7 (3.7)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Benin	585.7 (6.4)	▼		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Senegal	575.9 (4.9)	▼	●		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Burkina Faso	551.5 (3.6)	▼	▼	▼		●	▲	▲	▲	▲	▲	▲	▲	▲	▲
Congo	542 (4.9)	▼	▼	▼	●		●	▲	▲	▲	▲	▲	▲	▲	▲
Cameroon	529.7 (5.5)	▼	▼	▼	▼	●		▲	▲	▲	▲	▲	▲	▲	▲
Guinea	502.9 (6)	▼	▼	▼	▼	▼	▼		●	●	▲	▲	▲	▲	▲
Côte d'Ivoire	502.8 (5.5)	▼	▼	▼	▼	▼	▼	●		●	▲	▲	▲	▲	▲
Togo	496.1 (3.7)	▼	▼	▼	▼	▼	▼	●	●		●	▲	▲	▲	▲
Burundi	489.9 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	●		▲	▲	▲	▲
DRC	472.7 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		●	●	▲
Niger	471 (5.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●		●	▲
Madagascar	459.5 (5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		●
Chad	450.9 (5.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	

Mean score in reading significantly ■ higher than ■ similar to ■ lower than the PASEC*2019* mean

▲ significant difference in scores in favour of the reference country relative to the compared country: the reference country has a higher mean than that of the compared country

● no significant difference in scores between the reference country and the compared country

▼ significant difference in scores to the disadvantage of the reference country relative to the compared country: the reference country has a lower mean than that of the compared country

In reading, Gabon's mean score was far higher than that of any other country participating in this assessment.

Gabon, Benin, Senegal, Burkina Faso, Congo and Cameroon had mean scores that were significantly higher than the PASEC*2019* international average.

17. The significance level is 5%; beyond this level, any interpretation of the comparison must be heavily qualified. In the tables below, the level of 10% is interpreted as not significant.

The mean scores did not differ significantly between Benin, Senegal, Burkina Faso and Congo, and between Congo and Cameroon. However, Burkina Faso's mean score was significantly higher than that of Cameroon.

Guinea, Côte d'Ivoire and Togo had approximately the same mean score, which was significantly higher than that of the DRC, Niger, Madagascar and Chad.

Chad's mean performance was equal to that of Madagascar but lower than those of the DRC and Niger.

Table 2.9: Countries' mean mathematics scores and multiple comparisons between countries - Late primary

Reference country	Average score en Mathematics 6A	Country compared: Senegal 557.6 (4.7)	Gabon 554.6 (4)	Burkina Faso 547.2 (4)	Burundi 546 (3.2)	Benin 533.8 (6.2)	Togo 495.4 (3.9)	Congo 489.1 (3.5)	Cameroon 488.1 (3.9)	Guinea 482.3 (4.7)	Madagascar 468.3 (5.1)	DRC 462.1 (4.6)	Niger 461.8 (5)	Côte d'Ivoire 454 (3.8)	Chad 437.8 (4)
Senegal	557.6 (4.7)		●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Gabon	554.6 (4)	●		●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Burkina Faso	547.2 (4)	●	●		●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲
Burundi	546 (3.2)	▼	●	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲
Benin	533.8 (6.2)	▼	▼	●	●		▲	▲	▲	▲	▲	▲	▲	▲	▲
Togo	495.4 (3.9)	▼	▼	▼	●	●		●	●	▲	▲	▲	▲	▲	▲
Congo	489.1 (3.5)	▼	▼	▼	▼	▼	▼		●	●	▲	▲	▲	▲	▲
Cameroon	488.1 (3.9)	▼	▼	▼	▼	▼	▼	●		●	▲	▲	▲	▲	▲
Guinea	482.3 (4.7)	▼	▼	▼	▼	▼	▼	●	●		▲	▲	▲	▲	▲
Madagascar	468.3 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼		●	●	▲	▲
DRC	462.1 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	●		●	●	▲
Niger	461.8 (5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		●	▲
Côte d'Ivoire	454 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		▲
Chad	437.8 (4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	

Mean score in mathematics significantly ■ higher than ■ similar to ■ lower than the PASEC*2019* mean

▲ significant difference in scores in favour of the reference country relative to the compared country: the reference country has a higher mean than that of the compared country

● no significant difference in scores between the reference country and the compared country

▼ significant difference in scores to the disadvantage of the reference country relative to the compared country: the reference country has a lower mean than that of the compared country

Senegal, Gabon and Burkina Faso presented mean scores in mathematics which were not significantly different, despite the minor points differences recorded in Table B2.12 in the annex. These countries, plus Burundi and Benin, had mean scores that were considerably higher than those of the other countries, whose per-formance was significantly lower than the PASEC*2019* international mean.

Togo had a mean score that was statistically similar to that of Congo and Cameroon. The mean performances of all three countries were significantly higher than those of Madagascar, DRC, Niger, Côte d'Ivoire and Chad. The mean scores for Madagascar, DRC and Niger were statistically equal.

2.3. Relationships between students' performance at the start and end of primary education

Comparison of countries' mean performances in each subject at the start and end of primary education could serve as a partial[18] indicator of the efforts that need to be made in terms of education policy in order to maintain and/or improve the quality of education. PASEC deliberately chose to target the two levels of educa-tion in order to help decision-makers not just to address performance differences at an early stage in the teaching/learning process, in the preparatory courses (when the first cognitive learning occurs), but also to assess the quality of learning after five or six years of schooling.

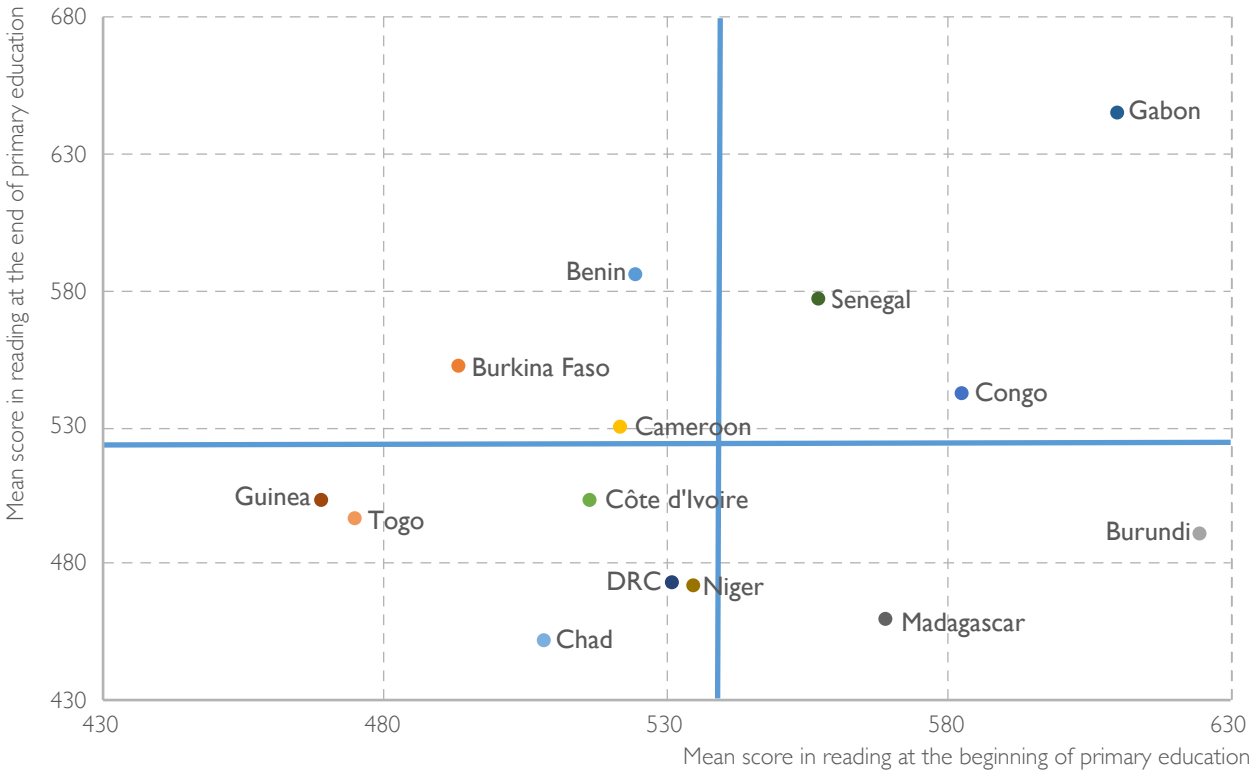
Figures 2.18 and 2.19 use the same design to present students' performance at the start and end of primary school and per subject.

Four groups of countries can be distinguished from these figures.

- Group 1: countries located in the upper right quadrant, whose mean performance at the start and end of primary education was higher than the PASEC*2019* in-ternational mean;
- Group 2: countries located in the lower right quadrant, with mean results that were higher than the mean of the 14 countries participating in this assessment in language (early primary), but lower than the international mean in reading (late primary);
- Group 3: countries located in the upper left quadrant, with mean results that were higher than the international mean in reading (late primary), but lower than the PASEC*2019* international mean in language (early primary);
- Group 4: countries located in the lower left quadrant, whose mean results at the start and end of primary education were lower than the PASEC*2019* international mean.

18. It is important to bear in mind that students' routes and progress through primary education are hard to analyse without conducting a longitudinal study with students in the specific context of the entry to and completion of prima-ry education..

Figure 2.18: Link between countries' mean scores in the PASEC2019 language/reading test - Early and late primary



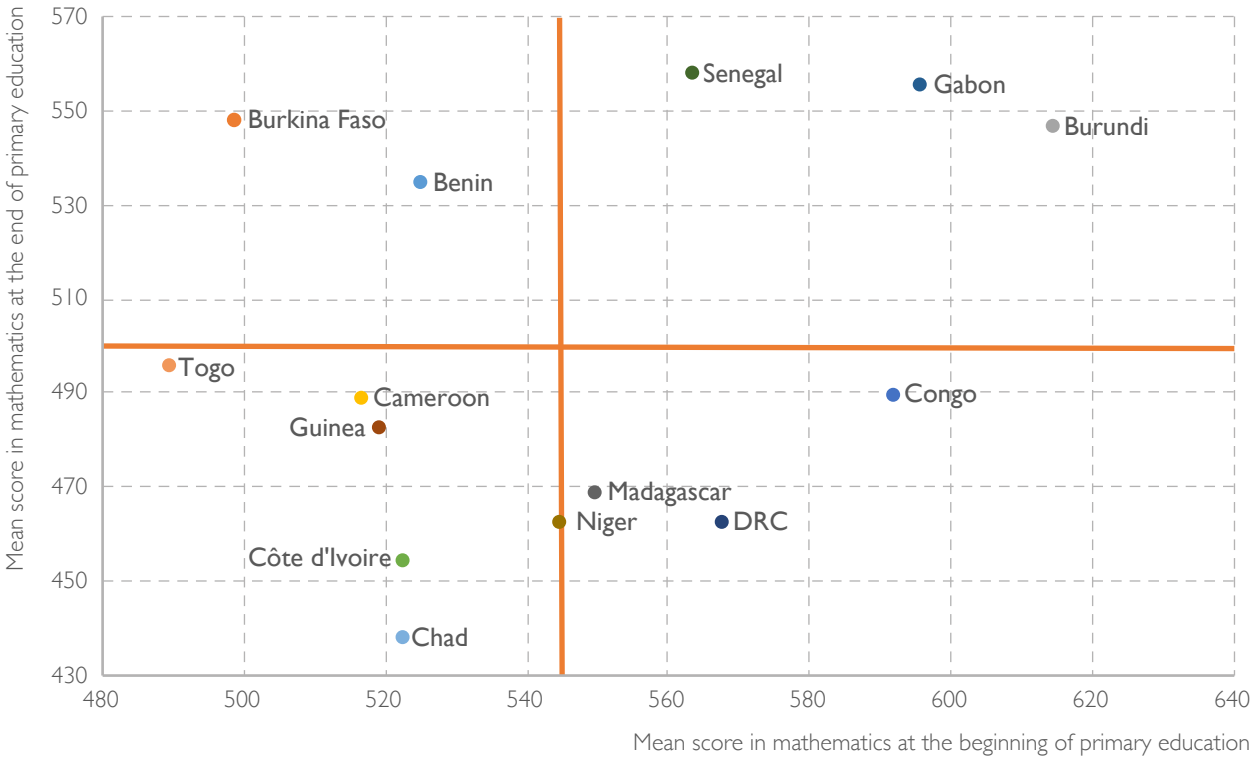
In Figure 2.18, above, Congo, Senegal and Gabon (with higher scores in both tests) are in Group 1. Guinea, Togo, Côte d'Ivoire, DRC, Niger and Chad are in Group 4, with mean performances below the international mean in language/reading at the start and end of primary education.

Burkina Faso, Benin and Cameroon recorded mean scores above the international mean in reading at the end of primary education, but below the PASEC*2019* in-ternational mean in language at the start of education.

This could be explained by a slower start in learning the language of instruction followed by rapid progress during primary education.

The mean performance in Burundi and Madagascar was higher than the international mean at the start of schooling but lower than the mean of the 14 PASEC*2019* countries in reading at the end of schooling.

Figure 2.19: Link between countries' mean scores in the PASEC2019 mathematics test - Early and late primary



The distribution of countries in mathematics is the same as in language/reading, with a few exceptions. For example, Burundi, which was in Group 2 in the previous figure, goes into Group 1 in mathematics, while Congo goes from Group 1 to Group 2. Cameroon, which was in Group 3 in language/reading, is in Group 4 in mathematics. DRC, which was one of the countries that performed weakly in language and reading, is in Group 2 in mathematics.

In general, a large number of countries participating in the PASEC*2019* assessment had students with learning difficulties in language/reading and mathematics at the beginning and end of primary education.

The countries where a large number of students reached satisfactory proficiency levels at the start of schooling (relative to the other countries) were generally those which recorded the highest performances (especially in mathematics, where the correlation is highest) at the end of primary education.

Likewise, the education systems with high percentages of students with difficulties in the early years were also those that tended to perform at the lowest level at the end of primary education. In these education systems, in general, primary/basic education fails to address the learning difficulties observed among students in the early years of schooling. Students' poor performance at the end of primary education probably results from a combination of difficulties that have accumulated throughout primary schooling; this may have a negative impact on later education, with a high risk of failure and dropping out.

SCHOOL ENVIRONMENT AND STUDENT CHARACTERISTICS AND PERFORMANCE

3

This chapter presents an analysis of students' learning environment. In macro-economic terms, an attempt is made to establish a link between the gross domestic product (GDP) growth rate in 2019 and the mean scores recorded in the countries in the PASEC*2019* study. At the level of education systems, it considers some key characteristics of students (gender, parental literacy, preschool attendance, grade repetition, age, etc.), classrooms and schools (classroom equipment, school infrastructure, etc.). This chapter is based on several studies of student learning and examines the link between learning environment and student outcomes. Past PASEC evaluations have also established a link between certain family, school and classroom variables (infrastructure, equipment, etc.) and learning outcomes. Since the work done by Michaelowa (2002) presenting some of the factors (provision and availability of books, inspection of classes, etc.) that positively influence learning outcomes, other authors have found that certain educational interventions in classes (Conn, 2014; Kremer, Brannen and Glennerster, 2013) and specific guidance for low-skilled teachers (Murnane and Ganimian, 2014) are effective. Hoogeveen and Rossi (2019) highlighted the links between factors that are responsible for poor school performance in Togo. In particular, they revealed the negative impact of the economic crisis of the 1990s on investment in education and how this has affected the quality of education.

3.1. Relationship between GDP growth rate and student performance

Another subject sometimes mentioned in the literature is the link between economic growth and the performance of education systems. Studies such as those by Altinok (2008) and, more recently, Hanushek and Woessmann (2015), have analysed this link by relating the quality of education systems to the scores obtained by countries in standardised tests. For instance, as UNESCO (2019) points out, recent results such as those of Komatsu and Rappleye (2017) have shown that the link between economic growth and learning outcomes is weak. The literature is far more conclusive on the link in the other direction, i.e. the contribution that education and learning outcomes make to the economy by improving labour productivity (Dao, 2020).

Turning to the countries in the PASEC*2019* assessment, we have compared the data on the countries' scores and their GDP growth rate[19] in 2019. Educational funding depends on countries' financial resources and on political choices, depending on which sector is prioritised in strategic development planning.

Figure 3.1: GDP growth rate in 2019 and student scores in language of instruction - Early primary

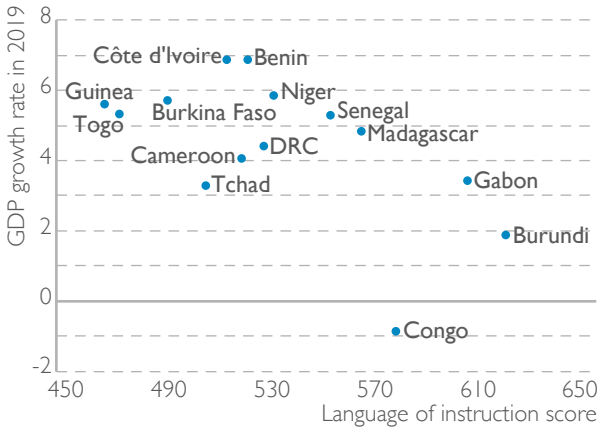
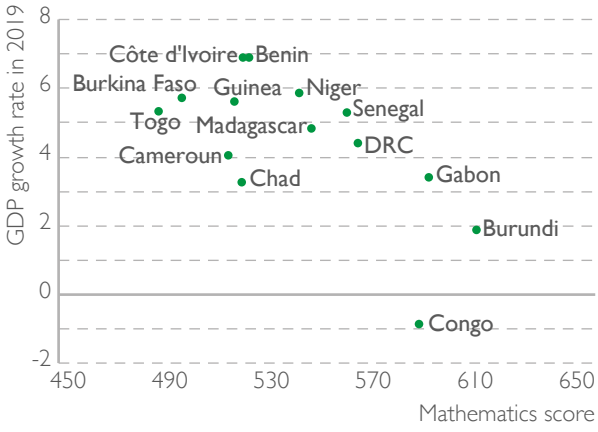


Figure 3.2: GDP growth rate in 2019 and student scores in mathematics - Early primary



19. World Bank: https://donnees.banquemondiale.org/indicator/NY.GDP.MKTP.KD.ZG, consulted in November 2020.

Figure 3.3: GDP growth rate in 2019 and student scores in reading - Late primary

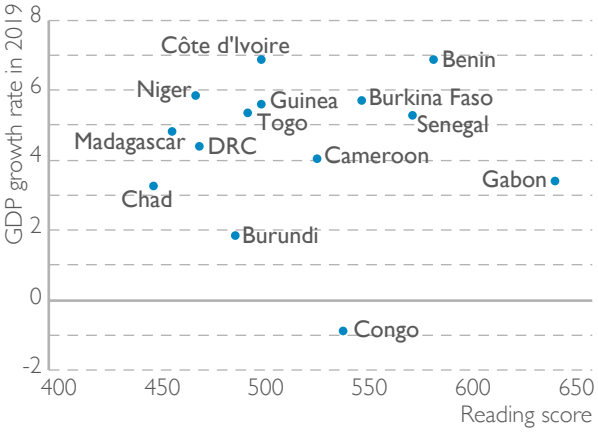
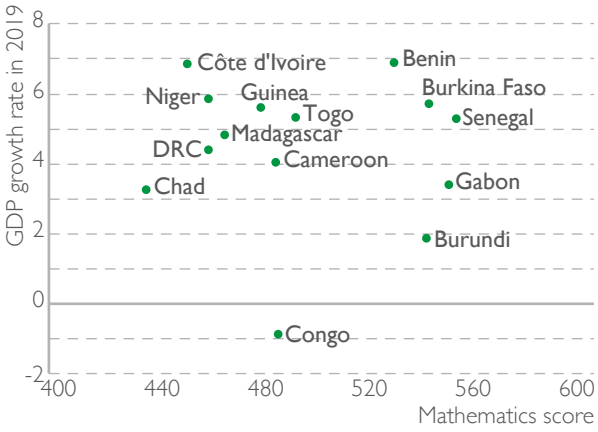


Figure 3.4: GDP growth rate in 2019 and student scores in mathematics - Late primary



Countries' growth rate appeared to be uncorrelated with performance in reading and mathematics either at the start or at the end of primary education. This result is not surprising since it confirms the results already pointed to by certain researchers, but it raises the question whether an increase in a country's wealth goes hand in hand with more substantial investment in the education sector (school infrastructure, teaching resources, reduction of class sizes, recruitment of teachers, etc.).

3.2. Variation in performance between schools and between students

The school environment has proved to be an important factor in students' performance at the start and end of primary education, both in language of instruction and in mathematics. Providing all students with the same schooling conditions (despite the infrastructure gap which exists between urban and rural settings) remained a challenge for most of the countries assessed.

Inequalities in performance could be explained by factors inherent to the student or to the school. Breaking down the variance[20] in the scores makes it possible to measure the weight of each factor (student or school) in the variation in student performance.

More than 50% of the variance in language scores was explained by differences between schools in all countries except for Burundi and Gabon. The same result was observed in mathematics, except for Burundi, Gabon, Madagascar, DRC and Senegal.

20. Variance is a measure that characterises the degree of dispersion of a series of values around their mean.

Figure 3.5: Breakdown of variance in language of instruction scores - Early primary

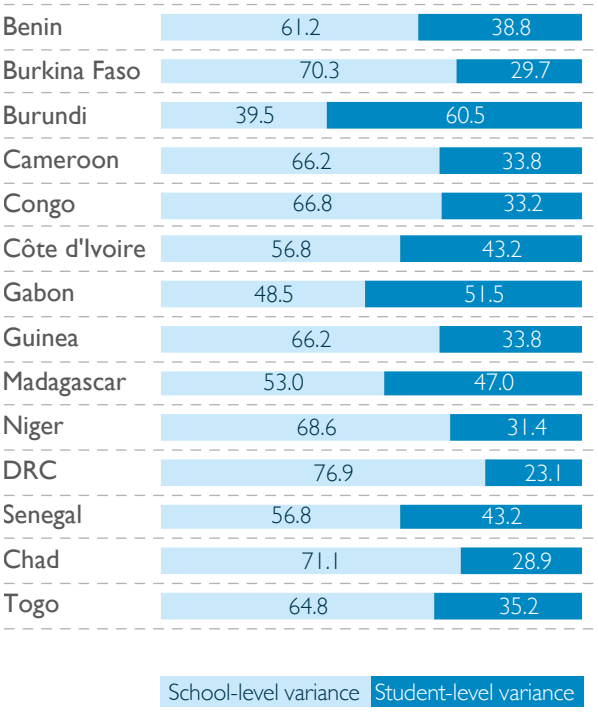
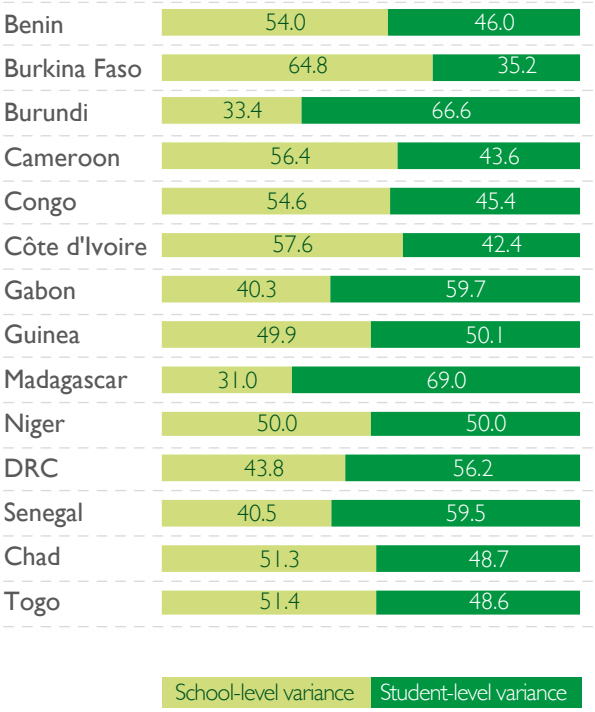


Figure 3.6: Breakdown of variance in mathematics scores - Early primary



In reading, the same situation was observed at the end of primary education as at the start. More than 50% of the variance in reading scores was explained by differences between schools in all countries except for Burundi, Gabon and Côte d'Ivoire.

In mathematics, the variance in scores in most countries was explained more by differences between schools than it was for reading. The highest values were observed in Madagascar (67.9%), Togo (67.8%), Niger (66.4%) and Congo (60.2%).

At both the beginning and the end of primary education, the inter-school variance of scores was greater than the intra-school variance in most countries. This means that the variation in performance was explained to a far greater extent by the differences between schools, such as their location (urban or rural) or type (public, private), and whether they had adequate learning materials. However, a non-negligible part of the variance was explained by the differences between students, deriving from several possible factors (students' individual characteristics, socio-economic status, etc.). The fact that the variance between schools was an element observable everywhere suggests that it is important for the PASEC countries to work on ensuring equality between different geographical areas in the same country.

Figure 3.7: Breakdown of variance in reading scores - Late primary

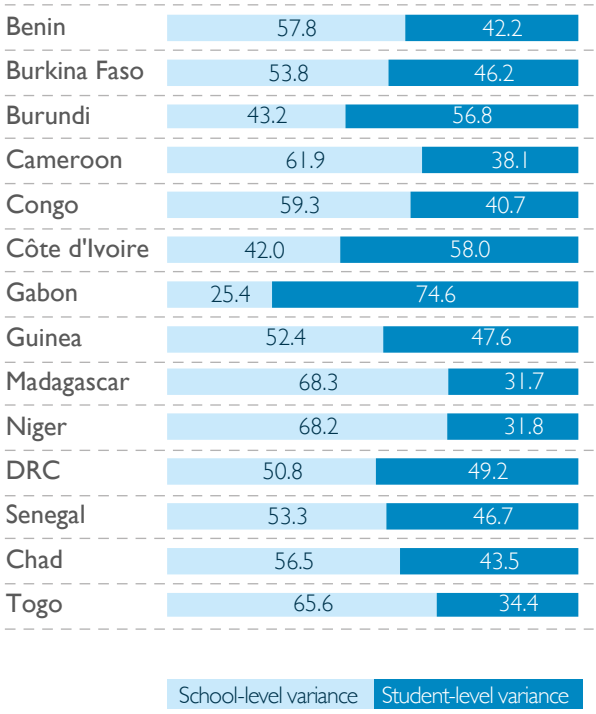
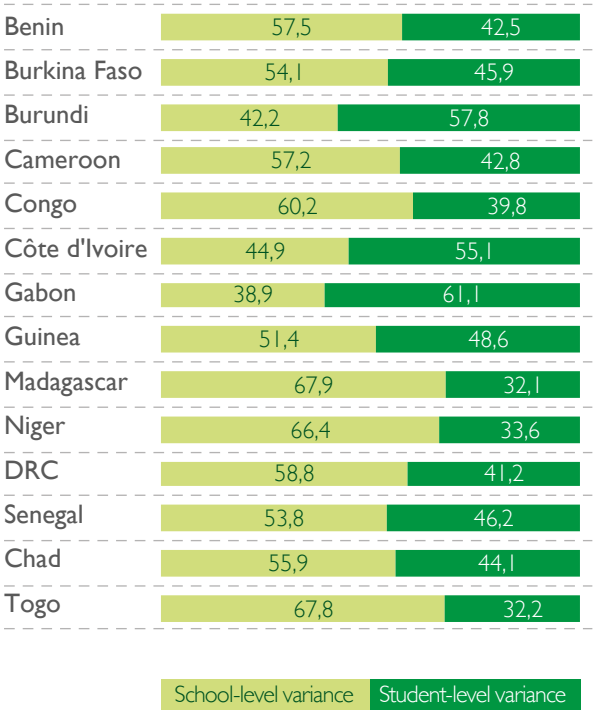


Figure 3.8 : Breakdown of variance in mathematics scores - Late primary



3.3. School environment and performance: characterisation of countries by contextual variables

The purpose of this section is to explore the links between certain variables (relating to school, class and student) and students' mean scores per country, analysing the similarities between countries. To this end, a principal component analysis (PCA) has been performed, in view of the continuous nature of the variables used.

Several indices have been identified and used in the different sections of this chapter, and their methods of calculation are briefly described in the following boxes.

Box 3.1: Description of the socio-economic index

Information on families' socio-economic status was collected from school students at the end of primary education through a series of questions relating to the availability of material goods in the household and the characteristics of their home: number of books at home, possession of capital goods (television, computer, radio, DVD player, hi-fi system, mobile phone, freezer or refrigerator, air conditioner, fan, cooker), possession of durable goods and means of transport (table, sewing machine, iron, car or truck, tractor, moped or scooter, bicycle, boat or canoe, cart), materials used for the construction of their home, presence of latrines, presence of electricity in the house, main source of water used at home (mains, standpipe, public fountain, well, borehole, pool, river).

This information was collected through a questionnaire administered to the grade 6 students in the sample. Student responses are reported on an international scale with a mean of 50 and a standard deviation of 10 to construct a socio-economic index. High values on the index correspond to more favourable living conditions, while the lower values are associated with more disadvantaged households. The index is not in itself an indicator that specifically measures the degree of poverty of students' families relative to an international or national standard; it mainly aims to produce a ranking of students' families on a single dimension, using variables that measure living conditions.

Box 3.2: Description of the classroom equipment index

Information about equipment in classrooms was collected from teachers through a series of questions concerning the availability of textbooks for students, documents and teaching materials for teachers and classroom furniture: number of mathematics and reading textbooks available per student; availability of manuals, teaching guides, and reading and mathematics curricula for teachers; availability of teaching material (blackboard, chalk, dictionary, maps of the world, Africa and the country, measuring equipment such as set squares, compasses, rulers and clocks) and availability of classroom furniture (desks and chairs for teachers, cupboards and shelves for books), availability of desks and seats, rulers, slates, chalk, exercise books and school bags in sufficient numbers for students), availability of electricity in the classroom and type of materials used in the construction of the classroom.

Teacher responses are summarised on an international scale with a mean of 50 and a standard deviation of 10 to construct a classroom equipment index. The index is higher when classrooms are well equipped. For the purposes of comparing student performance, the index data are split into quartiles. The index is not in itself an indicator that specifically measures the level of equipment in classrooms relative to an international or national standard; it mainly aims to produce a ranking on a single dimension using variables that measure classroom equipment. In this chapter, the mean classroom equipment index (mean per school) is used.

Box 3.3: Description of the school infrastructure index

Information about infrastructure in the school attended by students was collected from school principals through a series of questions concerning availability of equipment, classroom capacity for students and the existence of sanitary facilities: number of functional classrooms, type of materials used in the construction of classrooms, availability of certain equipment (a separate office for the principal, a place to store materials, a staff room, a playground, a separate sports ground, fully fenced grounds, a first aid box, one or more dwellings for teachers or principals, running water, a source of drinking water other than running water, electricity, computer equipment, etc.), availability of a canteen and presence of latrines or toilets including devices dispensing hygiene products.

School principal responses are summarised on an international scale with a mean of 50 and a standard deviation of 10 to construct a school infrastructure index. The index is higher when schools are better equipped with infrastructure. For the purposes of comparing student performance, the index data are split into quartiles. The analysis in this chapter focuses on the top and bottom quartiles. The index is not in itself an indicator that specifically measures the extent to which schools are endowed with infrastructure relative to an international or national standard; it mainly aims to produce a ranking on a single dimension using variables that measure the level of school infrastructure.

Box 3.4: Description of the local facilities index

Information about local facilities in the schools attended by students is collected from school principals through a series of questions about availability of electricity, presence of surfaced roads, a secondary school, health infrastructure (a health clinic, a hospital), a bank, a microfinance institution and a cultural or social centre, a library, etc.

School principal responses are summarised on an international scale with a mean of 50 and a standard deviation of 10 to construct a school infrastructure index. The index is higher when schools benefit from better local facilities. For the purposes of comparing student performance, the index data are split into quartiles. The analysis in this chapter focuses on the top and bottom quartiles. The index is not in itself an indicator that specifically measures the level of the local facilities around each school relative to an international or national standard; it mainly aims to produce a ranking on a single dimension using variables that measure the level of local facilities.

Box 3.5: Principal component analysis and classification

Principal component analysis (PCA) is a descriptive method for reducing the dimensionality of a set of quantitative variables from a table of quantitative data. In other words, it is a method for compressing and synthesising the information contained in a data table, data matrix or individual-variable table by answering certain questions, such as: what is the proximity between individuals? What variables are the similarities/dissimilarities based on and what are the relationships between the variables?

In technical terms, it is a factor analysis performed on a given population – in this case, the 14 countries of the PASEC2019 assessment, with a set of variables relating to class, school, and student. These variables are in the form of either means or proportions. For example, the school infrastructure or classroom equipment indices are in the form of a mean (see Boxes 3.2 and 3.3), whereas the local facilities variable is presented as the percentage of students attending a school in an urban area.

Following a PCA, a classification can be made to provide more precise information. The main objective of this classification is to gather individuals into homogeneous groups or classes based on a set of variables. It depends on the objects to be classified and the practical classification method used. Several classification methods exist, but the best known and most widely used is the ascending hierarchical classification (AHC). The principle of this method is to gradually build up the classes by associating the individuals who resemble each other most closely step by step. A group of individuals is characterised by a set of variables if it has high values for that variable relative to other individuals.

Start of primary education

The variables that made a strong contribution to forming the first factorial axis were proportion of students in urban areas, level of school infrastructure, level of local facilities and official encouragement of the top-performing students in the school. The variables that contributed most to the formation of the second axis were proportion of students with a reading book in class and mean seniority of school principal.

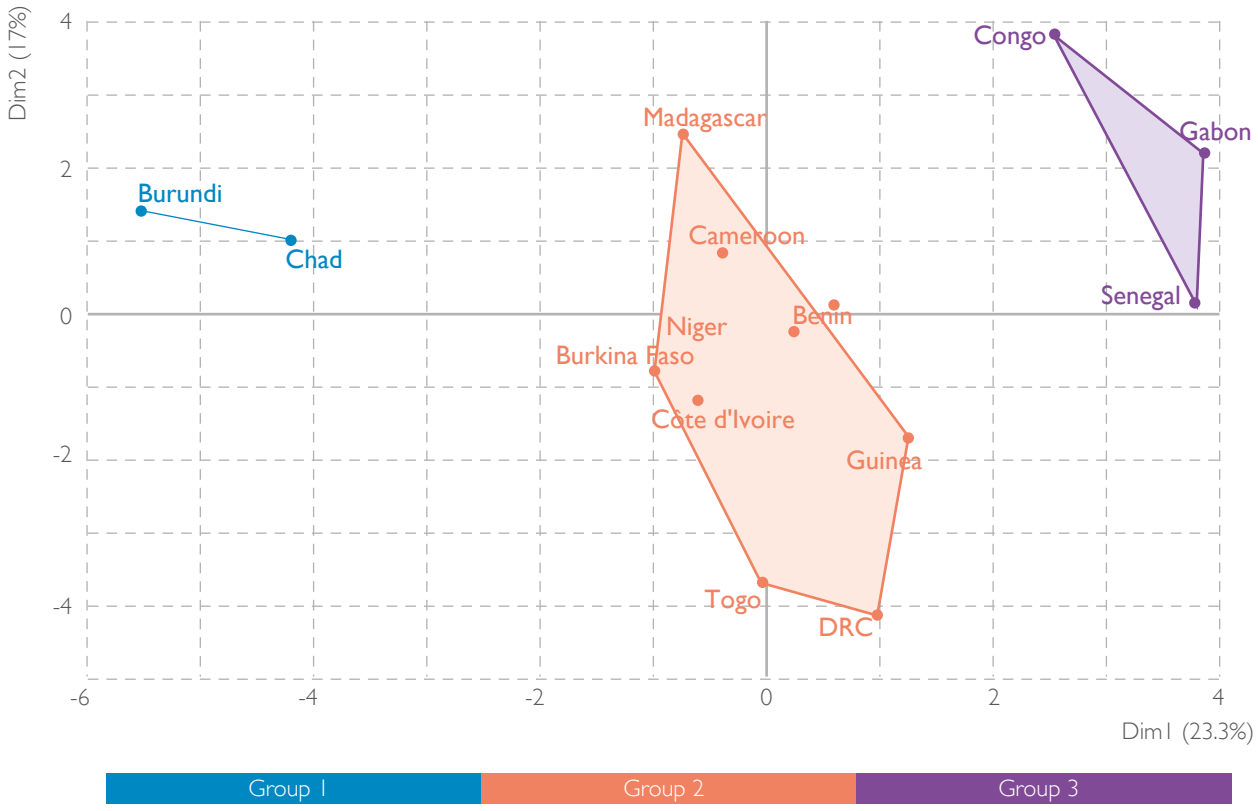
The classification of the PCA results led to the formation of three groups of countries: a first group containing two countries (Burundi, Chad), a second containing nine countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar, Guinea, Niger, DRC, Togo) and a third containing three countries (Congo, Gabon, Senegal).

Large class sizes, a high percentage of students who had repeated a grade at least once, a low level of school infrastructure, low seniority of school principals and a low proportion of students in the private sector characterised the countries in the first group.

The second group was characterised by high seniority of school principals, a high proportion of teachers receiving classroom support from their principals and a high number of days of teacher absences.

The third group was characterised by high percentages of students in urban areas, high levels of local facilities and high levels of school infrastructure, as well as high percentages of schools that officially encouraged the top-performing students (honour rolls, prizes, scholarships, gifts, etc.).

Figure 3.9: Scatter diagram of countries by the first two factorial axes - Early primary



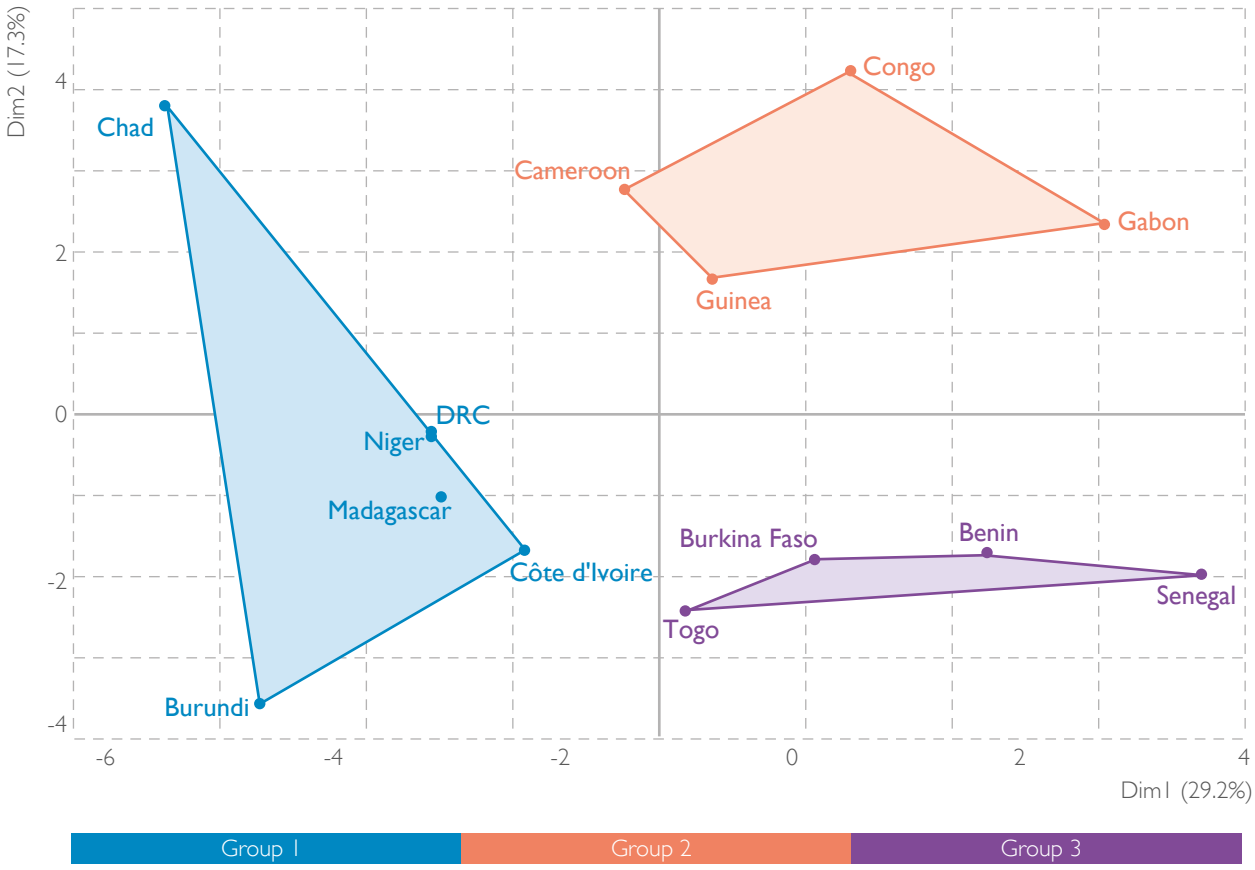
End of primary education

The classification produced three groups of countries: the first group of countries (Burundi, Côte d'Ivoire, Madagascar, Niger, DRC and Chad) was negatively correlated with the variables of the first factorial axis and was characterised by a poor level of school infrastructure, a low proportion of schools with a system in place to encourage the top-performing students, and a low proportion of students who read at home.

The second group of countries, made up of Cameroon, Congo, Gabon and Guinea, was characterised by the proportion of students whose school was located in an urban area, who had attended preschool, who attended a private school, and who had a high socio-economic level. This group was positively associated with the second axis.

Benin, Burkina Faso, Senegal and Togo formed the third group of countries. They were distinguished by the percentages of students with reading and mathematics books in class, by the mean level of equipment in the classes, the practice of automatic grade progression within particular levels of primary education, the proportion of students usually given homework, etc.

Figure 3.10: Scatter diagram of countries by the first two factorial axes - End primary



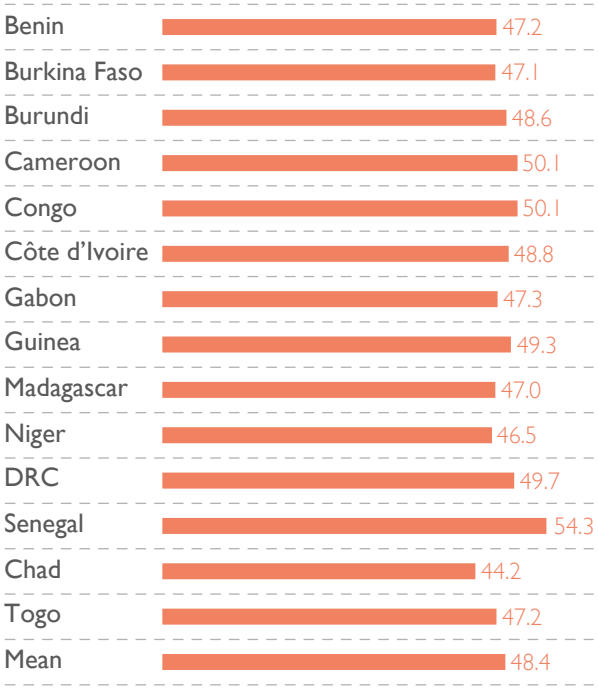
3.4. Student characteristics, socio-economic background and student performance

3.4.1. Student gender

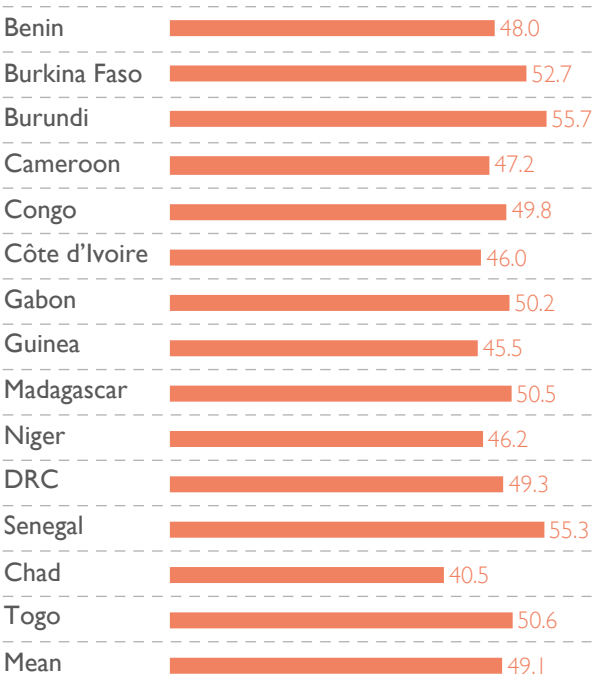
Inclusive education is part of the 2030 Agenda. Part of SDG 4 is to 'Ensure quality education for all'. This makes the issue of gender an important one in the quest for inclusive education, since in most countries, and in developing countries in particular, girls tend to lose out in terms of access to education and the pursuit of studies.

Efforts still need to be made to increase girls' enrolment rate in several countries participating in PASEC*2019*. The percentage of girls was lower than that of boys across the countries at both the start (48.4 %) and the end of primary education (49.1%). However, in some countries such as Cameroon, Congo and Senegal, the percentage of girls was slightly higher than that of boys at the start of primary education. The overall proportion of girls was relatively stable between early and late primary education, although the proportion fell in eight of the 14 PASEC*2019* countries and rose in five (Burkina Faso, Burundi, Gabon, Madagascar, Togo). Thus, there was a higher dropout rate among girls in more than half of the countries assessed (see Figures 3.11 and 3.12).

Figure 3.11: Percentage of girls - Early primary



Graphique 3.12: Percentage des Girls en End of primary education



Although girls seemed to be disadvantaged in terms of overall access, in terms of performance there was no significant gender difference in language of instruction at the start of primary education. However, at country level, there was a significant difference in Benin, where boys did better, and in Burundi, where girls did better. In mathematics, boys' mean score across the countries was significantly higher than that of girls at the start of primary education, but a significant difference in scores between girls and boys was only observed in six countries (Benin, Côte d'Ivoire, Gabon, DRC, Senegal, Chad) where girls did better (see Figure 3.13).

At the end of primary education, the mean difference in scores between girls and boys was significant in both reading, where girls did better, and mathematics, where boys did better. However, at the individual country level, the difference was only significant in reading in six countries, with girls doing better in three (Congo, Gabon, Madagascar) and boys in three (Burundi, DRC, Chad). In mathematics a significant difference in favour of boys was observed in five countries (Burundi, Côte d'Ivoire, Gabon, DRC, Chad) (see Figure 3.14).

This disadvantage of girls in primary school mathematics was also observed in the PASEC*2014* assessment.

Although the differences in performance between girls and boys were not systematically in favour of boys, the analysis of the PASEC*2019* data highlights the persistence of the problem of gender parity in the region's education systems. The achievement of gender parity is probably linked to socio-cultural factors which go beyond the school system, relating to inequalities within families, communities and society as a whole (Koissy-Kpein, 2020).

Figure 3.13: Student performance in language and mathematics at the beginning of primary education by gender

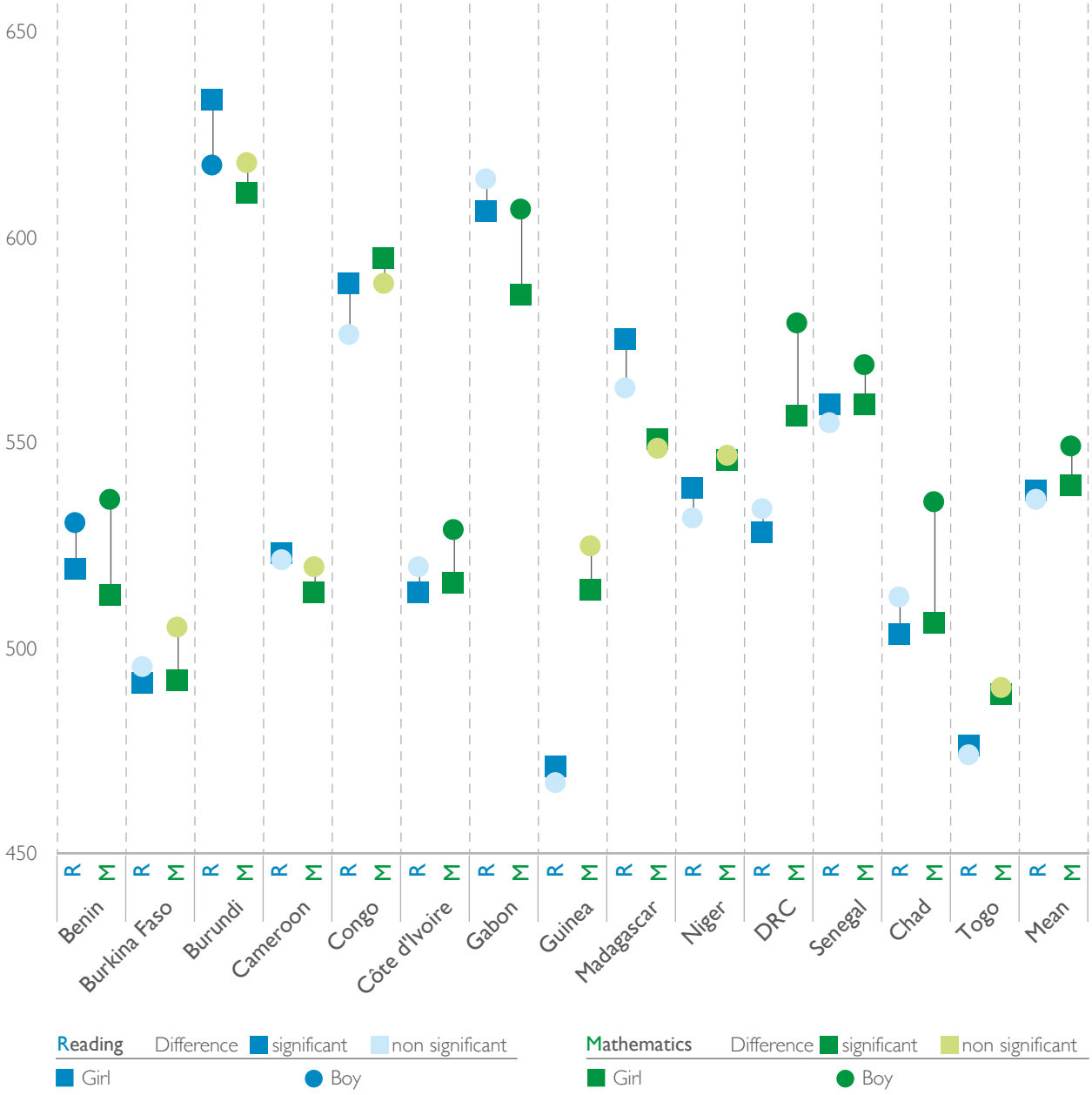
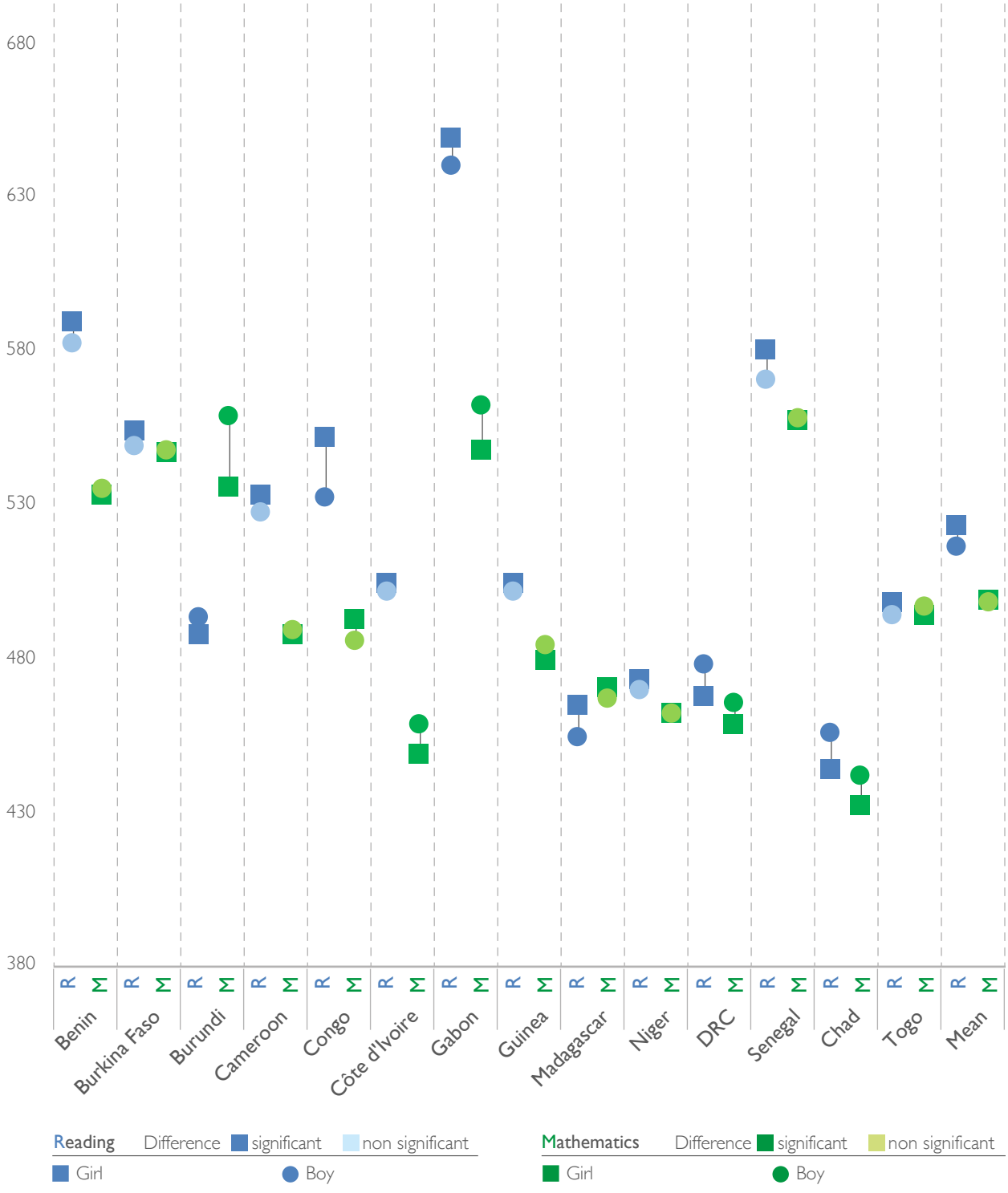


Figure 3.14: Student performance in reading and mathematics at the end of primary education by gender

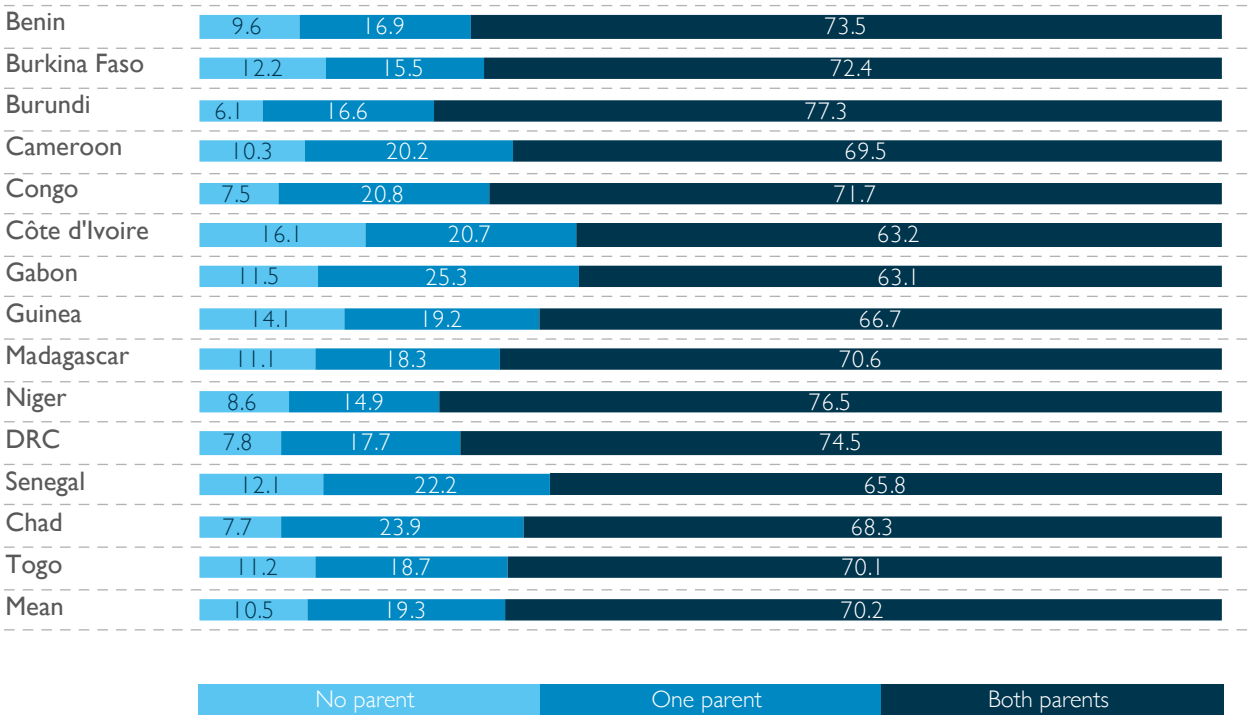


3.4.2. Presence of parents

School, family and community share responsibility for the education of young people, and when they work together more effective results are achieved (Epstein, 1995). There is a relationship between school dropout and family situation, and many studies have shown a positive relationship between home environment and student success (Coleman, 1966; Hanushek, 2003; Gruijters & Behrman, 2020).

The distribution of students at the end of primary school by parental presence indicates that on average 70.2% of students were living with both parents, 19.3% with one parent and 10.5% with no parents. The percentage of students living with no parents was highest in Côte d'Ivoire (16.1%).

Figure 3.15: Distribution of students by presence of parents - Late primary

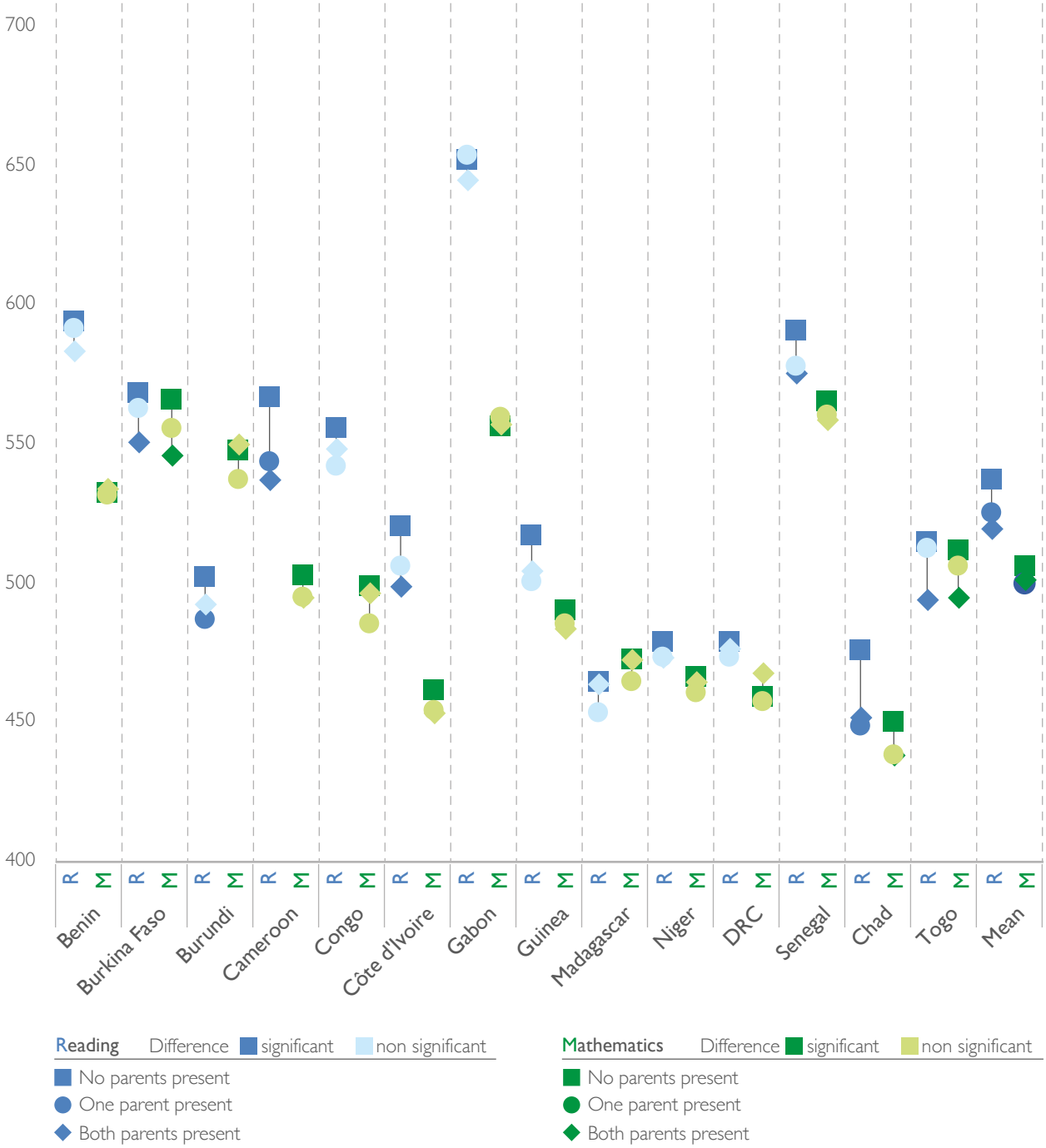


Reading and mathematics performance at the end of primary education was higher in all countries for students not living with either parent compared to those living with at least one parent. At individual country level, this difference was only significant in the case of reading in Burkina Faso, Cameroon, Côte d'Ivoire, Senegal, Chad and Togo for students not living with either parent compared to those living with both parents.

Burkina Faso, Chad and Togo were the only countries where the difference in mathematics scores between students living with both parents and those living with no parents was significantly in favour of the latter.

This somewhat paradoxical observation is probably since children in school who do not live with their parents are usually entrusted to relatives. This may result in better access to educational institutions and strong motivation to learn at school.

Figure 3.16: Student performance in reading and mathematics by parental presence - Late primary

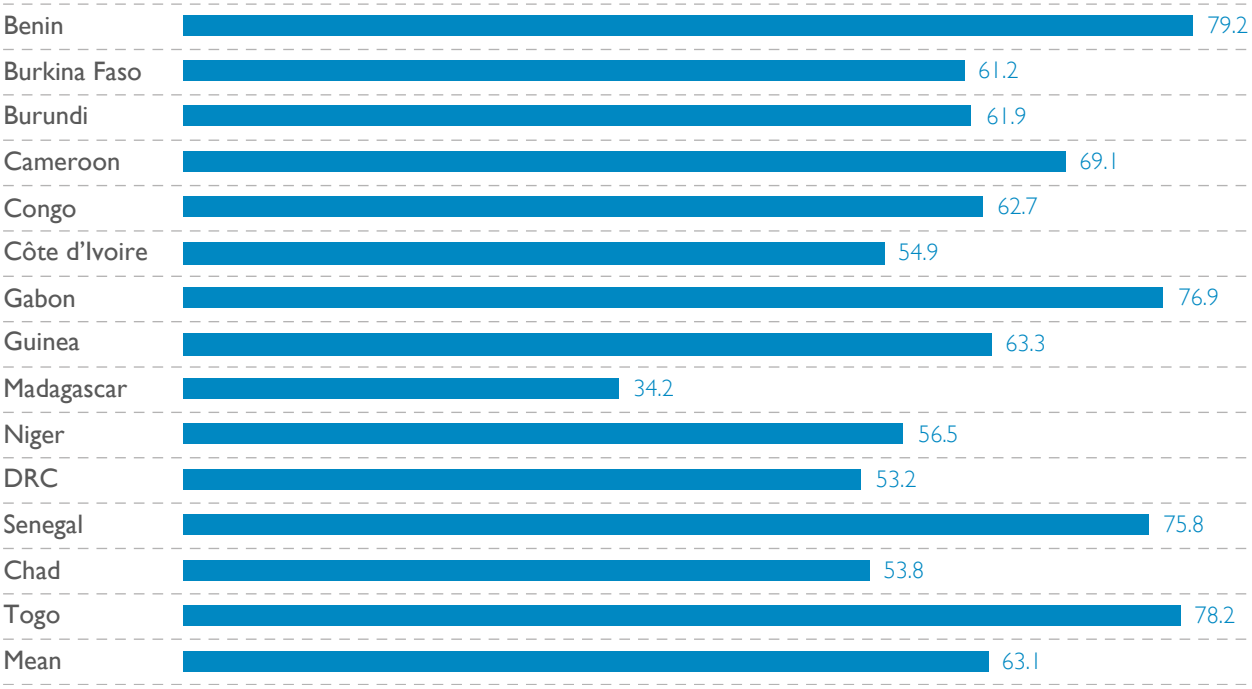


3.4.3. Support for students with homework

Parental support with homework positively influences student performance.

Across all countries participating in the PASEC*2019* assessment, an average of 63.1% of students received help with their homework. In most of these countries, more than half of students at the end of their primary schooling were helped with their homework, the only exception being Madagascar (34.2%). The highest percentages of parental support with homework were observed in Benin (79.2%), Togo (78.2%), Gabon (76.9%) and Senegal (75.8%) (see Figure 3.17).

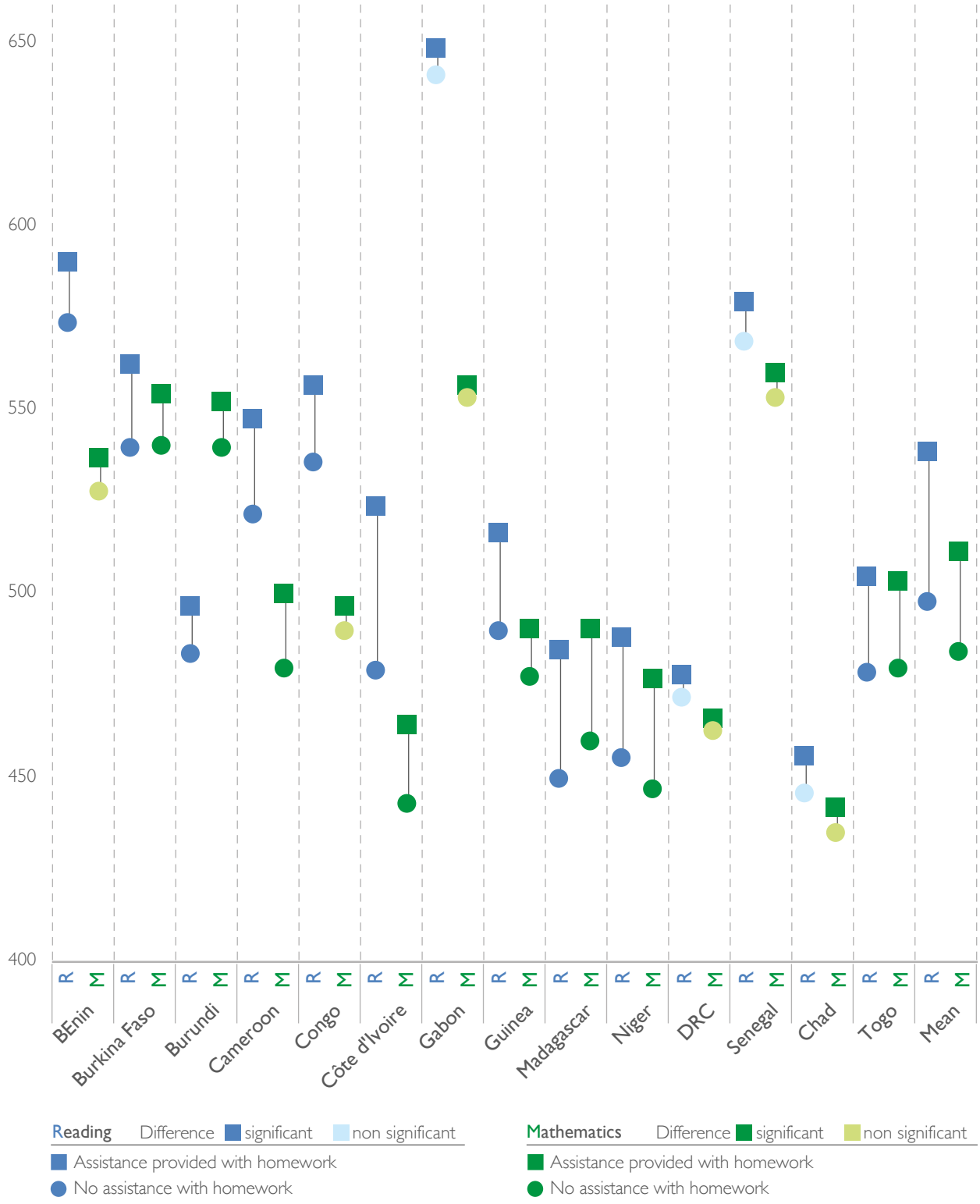
Figure 3.17: Percentage of students receiving assistance with homework - Late primary



Average performance in reading and mathematics at the end of primary education was better among students who received assistance with homework at home than among those who did not. At the individual country level, this significant difference in favour of students who were helped at home was observed for reading in all countries except for Gabon, DRC, Senegal and Chad, and for mathematics in all countries except for Benin, Congo, Gabon, DRC, Senegal and Chad. Analysis of the performance of the two groups of students after controlling for the local facilities index showed that the mean difference in performance remained favourable for students who received support with their homework. However, this difference was no longer significant for either subject in Togo and Cameroon, for reading in Benin and Niger, or for mathematics in Burkina Faso and Guinea.

Parental involvement and support with homework is generally expected by schools all over the world. Such involvement appears to be vital for students' academic success (Patall et al., 2008; Epstein, 1986; Trautwein et al., 2009).

Figure 3.18: Performance of students in reading and mathematics by assistance with homework - Late primary



3.4.4. Literacy of parents or guardians and presence of books at home

A literate environment (availability of books and presence of people who can read) helps improve students' performance.

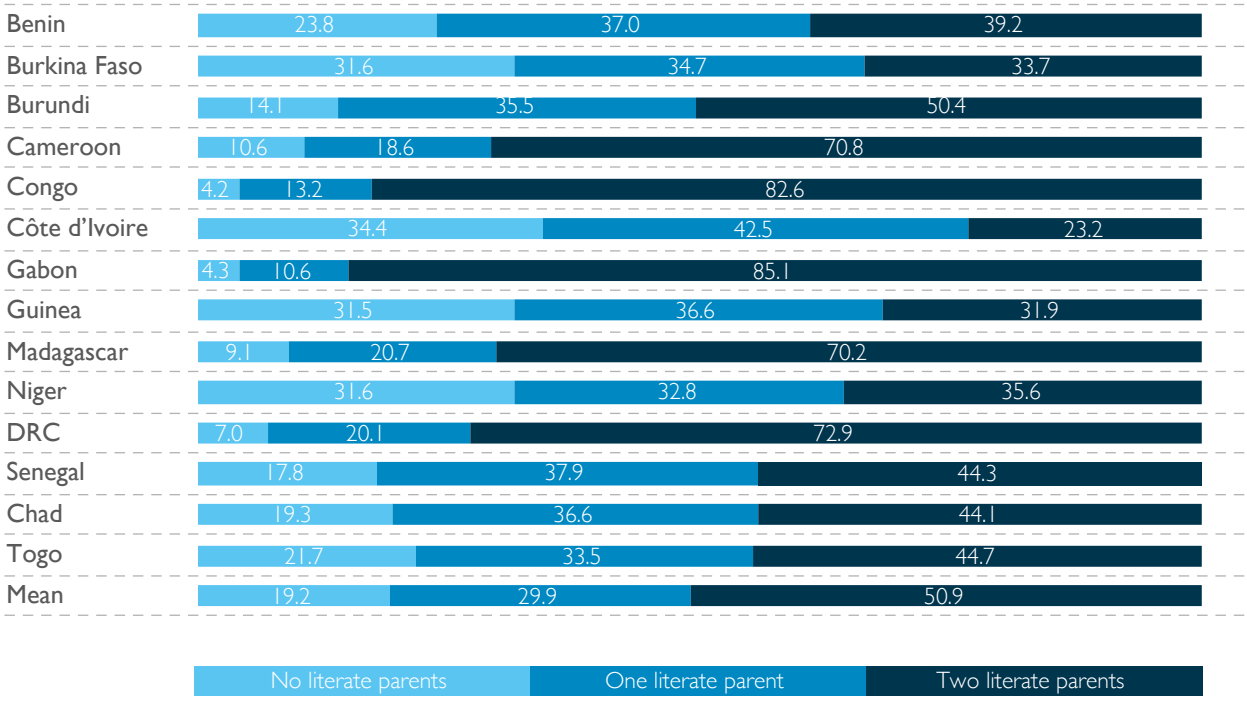
3.4.4.1. Literacy of parents or guardians

Various studies have shown that there is a link between the education level of parents and their children's success at school (Fan and Chen, 2001). A study carried out in Burkina Faso by the Educational Research Network for West and Central Africa (ERNWACA) in 2002 found that out of 524 students who had dropped out of school, only 21 (or 4%) were living with a parent or guardian educated beyond primary level; 53% had parents without any formal education. The study shows that more literate parents[21] contribute more to their children's success at school and are more able to keep them in the education system.

The recent study by Adeniran et al. (2020) in Nigeria showed no significant difference in the literacy level of children with parents who had not completed their primary education and those whose parents had done so. However, the results showed significant variation between students whose parents were educated to primary level and those whose parents were educated to secondary or post-secondary level. Students whose parents had a post-secondary qualification were 56% and 23% more likely to outperform students whose parents were uneducated in tests in literacy and numeracy respectively.

On average, 80.8% of children at the end of primary education were living with at least one literate parent across the countries that participated in the PASEC*2019* assessment. At country level, the percentage varied between 65.6% (Côte d'Ivoire) and 95.8% (Congo). Looking at the number of literate parents, 29.9% of students had one parent who could read and 50.9% had two parents who could read. Côte d'Ivoire had the highest proportion of students living with one literate parent (42.5%), while Gabon was the country with the highest proportion of students living with two literate parents (85.1%) (see Figure 3.19).

Figure 3.19: Distribution of students by the number of literate parents - Late primary



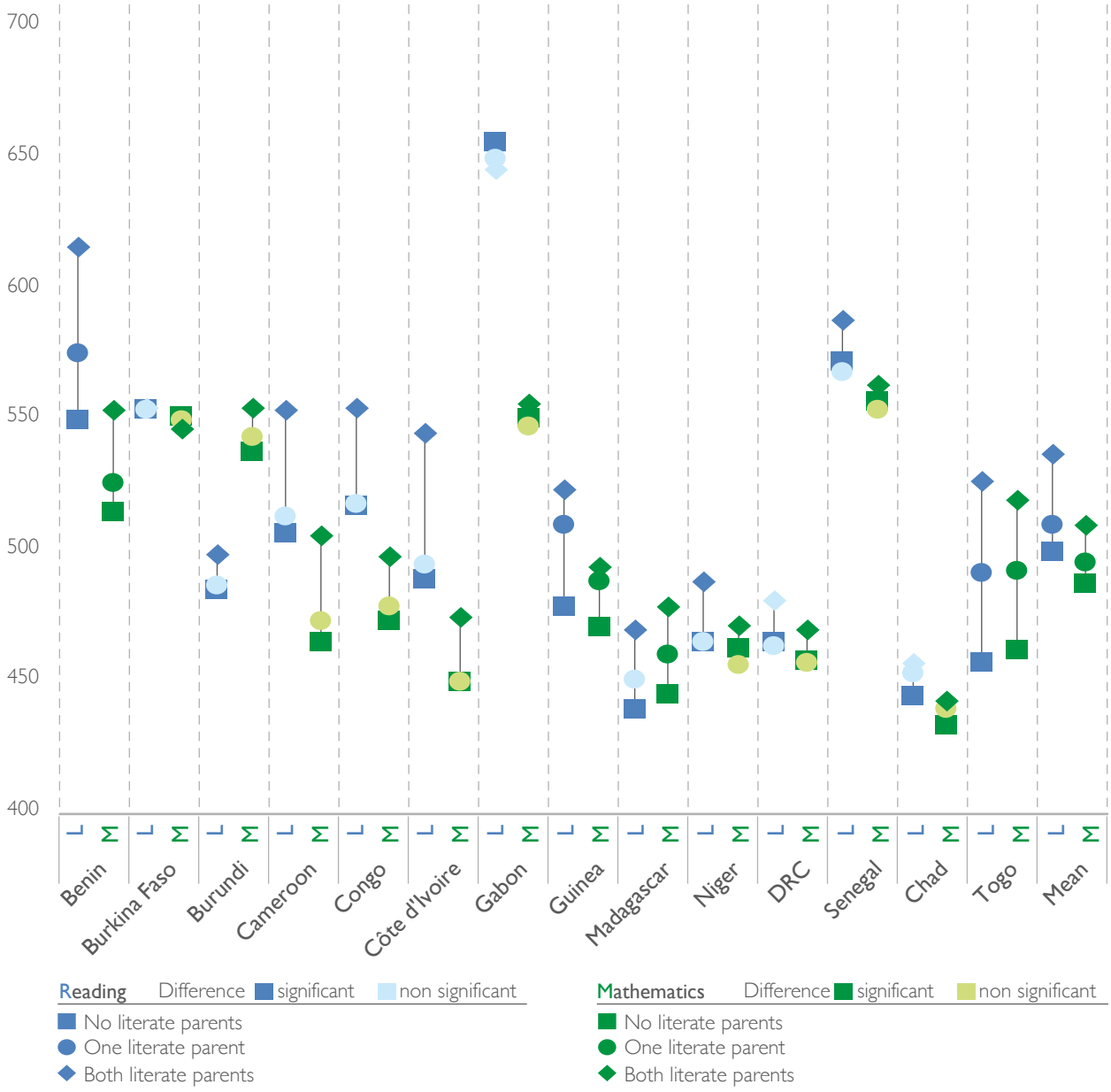
21. In this document, a person who can read is regarded as literate.

Comparison of the performance in reading at the end of primary education of students by their parents' literacy status was performed first between students with one literate parent and those with no literate parents, and then between those with two literate parents and those with no literate parents.

This showed that, on average, parental literacy had a positive influence on students' performance in reading and mathematics. Students with at least one parent who could read scored higher in both subjects than those with no literate parents.

The same result was observed in most countries. Students with at least one literate parent performed better in both subjects in all countries except for Burkina Faso, Gabon, DRC and Chad. Parental literacy had a positive impact on the performance of students in Niger and Senegal in reading, but not in mathematics (see Figure 3.20).

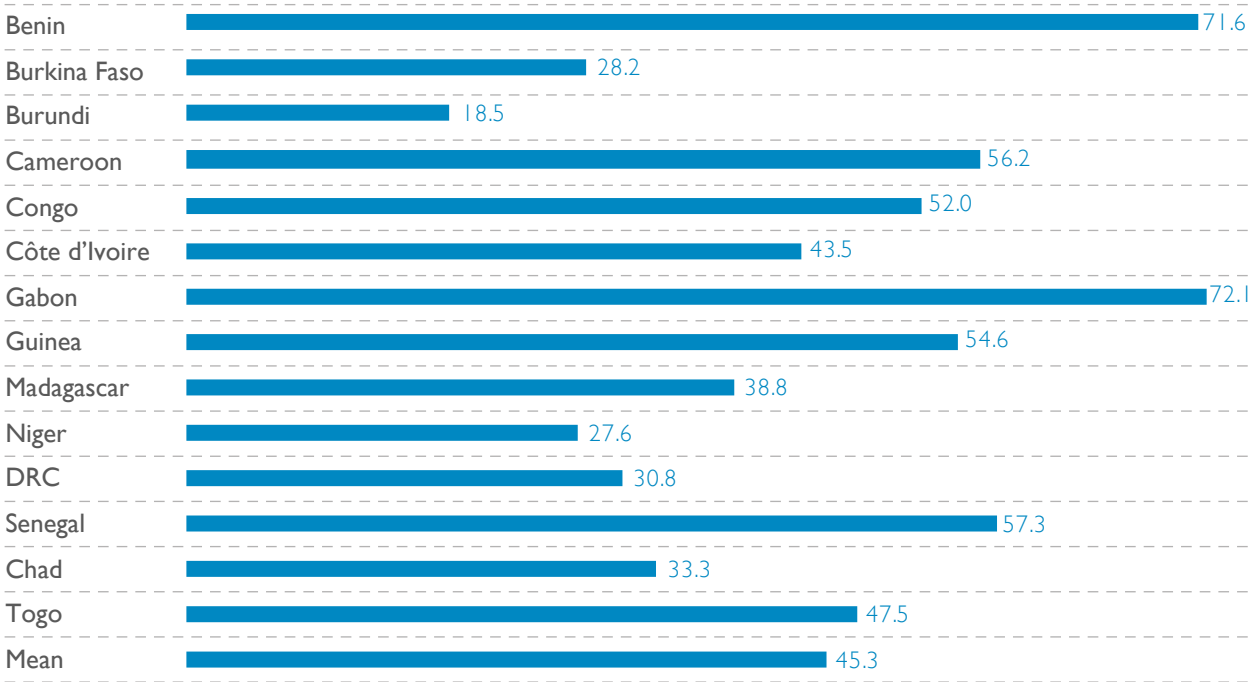
Figure 3.20 : Student performance in reading and mathematics by the number of literate parents - Late primary



3.3.4.2. Possession of books at home

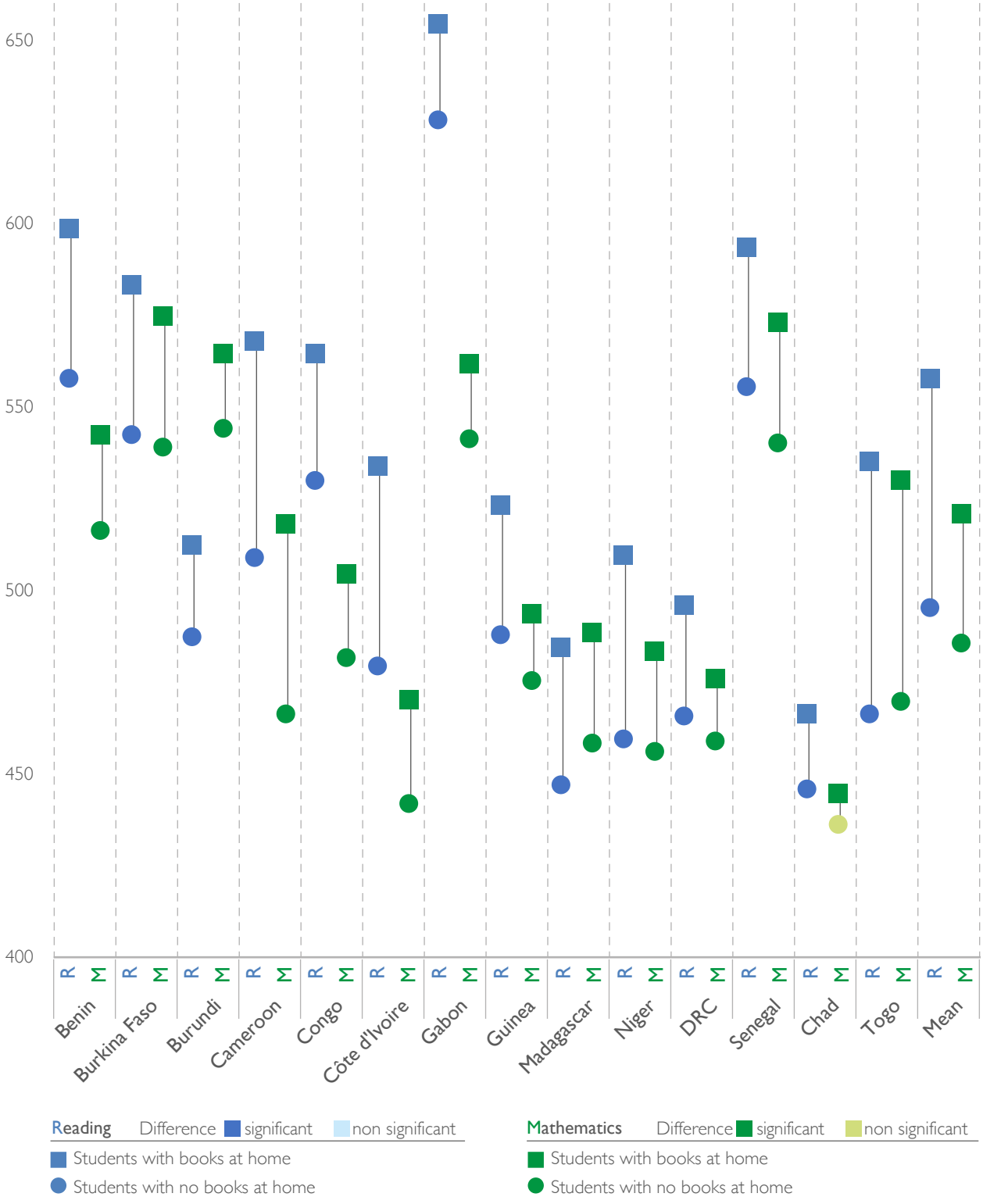
Across all participating countries, an average of 45.3% of students at the end of primary education had books at home. The highest proportions were observed in Benin and Gabon; the lowest proportions were recorded in Burundi and Niger.

Figure 3.21: Percentage of students with books at home - Late primary



Across all countries, the average performance at the end of primary education in reading and mathematics was significantly higher among students who had books at home. The same was true of each individual country in both subjects with the exception of Chad for mathematics.

Figure 3.22: Student performance in reading and mathematics by the number of books at home - Late primary



The proportion of students with no books at home was relatively low across the participating countries, averaging less than 13%. The percentage was highest in Madagascar (38.1%), Chad (24.9%), Niger (21.9%) and Guinea (18%). Côte d'Ivoire was the country where the percentage of students at the end of primary education with no books at home was lowest (1.6%). This percentage was also very low In Senegal (6.7%).

There was a high percentage of students at the end of primary education with enough books at home to fill a bookshelf. The figure averaged 64.5% across the 14 countries participating in the PASEC*2019* assessment and varied between 50% (Chad) and 83.1% (Burundi). By contrast, in all countries, the proportion of students at the end of primary education with enough books at home to fill two shelves or a whole bookcase was low.

Figure 3.23: Distribution of students by the number of books at home - Late primary

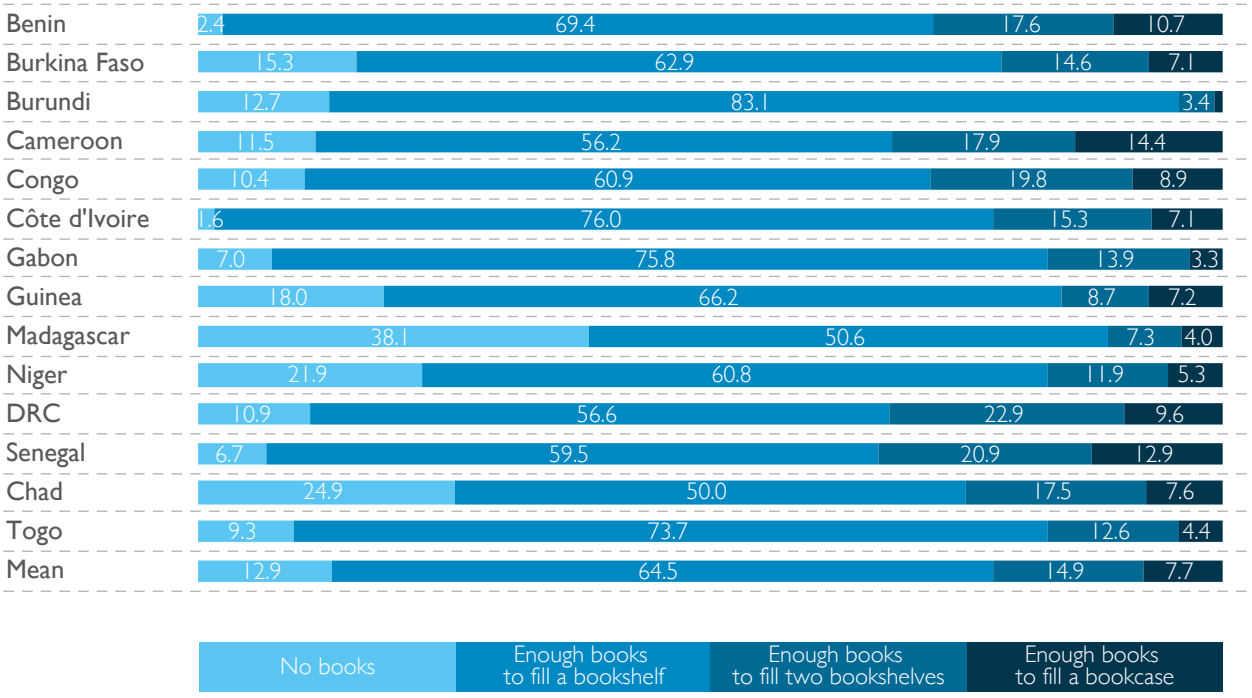
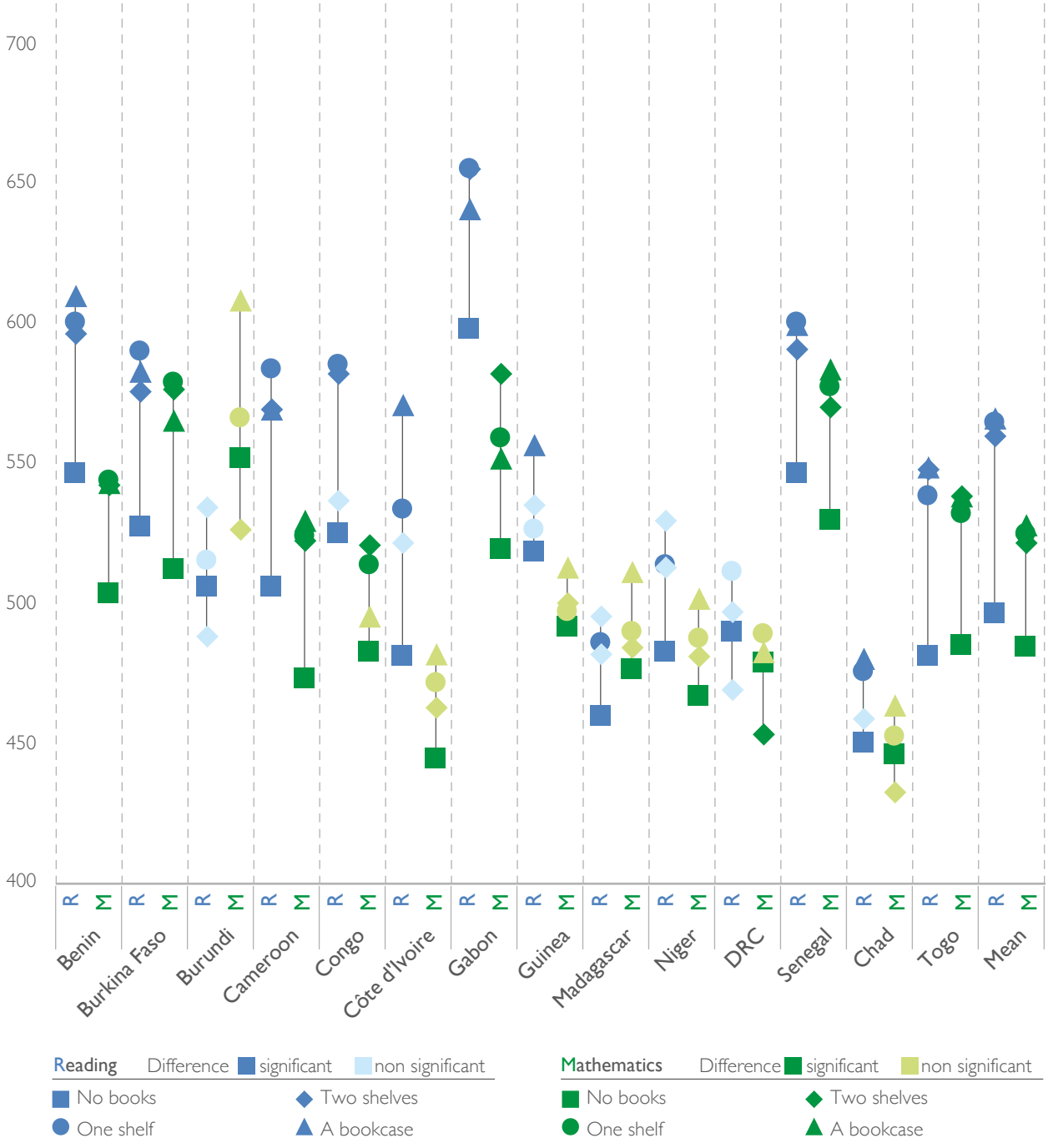


Figure 3.24 compares the reading and mathematics performance of students at the end of primary education by the number of books at home. On average in reading and mathematics, regardless of the number of books at home, the performance difference between students at the end of primary education with books at home and those with no books was significantly in favour of the first group. For example, students with enough books at home to fill one bookshelf had higher reading scores than those without any books. The average difference in performance between the two groups of students was significantly better for students with books at home in all countries except for Burundi, Guinea and DRC. However, when students with enough books at home to fill two shelves or a bookcase were compared with students without any books, significant performance gaps in reading in favour of the first group were observed in seven countries (Benin, Burkina Faso, Cameroon, Congo, Gabon, Senegal, Togo) and nine countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Gabon, Guinea, Senegal, Chad, and Togo) respectively. Almost the same findings were made for mathematics. The performance gaps between students with enough books at home to fill one shelf, two shelves and a bookcase and those with no books at home were significant in seven countries (Benin, Burkina Faso, Cameroon, Congo, Gabon, Senegal, Togo), eight countries (Benin, Burkina Faso, Cameroon, Congo, Gabon, DRC, Senegal, Togo) and six countries (Benin, Burkina Faso, Cameroon, Gabon, Senegal, Togo) respectively.

Figure 3.24 : Student performance in reading and mathematics by the number of books at home - Late primary



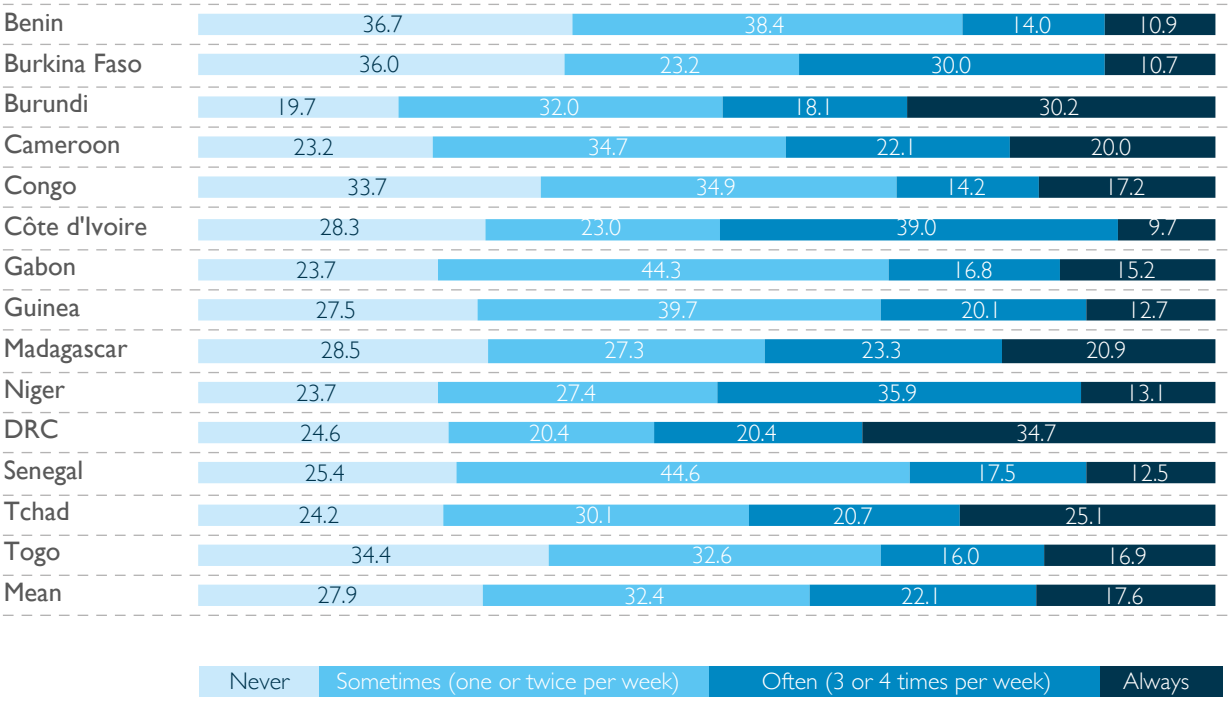
3.4.5. Student nutrition at the end of primary education

Nutrition is an important factor in educational success.

To ensure proper nutrition that is conducive to learning and student well-being, school meal programmes have been implemented in many developing countries. Empirical evidence has shown that school meals improve student outcomes. For example, Diagne et al. (2013) assessed the influence of school meals on student performance in mathematics and French in Senegal. They found that school meal programmes significantly improved school performance; in French, they increased the students' average score by 5.6 percentage points. However, there is no consensus on this issue in the literature. For example, Powell et al. (1998) found that school meals did not significantly improve performance in French.

In the countries that took part in the assessment, 27.9% of students were never hungry at school, while 32.4% were sometimes hungry and 39.7% were often or always hungry. The highest percentage for this last group was found in DRC (55.0%), while for the other countries the figure varied between 24.9% (Benin) and 48.9% (Niger). It is very likely that these percentages reflect the extent of extreme poverty, which varies between countries, and the presence or lack of school canteens.

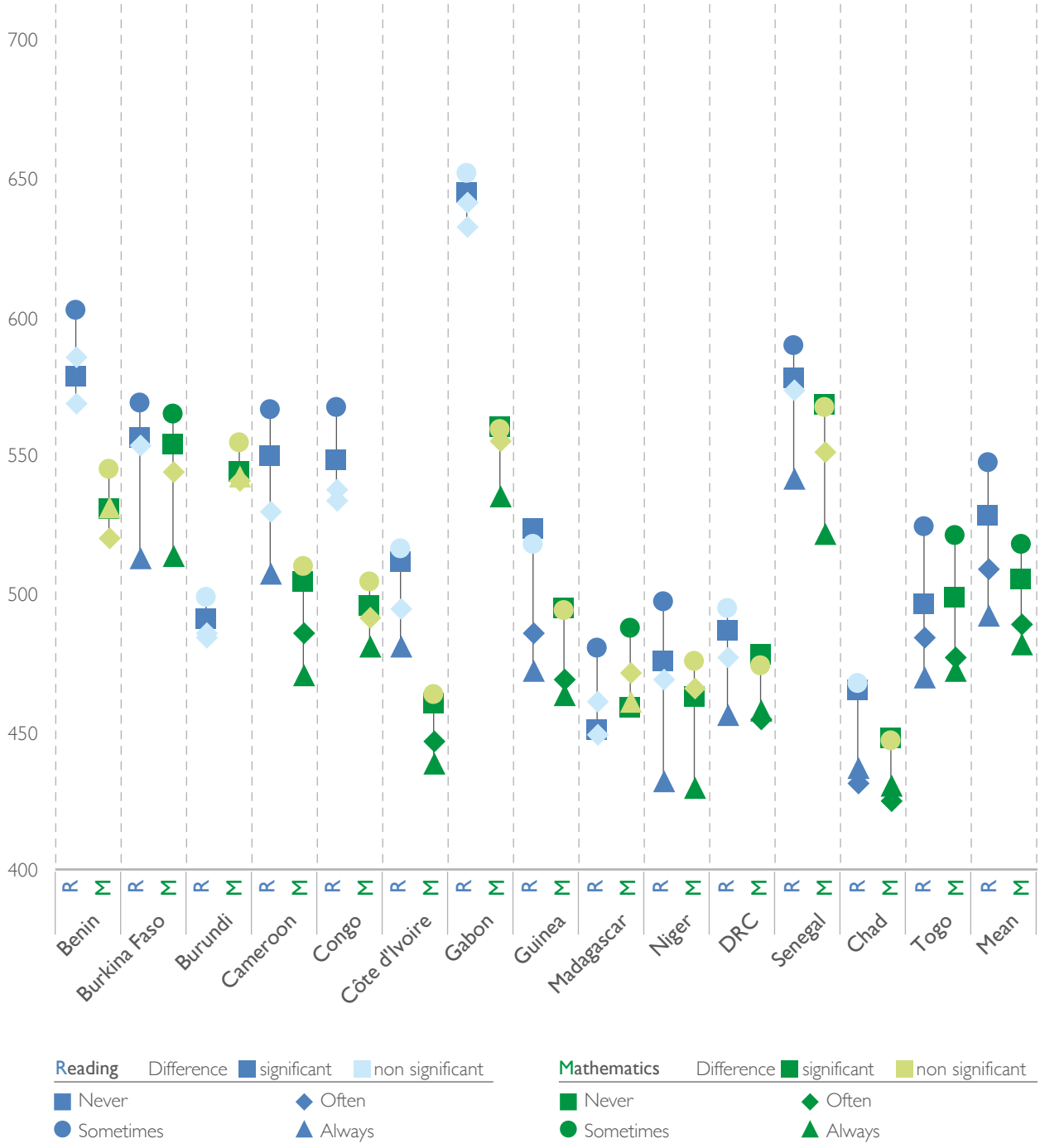
Figure 3.25: Percentage of students by frequency of hunger at school



At the end of primary education, the average differences in reading performance between students who were often or always hungry at school and those who were never hungry were significantly in favour of the latter. At country level, this performance difference in favour of students who were never hungry was significant in Guinea and Chad compared with those who were often hungry and in nine countries (Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, Niger, DRC, Senegal, Chad, Togo) compared with those who were always hungry.

In mathematics, the same results were obtained at the overall level. At country level, the difference in favour of students who were never hungry was significant in six countries (Cameroon, Côte d'Ivoire, Guinea, DRC, Chad, Togo) compared with those who were often hungry at school and in all countries except for Benin, Burundi and Madagascar compared with students who were always hungry.

Figure 3.26: Student performance in reading and mathematics by frequency of hunger at school - Late primary



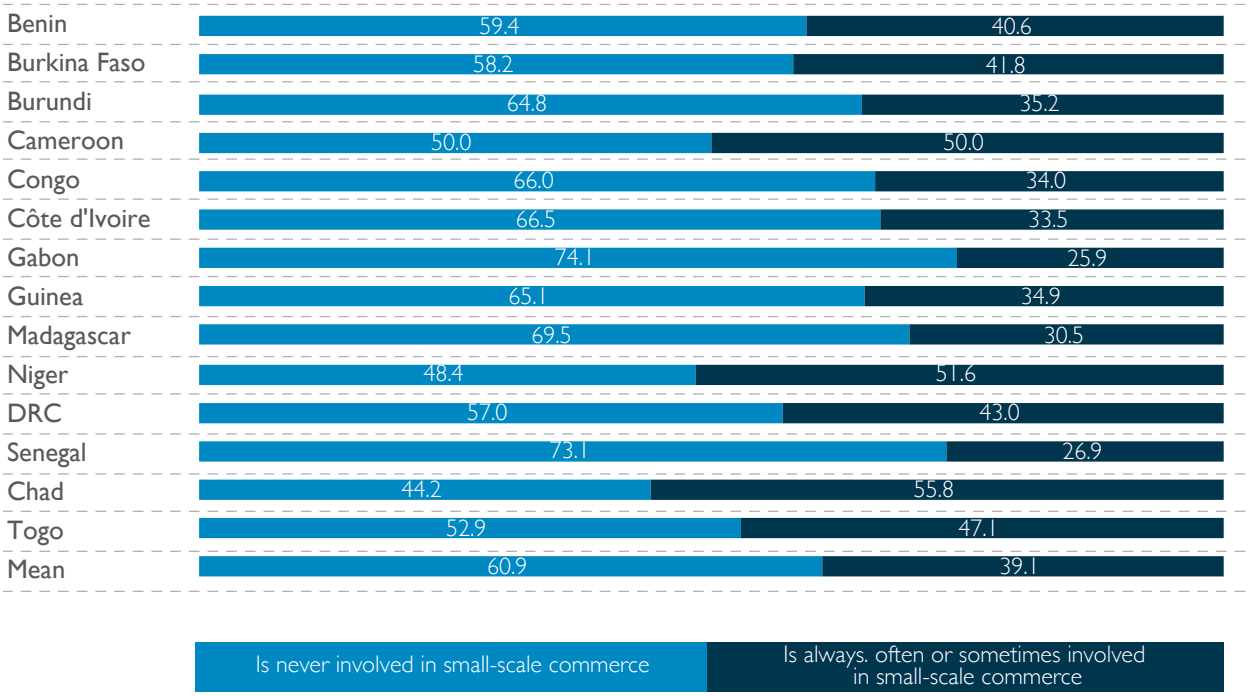
3.4.6. Work outside school hours at the end of primary education

Students' participation in certain activities outside school hours during the school year tends to adversely affect their performance at school.

3.4.6.1. Student involvement in small-scale commerce

The percentage of students at the end of primary education involved in small-scale commerce was relatively high for all participating countries. The average figure was 39.1% across all countries. The proportion was highest in Chad (55.8%), Niger (51.6%), Cameroon (50.0%) and Togo (47.1%); in the other countries it varied between 25.9% (Gabon) and 43.0% (DRC) (see Figure 3.27).

Figure 3.27: Distribution of students by involvement in small-scale commerce - Late primary

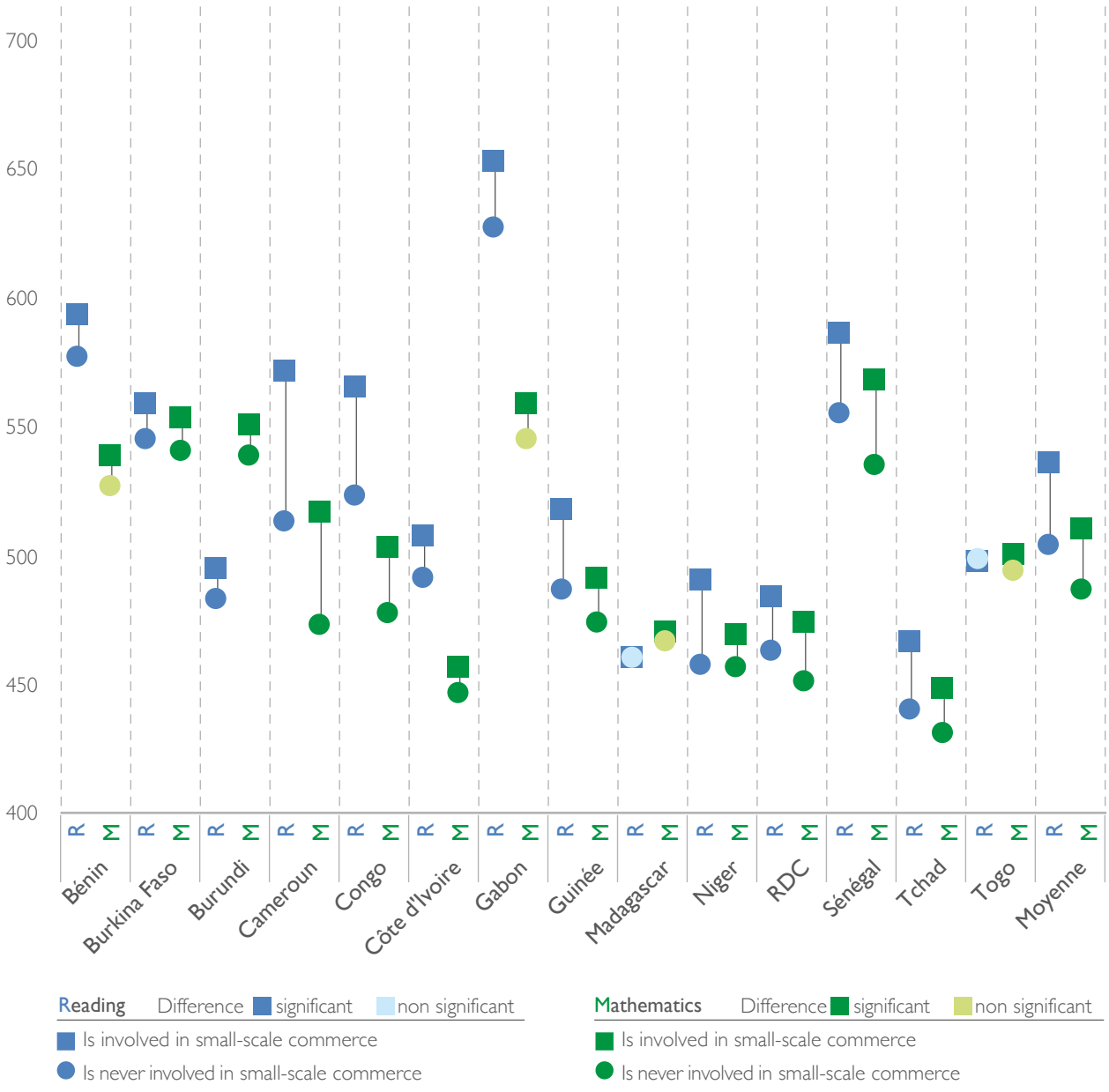


At the end of primary education, the average difference in reading performance across all countries between students involved in small-scale commerce and those never involved in it was significantly in favour of the latter. At country level, this difference was significantly in favour of those never involved in small-scale commerce in all countries except for Madagascar and Togo.

In mathematics, the average score of students involved in small-scale commerce was significantly lower than that of students who were never involved in it across all countries. This was also true of each individual country except for Benin, Gabon, Madagascar and Togo.

This result shows that although involvement in work outside school hours has an adverse impact on learning outcomes overall, some such activities, such as small-scale commerce, have a negative influence on performance in mathematics. This finding, which is consistent with the literature, shows the importance of the impact of informal learning on school learning in mathematics (Nunes, Schliemann & Carraher, 1993; Brenner, 1998).

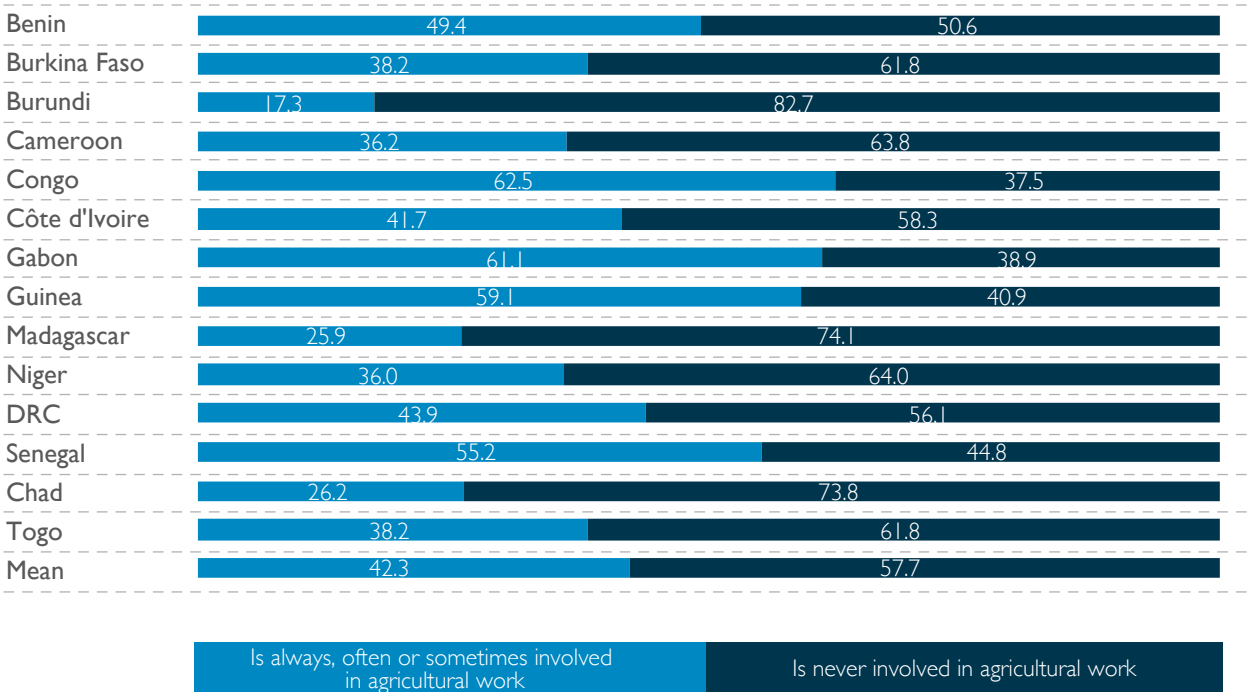
Figure 3.28: Student performance in reading and mathematics by involvement in small-scale commerce - Late primary



3.4.6.2. Student involvement in agricultural work

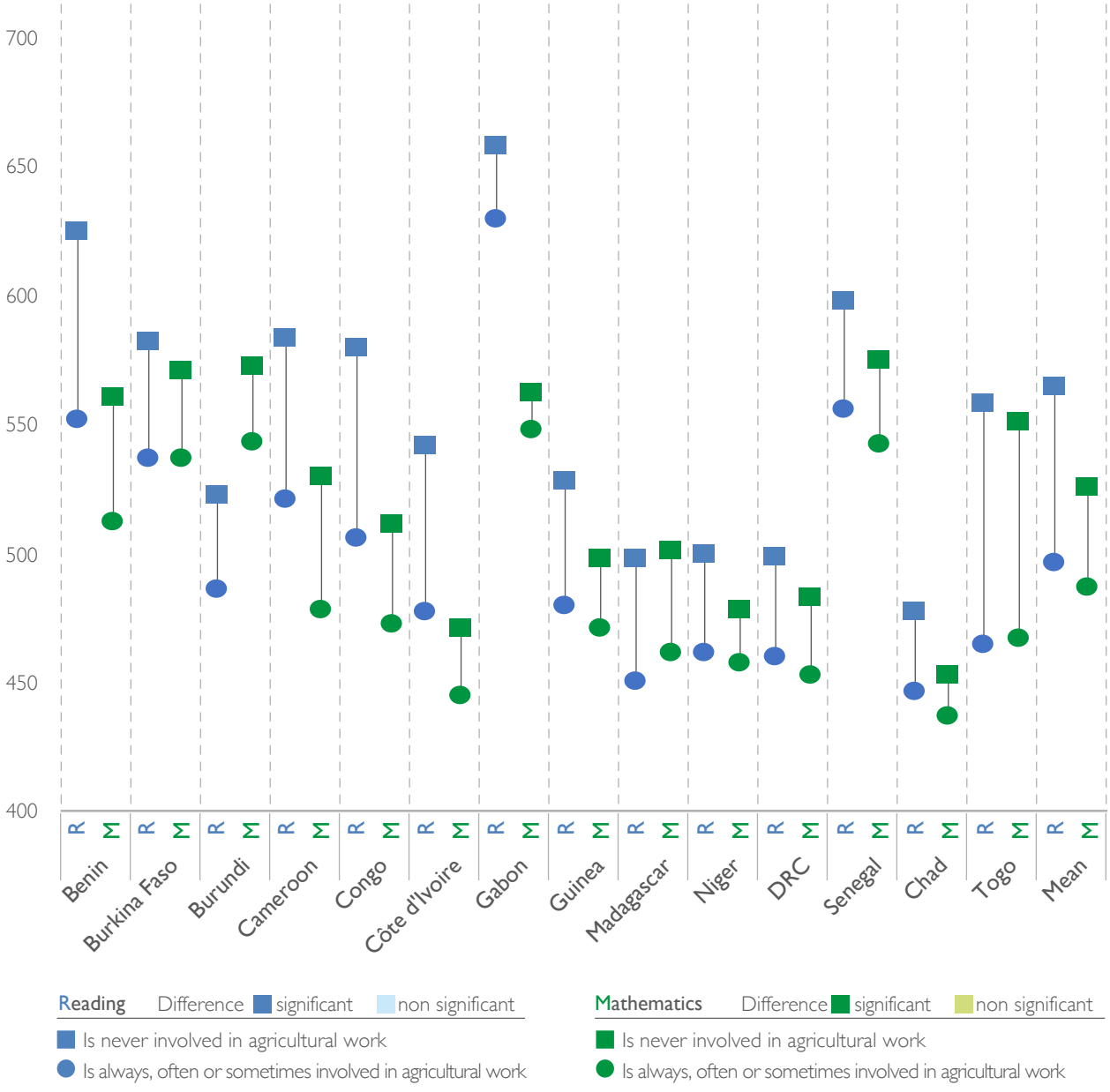
More than half of students (57.7%) at the end of primary education across the countries were involved in agricultural work. The proportion was highest in Burundi (82.7%), Madagascar (74.1%) and Chad (73.8%), and varied elsewhere between 37.5% (Congo) and 64.0% (Niger).

Figure 3.29: Distribution of students by involvement in agricultural work - Late primary



The average difference in reading and mathematics performance across all countries between students involved in agricultural work and those never involved in it was significantly in favour of the latter. The same significant difference was also seen in each individual country.

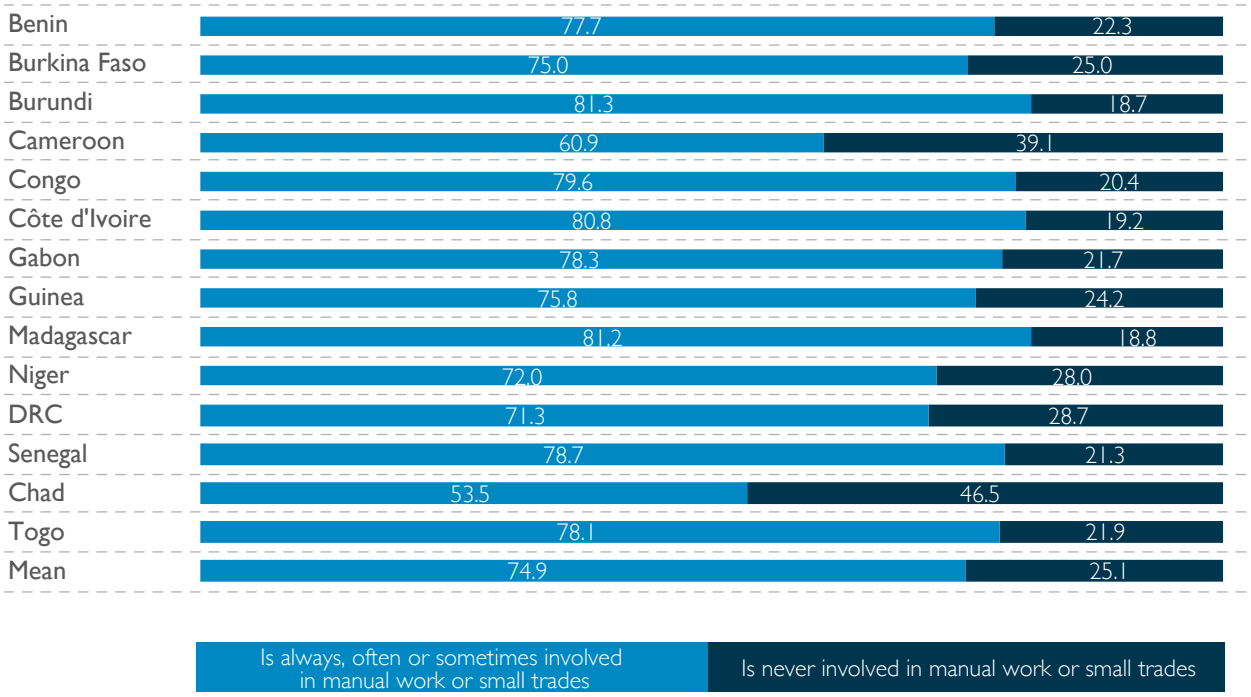
Figure 3. 30: Student performance in reading and mathematics by involvement in agricultural work - Late primary



3.4.6.3. Student involvement in manual work or small trades

The percentage of students at the end of primary education involved in manual work or small trades was relatively low across the participating countries, at 25.1%. It was highest in Chad (46.5%) and Cameroon (39.1%), varying in the other countries between 18.7% (Burundi) and 28.7% (DRC).

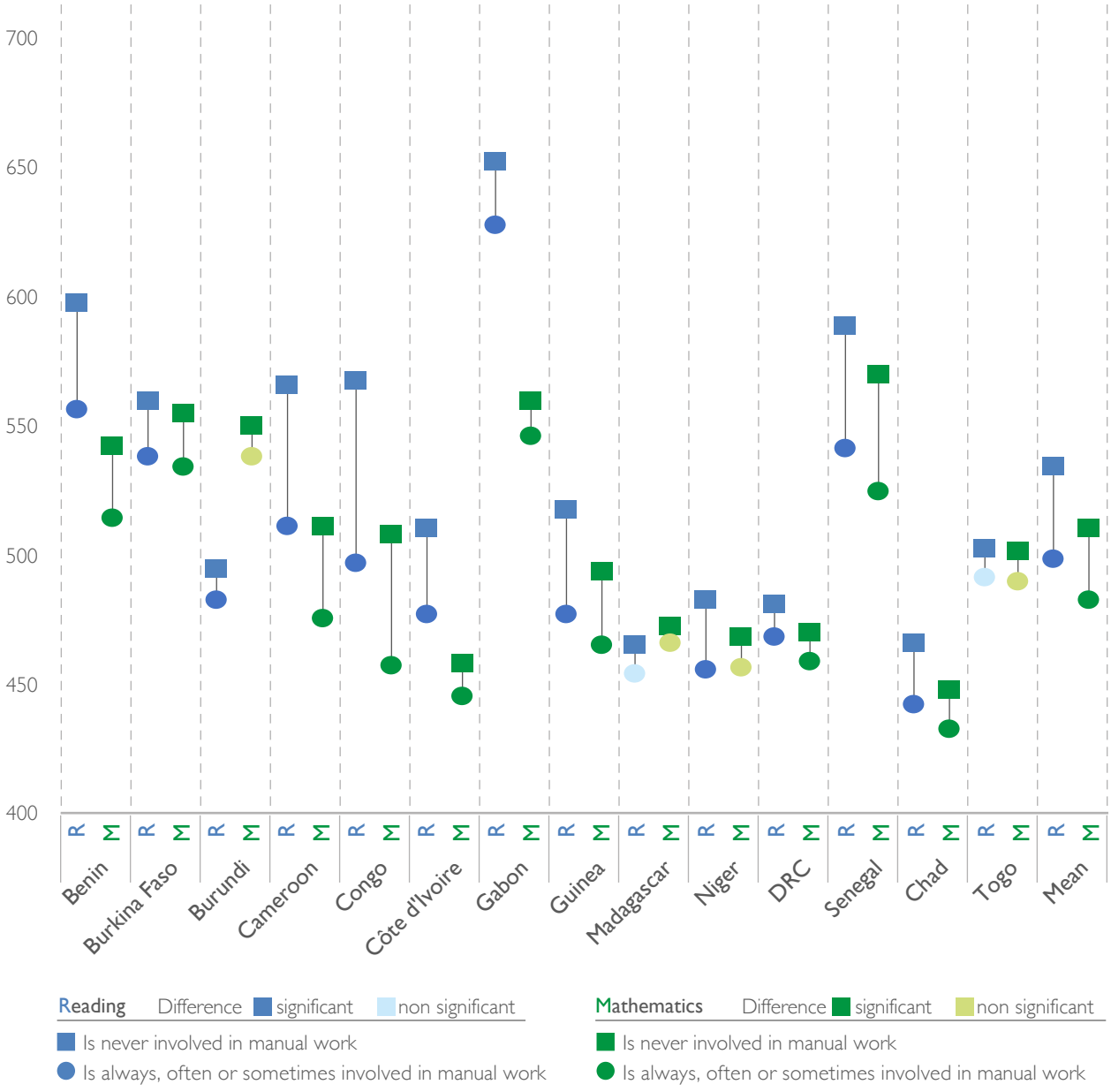
Figure 3.31: Distribution of students by involvement in manual work or small trades - Late primary



The average difference in reading scores across all countries between students involved in manual work or small trades and those never involved in them was significantly in favour of the latter. This difference was also significant in all individual countries apart from Madagascar and Togo.

In mathematics, students who were involved in manual work performed at a lower level than those who were never involved. This result was observed in every individual country except for Burundi, Madagascar, Niger and Togo.

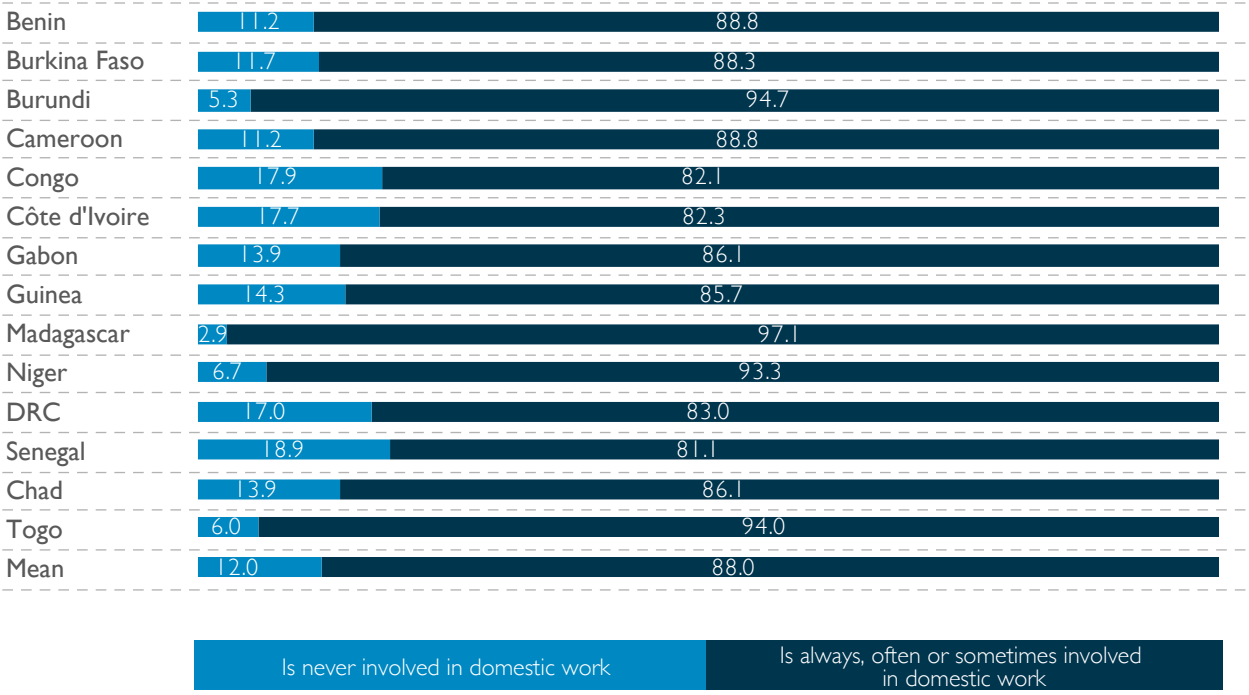
Figure 3. 32: Student performance in reading and mathematics by involvement in manual work or small trades - Late primary



3.4.6.4. Student involvement in domestic work

Domestic work was engaged in by most students: 88.0% of students did domestic work during the school year. The proportion of students involved in domestic work was highest in Madagascar (97.1%), Burundi (94.7%), Togo (94.0%) and Niger (93.3%). Elsewhere, it varied between 81.1% (Senegal) and 88.8% (Benin).

Figure 3.33: Distribution of students by involvement in domestic work - Late primary



Across the countries, the average reading score of students involved in domestic work was significantly higher than that of students who never did domestic work. At country level, the performance difference between the two groups was only significant in two countries: in Niger in favour of those who were always, often or sometimes involved in domestic work, and in DRC in favour of those who were never involved.

In mathematics, the average difference in performance across all countries between students who did and those who never did domestic work was not significant. At country level, this difference was significant in four countries: in Benin and the DRC in favour of those who never did domestic work, and in Gabon and Niger in favour of those who did domestic work.

Figure 3.34: Student performance in reading and mathematics by involvement in domestic work - Late primary

3.4. 7. Educational career

3.4.7.1. Preschool attendance

Preschool is an important factor in educational success. Despite the importance of preschool learning for the achievement of SDG 4.2, access to pre-primary education remains low in most countries.

Preschool was introduced to promote the socialisation of children and thus prepare them to fit in at school. Several studies have shown that children who attend preschool perform at a higher level at the start of primary school. According to Reynolds (1995), children who participate in a preschool programme for two years have a higher level of readiness for school than those who do so for one year. According to Letarte et al. (1998), even allowing for family risk factors, preschool attendance is a predictor of the level of cognitive and psychosocial readiness for school. The evidence for the contribution of preschooling to students' subsequent educational careers has been investigated in the literature (Marope & Kaga, 2017).

The distribution of students by preschool attendance shows that 32.3% of students at the start of primary education and 37.1% at the end of primary education had attended preschool. The fact that the proportion is higher by the end of primary education could be explained by the positive influence of preschool on students' educational outcomes.

At country level, the proportion of students who had attended preschool varied between 7.0% (Chad) and 72.4% (Gabon) at the start and between 12.0% (Burkina Faso) and 6.91% (Gabon) at the end of primary education.

Figure 3.35: Percentage of students who had attended kindergarten or preschool - Early primary

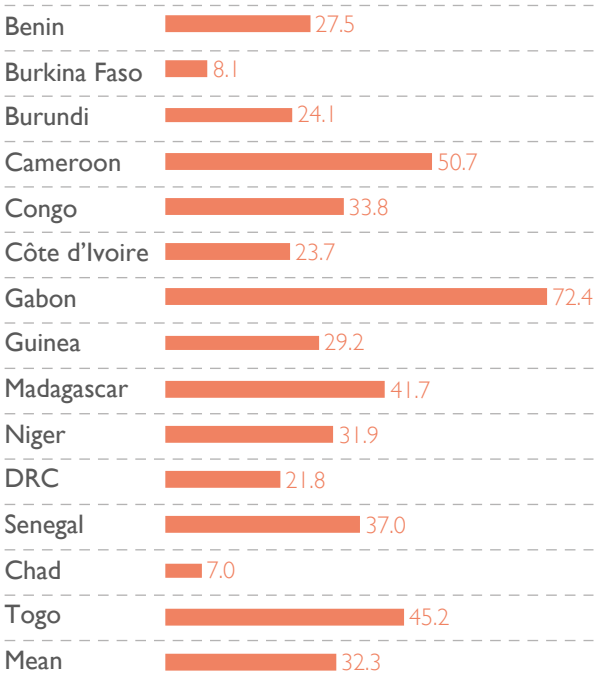
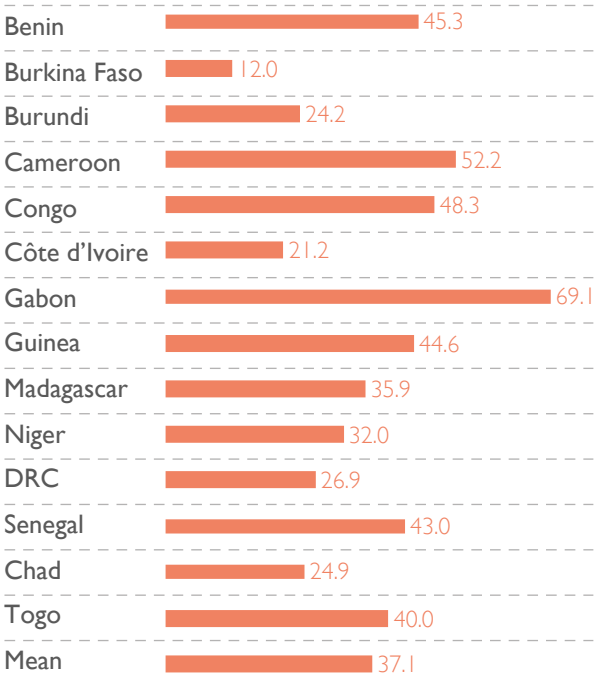


Figure 3.36: Percentage of students who had attended kindergarten or preschool - Late primary



At the start of primary education, students who had attended preschool on average outperformed those who had not in language of instruction and mathematics. The difference was significant in all countries except for Burundi in mathematics.

The same was true at the end of primary education: preschool had a positive overall influence on results in reading and mathematics, which was significant in all countries except for Chad (in reading and mathematics) and Senegal (in mathematics only).

Figure 3.37: Student performance in language of instruction and mathematics by attendance of kindergarten or preschool - Early primary

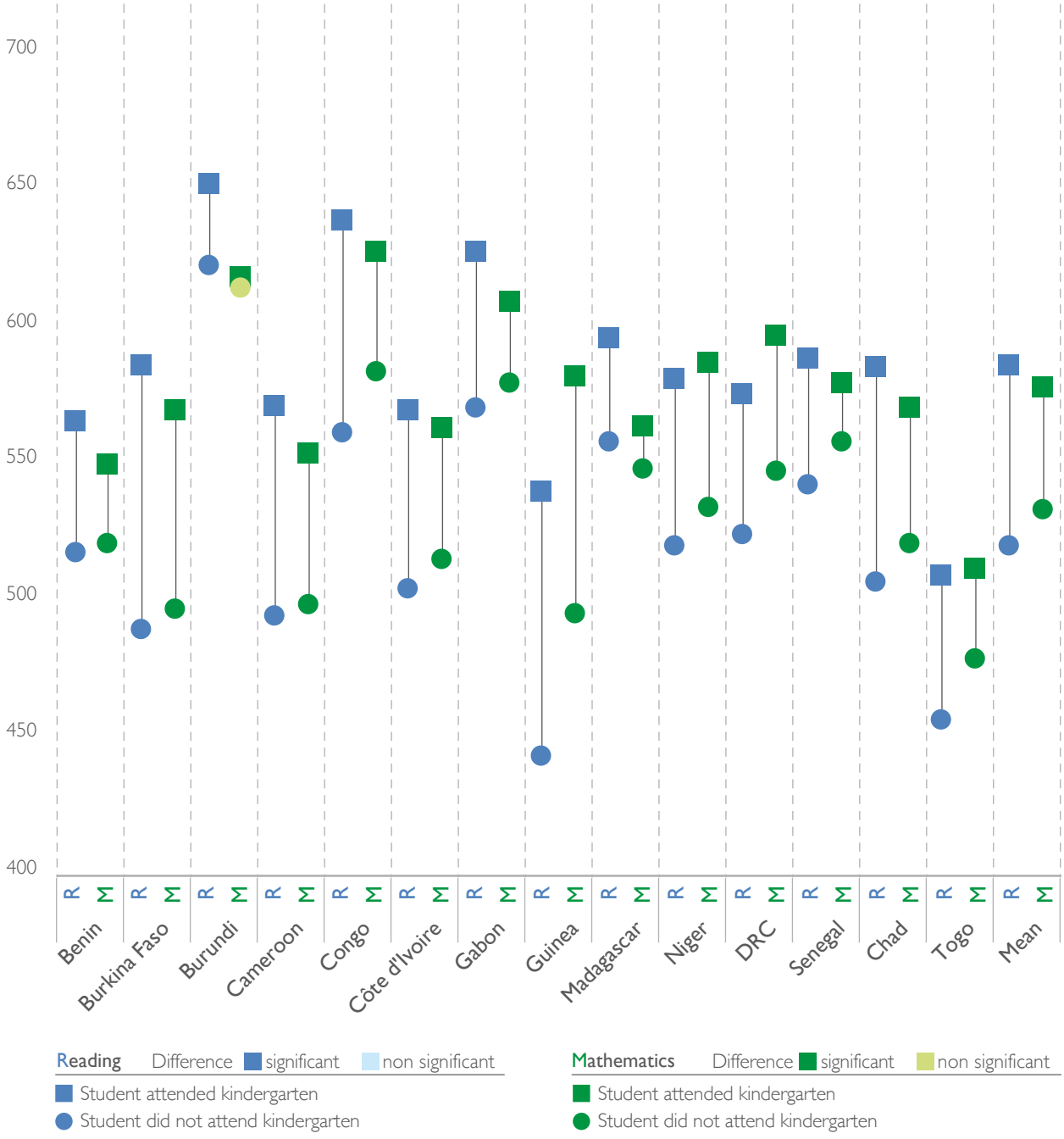
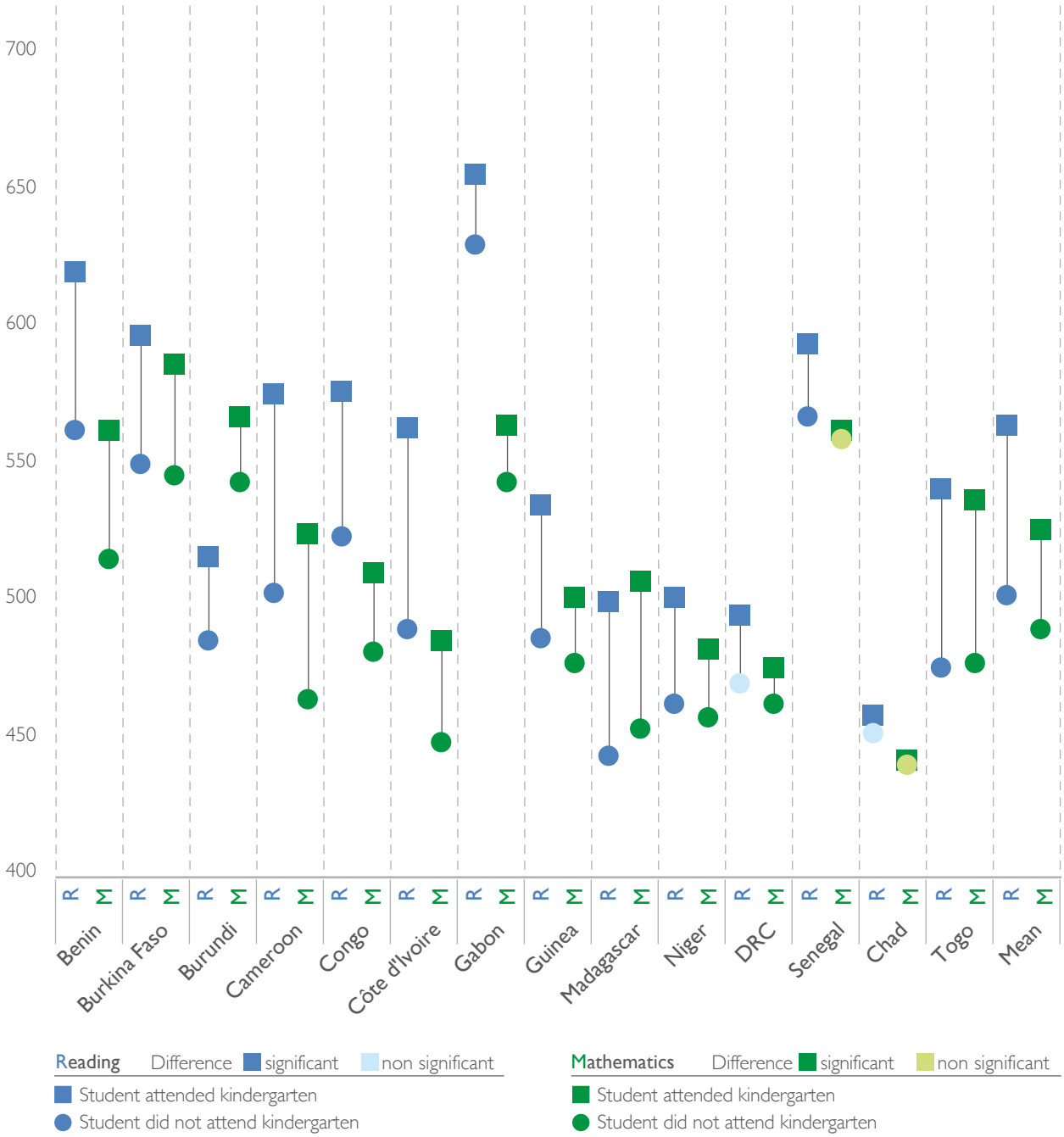
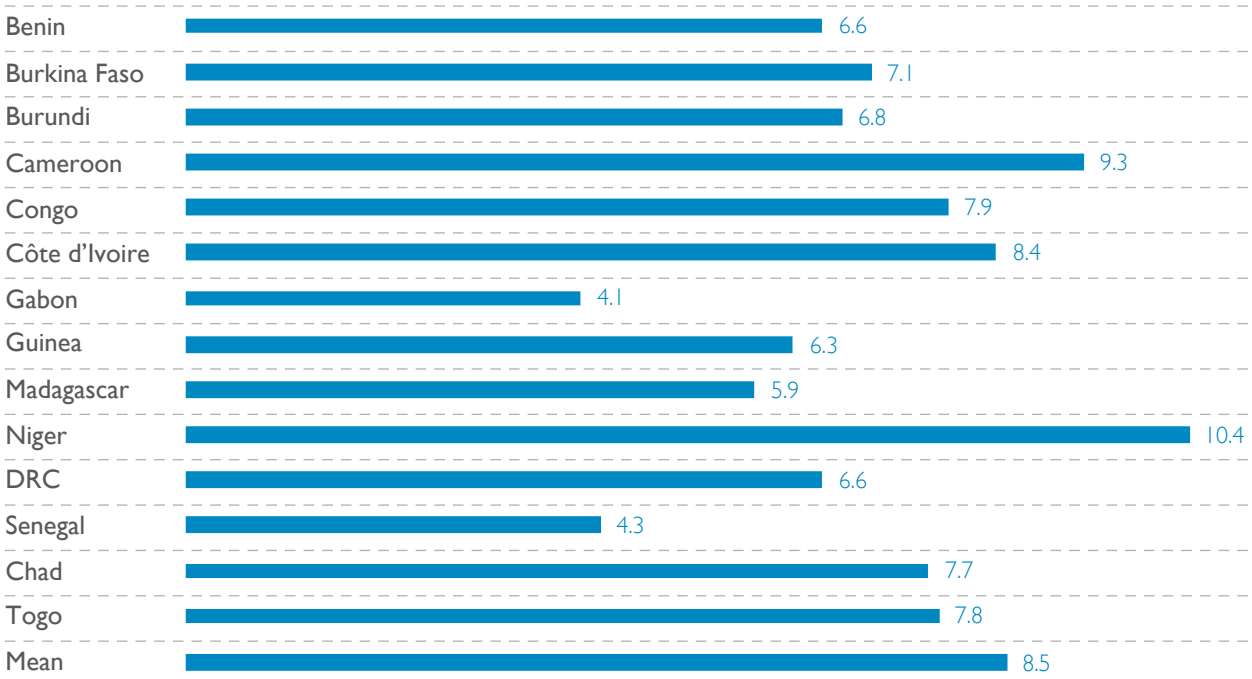


Figure 3.38: Student performance in reading and mathematics by attendance of kindergarten or preschool - Late primary



The average socio-economic index of students who had attended preschool was higher than that of students who had not (see Figure 3.39). Poverty seems to be the main obstacle to access to pre-primary education.

Figure 3.39: Mean difference in socio-economic index between students by attendance of kindergarten or preschool



3.4.7.2. Grade repetition

The proportion of students repeating a grade remains a matter of concern in most countries. Grade repetition makes it impossible for students to catch up with peers who have not repeated a grade.

Grade repetition is an educational practice used to help students with learning difficulties by giving them a chance to catch up educationally.

For several years, reducing the grade repetition rate has been a priority in the education policies of countries in French-speaking sub-Saharan Africa. The measures that have been taken are varied and depend on the national context. Thus, while some countries are pursuing a policy of automatic progression to the next grade (Burkina Faso, Senegal and Chad) and/or a drastic reduction in the grade repetition rate (Niger)[22], others have chosen to integrate national languages into primary education[23] in order to counter this phenomenon.

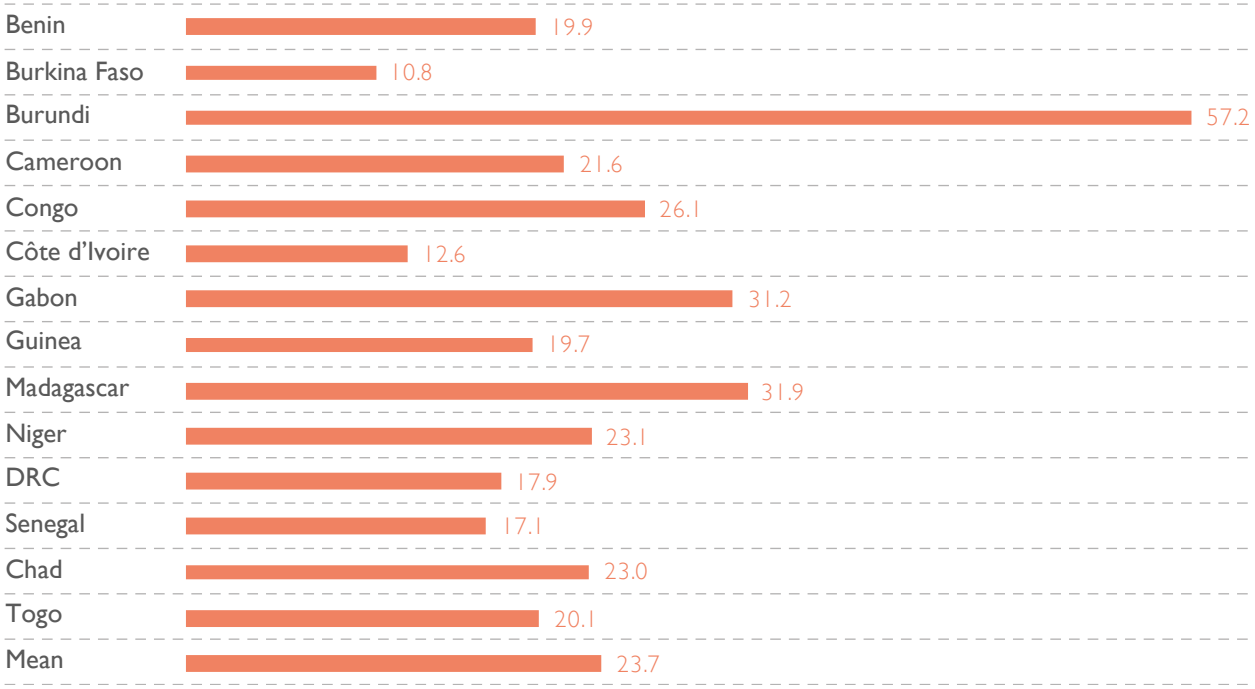
The scientific literature is almost unanimous in emphasising the ineffectiveness of grade repetition and its lasting and negative impact on students' educational careers (Basa, 2019; Draelants, 2008; Draelants, 2019; Sunny et al., 2017).

At the start of primary education, the average proportion of students who had repeated a grade across all PASEC*2019* assessment countries was 23.7%. This proportion varied in individual countries from 10.8% in Burkina Faso to 57.2% in Burundi.

22. PASEC*2014* report.

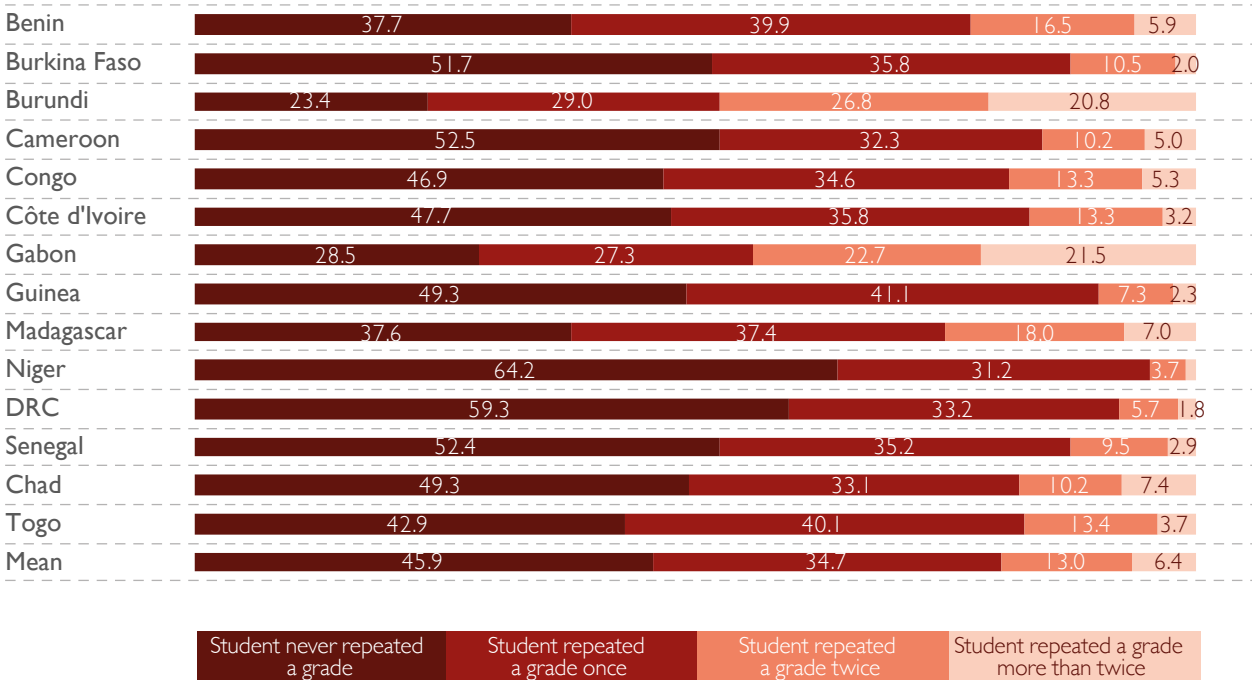
23. Starting instruction in the learner's first language has been shown to improve learning outcomes and is cost-effective, reducing grade repetition and dropout rates. Education for All monitoring report 2005.

Figure 3.40: Percentage of students who had repeated the second grade of primary school - Early primary



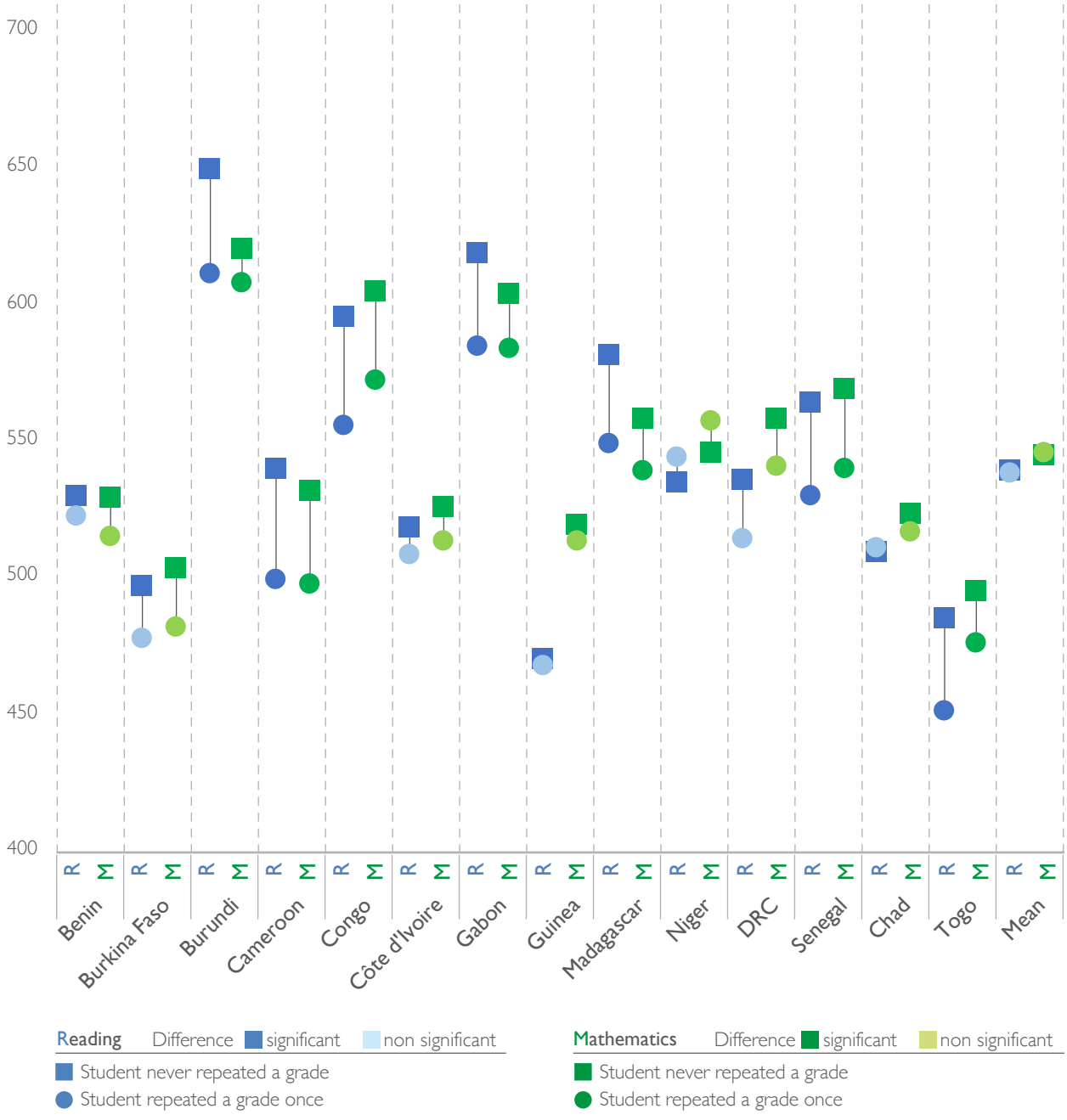
At the end of primary education, an average of 54.1% of students across all countries reported that they had repeated at least one grade. This proportion was highest in Burundi (76.6%) and Gabon (71.5%). Elsewhere, it varied between 35.8% (Niger) and 62.4% (Madagascar).

Figure 3.41: Distribution of students by the number of grades repeated - Late primary



Overall, the average performance difference in language of instruction and mathematics between students who had repeated the second grade and those who had not was not significant at the start of primary education. At country level, however, students who had not repeated a grade performed at a significantly higher level in language of instruction and mathematics in seven countries (Burundi, Cameroon, Congo, Gabon, Madagascar, Senegal, Togo).

Figure 3.42: Performance of students in language of instruction and mathematics by second grade repetition or not - Early primary

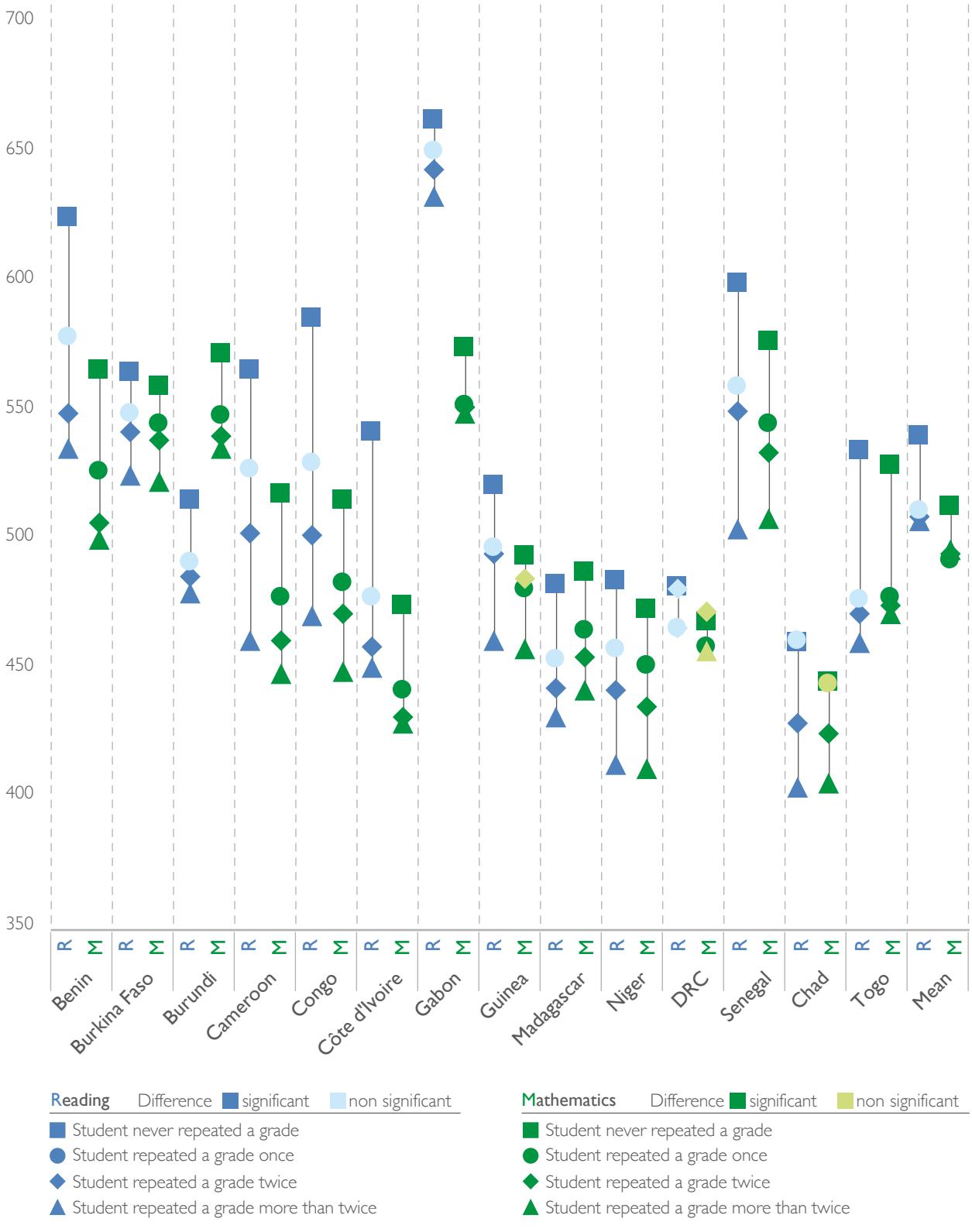


A comparison of reading performance at the end of primary education was conducted between students who had never repeated a grade and other groups of students.

The average difference in reading performance between those who had repeated a grade once and those who had never done so was not significant across the countries as a whole; this was also true of each individual country. Students who had repeated a grade at least twice performed less well in reading than those who had never repeated a grade. Except for the DRC, the same was found at individual country level.

In mathematics, the average performance difference between students who had repeated a grade at least once and those who had never done so was significantly in favour of the latter across all the assessment countries. This difference was also significant in all individual countries except for Guinea, Chad and DRC. However, in Guinea and Chad, it was significant for students who had repeated a grade more than twice, whereas in DRC it was only significant for students who had repeated a grade exactly twice.

Figure 3.43: Student performance in reading and mathematics by the number of repeated grades - Late primary



3.4.7.3. Student age

Late entry of children into school negatively affects their educational performance.

The analysis of the relationship between student age (in completed years) and performance was carried out after controlling for grade repetition.

At the start of primary education, this relationship was not significant in language of instruction across the countries as a whole. At country level, it was significantly to the disadvantage of the older students in only five countries (Cameroon, Congo, Côte d'Ivoire, Gabon, Guinea). In mathematics, it was significantly in favour of the older students across the countries as a whole. It was also significantly in favour of the older students in seven countries (Cameroon, Congo, Côte d'Ivoire, Gabon, Guinea, Madagascar, DRC, Senegal, Chad).

At the end of primary education, overall, student age had a negative influence on performance in reading and mathematics. This result was observed in all countries except for Niger in reading and in all countries except for Côte d'Ivoire and Niger in mathematics.

These results were similar to those obtained in the PASEC*2014* assessment, and show that late entry of children into school has a negative impact on educational performance.

Figure 3.44: Average difference in language of instruction between students of a given age and students one year younger, controlling for grade repetition - Early primary

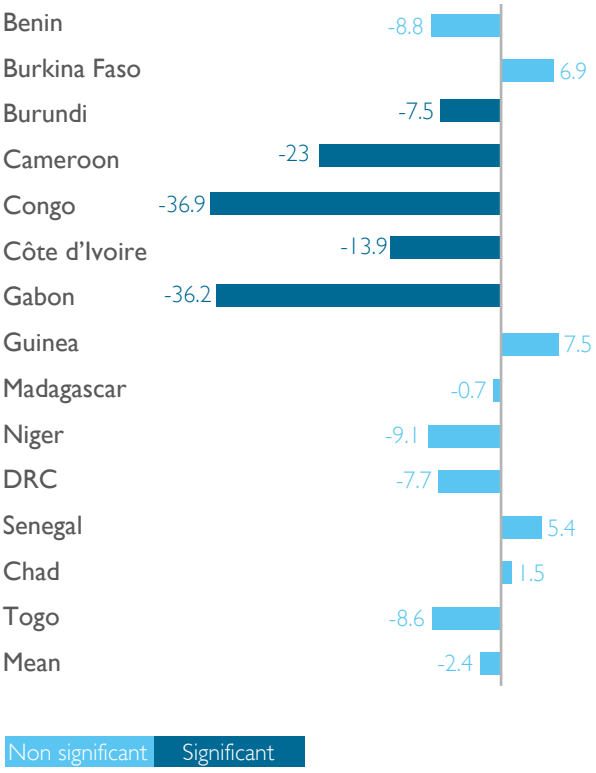


Figure 3.45: Average difference in mathematics between students of a given age and students one year younger, controlling for grade repetition - Early primary

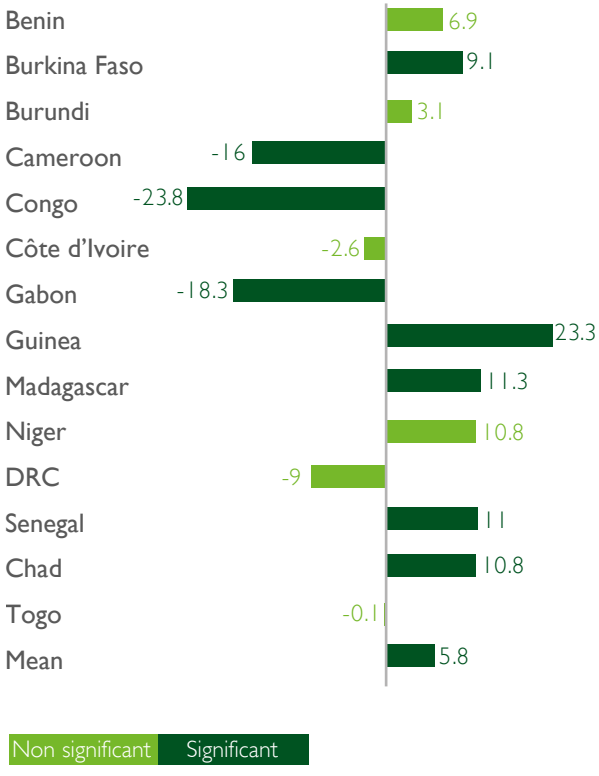


Figure 3.46: Average difference in reading between students of a given age and students one year younger, controlling for grade repetition - Late primary

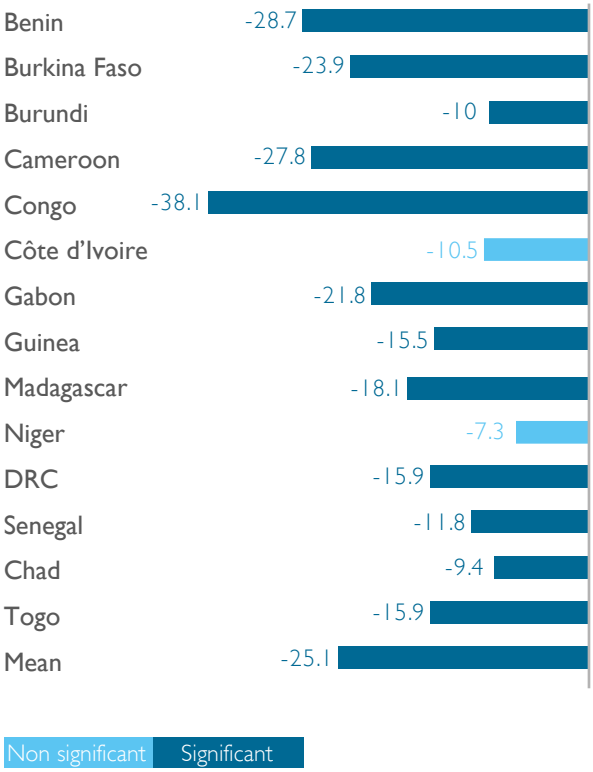
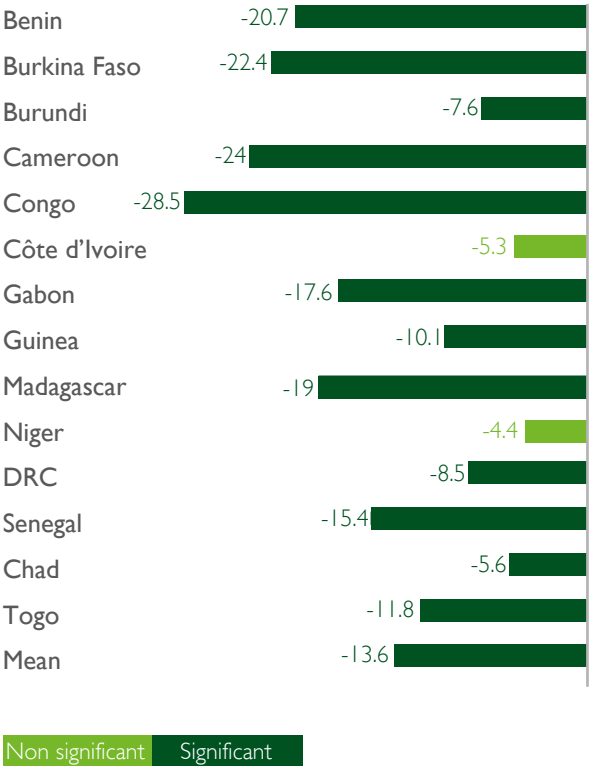


Figure 3.47: Average difference in mathematics between students of a given age and students one year younger, controlling for grade repetition - Late primary



3.5. School environment and student performance

3.5.1. School location and educational performance

Students in urban schools outperform those in rural areas.

In this analysis, the term 'school location' refers to the area (rural or urban) where the school is located. The urban area encompasses cities and their suburbs, while the rural area corresponds to large and small villages.

Across the 14 countries participating in the survey, most students were in schools located in rural areas: 57.6% at the start and 54.7% at the end of primary education. However, the situation varied from one country to another. In Congo and Gabon, the percentage of students whose school was in a rural area was the lowest of all the countries. The percentage was the highest in Burundi (80.2% at the start and 79.9% at the end of primary education).

Figures 3.50 and 3.51 show the distribution of students whose school was in rural areas by country, at the start and the end of primary education respectively.

Figure 3.48: Percentage of students attending schools in rural areas - Early primary

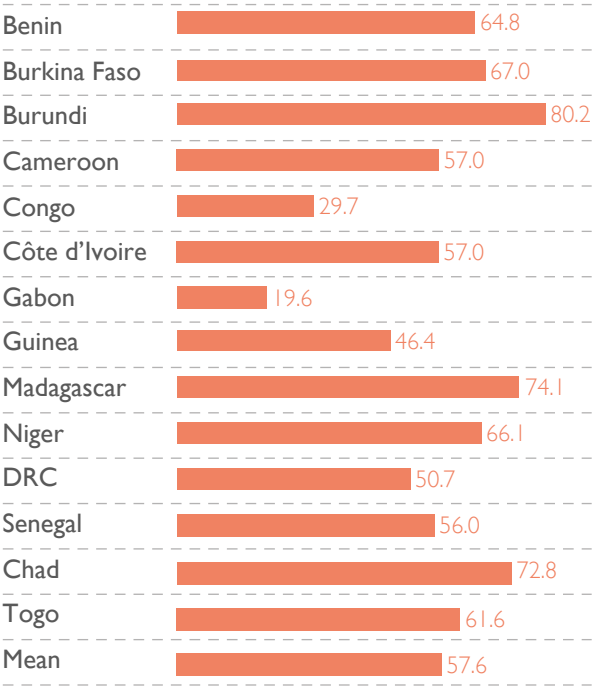
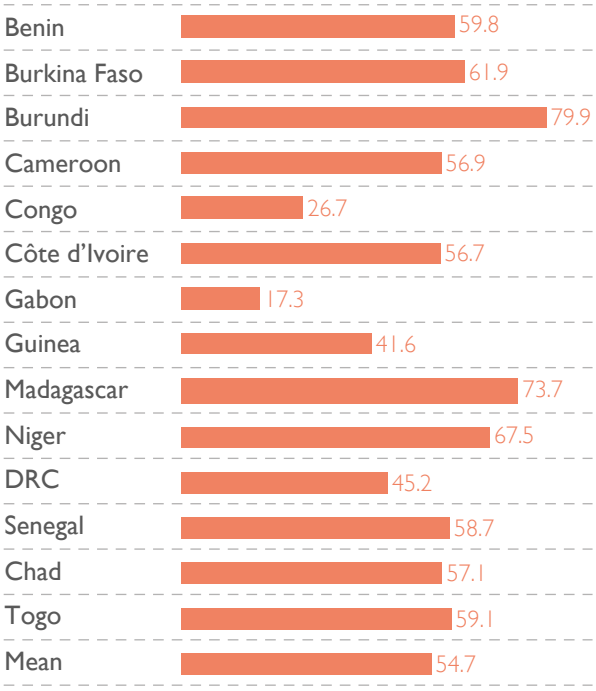


Figure 3.49: Percentage of students attending schools in rural areas - Late primary



Figures 3.52 and 3.53 show the differences in mean performance between early primary students at schools located in urban areas and those at schools located in rural areas.

The comparison of student performance by school location shows that students at schools in urban areas outperformed those at schools in rural areas in all but two countries (Burkina Faso, DRC) in language of instruction and in all but three countries (Burkina Faso, Senegal, Chad) in mathematics. The difference in performance was sometimes more than 50 points in both subjects, as was the case in Congo, Cameroon, Gabon, Guinea and Togo. Even when the local facilities index is controlled for, the difference in performance remains in favour of students at schools in urban areas.

Figure 3.50: Difference in language of instruction scores between students in rural and urban areas - Early primary

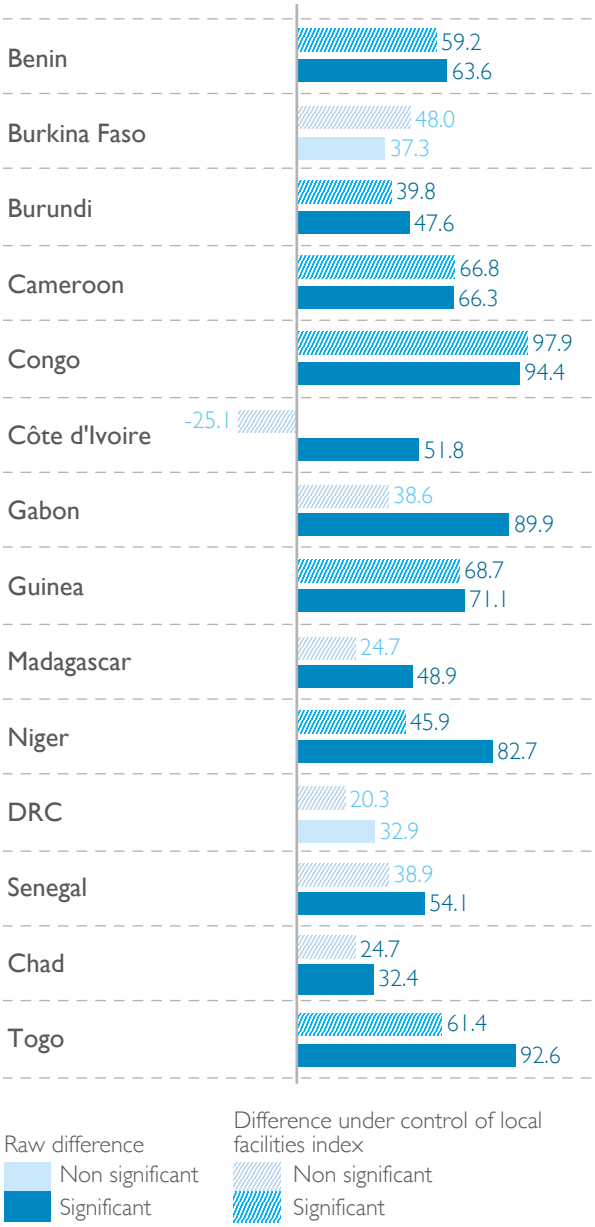
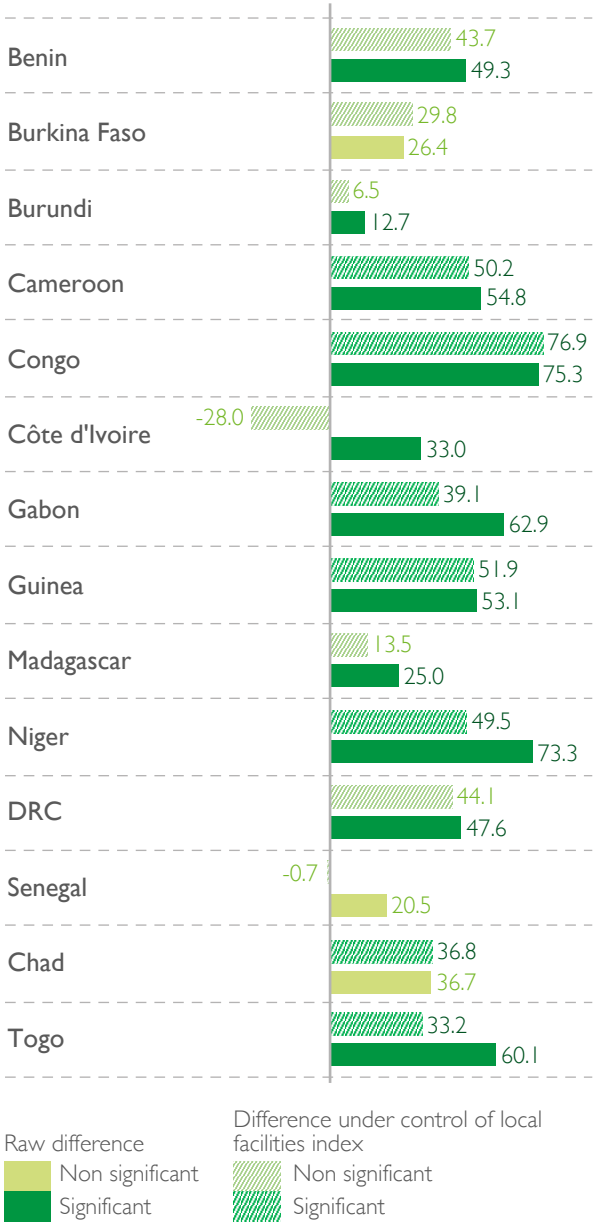


Figure 3.51: Difference in mathematics scores between students in rural and urban areas - Early primary



Figures 3.52 and 3.53 show the differences in mean performance between late primary students at schools located in urban areas and those at schools located in rural areas. Like early primary students, those at the end of primary education at schools located in urban areas outperformed those at schools in rural areas in all countries for reading and in all countries except for Guinea and DRC for mathematics.

When the local facilities index was controlled for, the difference in performance remained significant in all but three countries (Côte d'Ivoire, Guinea and DRC) for reading and in all but five countries (Côte d'Ivoire, Gabon, Guinea, DRC and Senegal) for mathematics in favour of students at schools in urban areas. The highest mean difference was observed in Congo for reading and in Togo for mathematics.

These results confirm previous analyses carried out during PASEC assessments showing that in most cases, students educated at schools in urban areas outperformed those educated at schools in rural areas in reading and mathematics.

Figure 3.52: Difference in reading scores between students in rural and urban areas - Late primary

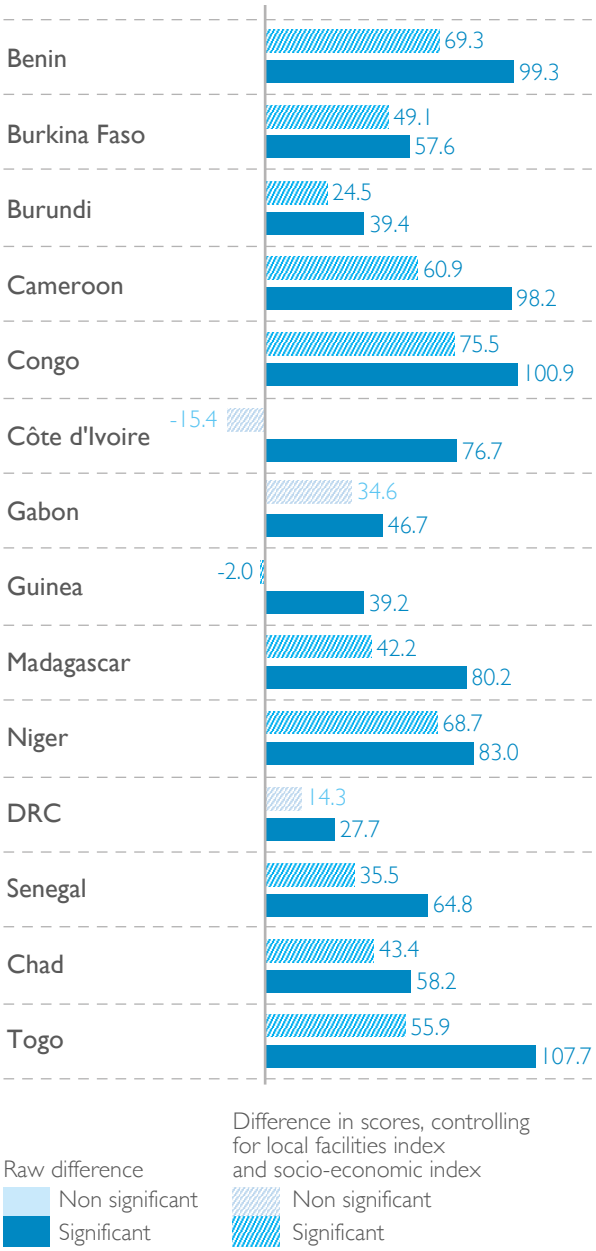
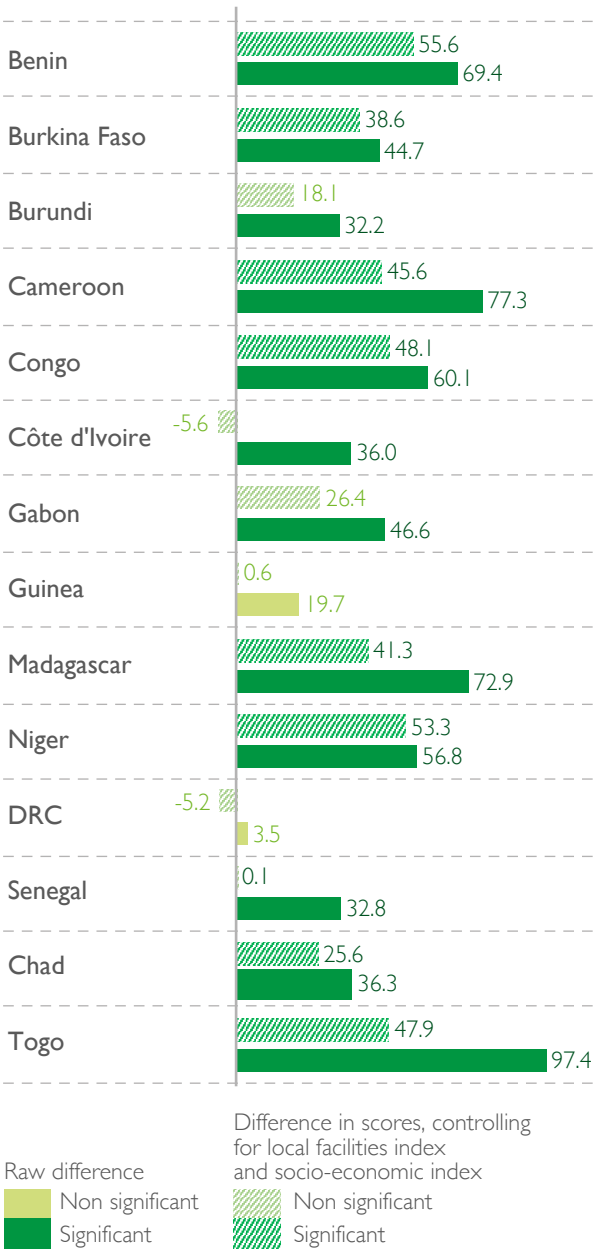


Figure 3.53: Difference in mathematics scores between students in rural and urban areas - Late primary



3.5.2 School status and educational performance

Public education occupies an important place in terms of numbers of school places in education systems. However, the private sector seems to offer a higher quality of education.

Three main categories of schools (public, private and community) were listed for the countries in the PASEC*2019* assessment, although some countries had no schools in a particular category. Across all countries, more than 70% of students were educated in public schools, around 25% in the private sector and just over 2% in community schools.

Public schools were very widely represented in all countries except for Congo. The highest proportions of students attending public schools were found In Burundi and Niger (over 93%), followed by Senegal and Côte d'Ivoire.

Congo had the highest proportion of students in the private sector (over 44%); the private sector's share in other countries was variable, but below 40% in all cases. It was especially low in Niger and Burundi.

Community schools were most common in the education system in Chad, where a formal subsidy mechanism for community teachers has been in place for several years[24].

Figure 3.54: Distribution of students by type of school attended - Early primary

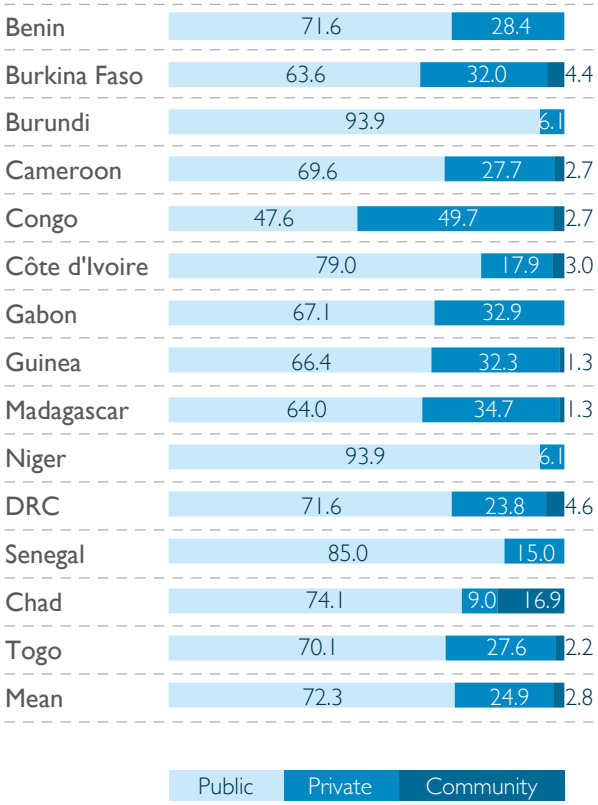
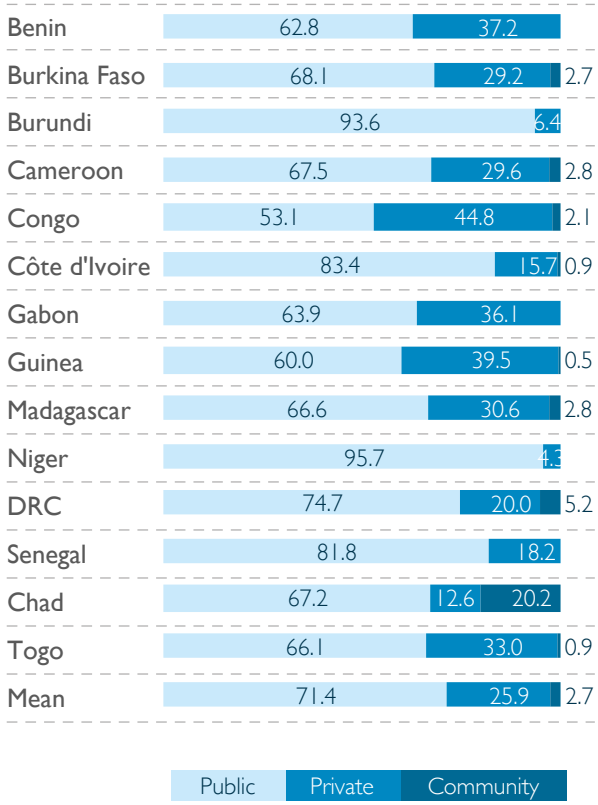


Figure 3.55: Distribution of students by type of school attended - Late primary



Early primary students attending private schools outperformed those in public schools in language of instruction and mathematics. The same finding was also made in most individual countries (Benin, Cameroon, Congo, Côte d'Ivoire, Guinea, Niger, Senegal and Togo). Controlling for the local facilities index, students at private schools still outperformed their peers in public schools. However, the performance differences in language of instruction between the two groups of students were no longer significant in Senegal and Niger.

Figure 3.56: Difference between the scores in language of instruction of private and public school students - Early primary

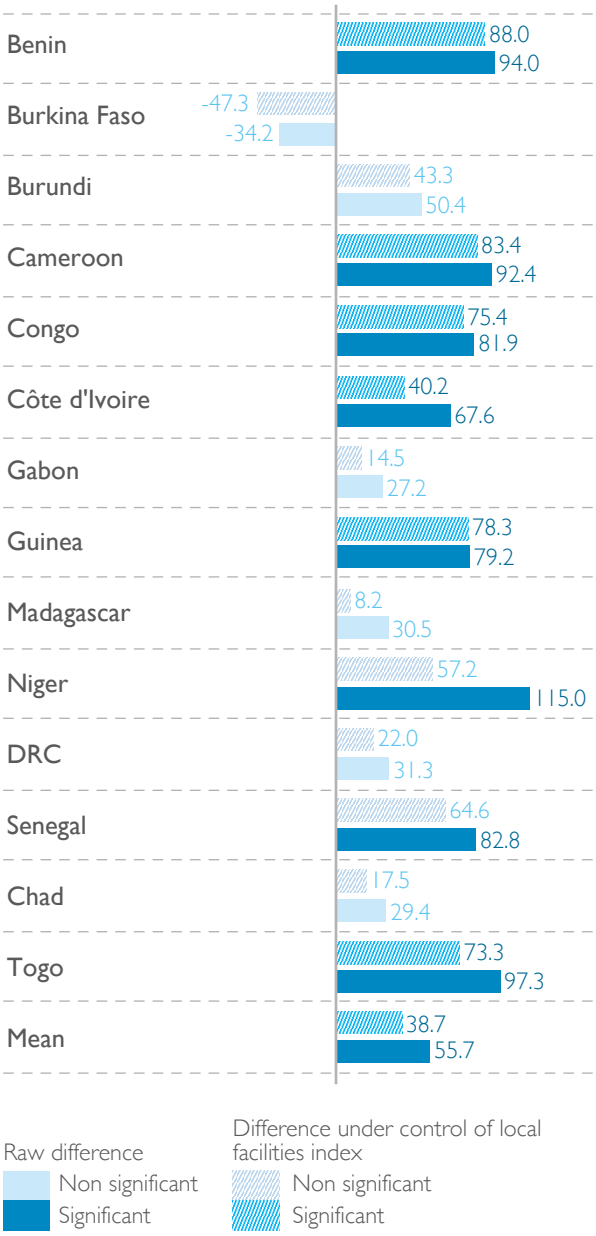
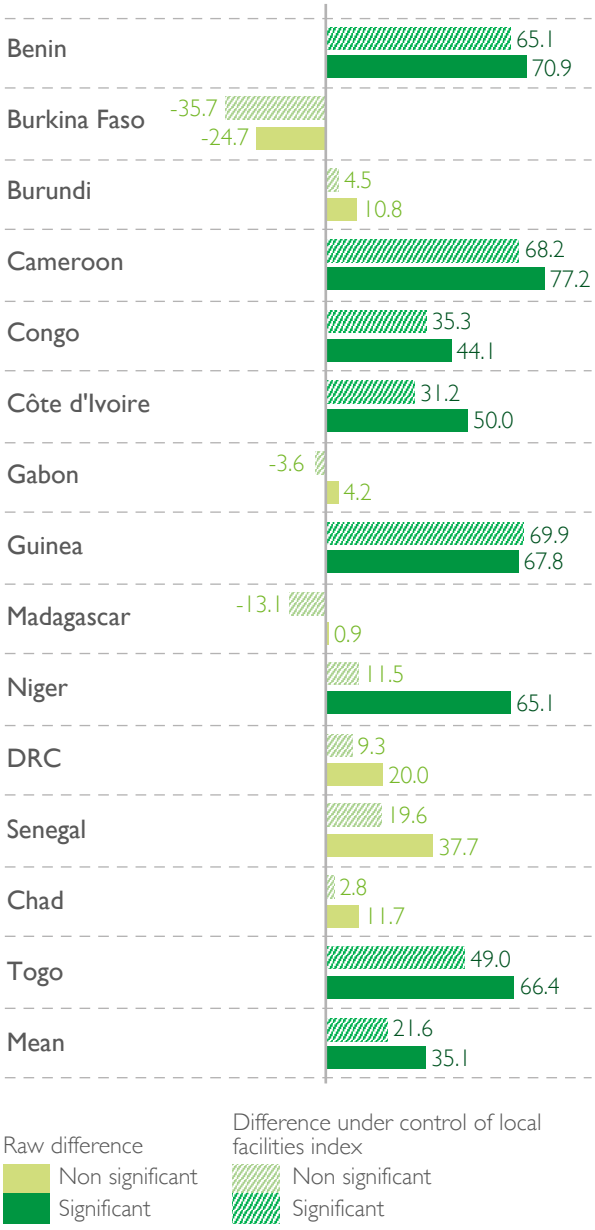


Figure 3.57: Difference between the scores in mathematics of private and public school students - Early primary



At the end of primary education, students in private schools still performed at a higher level in reading and mathematics than those in public schools across all countries. In Burkina Faso and Gabon (in both subjects) and in Burundi and the DRC (in mathematics), the difference in performance between the two groups of students was not significant. Controlling for the local facilities index and the socio-economic index of students' families, the same results were observed in reading and mathematics in all countries apart from Guinea and Senegal: the difference between private and public-school students was insignificant in both subjects in the case of Guinea and in mathematics in the case of Senegal.

24. There are two mechanisms for subsidising community teachers in Chad: 1-A contract is established between the Provincial Education and Youth Delegation (DPEJ), the Student Parents Associations (APEs) and the Community Teacher (MC) meeting a certain number of criteria (age, contract with the APEs); 2-A contract is established between the Student Parents Associations (APEs) and the Community Teacher (MC) with the involvement of the school principal. The subsidy is paid directly by the APE.

These results confirming the higher performance of privately educated students are consistent with the findings of studies comparing the performance of privately and publicly educated students in Africa (Baum & Riley, 2019; Schwantner, 2016).

Figure 3.58: Difference between the scores in reading of private and public school students - Late primary

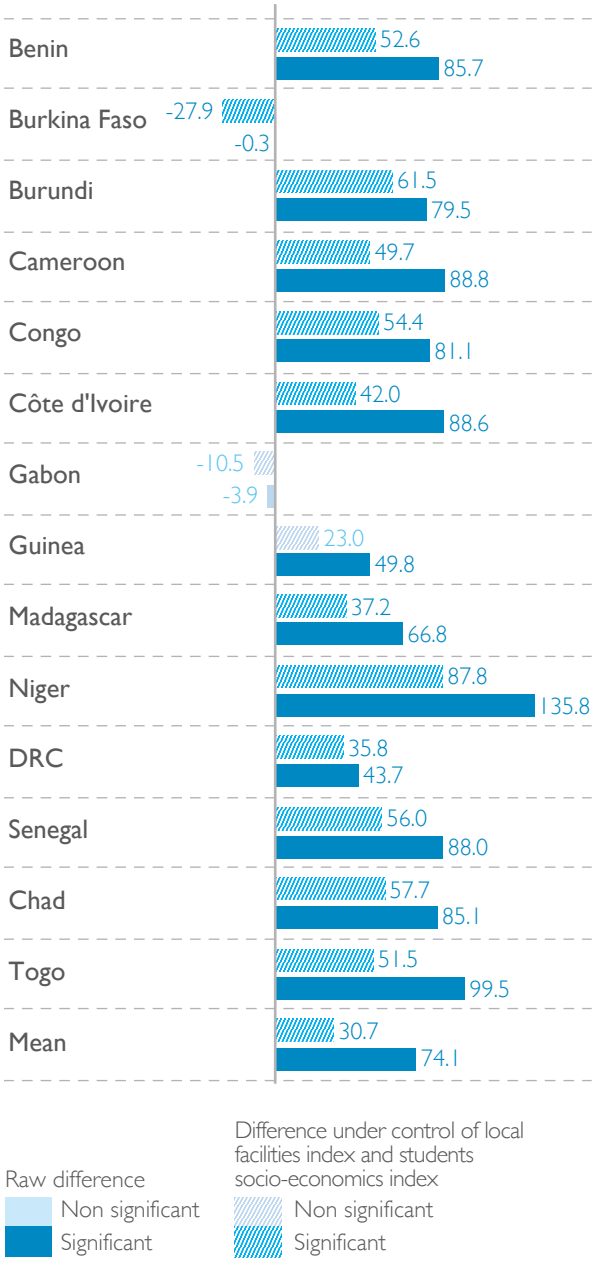
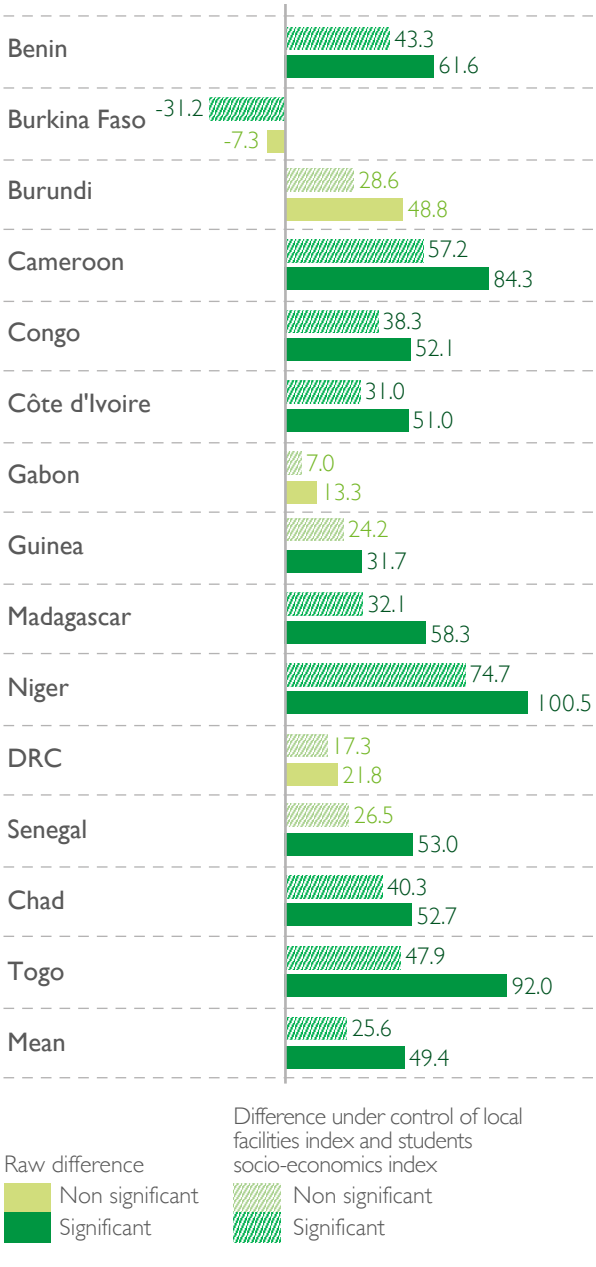


Figure 3.59: Difference between the scores in mathematics of private and public school students - Late primary



3.5.3. School environment and performance: educational and health resources

School infrastructure and educational equipment and resources help create a school environment that is conducive to teaching and learning. Several international assessments have shown how important it is for suitable resources of such kinds to be present in sufficient quantity for the creation of favourable learning conditions (Hungi et al. 2011; Mullis et al. 2012a; Mullis et al. 2012b).

3.5.3.1. Class size

Students in smaller classes outperform those in larger classes.

The average class size in the 14 countries varied between 35 and 55 students at the start of primary education. Student numbers per class were relatively low in Benin, Côte d'Ivoire, Gabon, Madagascar, Niger, DRC and Togo, averaging slightly under 40. In Burkina Faso, Cameroon, Congo, Guinea and Senegal, the average class size varied between 40 and 50 students. The highest average class sizes were found in Burundi and Chad, with more than 50 students per class in early primary education.

In late primary education, the average class size was smaller than in early primary education in almost every country. Average numbers varied between 26 and 57 students per class. Average class sizes were lowest in Benin and Madagascar, with around 26 and 29 students per class, and highest in Congo, with around 57 students per class (see Figures 3.60 and 3.61).

Figure 3.60: Class size - Early primary

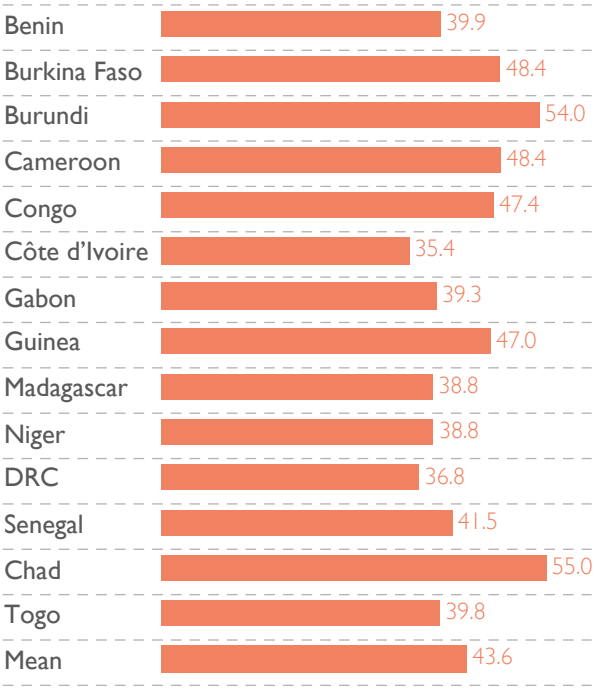


Figure 3.61: Class size - Late primary

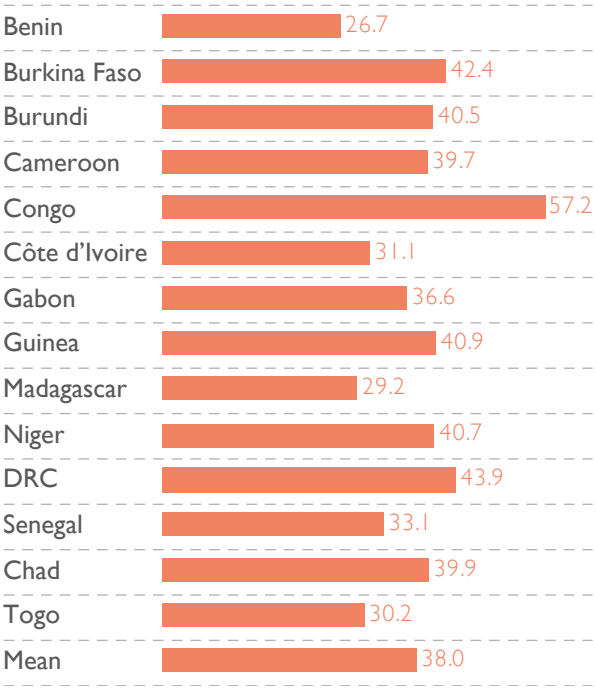
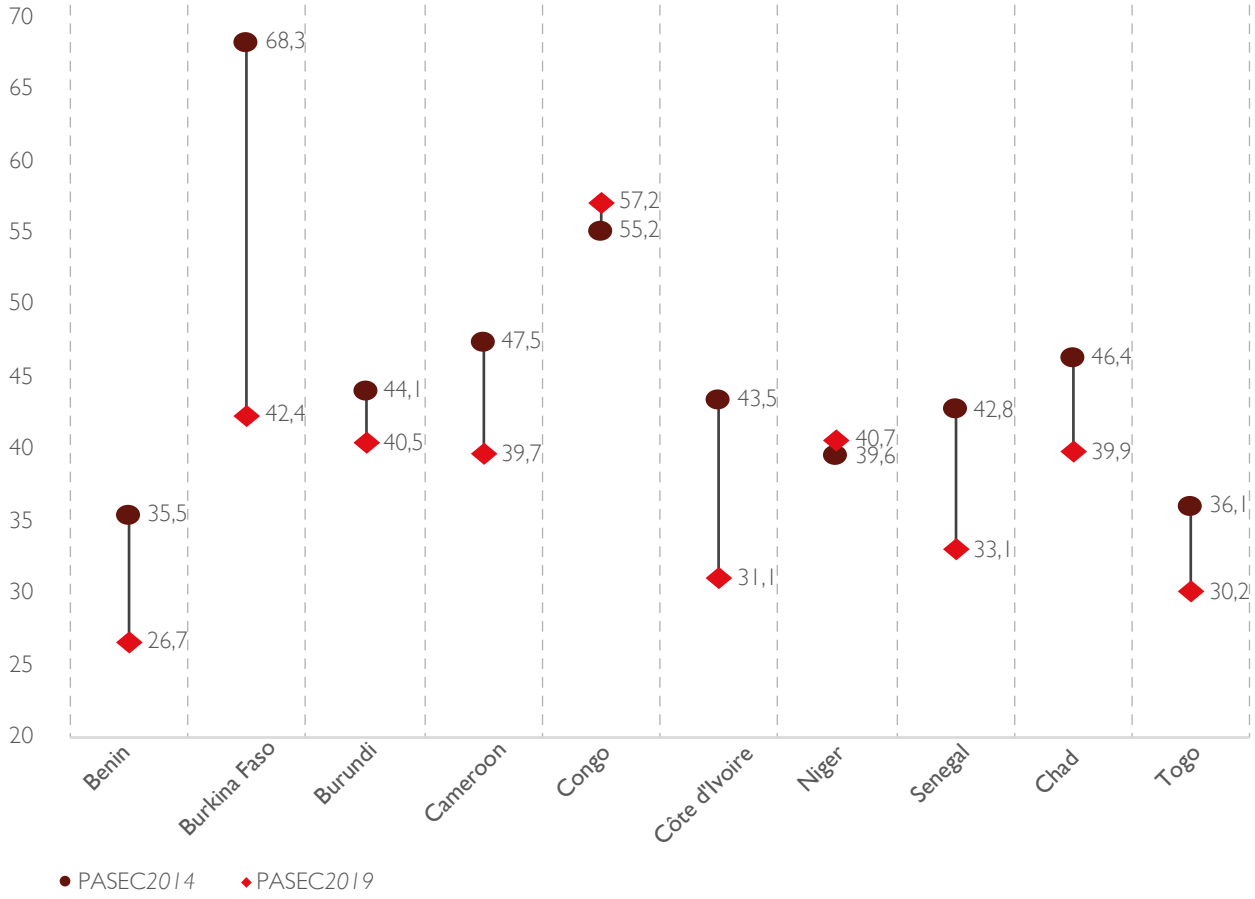


Figure 3.62 below provides information on the change in average class size at the end of primary education between PASEC*2014* and PASEC*2019* for the ten countries that participated in both assessments.

Figure 3.62: Change in class size between the PASEC2014 and PASEC2019 assessments



There is an abundant literature on the issue of whether a causal link exists between class size and student performance (Kariuki & Guantai, 2005; Woessmann & West, 2006). Despite the lack of consensus on this point, a large majority of studies have found a significant link between class size and student performance (see, for example, the investigation of Adrien and Julien (2017), analysing the impact of a reduction in class size on students' educational performance and longer-term effects). The PASEC*2019* assessment related class size to student outcomes.

The relationship was either linear or quadratic, depending on the country. A positive linear relationship means that the larger the class, the higher the performance of the students, with the opposite being true of a negative linear relationship. An inverse quadratic relationship indicates that outcomes improve as class size increases, but only up to a certain level, after which they deteriorate and vice versa.

At the start of primary education, across the countries, student performance in language and mathematics deteriorated as class size increased up to a certain level, and then improved. Cameroon, Senegal, Chad and Togo were the only countries with similar results in both subjects. For Gabon, this result was only found in language of instruction.

In late primary education, student performance in both subjects deteriorated as class size increased up to a certain level, and then improved across all countries. Cameroon and Senegal were the only countries with similar results for the two subjects. In Chad, this finding only applied to reading (see Tables B3.54 and B3.55 in the annex).

3.5.3.2. Libraries

The majority of students attended a school without a library.

The distribution of students in schools with a library was similar at the start and end of primary education.

On average across the 14 countries, the percentage of students at a school with a library was 8.3% at the start of primary education and 8.4% at the end. Senegal, DRC, Madagascar and Cameroon had above-average percentages.

The availability of libraries in schools was relatively low in the 14 countries, given the international consensus on the role of libraries in supporting student learning (Molaudzi, 2020).

Figure 3.63: Percentage of students at a school with a library - Early primary

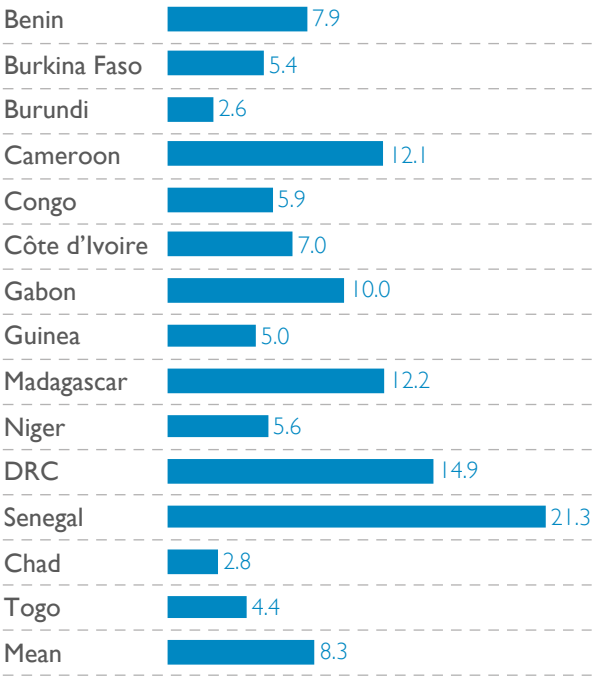
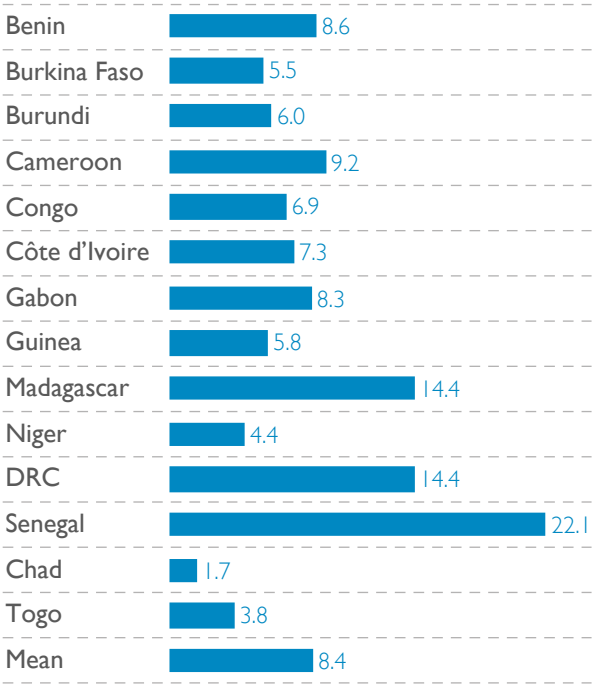


Figure 3.64: Percentage of students at a school with a library - Late primary



3.5.3.3. First aid equipment and health actions

Less than a third of students had access to primary health care at school.

The average percentage of students attending a school with an infirmary or first aid equipment (a first aid box) was 26.0% at the start and 28.6% at the end of primary education. Cameroon and Senegal had the highest percentages at the start of primary education and Chad at the end of primary education.

Figure 3.65: Percentage of students attending a school with an infirmary or first aid equipment (first aid box) - Early primary

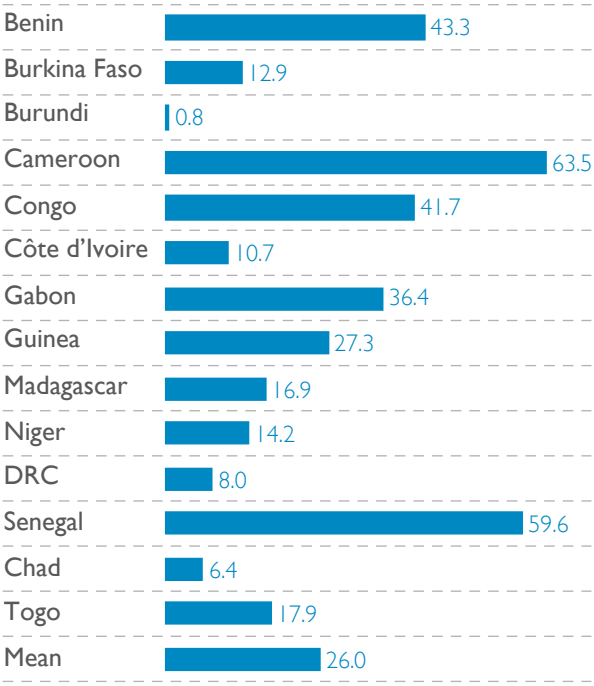
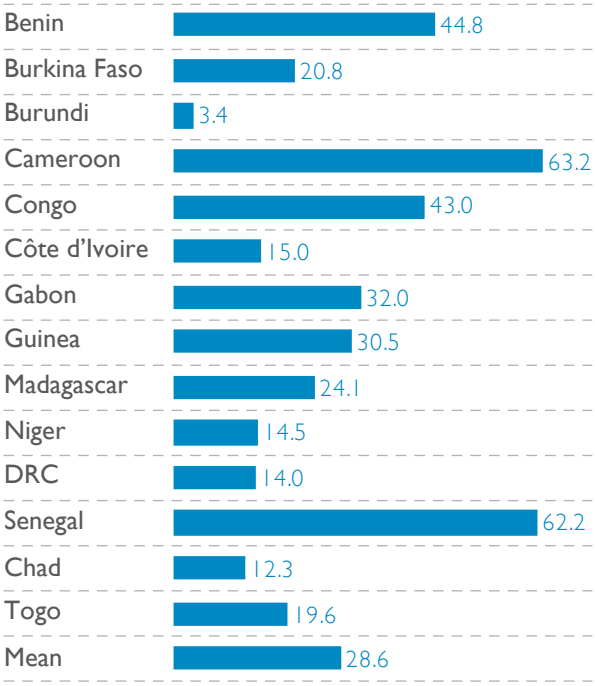


Figure 3.66: Percentage of students attending a school with an infirmary or first aid equipment (first aid box) - Late primary



3.5.4. School environment and performance: infrastructure

A high-quality school environment (local facilities, presence of school infrastructure and equipment) is conducive to learning.

3.5.4.1. Local facilities and student performance

Out of all the countries in the study, Gabon had the highest local facilities index. Other countries with an above-average index were Benin, Burkina Faso, Cameroon, Congo, Côte d'Ivoire, Niger and Senegal; those with the lowest level of local facilities were Burundi, Madagascar, DRC and Chad.

The indicator of the variation in within-country results (the standard deviation) shows that the degree of homogeneity in the distribution of local facilities varied from country to country (see Figures 3.67 and 3.68). Côte d'Ivoire had the greatest variation at national level, while Burundi, DRC and Chad had the least. Among the countries assessed, those with a high level of local facilities did not have the most even distribution across their territory, whereas countries with a low level of local facilities were characterised by greater homogeneity.

At the end of primary education, the mean level of the local facilities index across the 14 countries was 50. The index was highest in Gabon; other countries with an index above or very close to the mean were Benin, Burkina Faso, Congo, Côte d'Ivoire and Senegal. The countries with the lowest level of local facilities were Burundi, Madagascar and Chad.

Côte d'Ivoire had the greatest variation at national level, while Burundi, DRC and Chad had the least.

Figure 3.67: Average level of local facilities index and standard deviation - Early primary

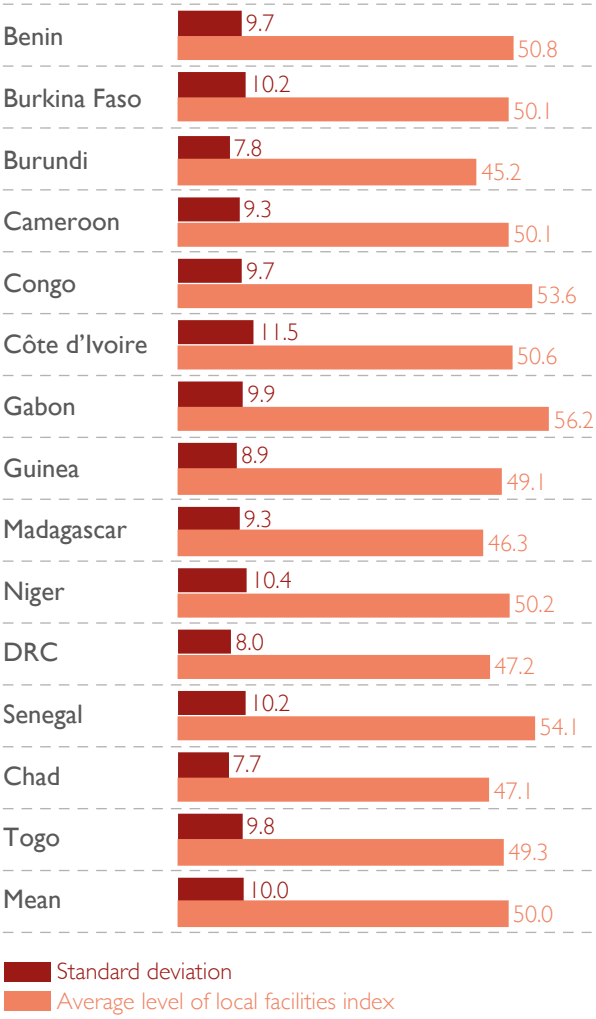
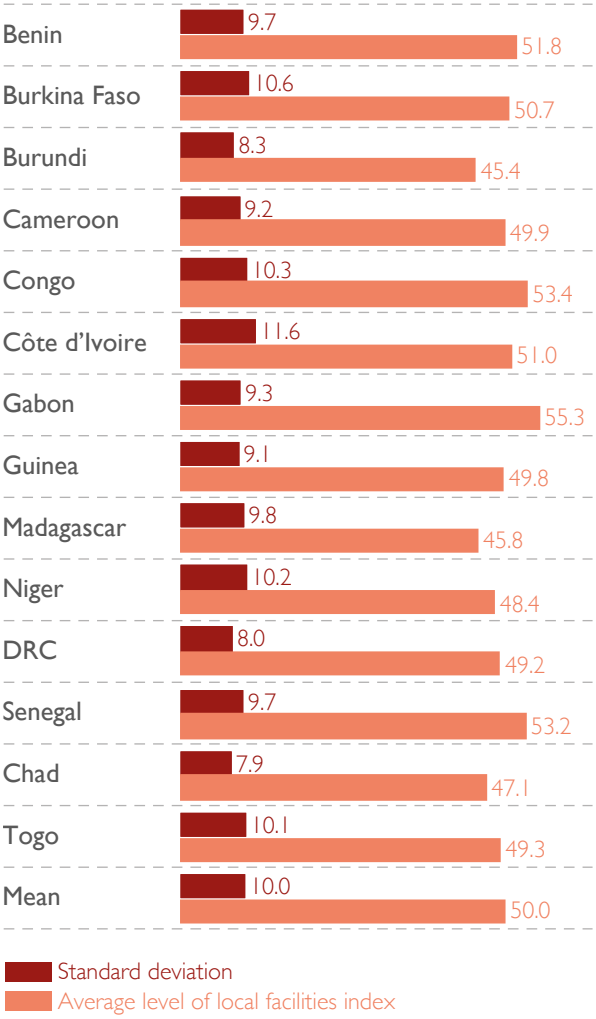


Figure 3.68: Average level of local facilities index and standard deviation - Late primary



At the start of primary education, the local facilities index had a positive influence on student performance in language of instruction and mathematics. The gross effect of the presence of local facilities on student learning in both subjects was significantly positive in all countries except for Burkina Faso, Guinea, DRC and Chad in language of instruction and Burundi, DRC and Chad in mathematics.

This link remained significantly positive in both subjects when the school infrastructure index was controlled for. This significant positive link was observed in five countries in language of instruction and in four countries in mathematics. It was not found in language of instruction in Benin, Cameroon, Congo, Madagascar and Senegal and in mathematics in Benin, Congo, Gabon, Madagascar and Senegal.

Figure 3.69: Average difference between scores in language of instruction of students in a given school and students whose local facilities index was one unit lower - Early primary

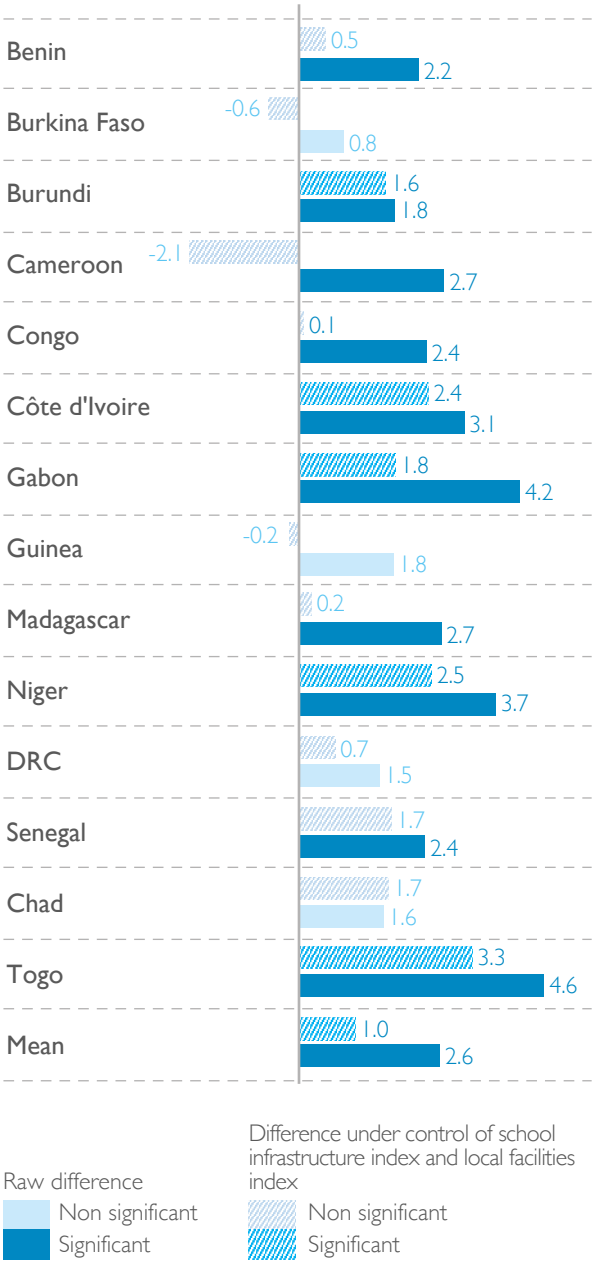
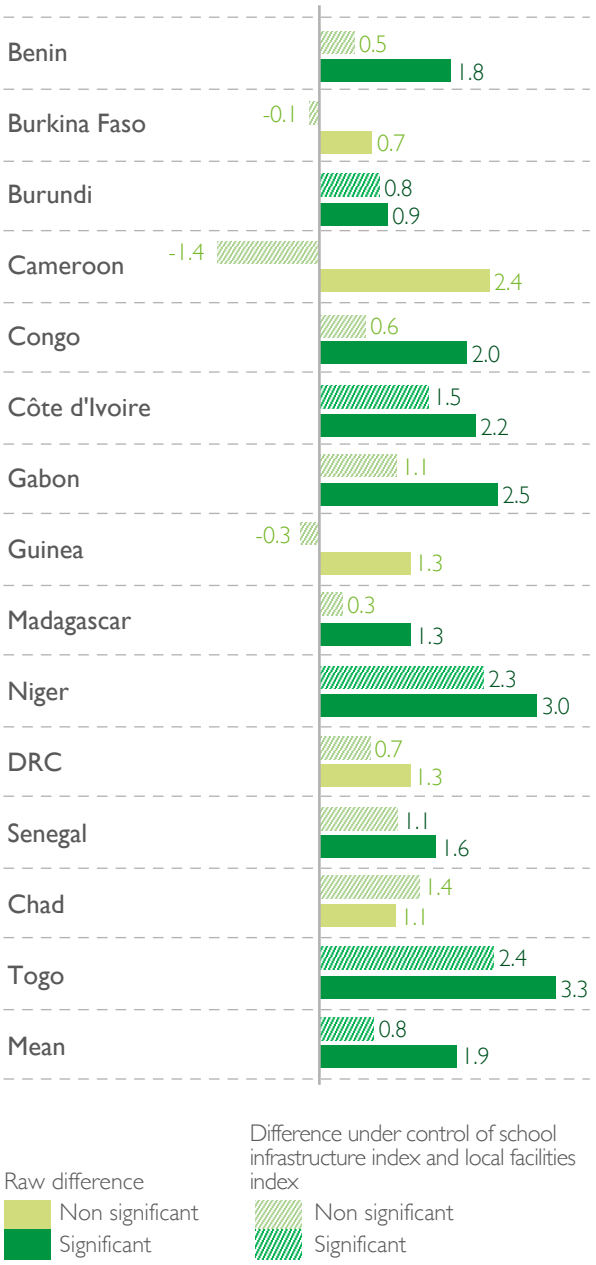


Figure 3.70 : Average difference between scores in mathematics of students in a given school and students whose local facilities index was one unit lower - Early primary



At the end of primary education, the gross effect of the presence of local facilities on student learning in reading and mathematics was significantly positive in all the countries surveyed in reading and in 13 countries (DRC being the exception) in mathematics.

When the school infrastructure index was controlled for, this link remained significant across the countries, and in seven individual countries (Burkina Faso, Cameroon, Congo, Gabon, Guinea, Madagascar, DRC) in reading and eight countries (Benin, Burkina Faso, Cameroon, Congo, Gabon, Guinea, Madagascar, Senegal) in mathematics.

Figure 3.71:Average difference between scores in reading of students in a given school and students whose local facilities index was one unit lower - Late primary

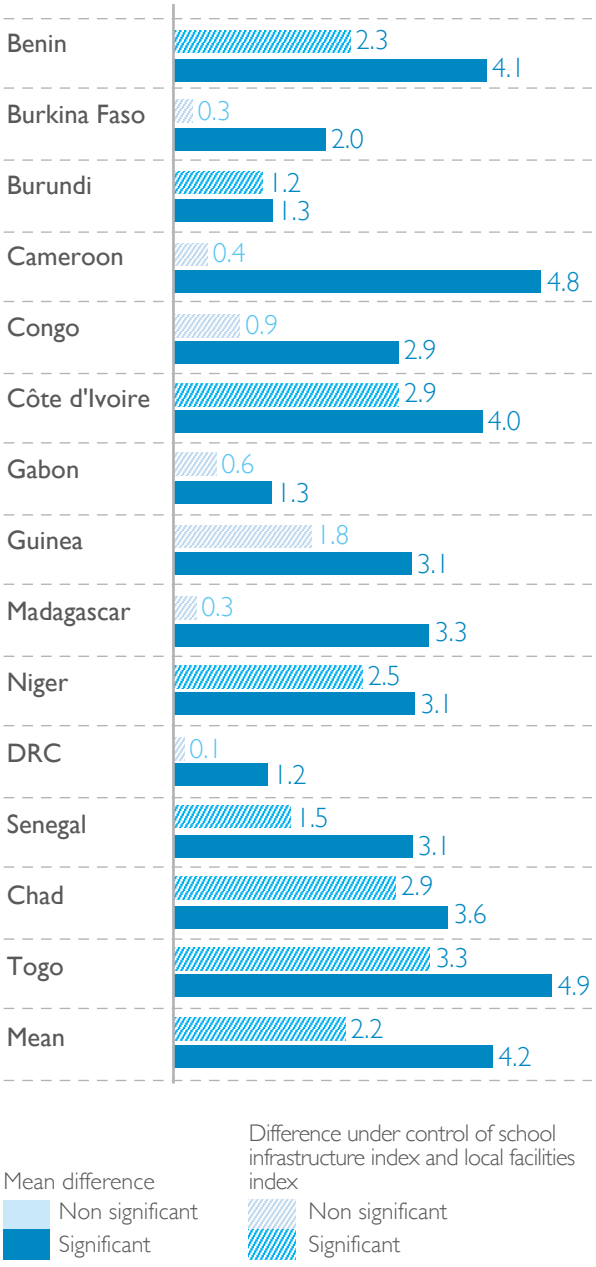
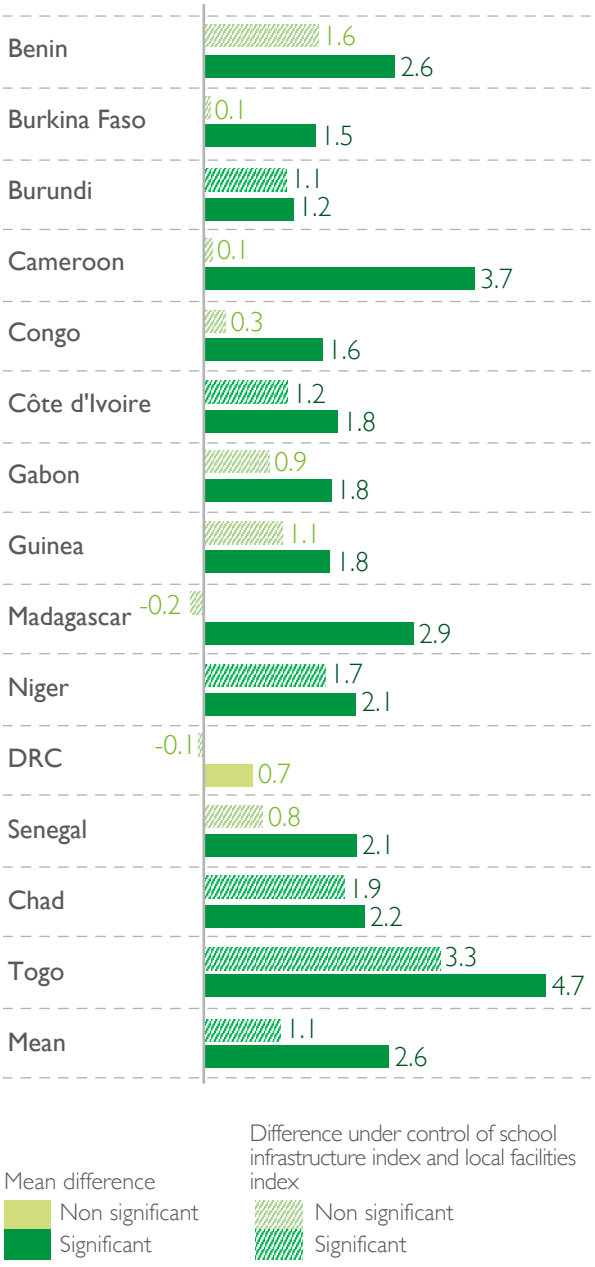


Figure 3.72: Average difference between scores in mathematics of students in a given school and students whose local facilities index was one unit lower - Late primary

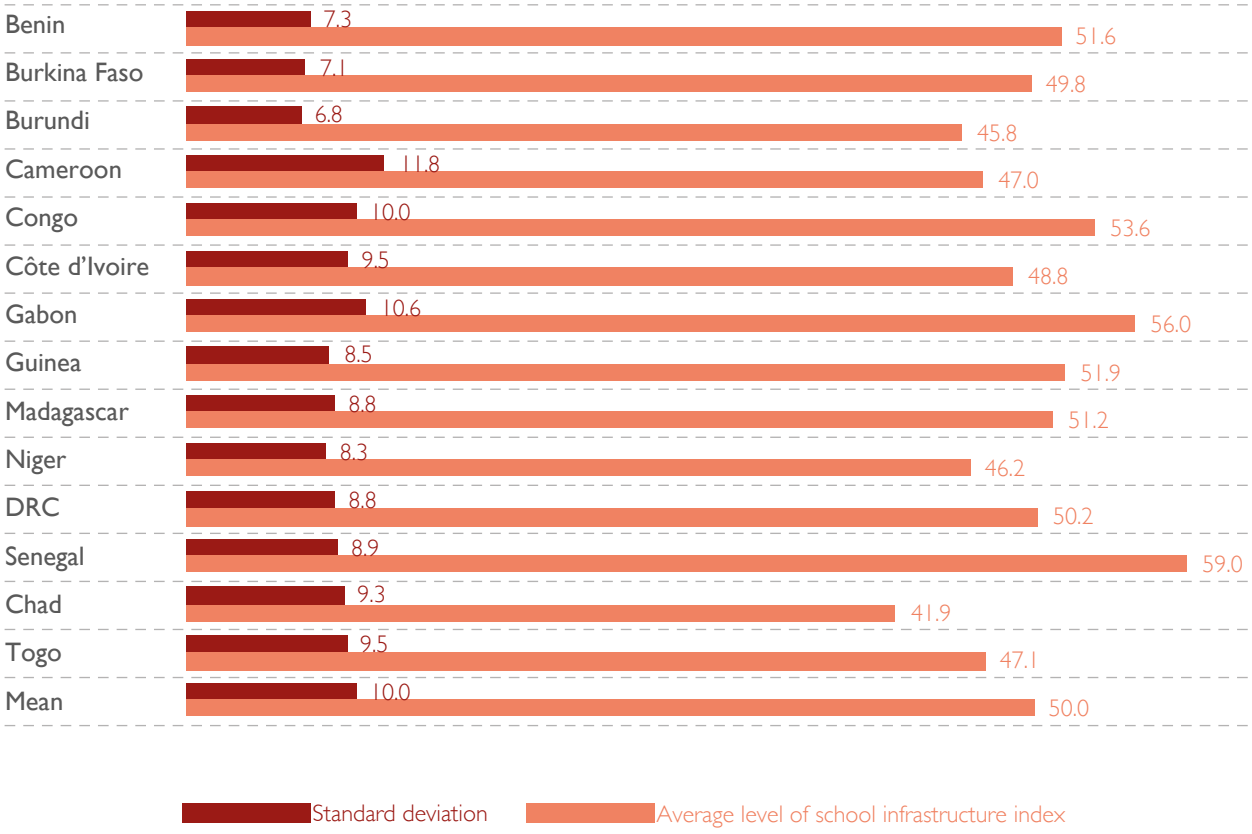


3.5.4.2. School infrastructure and student performance

At the start of schooling, the mean level of the school infrastructure index across the 14 countries was 50. The index was highest in Gabon and Senegal; other countries with an above-average index were Benin, Congo, Guinea, Madagascar and DRC. Burundi, Cameroon, Niger and Chad had the lowest school infrastructure index.

The indicator of the variation in within-country results (the standard deviation) shows that the degree of homogeneity in the distribution of infrastructure between schools varied from country to country. Cameroon and Gabon had the greatest disparities at national level, while Benin, Burkina Faso and Burundi had the lowest. Among the countries assessed, Senegal combined the highest level of school infrastructure with relatively even distribution of infrastructure between schools (see Figure 3.73).

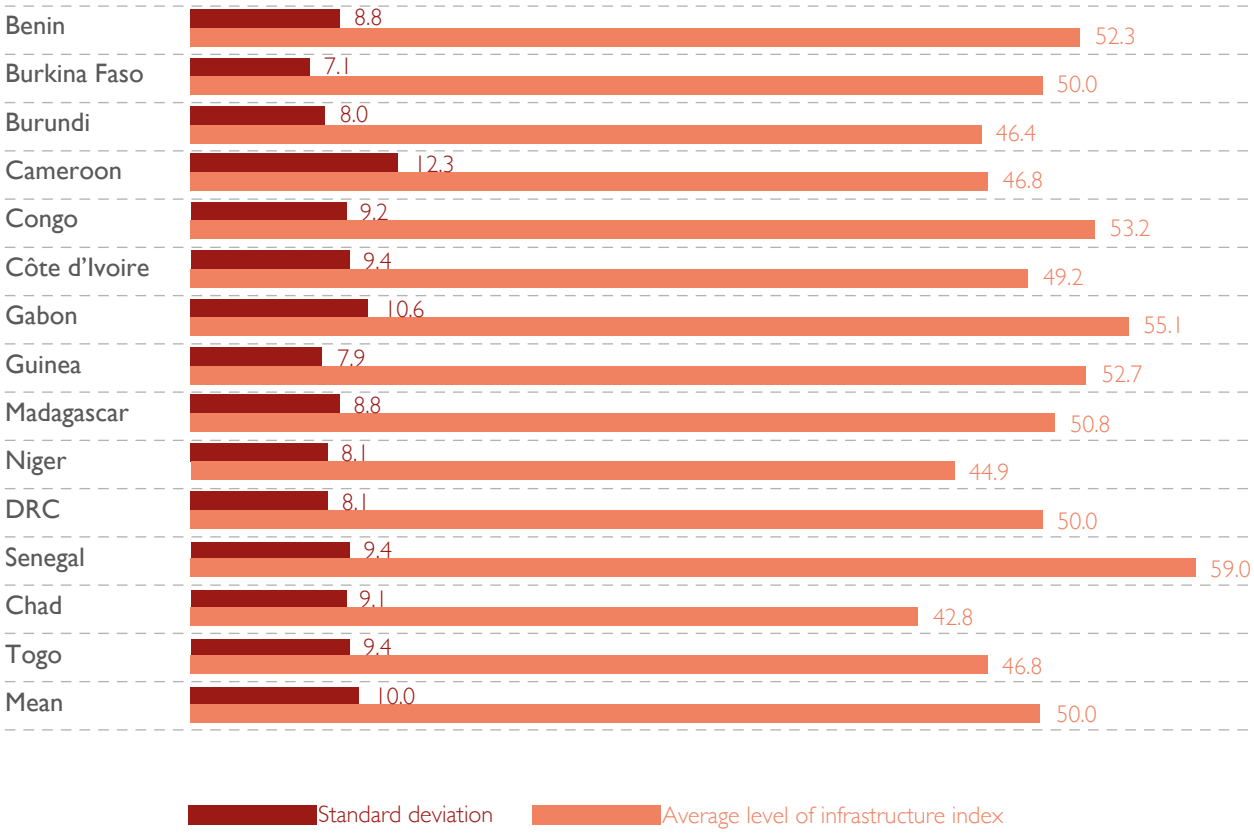
Figure 3.73: Average level of school infrastructure index and standard deviation - Early primary



At the end of primary education, the mean level of the school infrastructure index across the 14 countries was 50. The index was highest in Gabon and Senegal; other countries with an above-average index were Benin, Congo, Guinea and Madagascar. Niger and Chad had the lowest school infrastructure index.

Cameroon and Gabon had the greatest disparities at national level, while Burkina Faso and Guinea had the lowest. Among the countries assessed, Senegal recorded the highest school infrastructure index with a relatively high level of disparity. Burkina Faso, whose school infrastructure index was average, showed relatively good allocation of infrastructure between schools.

Figure 3.74: Average level of school infrastructure index and standard deviation - Late primary



At the start of primary education, the average level of a school's infrastructure positively influenced performance in reading and mathematics across the countries as a group. In reading and mathematics, this influence was positive in all countries except for DRC and Chad. In Burundi, this result was only observed in reading. When the average classroom equipment index was controlled for, this link remained significant and positive for the same groups of countries, except for Burundi in reading. In these countries, students at schools with high levels of school infrastructure performed at a higher level.

Figure 3.75: Average difference between scores in language of instruction of students in a given school and students whose school infrastructure index was one unit lower - Early primary

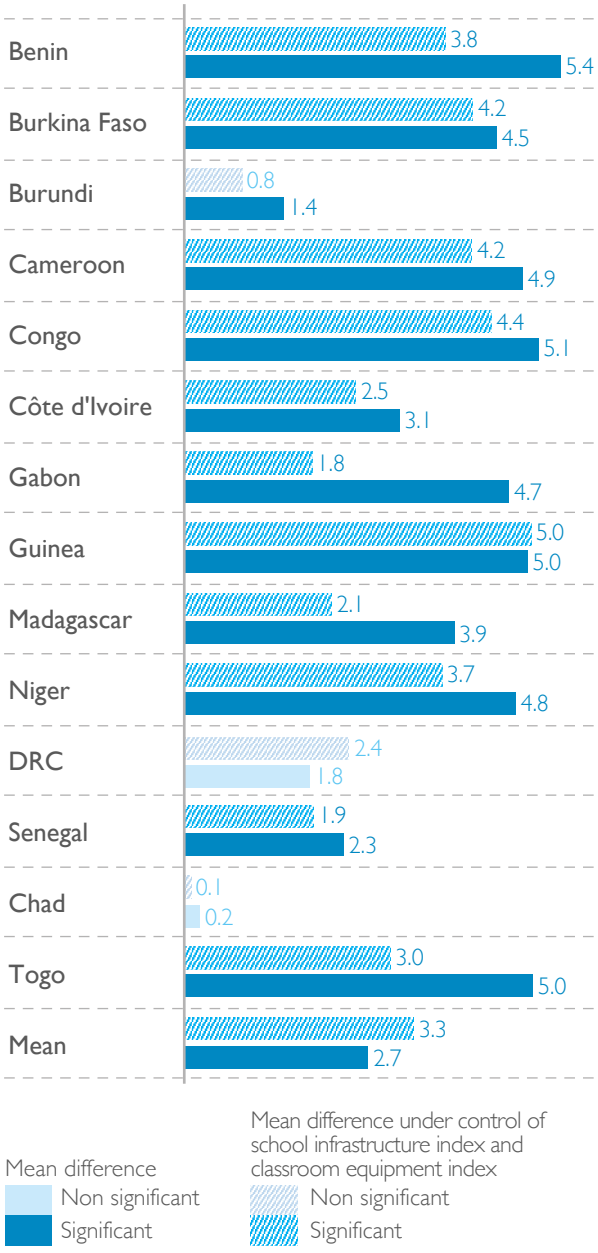
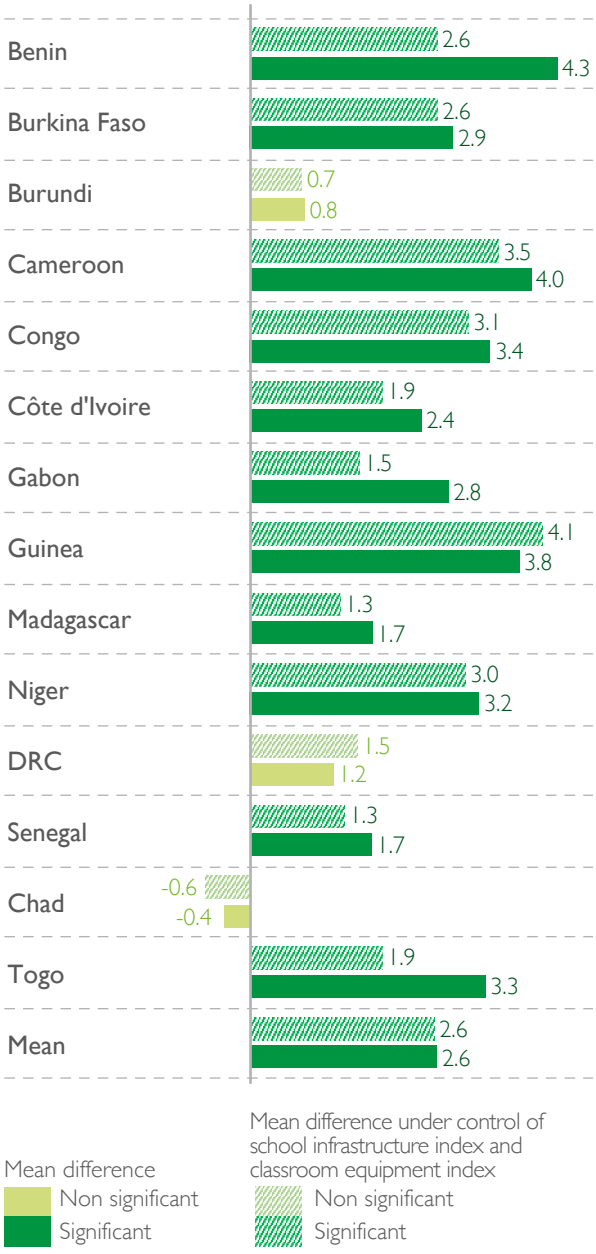


Figure 3.76: Average difference between scores in mathematics of students in a given school and students whose school infrastructure index was one unit lower - Early primary



At the end of primary education, the average level of a school's infrastructure positively influenced performance in reading and mathematics across the countries as a group. The average level of school infrastructure had a positive influence on students' reading and mathematics performance at the end of primary education in all countries. Controlling for the average classroom equipment index, the link remained significant in reading in all countries except for Burundi and in mathematics in all countries except for Benin and Burundi. Overall, students at schools with high levels of school infrastructure performed at a higher level.

Figure 3.77:Average difference between scores in reading of students in a given school and students whose school infrastructure index was one unit lower - Late primary

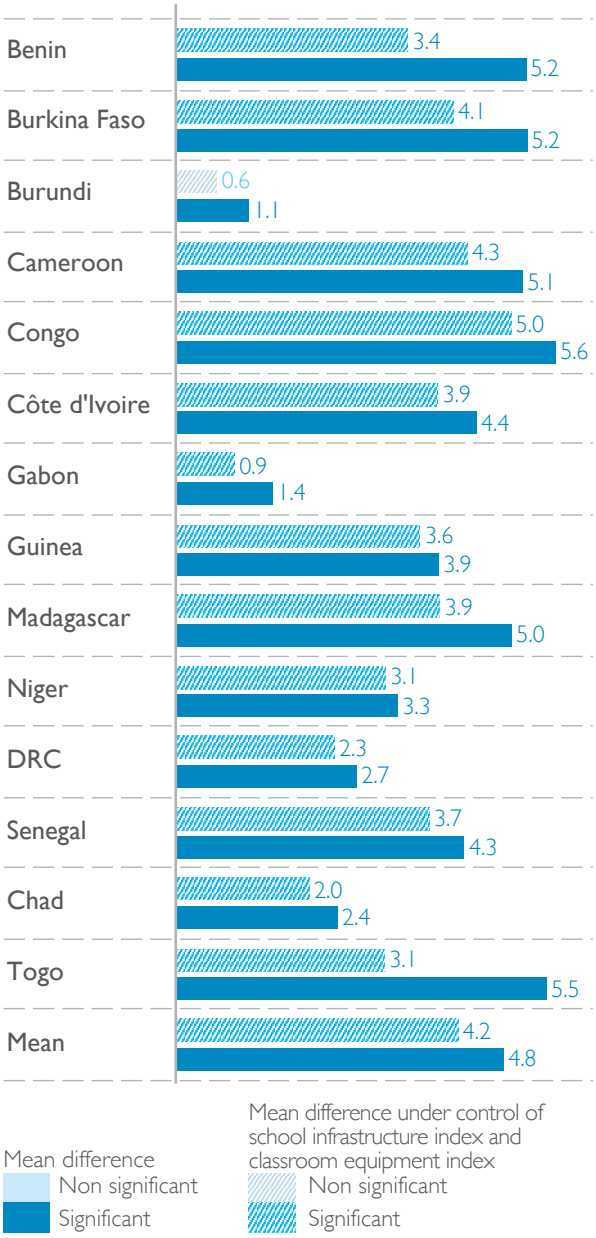
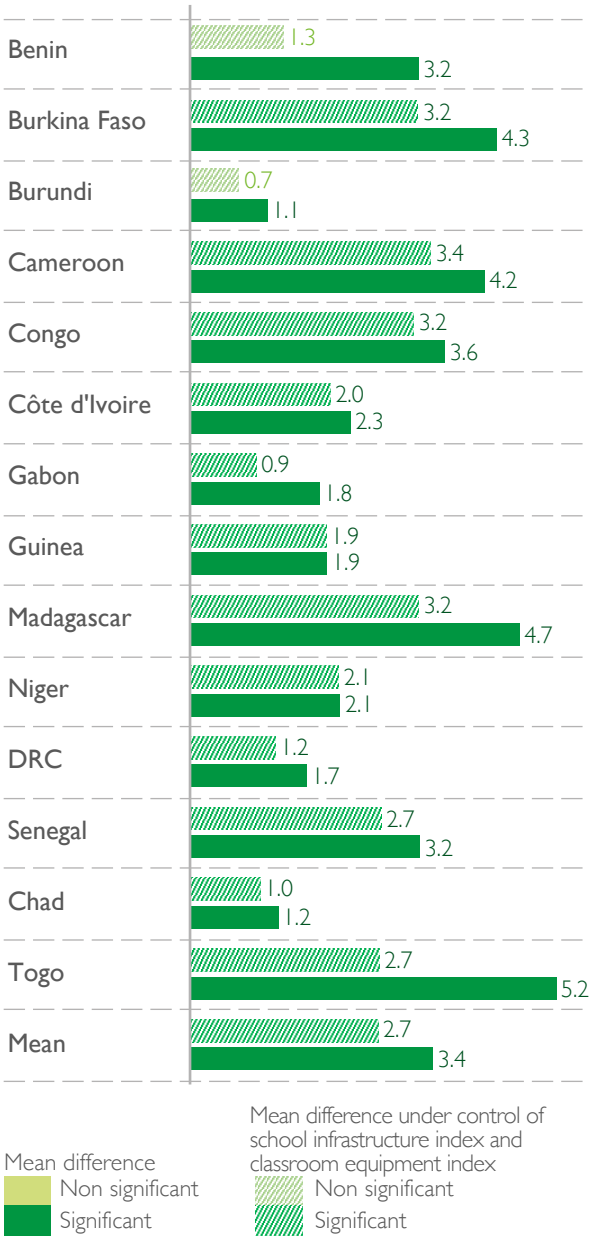


Figure 3.78: Average difference between scores in mathematics of students in a given school and students whose school infrastructure index was one unit lower - Late primary



3.5.4.3 Classroom equipment and student performance

The average level of classroom equipment had a positive effect on students' performance in language of instruction and mathematics at the start of primary education across all countries. This result was the same in language of instruction for all countries apart from Guinea, DRC, Senegal and Chad. The positive influence of classroom equipment on students' mathematics scores was seen in all countries except for Burundi, Congo, Guinea, DRC and Chad.

After controlling for the school infrastructure index, the influence only remained significantly positive in language of instruction across the countries taken together. It became non-significant for Burkina Faso, Burundi, Cameroon and Congo in language of instruction.

Figure 3.79: Average difference between scores in language of instruction of students in a given school and students whose classroom equipment index was one unit lower - Early primary

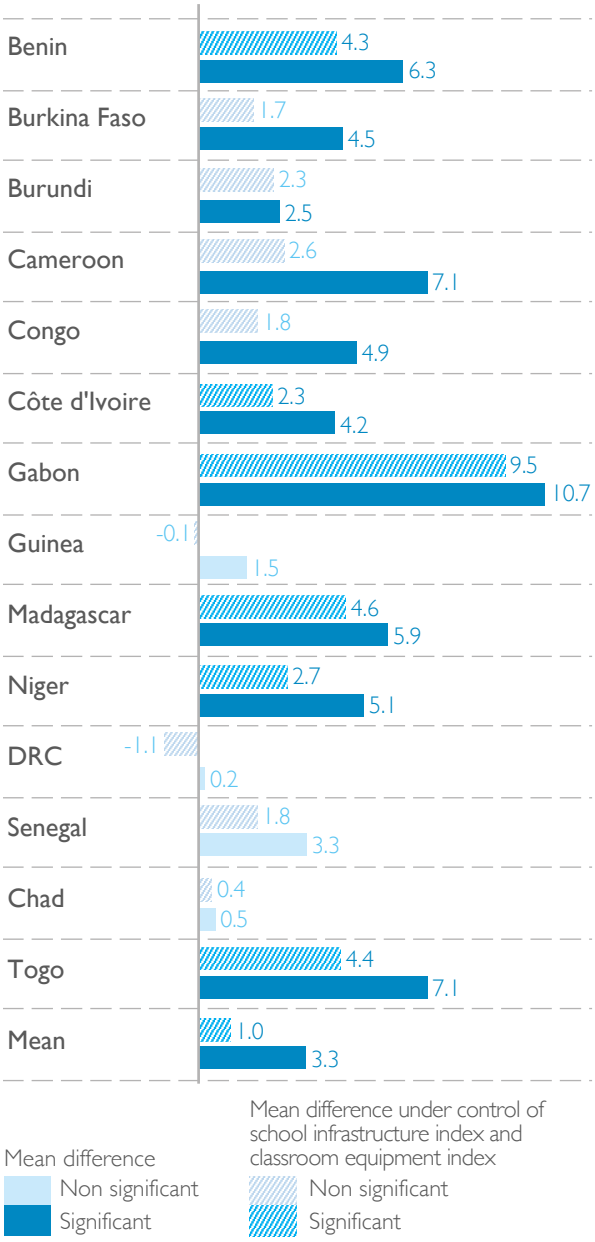
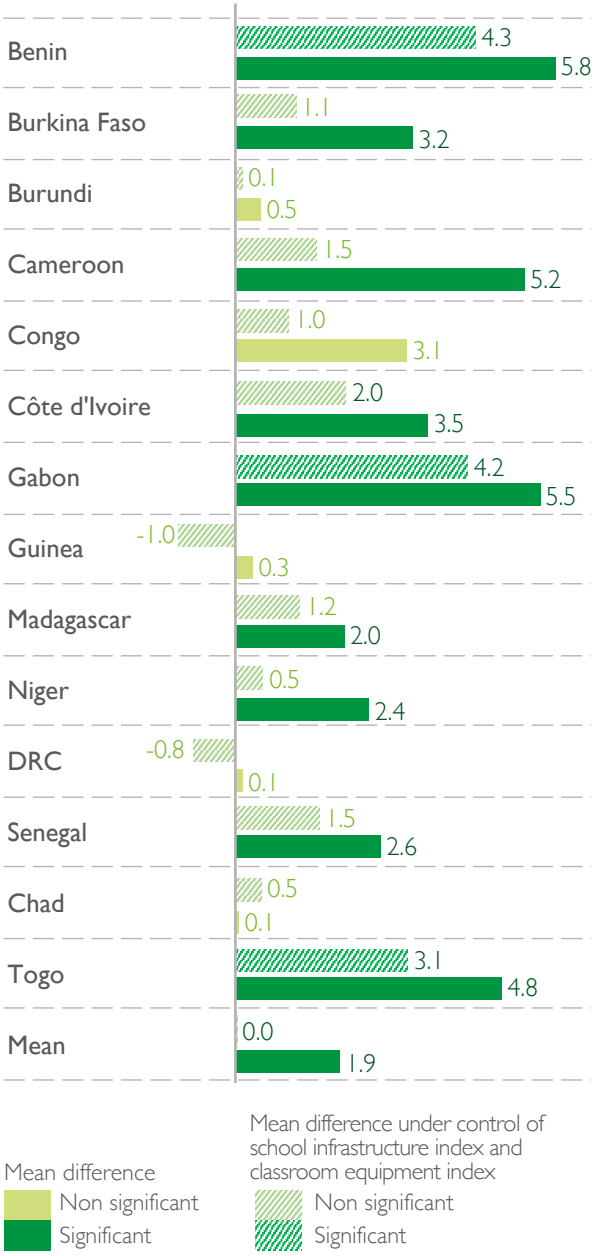


Figure 3.80: Average difference between scores in mathematics of students in a given school and students whose classroom equipment index was one unit lower - Early primary



Overall, the average classroom equipment index had a positive effect on students' reading and mathematics performance at the end of primary schooling. This observation was also made in each individual country in both subjects, with the exception of Guinea and Niger in mathematics.

After controlling for school infrastructure, this link remained significantly positive in reading and mathematics across all countries. It became non-significant in Côte d'Ivoire, Guinea, Niger, DRC and Chad in reading, and in Congo, Côte d'Ivoire and DRC in mathematics.

Figure 3.81: Average difference between scores in reading of students in a given school and students whose classroom equipment index was one unit lower - Late primary

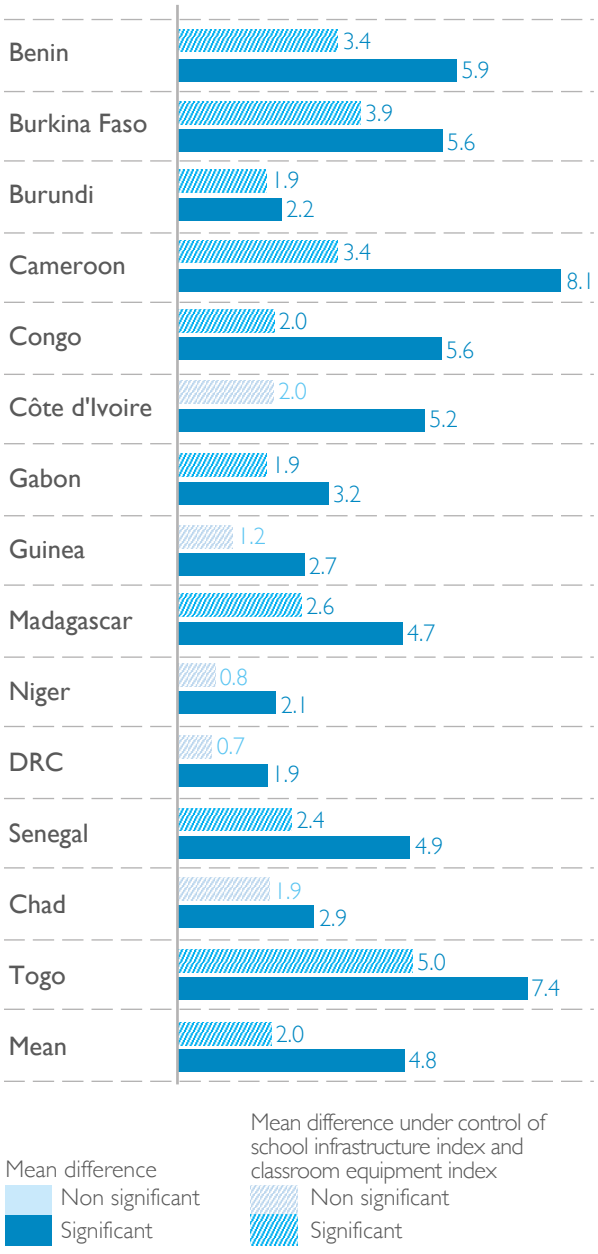
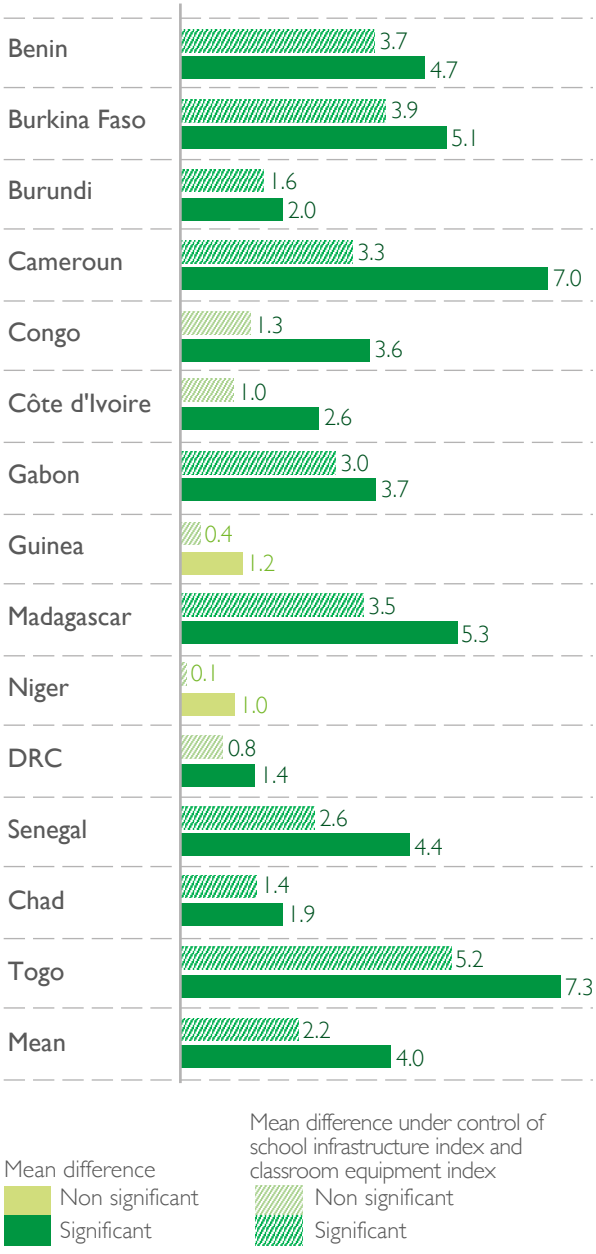


Figure 3.82: Average difference between scores in mathematics of students in a given school and students whose classroom equipment index was one unit lower - Late primary



3.6. School principal characteristics and student performance

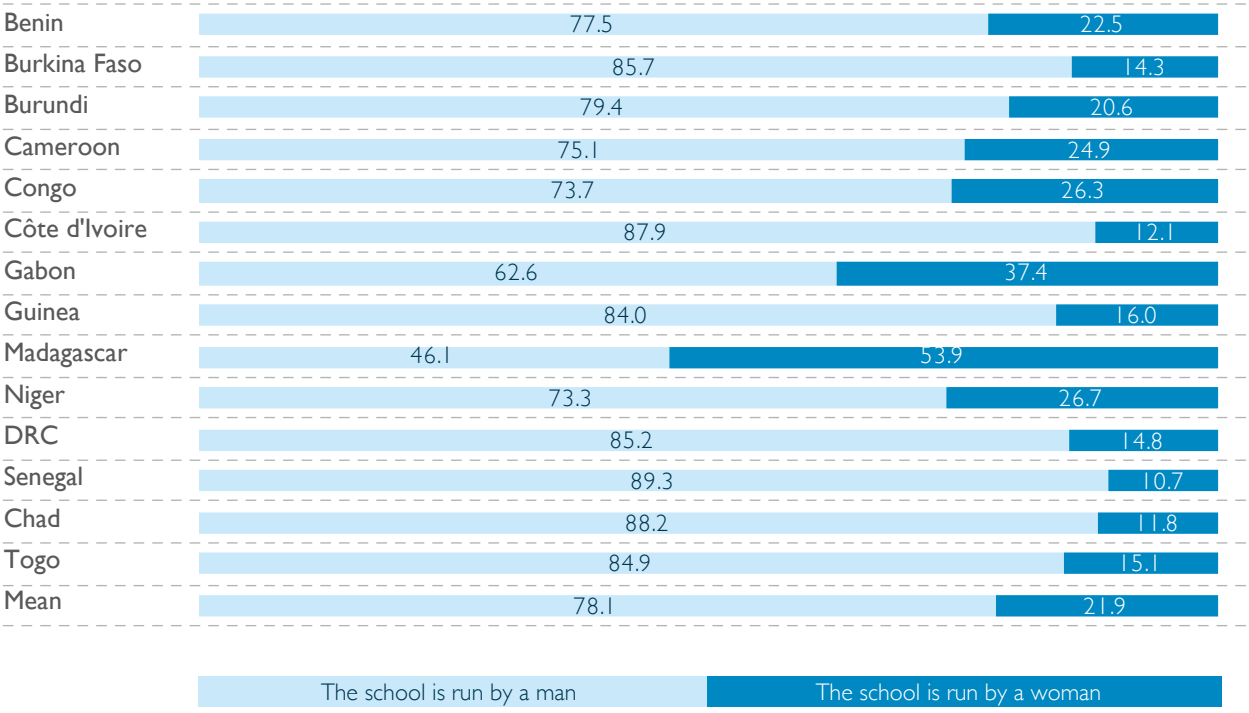
Using the responses to the questionnaires submitted to the principals of the schools surveyed, the PASEC*2019* assessment made it possible to identify some characteristics of school principals that give a better understanding of students' learning context.

3.6.1 Gender of school principals

Most of the students attended schools run by men; however, those attending schools headed by women performed at a higher level.

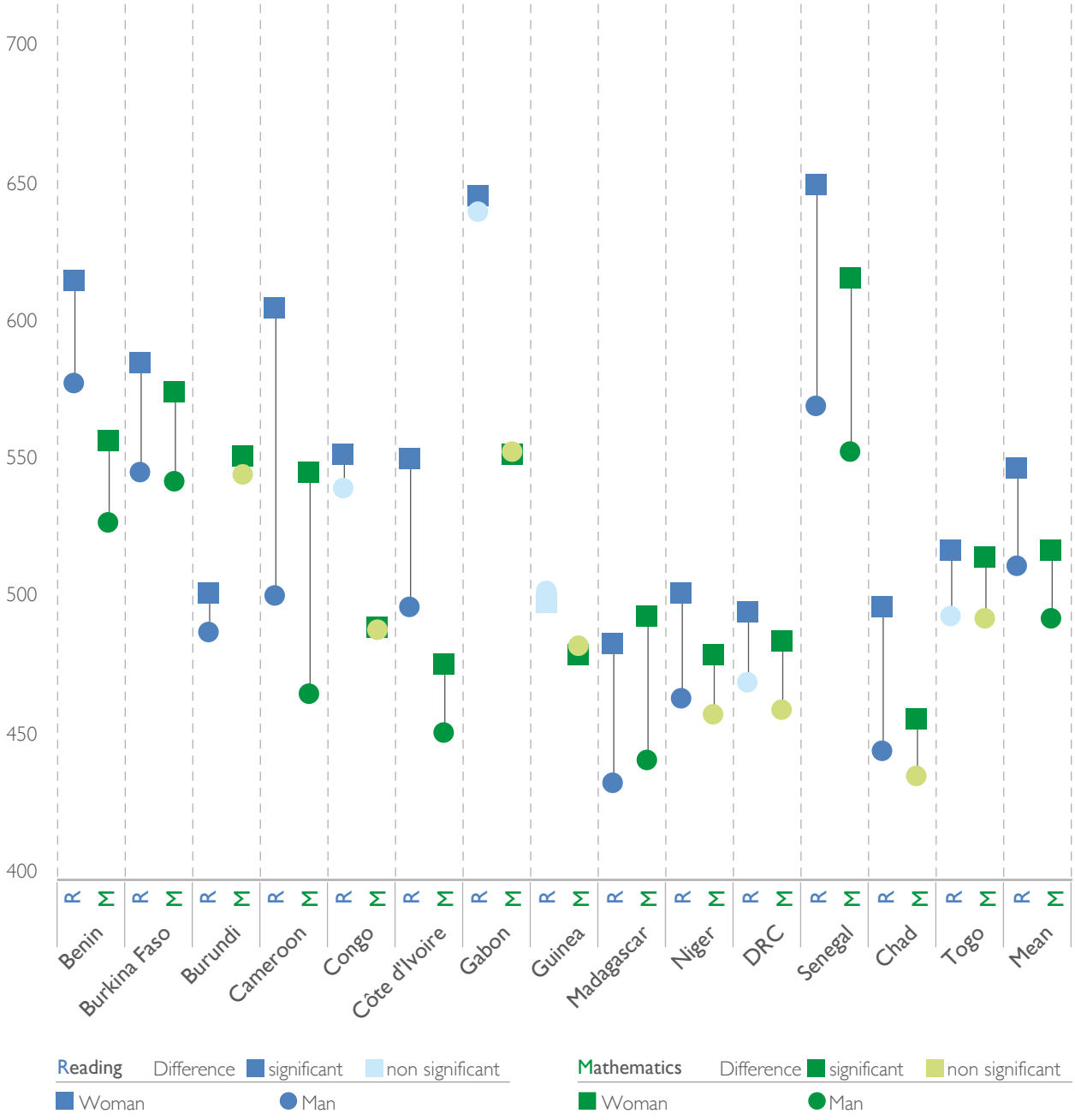
Most of the students (78.1% overall) surveyed at the end of their primary education were at schools run by men. At country level, the situation was only different in Madagascar, where less than half of the students were attending schools run by men.

Figure 3.83: Distribution of students by school principal's gender - Late primary



At the end of primary education, the average difference in performance in reading and mathematics between students whose school principal was a woman and those whose principal was a man was significantly in favour of students at schools run by women. This difference was significant in eight countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar, Niger, Senegal, Chad) in reading and in six countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar, Senegal) in mathematics.

Figure 3.84: Student performance in reading and mathematics by school principal's gender - Late primary

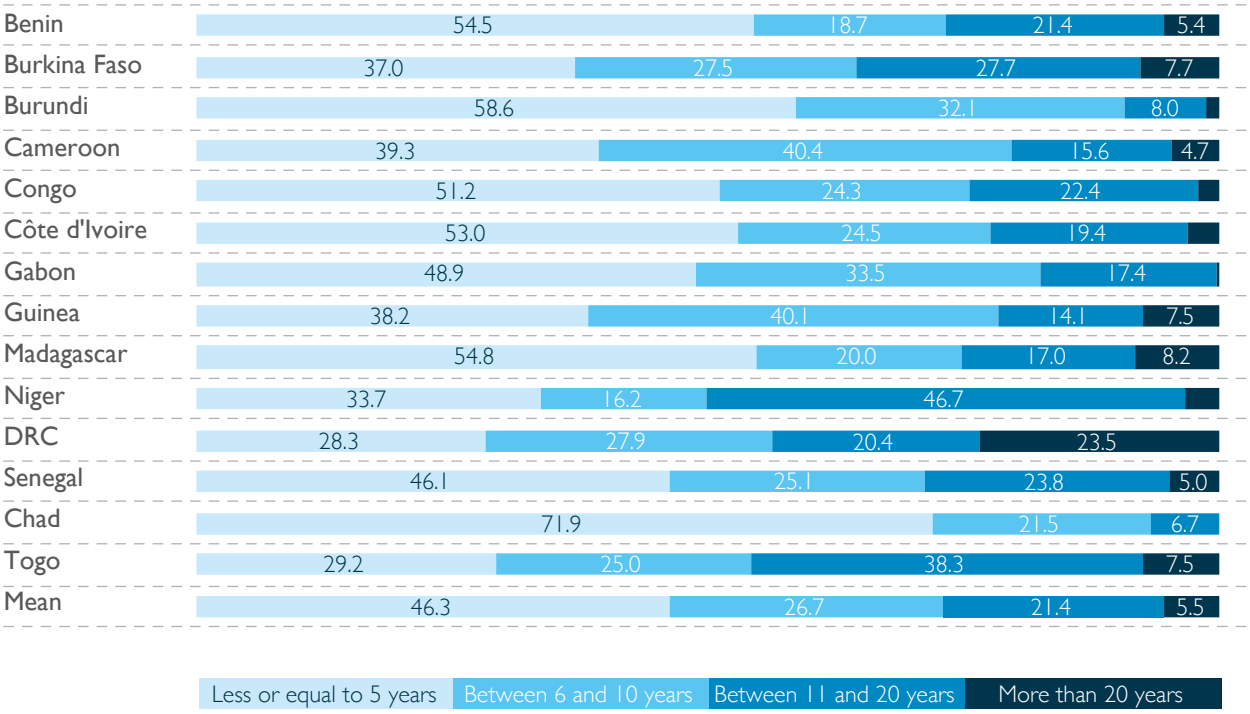


3.6.2. Seniority of school principals

More than half of the students attended schools where the principal had served for more than five years.

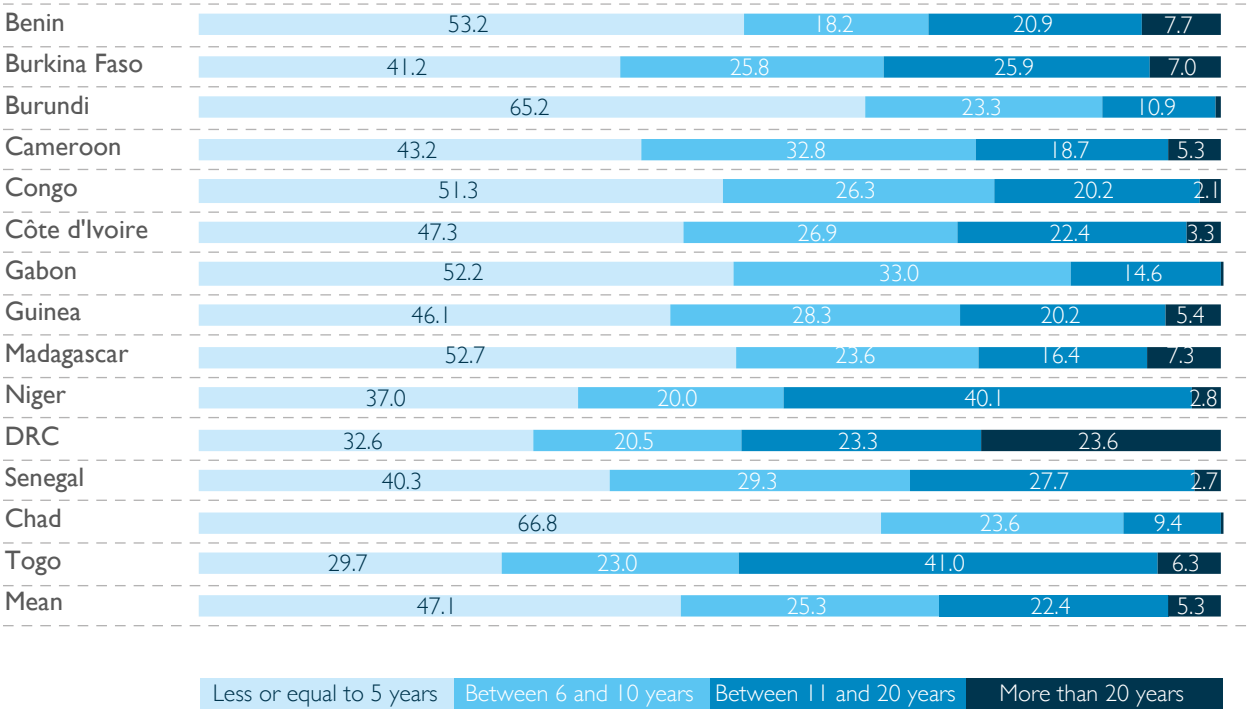
At the start of primary education, 46.3% of students were at schools where the principal had no more than five years' experience in this position; 26.7% at schools where the principal had between six- and ten-years' experience; 21.4% at schools where the principal had between 11- and 20-years' experience; and 5.5% at schools where the principal had more than 20 years' experience. Chad appeared to be the country with the highest proportion of students (71.9%) attending schools run by less experienced principals. DRC (71.7%), Togo (70.8%) and Niger (66.3%) had the highest proportions of students at schools run by a principal with over five years of experience (see Figure 3.85).

Figure 3.85: Distribution of students by school principal's seniority - Early primary



At the end of primary education, 47.1% of students were at schools where the principal had no more than five years' experience in this position; 25.3% at schools where the principal had between six- and ten-years' experience; 22.4% at schools where the principal had between 11- and 20-years' experience; and 5.3% at schools where the principal had more than 20 years' experience. Chad (66.8%) and Burundi (65.2%) were the countries with the highest proportion of students attending schools run by less experienced principals. Togo (70.3%), DRC (67.4%) and Niger (63.0%) had the highest proportions of students at schools run by a principal with over five years of experience (see Figure 3.86).

Figure 3.86: Distribution of students by school principal's seniority - Late primary



3.6.3. Academic level of school principals

Almost all early and late primary students were attending a school run by a principal educated beyond primary level. Just over half of students had a school principal with secondary education. The percentage of students whose principal was university-educated was highest in Burundi and lowest in DRC (see Figures 3.87 and 3.88).

Figure 3.87: Distribution of students by school principal's level of education - Early primary

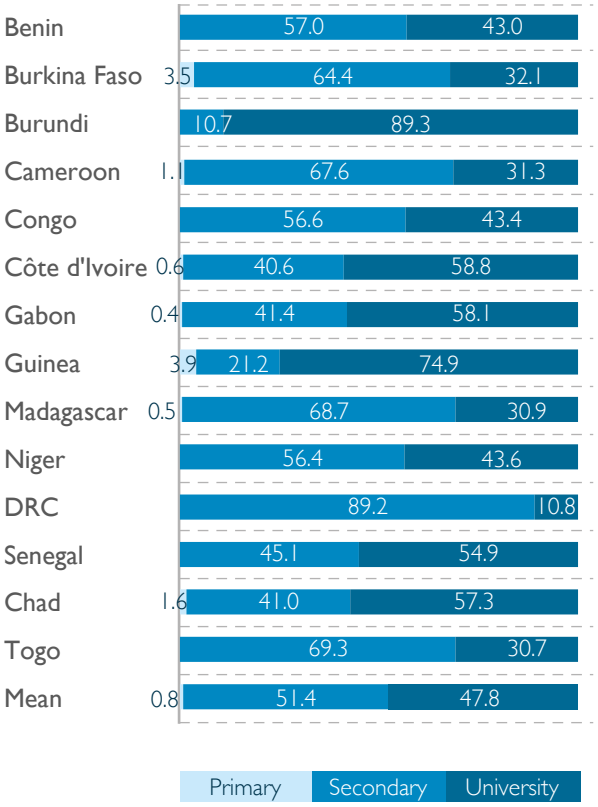
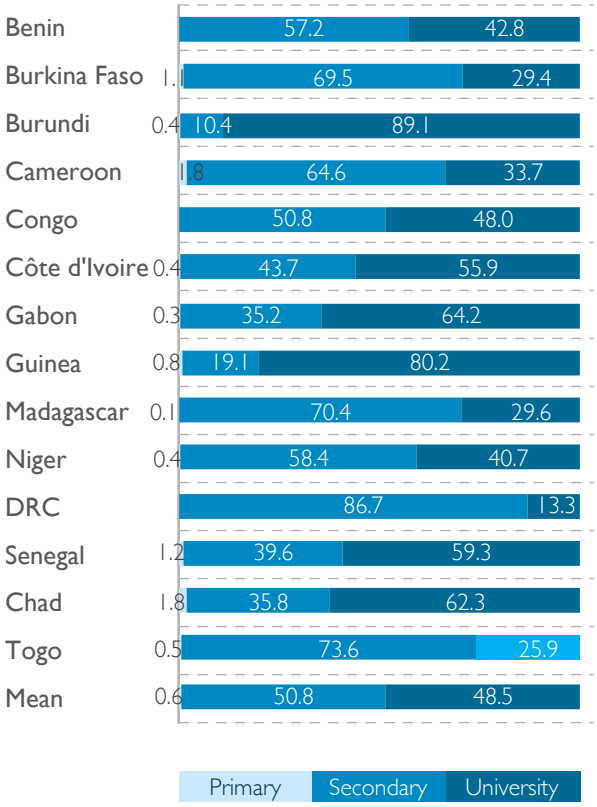


Figure 3.88: Distribution of students by school principal's level of education - Late primary

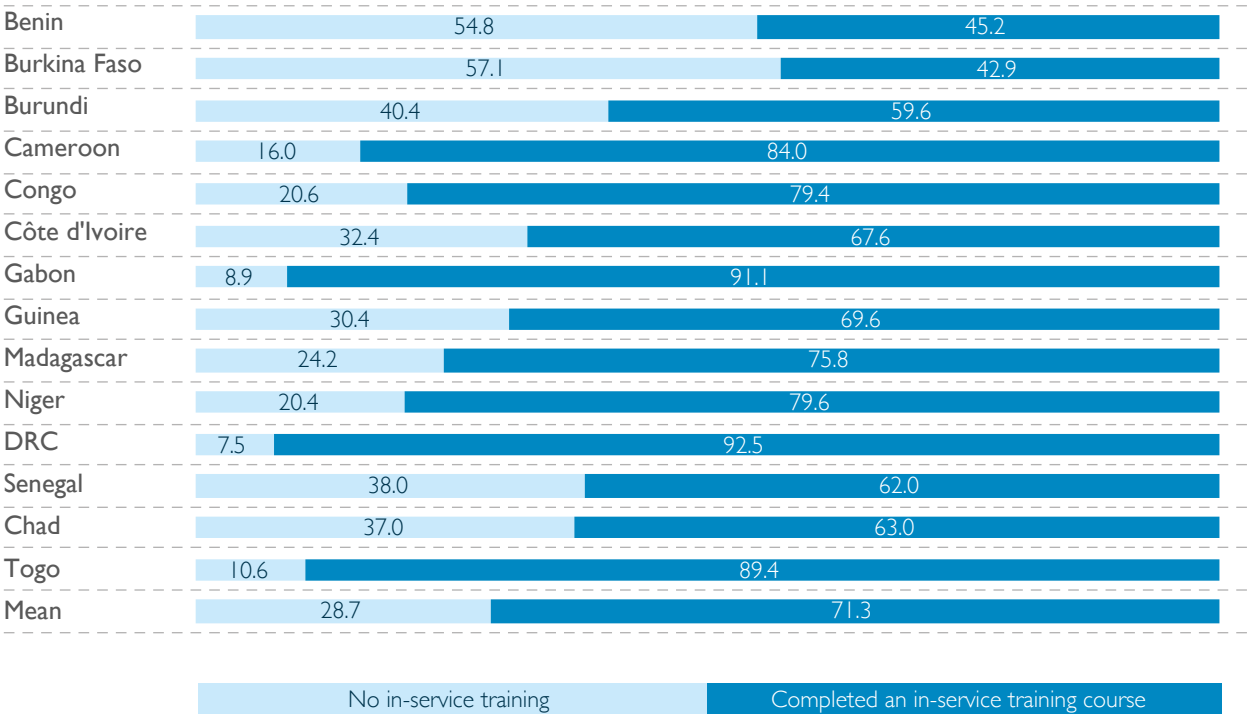


3.6.4 In-service training of school principals

Principals' in-service training did not seem to have an influence on student performance.

At the start of primary education, 71.3% of students had a school principal who had completed at least one in-service training course. The proportion was highest in DRC (92.5%) and Gabon (91.1%). The other countries where a higher-than-average percentage of students had a school principal who had completed at least one in-service training course were Cameroon (84.0%), Congo (79.4%), Madagascar (75.8%), Niger (79.6%) and Togo (89.4%). The percentage was lowest in Benin (45.2%) and Burkina Faso (42.9%).

Figure 3.89: Distribution of students by school principal's in-service training - Early primary



The average performance difference at the start of primary education between students whose school principal had completed at least one in-service training course and those whose school principal had not attended in-service training was not significant for the countries overall. However, it was significant in Congo and Gabon for mathematics and in Congo for reading.

Figure 3.90: Language of instruction performance difference between students by school principal's in-service training - Early primary

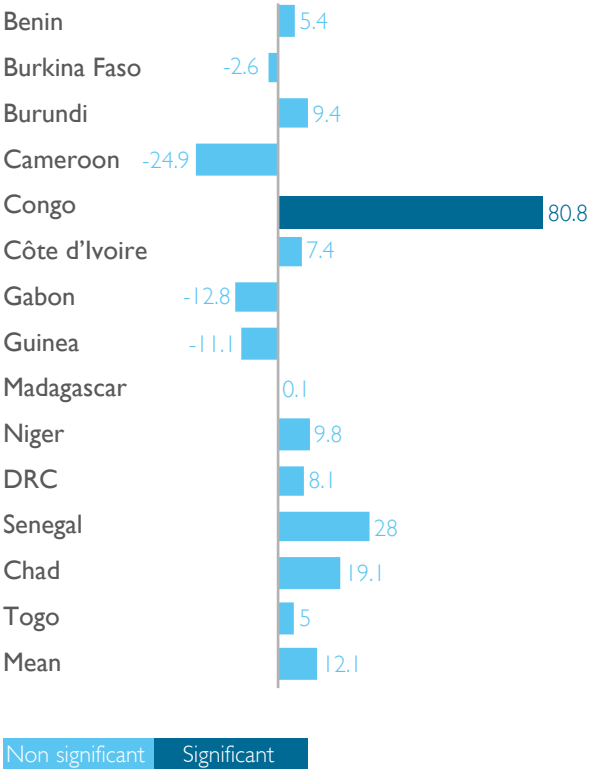
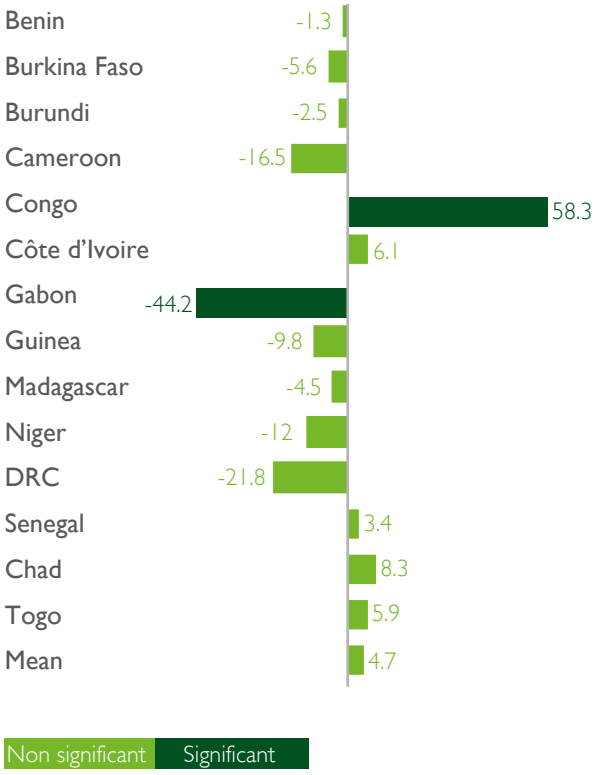
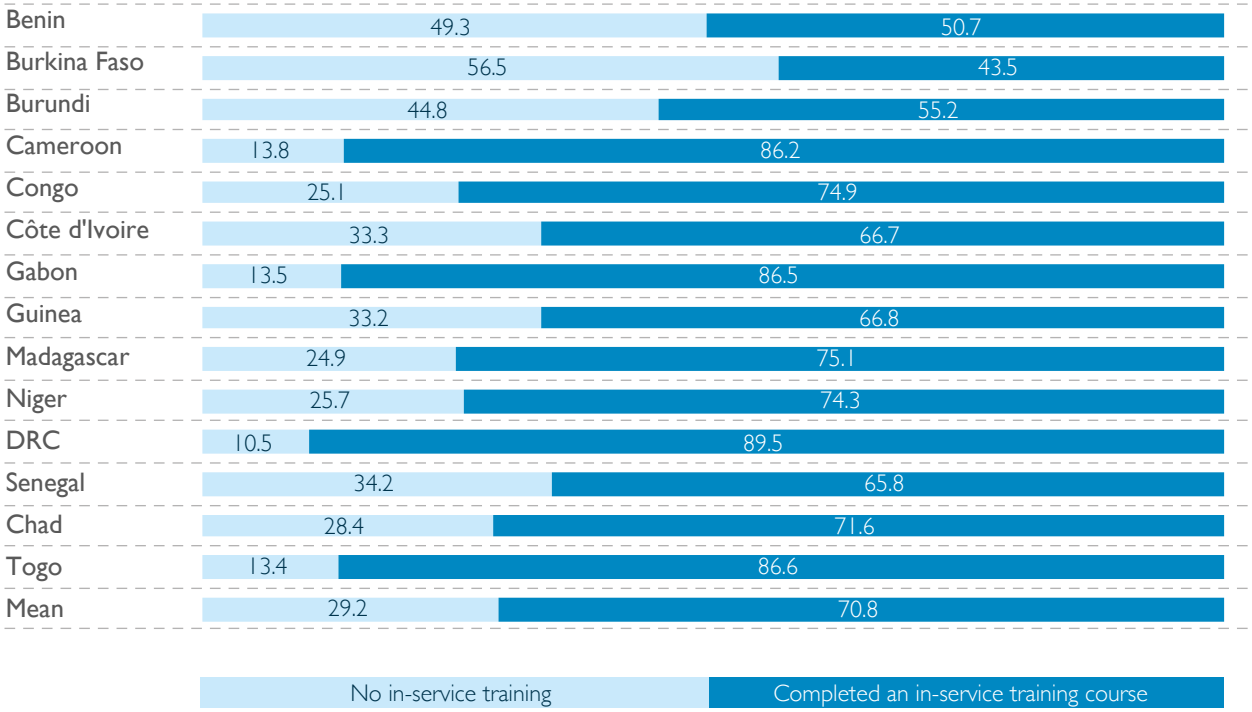


Figure 3.91: Mathematics performance difference between students by school principal's in-service training - Early primary



At the end of primary education, 70.8% of students had a school principal who had completed at least one in-service training course. The proportion was highest in DRC (89.5%), Togo (86.6%), Gabon (86.5%) and Cameroon (86.2%). The other countries where a higher-than-average percentage of students had a school principal who had completed at least one in-service training course were Congo (74.9%), Madagascar (75.1%), Niger (74.3%) and Chad (71.6%). The lowest percentage was recorded in Burkina Faso (43.5%).

Figure 3.92: Distribution of students by school principal's in-service training - Late primary



The average performance difference in reading and mathematics at the end of primary education between students whose school principal had completed at least one in-service training course and those whose school principal had not attended in-service training was not significant for the countries overall. However, it was significant in Congo and Togo for reading and in Congo and Burundi for mathematics, in favour of students whose principal had completed at least one in-service training course.

Figure 3.93: Reading performance difference between students by school principal's in-service training - Late primary

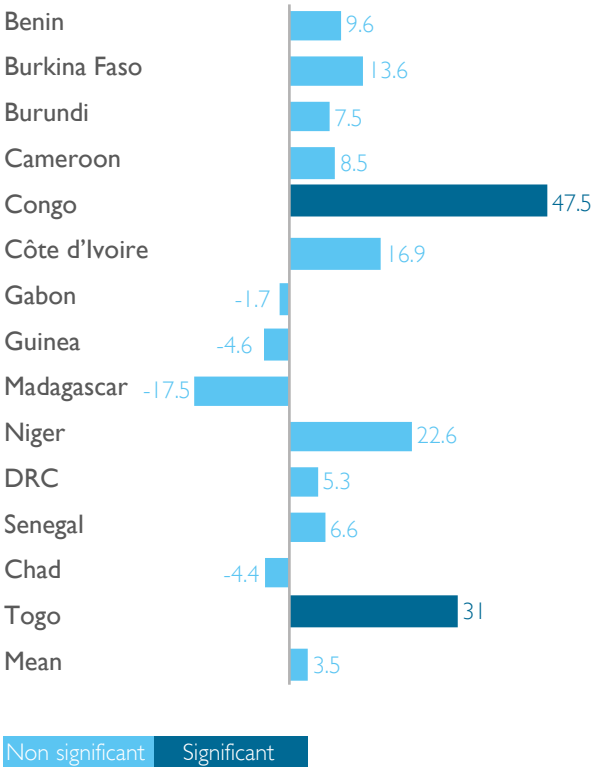
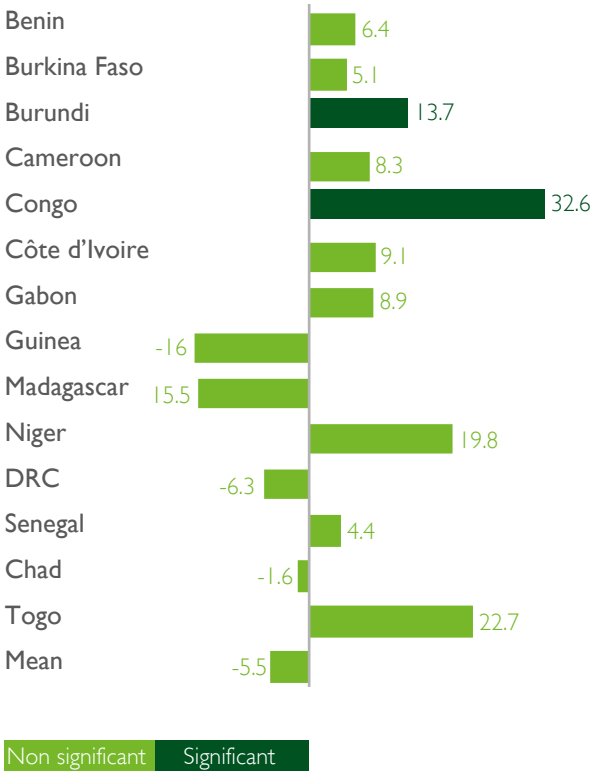


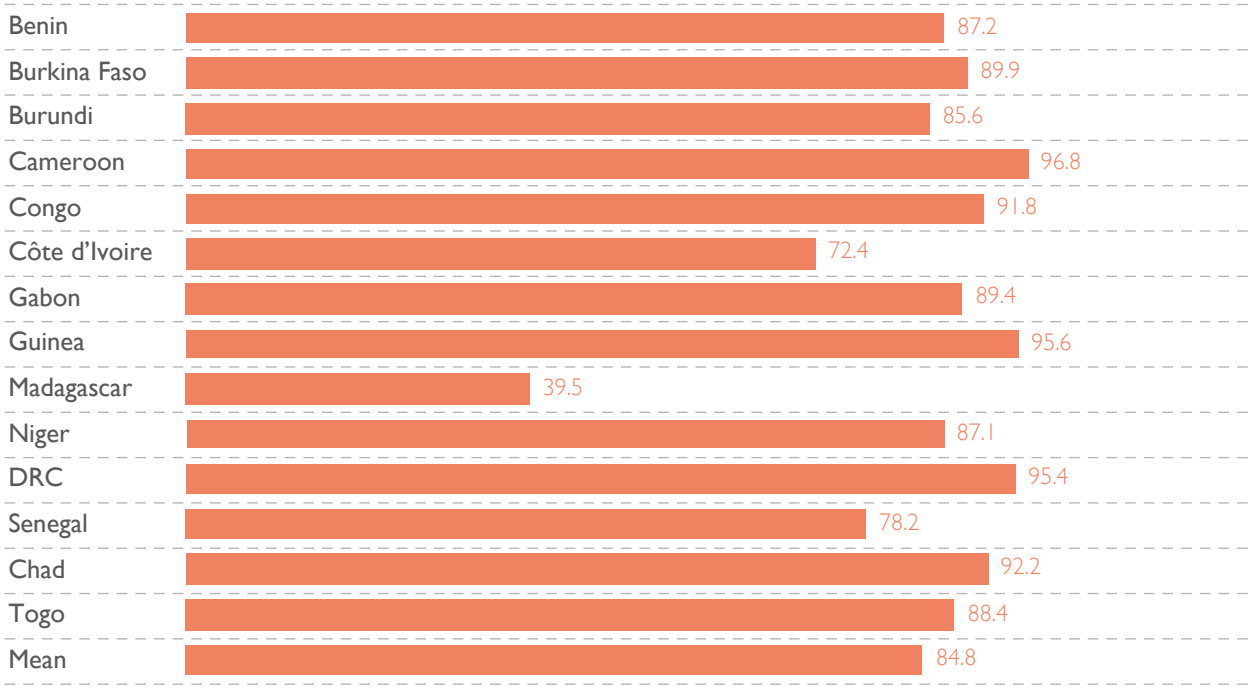
Figure 3.94: Mathematics performance difference between students by school principal's in-service training - Late primary



3.6.5. Inspection of schools

The average percentage of students whose school had been inspected at least once during the previous two years was 84.8% at the end of primary education. Côte d'Ivoire, Madagascar and Senegal were the only countries where these proportions were below the overall average for both educational levels. The percentage of students whose school had been inspected at least once during the previous two years was lower in Madagascar for both the start and the end of primary education, with rates of 39.5%. Cameroon and DRC had particularly high percentages: 96.8% and 95.4% respectively.

Figure 3.95: Percentage of students whose school had been inspected at least once in the previous two years - Late primary

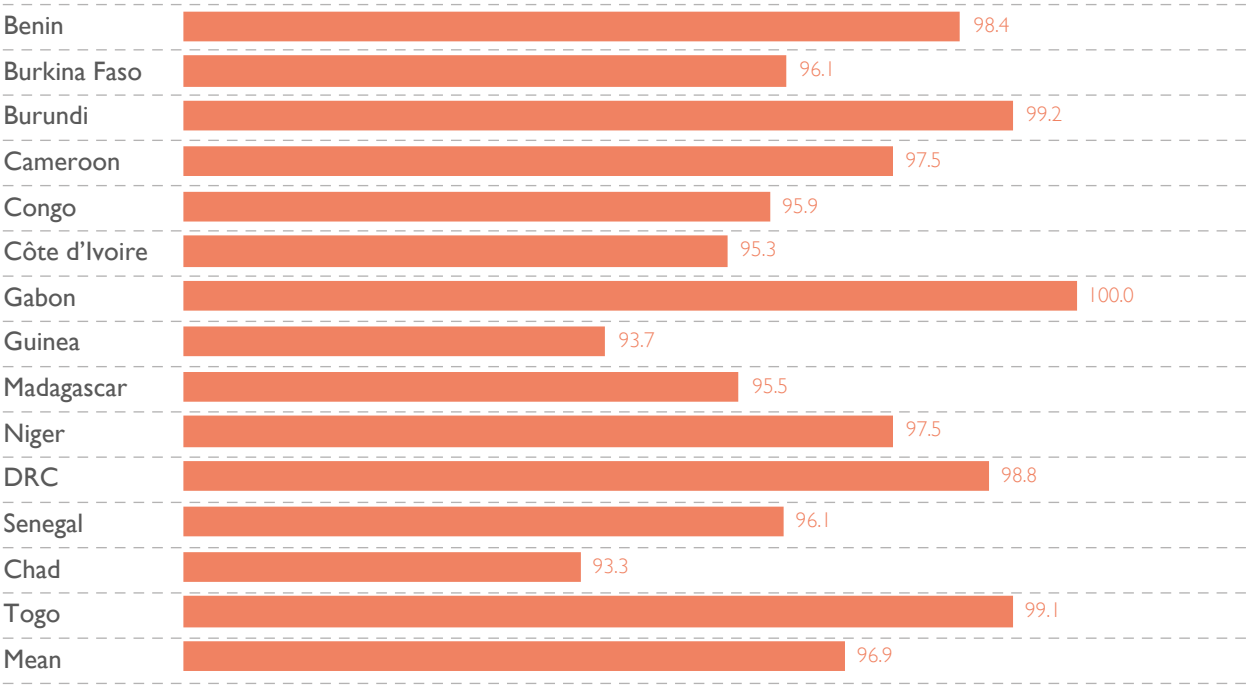


3.6.6. Organisation of meetings with students' parents

The purpose of organising a meeting with students' parents may be to inform parents about the school's overall educational success, to discuss parents' concerns and wishes regarding how the school is organised, to discuss support for the child at home, in particular help with homework, etc. Research has shown that involving parents in the school life of their children has beneficial effects (Fan & Williams, 2010).

The questionnaire sent to school principals made it possible to find out whether schools organised meetings with students' parents. Across the countries as a whole, most late primary students were at schools that organised meetings with parents (see Figure 3.96).

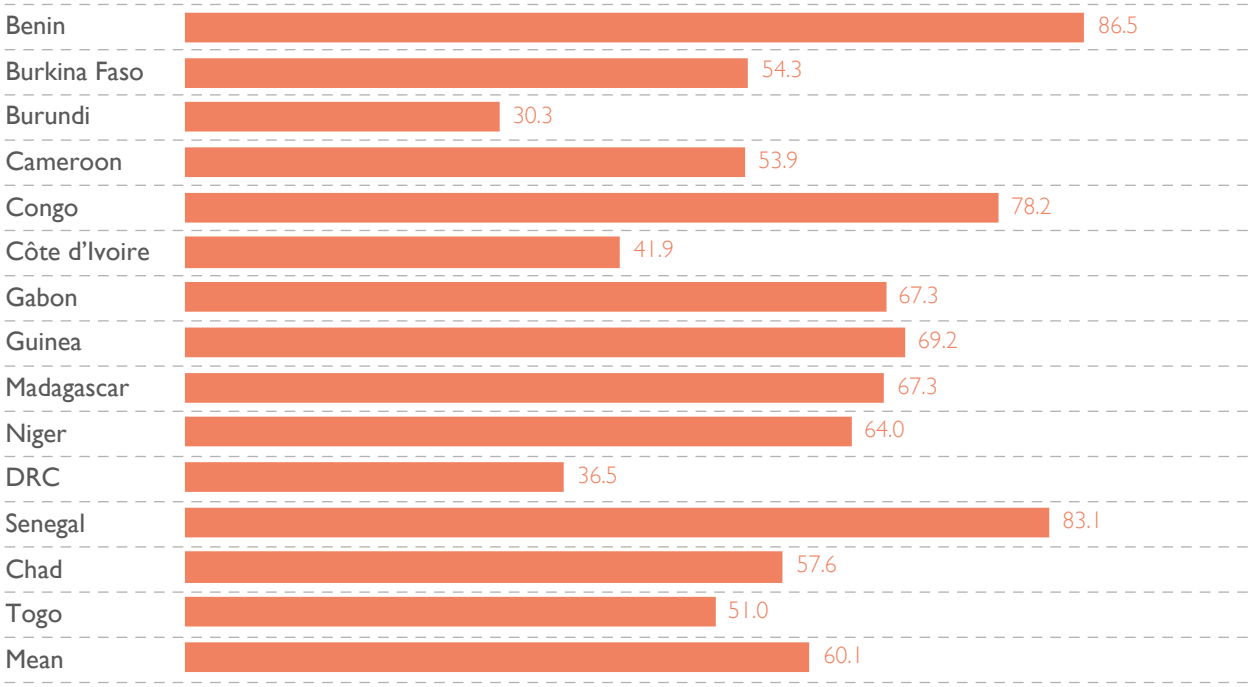
Figure 3.96: Percentage of students whose school organised parent meetings - Late primary



3.6.7. Establishment of an incentive system for the top-performing students

School principals were asked: 'At your school, are the top-performing students given official encouragement (honour rolls, prizes, scholarships, gifts, etc.)?' In general, the purpose of setting up an incentive system for the top-performing students is to encourage all students to perform at a higher level. According to the data collected, the top-performing students did receive official encouragement in most cases: an average of 60.1% of late primary students were at schools where this was done. Benin, Congo and Senegal were the countries with the highest percentages in this respect, while Burundi and the DRC had the lowest percentages.

Figure 3.97: Percentage of students whose school officially gave the top-performing students encouragement (honour rolls, prizes, scholarship, gifts, etc.) - Late primary



3.6.8. Organisation of extra hours for low-performing students

The purpose of extra hours for the lowest-performing students is to help them catch up with their learning. In other words, it is about bringing these students back up to the expected level. Through the questionnaire sent to school principals, the survey was able to collect information on the organisation of extra hours for low-performing students at the start and end of primary education.

Nearly 45% of early primary students across all countries combined were at schools that organised extra support for under-performing students. According to the data, Senegal (61.8%) was the country where the highest proportion of under-performers at this level were given extra hours. At the end of primary education, an average of 74.1% of students were at schools that organised support hours for the lowest performers. The percentages of students were highest in Benin (85.9%), Burkina Faso (86.9%), Senegal (86.4%) and Togo (89.4%).

Figure 3.98: Percentage of students whose school organised support hours for the lowest performers - Early primary

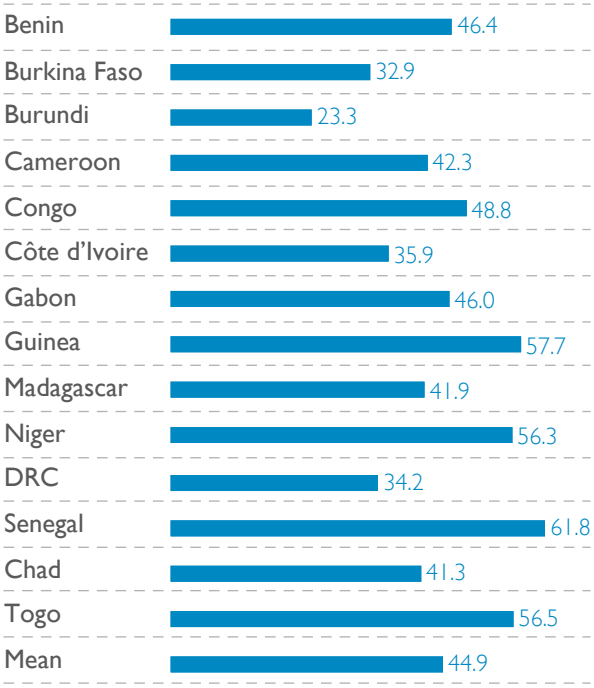
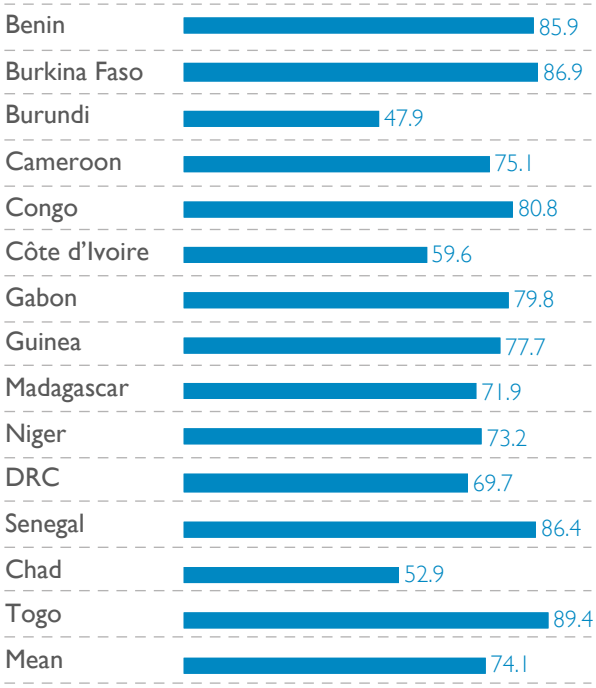


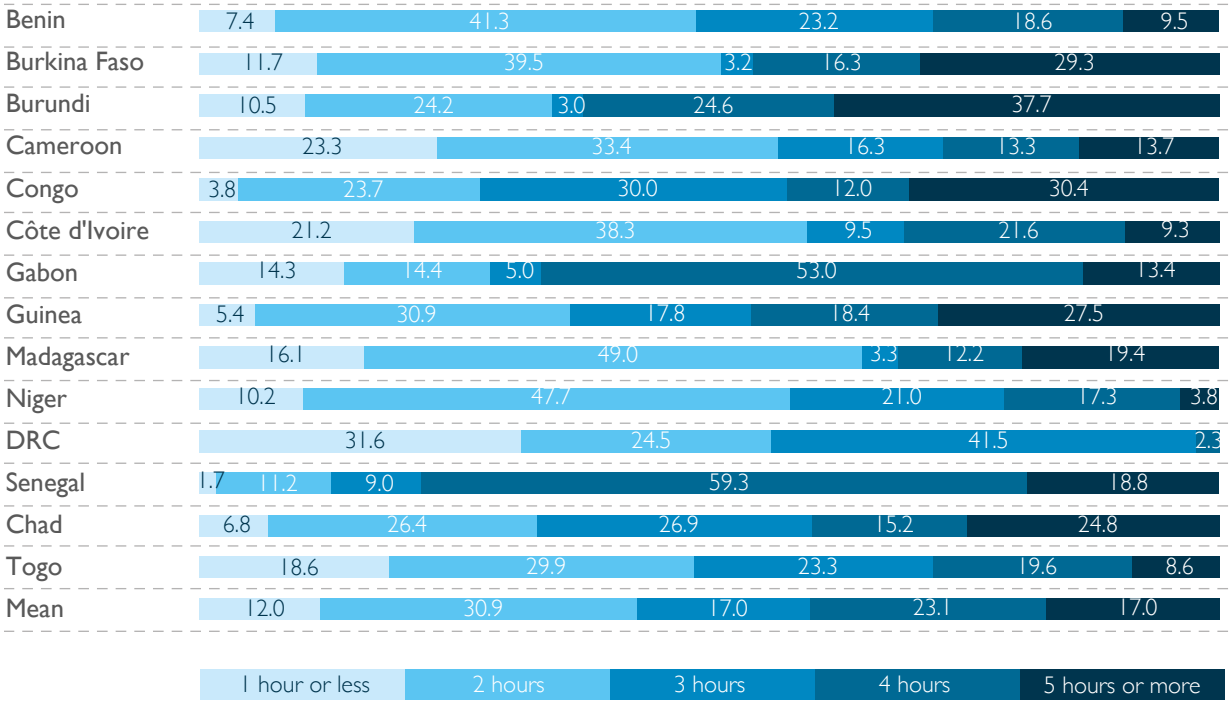
Figure 3.99: Percentage of students whose school organised support hours for the lowest performers - Late primary



The number of extra hours per week devoted to the lowest-performing students varied from country to country. In some countries the highest proportion of under-performing students received five or more extra hours, while in other countries four hours of support was most common.

An average of 17.0% of early primary students were at schools that organised at least five hours of support per week for the lowest performers. At country level, this percentage for early primary students was 29.3% in Burkina Faso, 37.7% in Burundi and 30.4% in Congo.

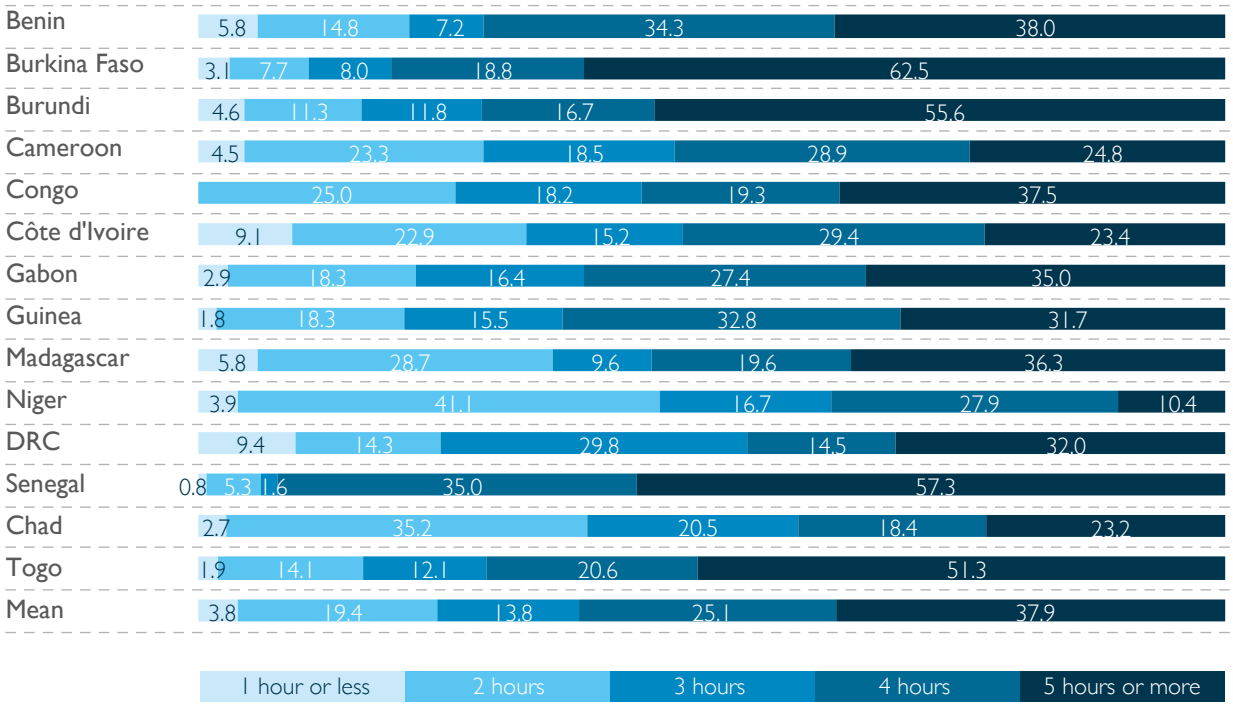
Figure 3.100 : Distribution of students by number of weekly hours of support provided to the lowest performers - Early primary



At the end of primary education, 37.9% of students were at schools that organised at least five hours of support per week for the lowest-performing students. This percentage was 62.5% in Burkina Faso, 55.6% in Burundi and 57.3% in Senegal.

Overall, more students at the end of primary education received at least five hours of extra support per week than at the start. This was probably due to the more intense preparation of students for the official examinations held at the end of primary education.

Figure 3.101: Distribution of students by number of weekly hours of support provided to the lowest performers - Late primary



Conclusion

Most governments and countries committed in the Incheon Declaration to a new vision for education accompanied by a framework for action on Sustainable Development Goal 4, 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all', and multiple initiatives have been developed to support countries in achieving this goal by 2030. PASEC's missions of assessing students' outcomes and identifying their main determinants make it a key player in this new educational paradigm. This chapter has analysed student performance in relation to certain student characteristics (socio-economic, family, educational career, etc.) and characteristics of the school environment. The aim was to study the explanatory factors behind student scores and the elements associated with lack of equity in education systems. Reviewing the multiple factors that may explain students' educational performance enables the most important to be identified.

In terms of improving the equity of education systems, much remains to be done. The school environment has turned out to be a major factor in explaining student performance. Countries should therefore reinforce policies on the allocation of educational resources according to the needs of different locations, schools and specific groups.

The issue of gender has been examined in terms of gender parity in both access and performance. While there was a situation of near-parity in all countries at the start of primary education, there were fewer girls in classes at the end of primary school. Emphasis should be placed on policies to keep children in general – and girls in particular – at school.

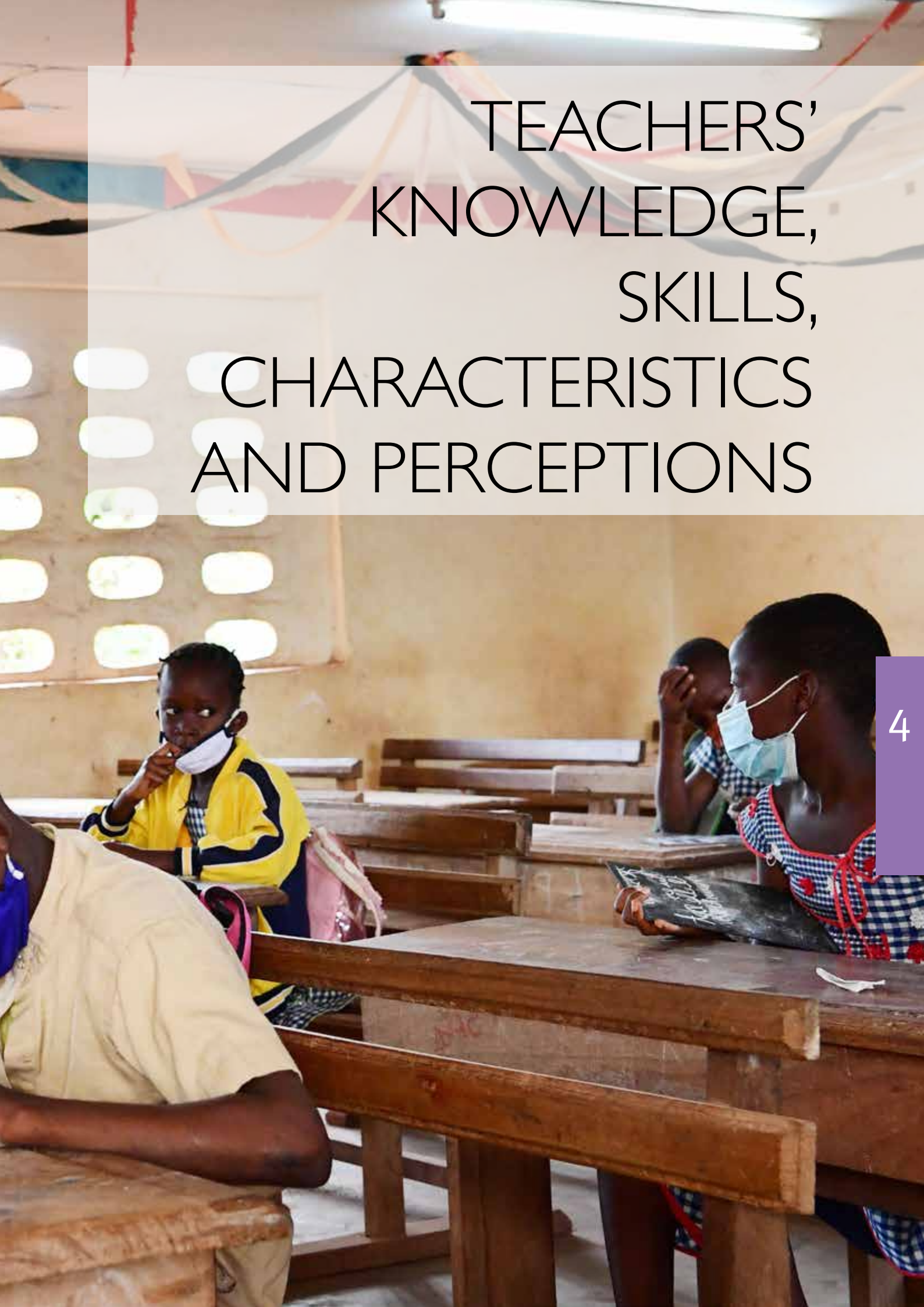
Preschool attendance is an important factor in improving student outcomes. Where there is poor access to preschool education, countries must make provision of preschool places a priority. Without significant efforts made in this direction, it will be difficult to achieve the goal of the 2030 Agenda of providing one year of preschool for all children.

The grade repetition rate remains a matter of concern in most of the countries and calls their education systems' internal efficiency into question. In addition, grade repetition makes it impossible for students to catch up with their peers, which raises the question of how low-performing students should be monitored. It is therefore important to set up a monitoring system for low-performing students in schools.

In terms of school management, the measures to strengthen the capacities of school principals are failing to have their full effect. In-service training for principals is not yet benefiting students. Particular attention should be paid to whether the training content reflects needs, and to the conditions in which the training is implemented. Attention must also be paid to increasing the proportion of women in school leadership positions.

The education system is characterised predominantly by public education provision. However, the quality of education in the private sector is higher than in public schools. Although countries' efforts must focus on policies capable of ensuring quality education for all (SDG 4.1), particular emphasis needs to be paid to public schools.

TEACHERS' KNOWLEDGE, SKILLS, CHARACTERISTICS AND PERCEPTIONS



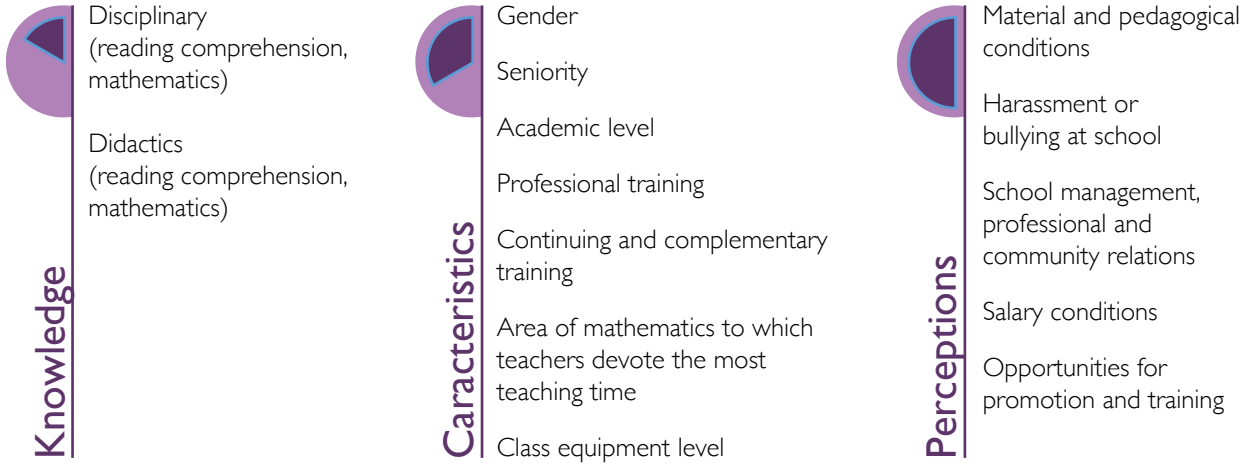
Introduction

The crucial role played by the teacher/student relationship is borne out by educational research (Hattie, 2009; Lessard et al., 2006). This relationship can have significant effects on the student's relations with the school, educational performance and sense of well-being (Frediksen and Rhodes, 2004). The benefits of a positive teacher/student relationship are particularly evident in the case of students who are at risk of dropping out (Fortin et al., 2006). Conversely, a poor teacher/student relationship tends to increase the likelihood of drop-out (Lessard et al., 2006).

Teachers thus constitute one of the pillars of education systems: given that their effectiveness is the most important factor in student learning (UNESCO, 2014b; Bold et al., 2017), they should be regarded as an essential resource within schools alongside other resources such as the leadership of school principals (Isabelle, Gélinas-Proulx and Meunier, 2015). This explains the requirement for high-quality teachers in education systems; increasing the number of qualified teachers in developing countries has been identified, within the framework of the sustainable development goals (SDGs), as one of the means to be implemented in order to achieve inclusive quality education for all by 2030.

In this context, the CONFEMEN countries expressed the need to augment the teacher survey (PASEC, 2018). It will be recalled that in the context of the PASEC*2014* assessment, the teacher survey focused on two dimensions: their personal characteristics and their perceptions. For the PASEC*2019* assessment, a new dimension was included in the survey: measurement of teachers' knowledge with the aim of finding out more about their training needs. These three dimensions were expected to make possible a more comprehensive mapping of the situation of teachers in the participating countries.

Chart 4.1a: The three dimensions of the PASEC*2019 teacher survey*



All teachers working at the schools covered by the PASEC*2019* assessment were included in the survey, not just those working in the classes whose students were assessed. The 'teachers' knowledge and skills' dimension was of particular importance given the emphasis on these aspects in international educational research (Shulman, 1986, 1987; Altet, 2008; Hill and Ball, 2004; Helms and Stokes, 2013). This dimension was understood in the context of the PASEC*2019* assessment on the basis of the model of Shulman (1986, 1987), which distinguishes between subject knowledge and skills and teaching knowledge and skills. The teachers were set paper-and-pencil tests in MCQ (multiple choice question) format relating to reading comprehension (subject knowledge and skills, teaching knowledge and skills) and mathematics (subject knowledge and skills, teaching knowledge and skills).

In reading comprehension, the assessment of subject knowledge and skills focused on three cognitive processes: 1) extracting explicit information, 2) making simple inferences and 3) interpreting and combining information. The aim was to determine to what extent teachers had mastered reading comprehension in the language of instruction, could understand the meaning of what they read and had sufficient knowledge of the structures of the language to teach it as a school subject and use it as the language of instruction (PASEC, 2018). The assessment of subject

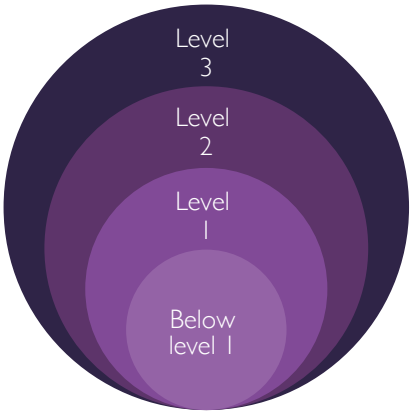
knowledge and skills in mathematics also focused on three cognitive processes: 1) knowing the concepts, 2) applying the procedures and 3) solving problems. The aim was to determine to what extent teachers had acquired the mathematical knowledge they were expected to teach and had sufficient reasoning capacity to solve mathematics problems at primary level (PASEC, 2018).

The assessment of knowledge and skills in the teaching of reading comprehension focused on two cognitive processes: 1) identifying educational objectives and 2) identifying sources of student error. The aim was to determine to what extent teachers were able to analyse a learning situation and discern student errors (PASEC, 2018). The assessment of knowledge and skills in mathematics teaching also focused on two cognitive processes: 1) analysing the approaches used by students and 2) choosing the situations best suited to the learning objectives. The aim was to determine to what extent teachers were able to analyse the approaches used by students and choose situations conducive to the learning of mathematical concepts (PASEC, 2018). The assessment of teaching knowledge and skills improves understanding of the effect they have on teaching practices. It also throws light on how they develop, with the ultimate aim of designing pre-service education and in-service training systems that foster that development (Kermen and Izquierdo-Aymerich, 2017).

Analysis of the subject test results was based on scores and associated proficiency scales, with which teachers can be categorised by their level of mastery of subject content in reading comprehension and mathematics. These scales differed from those for the student tests because the content of the teacher tests differed from that of the student tests. They were divided into levels, each characterised by:

- a description of the typical knowledge and skills of teachers who had achieved the level (an overall presentation, not a complete list of elements to be individually verified);
- inclusivity, in the sense that teachers at Level n also had the knowledge and skills of Level n-1 (Diagram 4.1b).

Chart 4.1b: The inclusive nature of teacher proficiency scales



The analyses of teaching knowledge and skills were not based on a proficiency scale, mainly because of the non-prescriptive nature of the science of teaching (Johsua and Dupin, 2003)[25]. They relied instead on findings relating to the percentages of correct responses to test items and the scores of teachers in the participating countries. These findings were then compared with data from research into teaching. The aim, as with the analysis of subject knowledge and skills, was to identify teachers' pre-service education and in-service training needs.

Ultimately, Chapter 4 could be summed up as addressing three questions: What reading comprehension and mathematics knowledge did teachers have? What were their characteristics? How did they perceive their professional environment? The chapter first presents the results of analyses of teachers' level of subject and teaching knowledge and skills in reading comprehension and mathematics. Teachers' knowledge and skills are then described according to teachers' characteristics and perceptions.

25. 'The science of teaching considers as legitimate a variety of ways of teaching the same subject and engaging in rational discussion about it, rather than suggesting that there is a specific natural way of doing so that should therefore be imposed on all teachers. It is thus not intended to be a normative and pre-scriptive science which aims to pass judgement on teaching.' (2003, p.8).

4.1. Teachers' knowledge and skills

4.1.1. Teachers' knowledge and skills in reading comprehension

Table 4.1 shows the PASEC*2019* proficiency scale for teachers in reading comprehension. This scale reports the levels of teachers across the different countries who participated in the reading comprehension test. It provides information on the scores and the distribution of teachers across the levels and a description of the corresponding skills. Teachers at any given level are able to perform tasks well at that level, less well at higher levels and better at lower levels.

Table 4.1: PASEC*2019 teachers' proficiency scale for reading comprehension*

Level	Score	Percentage of teachers at that level	Description of teachers' skills
Level 3	497 or more	52.0%	At this level, teachers are able to take a step back and engage in general processing of all types of texts. They make complex inferences and are able to combine and interpret multiple implicit ideas, drawing on their own experience and knowledge. They are capable of detaching themselves from the literal meaning of a text to identify the author's intention and perceive the humorous dimension of a text (even when this is subtle). They can take the content of a text into account to formulate a new idea that is relevant to the information they have read.
Level 2	Between 394 and 496	32.2%	Teachers display the ability to use paraphrased information. They are able to make simple inferences in any type of text. They are also able to perceive the anaphoric system of pronouns, synonyms and other substitutes used in a literary text. They can combine information from different parts of a text.
Level 1	Between 290 and 393	14.2%	Teachers are able to locate explicit information in medium-length or long texts using cues from the text and the questions. They can use this skill on narrative and informative texts. They are able to locate some elementary paraphrases in a text.
Below Level 1	Less than 290	1.6%	Teachers below Level 1 do not sufficiently demonstrate the skills measured by this test in reading comprehension. They struggle with the knowledge and skills of Level 1.

The three levels presented in Table 4.1 correspond to the three levels of reading comprehension described in Box 4.1: extracting explicit information, making simple inferences, and interpreting and combining information.

Box 4.1: Reading comprehension levels

Extracting explicit information (Level 1) *uses the ability to locate and extract concrete information presented word for word or in slightly paraphrased form in a sentence, paragraph or text.*

Making simple inferences (Level 2) *refers to the ability to deduce additional information from one or more elements present in the text. The reader uses explicit (or implicit) referents and connectors which allow him or her to construct meaning by direct deduction and logical reasoning. These inferences must be verifiable.*

Interpreting and combining information (Level 3) *refers to the ability to connect several explicit and implicit cues located throughout the text in order to construct new ideas. The difficulty lies in making use of knowledge external to the text and responding to the text as a whole. These inferences may be verifiable and may vary from reader to reader..*

Overall, slightly over half of the teachers surveyed were at Level 3 (497 points or more) on the proficiency scale, and just under a third were at Level 2 (394-496 points). Just under 15% were at Level 1 (290-393 points), while less than 2% did not demonstrate the knowledge and skills assessed in this test (less than 290 points). These results revealed a generally satisfactory level of knowledge and skills in reading comprehension among the teachers surveyed. However, teachers at or below Level 1 require particular attention and specific training. Essentially, these findings reveal the need to implement specific training for teachers at each level of the reading comprehension skills scale.

More than 70% of the teachers were at Level 3 of the reading comprehension proficiency scale in half of the countries (7 out of 14): Côte d'Ivoire (87.8%), Senegal (81.9%), Benin (75.6%), Burkina Faso (75.5%), Togo (74, 3%), Gabon (74.2%) and Cameroon (72.3%). This reveals a good level of reading comprehension in this group of countries which should be reinforced through specific training.

The lowest percentages (less than 20%) of teachers at Level 3 were observed in Madagascar (11.2%), DRC (16.3%) and Chad (18.5%); elsewhere, they varied between 29.9% in Burundi and 42.7% in Niger. In these countries, teachers' reading comprehension skills need to be improved by means of training focusing on the cognitive processes involved in the PASEC*2019* subject test for teachers. (See Box 4.1 and Figure 4.1).

Figure 4.1: Distribution of teachers across the different levels of the reading proficiency scale by country

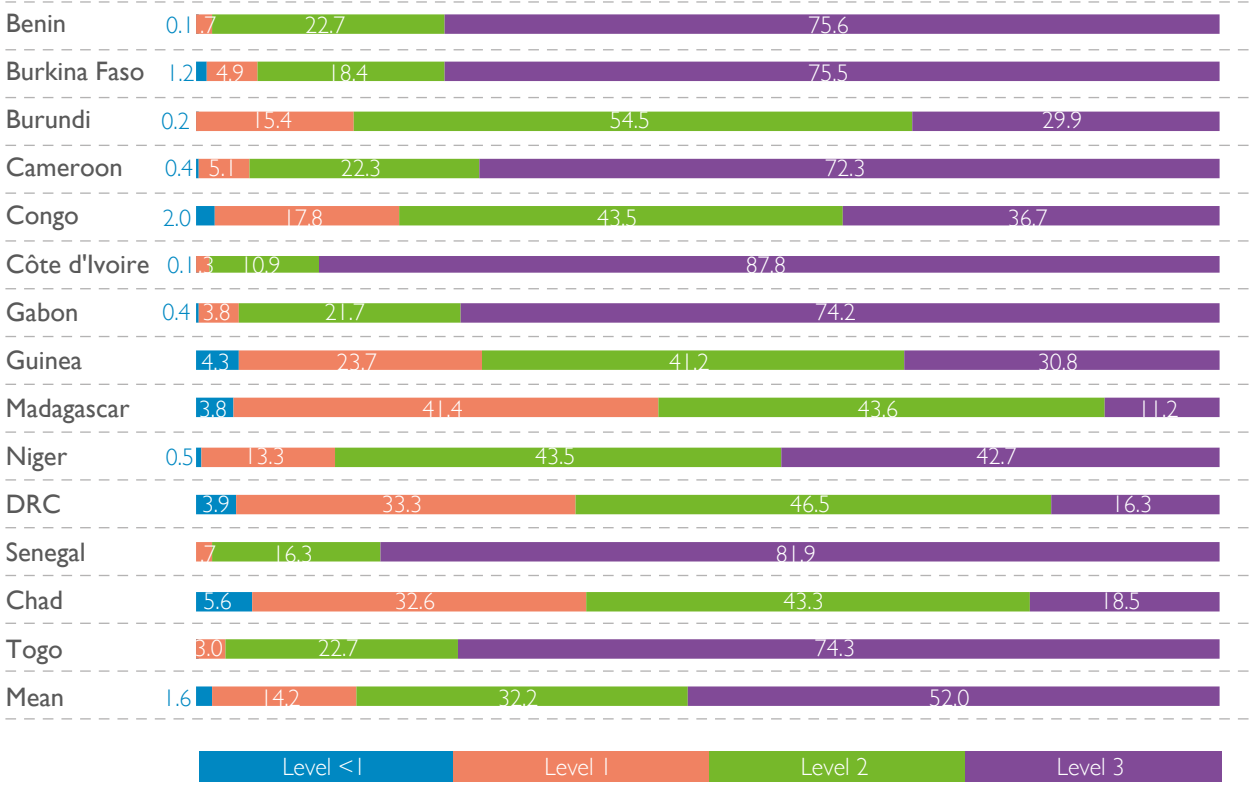


Table 4.2 shows teachers' average scores in reading comprehension in each of the participating countries.

Table 4.2: Average scores of teachers in teaching reading comprehension by country

	Mean	Standard error	Standard deviation	Standard error
Benin	548.4	2.9	73.4	1.8
Burkina Faso	550.4	3.3	92.4	3.1
Burundi	461.5	2.3	66.0	1.2
Cameroon	542.7	4.0	84.5	3.1
Congo	467.3	3.8	83.6	2.6
Côte d'Ivoire	589.3	3.6	81.1	2.6
Gabon	548.5	4.2	85.0	3.1
Guinea	449.7	4.4	93.1	2.6
Madagascar	407.3	3.4	70.2	2.7
Niger	484.5	2.5	82.4	1.8
DRC	420.9	3.4	76.2	2.1
Senegal	561.8	3.3	73.1	2.7
Chad	420.8	3.2	83.4	2.4
Togo	546.8	2.4	76.5	1.7
Mean	500.0	1.0	100.0	0.6

The scores varied between 407.3 points (Madagascar) and 589.3 points (Côte d'Ivoire). Half of the countries (Congo, Guinea, Madagascar, Niger, DRC, Chad and Burundi) scored below the average (500 points), and Niger (484.5 points) was close to the average. However, these national averages sometimes concealed large variations in scores within countries, as shown by the standard deviations. This dispersion of results was particularly great in Guinea and Burkina Faso; the smallest variation was recorded in Burundi (see Table 4.2).

These findings confirm the observations arising from Figure 4.1, and in particular the distinction between two groups of countries: those where the teachers surveyed (around half) had a satisfactory level of knowledge and skills in reading comprehension, and those where such knowledge and skills would benefit from being substantially improved. Teachers' priority needs in reading comprehension therefore turn out to differ: for one group the focus should be on reinforcing and consolidating existing skills, while for the other group more work needs to be done on mastering the fundamentals. It is important to specify that these general results conceal variations which can sometimes be significant in the countries. These variations, which will be further highlighted in the national reports, should lead to a differentiated approach to the education measures to be considered in each country.

4.1.2. Teachers' knowledge and skills in teaching reading comprehension

Teachers need to be equipped to teach strategies for understanding a text thoroughly. To do this, they must have acquired a detailed understanding of the processes involved in reading comprehension and the different levels mentioned above (see Box 4.1). This is why a test focusing on certain elements of the teaching of reading comprehension was set for teachers, in order to assess to what extent these different levels of reading comprehension were known about and understood and to what extent teachers could identify the source of a student's misunderstanding.

The results of the reading comprehension teaching test are presented in two parts. The first is an analysis of the percentages of teachers giving the correct response to the items in the test. The second analyses the scores obtained by the participating countries.

In the first part, the percentages of teachers giving the correct response to three items of the reading comprehension teaching test are analysed. After a number of preliminary analyses, the teachers' results for these three items were considered sufficiently representative of the findings for the items as a whole (see Table 4.3).

Table 4.3: Percentage of teachers giving the correct response to the three items selected to illustrate the results of the reading comprehension teaching test

Item	Teaching knowledge	Cognitive processes	Correct response percentage (%)
Demi-lune	Identifier les objectifs	Chercher des informations explicites	52
		Réaliser des inférences	37
		Interpréter et combiner des informations	43
Enfant et grand-père	Identifier les objectifs	Interpréter et combiner des informations	40
Mon premier envol	Identifier les sources d'erreurs	Réaliser des inférences	34

The item 'Demi-lune' is an educational situation in which a teacher gives some students a text with the same name as the item and three questions relating to the text. The teachers in the survey were asked to identify which of the three reading comprehension teaching/learning objectives corresponded to each of the three questions the students were asked.

Details of the results of the item 'Demi-lune' are given in Table 4.4.

Table 4.4: Results of the item 'Demi-lune' in the reading comprehension teaching test

Question asked by the teacher	Looking for explicit information (%)	Making inferences (%)	Interpreting and combining information (%)
Why does Demi-lune take a spear?	41	**37**	12
What things does Demi-lune get ready?	52	18	16
Why does the author use the word 'big' in the expression 'big day'?	**18**	26	**43**

The correct responses are shown in purple[26]

The correct response percentages for the first and third questions of this item were less than 45%, while for the second question it was just over 50%. In general, the distinction between searching for explicit information and the other two cognitive processes of reading comprehension is quite easy to make (although the results show that not all the teachers succeeded in doing so). On the other hand, the distinction between inference and interpretation is sometimes less clear, as shown by the 26% of teachers who ticked 'making inferences' for the third question.

26. For the tables relating to the results of the teaching items, the percentages of non-responses are not indicated.

The item 'Child and grandfather' involves a short text that is described as having been set for some primary school students. As well as the story, the text includes a brief description of the grandfather's physical appearance. Several comprehension questions on the text are shown, and teachers were asked to identify those which involve interpretation. One of the questions is 'Draw the grandfather'. Most of the teachers had difficulty with this item: 60% of them did not perceive that in order to draw the grandfather, it was necessary to combine several pieces of information so as to imagine what he looked like. Although this is an unusual way of questioning students about their understanding of a text, the ability to imagine a scene, place or character concretely contributes to the understanding of a story.

The item 'My first flight' involves identification by teachers of the source of a student's misunderstanding.

Box 4.1.2a - My first flight

A teacher asks a student to read a text. The student reads the following text aloud.

When I was little, I slept in an egg that was all white. My mother sat on me to keep me warm. One day, my mother got up, chirping. That's when I first met the dear one who had been sitting on me. As I wasn't able to fly yet, my mother would bring me food. Weeks went by, and it was time for me to make my first flight…

After the student has read the text aloud, the teacher asks the following question. *'Who is telling the story?'*

The student replies: *'A child'.*

The student's answer to this reading comprehension question is wrong.

What do you think needs to be worked on with this student? Tick the right answer. There is only one possible answer.

Table 4.5: Results of the item 'My first flight' in the reading comprehension teaching test

	The student's response shows the need to...
Work on the literal meaning	22%
Work on a longer text	8%
Work on the implicit meaning	**34%**
Work on decoding text	20%

The correct response is shown in purple

Only 34% of teachers understood that the student's response shows that it is necessary to work on the implicit meaning of the text. The student's error indicates that he has confined himself to the text's literal meaning and incorrectly used a number of superficial cues (when I was little, my mother, etc.). He is unable to make the necessary inferences from the information in the text (in an egg, my mother was sitting on me, with a chirp, take flight etc.). 22% of teachers answered that the literal meaning needed to be worked on.

In the reading comprehension test, significant proportions of teachers made inferences correctly. However, a teacher is not just an expert in the content he or she teaches. Teachers must master the knowledge that they will pass on to students but also be able to analyse students' approaches, spot common errors and identify the source of those errors so that they can help students to progress.

The second part of the analysis is based on Table 4.6, which shows the teachers' scores in reading comprehension teaching.

Teachers' scores in the reading comprehension teaching test ranged from 430.1 points (Congo) to 578.9 points (Côte d'Ivoire). Half of the countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Gabon, Senegal and Togo) scored above the average (500 points), showing a sufficient level of teaching knowledge and skills to offer their students proper support with the acquisition of knowledge and skills in reading comprehension. Analysis of standard deviations revealed variations which were much greater in Burkina Faso than in Congo; these two countries again illustrate the need for a more thorough examination of differences within countries in the national reports in order to adapt education measures to each specific group.

Finally, comparison of the results in reading comprehension and in the teaching of reading comprehension brought out some striking differences. Teachers showed knowledge and skills at Levels 2 or 3 in reading comprehension, but their knowledge and skills in the teaching of reading comprehension were much less secure (with the correct response rate for items ranging from 43% to 52%, and half the countries scoring below average). In other words, while the vast majority of teachers were able to use reading comprehension processes satisfactorily when reading a text themselves, they were significantly more likely to experience difficulties in teaching those processes to students. All these findings indicate a need for pre-service education and/or in-service training extending beyond mastery of subject content and placing emphasis on issues relating to the teaching and learning of that content.

Table 4.6: Average scores of teachers in teaching reading comprehension by country

	Mean	Standard error	Standard deviation	Standard error
Benin	536.2	3.6	89.3	2.9
Burkina Faso	543.1	3.9	103.4	2.4
Burundi	457.0	3.3	80.2	2.9
Cameroon	539.4	4.4	92.9	2.9
Congo	430.1	5.2	111.2	4.1
Côte d'Ivoire	578.9	4.9	100.7	3.2
Gabon	540.7	4.5	95.1	3.2
Guinea	460.4	2.7	53.1	1.9
Madagascar	450.5	2.5	53.6	1.8
Niger	487.4	2.7	75.3	2.2
DRC	437.4	2.8	51.8	2.4
Senegal	572.5	4.9	95.7	3.2
Chad	436.9	4.5	78.7	3.6
Togo	529.6	3.3	88.5	2.2
Mean	500.0	1.1	100.0	0.9

4.1.3. Teachers' knowledge of mathematics

Table 4.7 shows the PASEC*2019* proficiency scale for teachers in mathematics. This scale reports the levels of teachers in mathematics demonstrated during the test in this subject. It provides information on the scores and the distribution of teachers across the levels and a description of the corresponding skills.

As indicated in the introduction to this chapter, the teachers' mathematics test for the PASEC*2019* assessment aimed to measure their knowledge and skills relating to three cognitive processes: 1) knowing the concepts, 2) applying the procedures and 3) solving problems. In addition, three essential areas of primary mathematics were covered: 1) numbers and operations, 2) quantities and measures and 3) geometry and space.

The distribution of teachers shown in Table 4.7 indicates that just under a third were at Level 3 (547 points or more), and about a third were at Level 2 (456-546 points). Just over a quarter of teachers were at Level 1 (365-455 points), while 8.5% did not demonstrate the knowledge and skills assessed in this mathematics test (less than 365 points).

These findings reveal a level of mathematical knowledge and skills in definite need of improvement. One possible explanation for this could be the predominance of candidates with literary profiles in recruitment by institutions for pre-service teacher education (Hounkpodoté, Diallo and Tankeu, 2017). The in-service training measures used in the different countries therefore do not seem to be providing large numbers of future teachers with a sufficient level of subject knowledge in mathematics. This is a point that needs to be explored in order to shape pre-service education or in-service training measures.

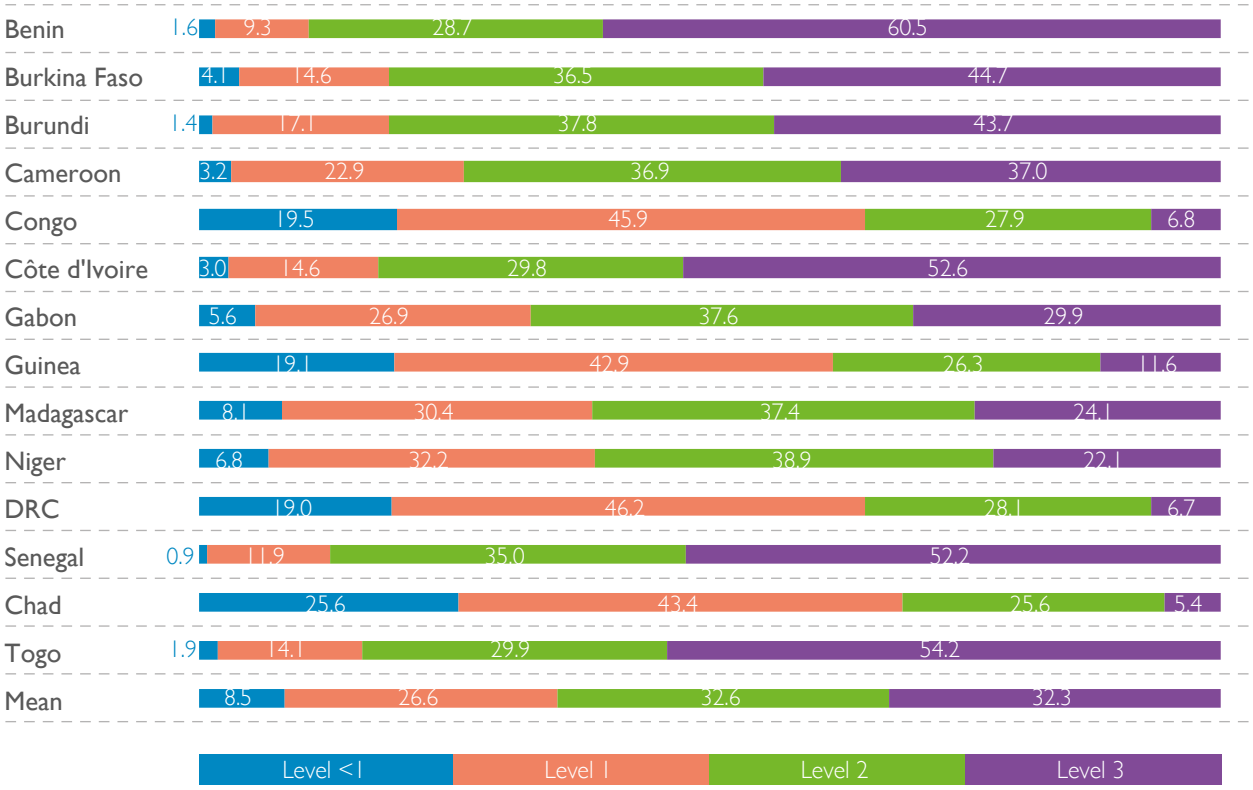
Table 4.7: PASEC*2019 teachers' proficiency scale for mathematics*

Level	Score	Percentage of teachers at that level	Description of teachers' skills
Level 3	547 or more	32.3%	Teachers at this level demonstrate the ability to solve complex problems in several stages, requiring the use of reasoning based on an in-depth analysis of the situation and possibly involving manipulating unknowns (for example in unequal sharing problems). To solve most tasks at this level, cognitive alertness is needed in order to avoid common mistakes and misconceptions (e.g. thinking that area and perimeter vary in the same way). Expertise at this level also involves an in-depth understanding of the concepts (for example, understanding the relativity of the whole in connection with the concept of a fraction).
Level 2	Between 456 and 546	32.6%	Teachers at this level can solve many direct proportionality problems, as well as some complex problems that have to be solved in several stages and require the use of an organised and sequential approach. Several tasks at this level involve unit conversions, which may or may not be integrated into problem situations. Some tasks call for factual knowledge relating to various mathematical objects (for example, formulae for calculating the area of a solid, a property of triangles, the name of a particular triangle, etc.).
Level 1	Between 365 and 455	26.6%	Teachers at this level demonstrate factual knowledge and mastery of the basic procedures, which they use in tasks requiring their direct application. Their skills are mainly in the areas of numbers (for example, knowledge about writing decimals, comparing fractions, the notion of percentage, etc.) and operations (the ability to solve operations involving whole numbers, decimals and fractions). They also show some knowledge in the area of solids and figures (for example, identifying some figures or solids, locating a diagonal or an axis of symmetry, etc.) as well as in quantities and measures (e.g. calculating the perimeter of a triangle). There are few problem-solving tasks at this level.
Below Level 1	Less than 365	8.5%	Teachers below Level 1 do not sufficiently demonstrate the knowledge and skills measured by this test. They struggle with the knowledge and skills of Level 1.

At least 50% of the teachers surveyed were at the top level (Level 3) of the mathematics proficiency scale in four countries: Benin (60.5%), Togo (54.2%), Côte d'Ivoire (52.6%) and Senegal (52.2%). Low proportions were recorded in Chad (5.4%), DRC (6.7%) and Congo (6.8%).

A considerable percentage of teachers was observed at Level 2 of the scale in all countries. The proportion averaged 32.6% across the 14 countries, varying between 25.6% in Chad and 38.9% in Niger. At Level 1 of the scale, the highest proportions of teachers were in DRC (46.2%), Congo (45.9%), Chad (43.4%) and Guinea (42.9%). Chad, DRC, Guinea and Congo were the four countries that had sizeable proportions of teachers below Level 1 on the scale (see Figure 4.2).

Figure 4.2: Distribution of teachers across the different proficiency levels in mathematics by country



Just over half of the countries had average scores above the overall average. Teachers' scores ranged from 419.3 points (Chad) to 571.1 points (Benin). Six countries (Congo, Guinea, Madagascar, Niger, DRC, Chad) scored below the average (500 points), two of which (Madagascar and Niger) were relatively close to the average (485.3 and 484.0 points respectively). The most varied scores were in Togo (standard deviation 96.1 points), Côte d'Ivoire (standard deviation 94 points) and Benin (standard deviation 93.4 points). The smallest variation was observed in Congo and DRC, with standard deviations of just under 75 points.

These differences may result from pre-service education and in-service training systems, which can differ greatly from one country to another and even within certain countries (Houkpodoté et al., 2017). They could also be due to specific measures taken in certain countries to increase the level of recruitment or to improve teachers' living and working conditions[27].

27. This point emerges from a survey of national correspondents and national PASEC team leaders carried out by CONFEMEN. This survey, the report on which will be published in January 2021, also included an analysis of the plans for the education sector of the countries participating in the PASEC*2019* assessment.

Table 4.8: Teachers' average scores in mathematics by country

	Mean	Standard error	Standard deviation	Standard error
Benin	571.1	3.5	93.4	2.3
Burkina Faso	532.2	3.4	91.2	2.5
Burundi	536.3	3.1	86.4	1.7
Cameroon	517.5	4.5	88.3	2.9
Congo	430.7	4.4	74.3	2.4
Côte d'Ivoire	548.3	3.6	94.0	2.7
Gabon	501.2	3.9	89.0	2.5
Guinea	437.0	4.9	86.8	3.4
Madagascar	485.3	3.3	87.4	2.3
Niger	484.0	3.3	83.5	1.9
DRC	431.0	3.6	74.3	2.2
Senegal	550.3	4.4	79.6	3.1
Chad	419.3	3.6	77.5	2.0
Togo	556.1	3.2	96.1	2.1
Mean	500.0	1.0	100.0	0.8

4.1.4. Teachers' knowledge of mathematics teaching

On the same pattern as the analyses in the teaching of reading comprehension, those for the teaching of mathematics are presented in two parts. The first relates to the correct response rates in the test, while the second examines the scores in the different countries.

The first part of the analyses concerns the eight items of the mathematics teaching test.

The first four of these dealt with whole numbers. The first, 'Fatima's logic' (Box 4.1.4a), required an analysis of the approach taken by a student (Fatima) to a task involving transcribing a whole natural number written in words into numerals. Only half of the teachers were able to analyse Fatima's incorrect answer properly. It should be noted that 30% of teachers chose solution (B), which targeted the content area as it is generally defined in curricula and textbooks. They appeared to have spotted that the question used the decimal system and therefore thought that the error was due to a problem in using the place value chart. An item in the mathematics test which used this concept was completed correctly by a significant proportion of teachers, showing that knowledge of a mathematical concept does not necessarily translate into a teacher's ability to analyse the approaches students take when learning that concept.

Table 4.9 shows the characteristics and the correct response percentage for each item.

Table 4.9: Percentage of teachers giving the correct response to the mathematics teaching items

Item	Domaines des Mathematics	Teaching knowledge	Correct response percentage (%)
Fatima's logic	Whole numbers (written in numerals and words) *Knowledge and application*	Analysing student approaches	50
The students of CM2	Whole numbers (subtraction) *Knowledge and application*	Analysing student approaches	51
The broken bottles	Whole numbers (additive structure) *Solving problems*	Choosing a learning situation	55
The rule of three	Whole numbers (proportionality situation) *Solving problems*	Choosing a learning situation	46
A quarter of a disc	Fractions (visualisation) *Knowledge and application*	Analysing student approaches	50
The chocolate bar	Fractions (unconventional representation) *Knowledge and application*	Analysing student approaches	23
The textbook method	Fractions (decimal fractions) *Knowledge and application*	Choosing a learning situation	35
Olivia's share	Fractions (visualisation) *Knowledge and application*	Choosing a learning situation	42

Box 4.1.4a - Fatima's logic

Fatima's teacher asks her to write in numerals the number
Five thousand three hundred and twenty-six

Fatima writes the following answer:
500030026

What is the most plausible explanation for the answer given by Fatima?

A. ☐ Fatima failed to read the number she was supposed to write in numerals

B. ☐ Fatima does not understand the place value chart properly

C. ☐ Fatima translated each pair of written words into a number > *X Correct answer*

D. ☐ Fatima's logic is completely nonsensical

The second item on whole numbers, 'The students of CM2' (inspired by Hill & Ball[28]), asked teachers to look for a possible pattern in the errors made by late primary students who worked on a subtraction problem in the form of a written calculation. Again, only around half of the teachers were able to analyse the students' approaches properly, yet the vast majority of teachers correctly answered the item in the mathematics test dealing with whole number subtraction. The observation about the mismatch between knowledge of subtraction and the ability to analyse what students do when performing a subtraction therefore applies here too.

28. http://www.umich.edu/~lmtweb/files/lmt_sample_items.pdf

The third item on whole numbers, 'The broken bottles', concerned early primary students and was about choosing a situation to support students in learning how to make sense of addition when one of the terms is missing. Just over half of the teachers (55%) chose the learning situation most consistent with the primary objective for missing number addition problems.

The fourth whole number item, 'The rule of three', required teachers to choose the appropriate problem for teaching direct proportionality to late primary students. Only 46% of teachers opted for the most suitable problem for teaching direct proportionality (Problem 3). The first problem (chosen by 18% of teachers) used inverse proportionality, while the second and last problems (each chosen by about 15% of teachers) were not proportionality problems. In this sense, this teaching item seems to reveal a certain weakness in the grasp of this topic in the teachers surveyed.

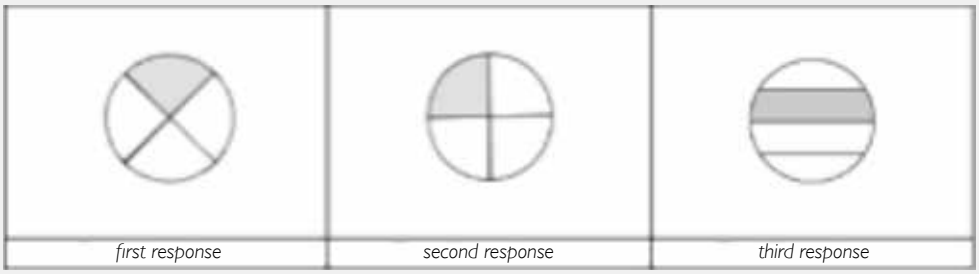
Research in the area of proportionality (Géron et al., 2010) has shown that it is important to work on various elements with students to help them develop a proper understanding of proportionality. It is therefore important for teachers to have a detailed understanding of all these nuances, so that they not only make the right choice of tasks to set but are also able to use them correctly with their students, in particular by anticipating the difficulties they may encounter. The observation of a certain weakness in the teachers surveyed in both mathematical knowledge and teaching knowledge in the area of proportionality suggests that this concept should be included prominently in their pre-service education and in-service training programmes.

The results for the items 'Fatima, Ali, Mamadou and Fatou' and 'The rule of three' also demonstrated that only a very few of the teachers surveyed had adequate teaching knowledge relating to problem-solving. The mathematics test had already revealed difficulties in acquiring subject knowledge relating to problem-solving, which therefore needs to be paid serious attention in teacher education programmes.

The next four items dealt with fractions. The first, 'A quarter of a disc' (Box 4.1.4b), which was answered correctly by 50% of the teachers, required attention to be paid to the concept of equal shares when dividing an object (here, a disc). Strikingly, 35% of teachers believed that all three solutions were correct, thus committing the same type of error as the students (a quarter corresponds to one part out of four). In fact, only the first two student responses were correct (solution B), since it is possible to use four of the shaded parts to reconstitute the unit (these parts really do represent '1/4' since 4 × 1/4 = 1; De Terwangne et al., 2007).

Box 4.1.4b - A quarter of a disc

A teacher asks his students to colour in grey the fraction representing one quarter of a disc.
When marking their work, he notices that three answers are often given.



Which of the following statements is correct?

A. ☐ Only the second answer is correct

B. ☐ Only the first and second answers are correct > *X Correct answer*

C. ☐ Only the second and third answers are correct

D. ☐ All three answers are correct

To understand the concept of fractions properly, it is also necessary to understand that a fraction is part of a 'whole' and that this 'whole' can vary according to the situation (this is what some people call 'the relativity of the whole'; Bednarz & Proulx, 2014). An item in the mathematics test had already revealed the difficulties encountered by a large proportion of teachers with regard to this concept.

The second item on fractions, 'The chocolate bar' (inspired by Depaepe et al., 201529), is a particularly good illustration of this difficulty, since only 23% of teachers answered it correctly by identifying the two correct solutions.

The third item on fractions, 'The textbook method', required teachers to choose an appropriate fraction to help students understand the relationship between fractions and decimals. Only 35% of teachers answered this item correctly. Although from a purely mathematical point of view, any fraction can be written in decimal form (terminating or recurring), it is essential for teachers to choose situations which are suited to the learning objectives (here, making the correspondence between these two types of numbers meaningful).

The fourth item on fractions, 'Olivia's share', required teachers to identify the visual aid that would help students to form an appropriate understanding of a problem situation. 42% of teachers answered this item correctly. The problem used in this item was also set in the mathematics test, where it had one of the lowest correct response rates. This is indicative of the difficulties encountered by teachers in solving a complex problem involving fractions and requiring reasoning based on a thorough analysis of the situation.

In short, just as for whole numbers, the mathematics test showed that teachers had basic knowledge (identification of a fraction presented in conventional or unconventional form, comparison of fractions, link between fractions and decimals, etc.) and were able to use technical procedures in this area (addition, multiplication and division of fractions). However, the analyses revealed some weakness in their conceptual understanding. In all cases, the mathematics teaching items dealing with fractions had a very low correct response rate among the teachers. Work in pre-service education or in-service training on the joint development of subject knowledge of fractions and knowledge of teaching methods in this area is therefore necessary.

These analyses show that when questions about teaching methods relate to problem-solving tasks, the teachers' results are quite poor (for example in the items 'The rule of three' and 'Olivia's share'), echoing certain difficulties already highlighted in the subject test (where problem-solving has little presence at Level 1 of the scale). Serious attention therefore needs to be paid to problem-solving in teacher education programmes.

The second part of the analysis of the mathematics teaching test results is based on the average scores of each participating country. These scores are presented in Table 4.10, together with the standard deviations. These analyses lead to a categorization of countries based on their scores.

Table 4.10: Teachers' average scores in mathematics teaching by country

	Mean	Standard error	Standard deviation	Standard error
Benin	551.7	3.6	84.0	2.1
Burkina Faso	558.3	3.1	92.4	2.3
Burundi	493.9	2.4	75.2	1.5
Cameroon	518.8	4.7	84.8	3.1
Congo	442.8	4.0	75.0	2.1
Côte d'Ivoire	533.4	4.9	95.9	3.2
Gabon	521.4	4.5	100.3	3.9
Guinea	409.0	4.7	84.8	3.6
Madagascar	479.9	3.5	85.8	2.7
Niger	518.3	3.1	76.7	2.4
DRC	411.1	4.5	72.8	3.2
Senegal	553.3	4.4	84.1	2.8
Chad	438.1	3.3	79.4	2.2
Togo	570.1	3.4	88.3	2.1
Mean	500.0	1.1	100.0	0.9

Teachers' scores in the mathematics teaching test ranged from 409 points (Guinea) to 570.1 points (Togo). Six countries, Burundi, Congo, Guinea, Madagascar, DRC and Chad, scored below average (500 points) although Burundi (493.9 points) was very close to the average. Among these countries, the least and greatest variation occurred in DRC and Madagascar respectively. Among countries that scored above average, Niger and Gabon showed the least and greatest variation respectively.

Ultimately, the results of the mathematics teaching test bring to light the difficulties for the surveyed teachers in analysing students' approaches and in choosing sufficiently meaningful situations to promote the learning of whole numbers and fractions (with correct response rates varying between 23% and 55% and country scores mostly below or close to the average). Moreover, for whole natural numbers, the analyses revealed a certain mismatch between correct responses to subject items and apparent weaknesses in teaching knowledge and skills. On the other hand, there was some consistency between the existence of difficulties with subject knowledge relating to fractions and problem-solving and weakness in teaching knowledge in these areas.

These analyses are in line with the work of Shulman (1986), who showed that having sound subject knowledge was not enough to teach that knowledge. Shulman spoke of a 'missing link' when discussing the lack of attention paid to teaching knowledge in the teacher training programmes that he analysed. Many more recent studies (see Depaepe et al., 2013 for a summary) have highlighted (1) links between teachers' teaching knowledge and skills and student outcomes; (2) the need to acquire a certain level of subject knowledge and skills in order to develop/master teaching knowledge and skills; (3) the fact that a high level of subject knowledge and skills is not synonymous with a teacher's proficiency. In other words, while teachers obviously need the right level of subject knowledge, what seems to make the difference when they go on to teach is essentially their mastery and use in the classroom of teaching knowledge. Conversely, a level of expertise which is too high in a particular area can be harmful, if it is not combined with appropriate teaching knowledge. This is known as the expert's blind spot: the expert fails to understand what causes difficulties for students and find suitable ways of explaining content to them that he or she finds very easy or even self-evident.

29. https://www.sciencedirect.com/science/article/abs/pii/S074205 1X14001668

In line with the analysis of the results of the PASEC*2019* tests of teachers' subject and teaching knowledge and skills and the international studies mentioned in the previous paragraph, it can be agreed that efforts to reinforce these two areas would benefit from being harmoniously combined in pre-service education and in-service training. By way of illustration, Depaepe et al. (2018) focused their education programme on the development of teaching knowledge and skills and found that these learning activities also had an impact (and in some cases even a greater impact) on the acquisition of subject knowledge and skills. This is undoubtedly an interesting avenue to explore with a view to reforming teacher education programmes.

4.2. Characteristics and knowledge of the teachers surveyed

As it strives to meet the challenge of quality education for all, sub-Saharan Africa faces a significant shortage of teachers. According to the UNESCO Institute for Statistics, the region needs a total of 17 million primary and secondary teachers by 2030.

Leaving aside the question of the teacher shortage, both the provision of education services and learning outcomes in the region's countries are still significantly dependent on the quality of teachers working in its education systems. The need to understand the factors in the quality of teachers gives rise to two questions which serve as a common thread in this section of Chapter 4 of this report: 1) what were the characteristics of the teachers surveyed? and 2) what links were there between those characteristics and the knowledge that they displayed during the tests administered in the teacher survey? To answer these questions, the teacher survey in the PASEC*2019* assessment was used to collect data on teachers' individual and professional characteristics, their views on their working conditions and other points.

These data relate to seven characteristics of teachers, each of which is the subject of a separate subsection of 4.2: 1) their gender, 2) their length of service in the profession, 3) their academic level, 4) the pre-service training for the teaching profession that they received (or did not receive), 5) their in-service and additional training, 6) the mathematical area on which they focus most in their teaching, and 7) the equipment in the classrooms where they work.

4.2.1. Gender and knowledge of the teachers surveyed

According to data from the ISU[30], the percentage of female teachers in primary schools increased from 56% to 66.9% worldwide between 1990 and 2019. According to the same source, in sub-Saharan Africa, the percentage of female primary school teachers did not increase much between 1990 and 2019, rising from 40.4% to 46.6%. In some countries, female teachers still represent a relatively low proportion of all teaching staff, for example in Benin (26.5%), Chad (18.8%), Côte d'Ivoire (31.6%), Senegal (31.9%) and Togo (17%).

Female teachers at the schools surveyed during the assessment were also in the minority in most countries – including Benin (27.9%), Chad (22.8%), Côte d'Ivoire (31.9%) and Togo (20.3%) – although they were slightly better represented than at national level. These findings are confirmed by previous data from the ISU and reveal that gender parity in primary teaching is far from being achieved in some countries. On the other hand, female teachers were in the majority in Burundi (51%), Congo (56%), Gabon (53%), Madagascar (58.7%) and Niger (62.6%) (see Figure 4.3).

30. https://data.worldbank.org/indicator/SE.PRM.TCHR.FE.ZS?end=2020&start=1970&view=chart

Figure 4.3 provides information on the percentage of female teachers who participated in the survey.

Figure 4.3: Percentage of female teachers who participated in the PASEC2019 survey

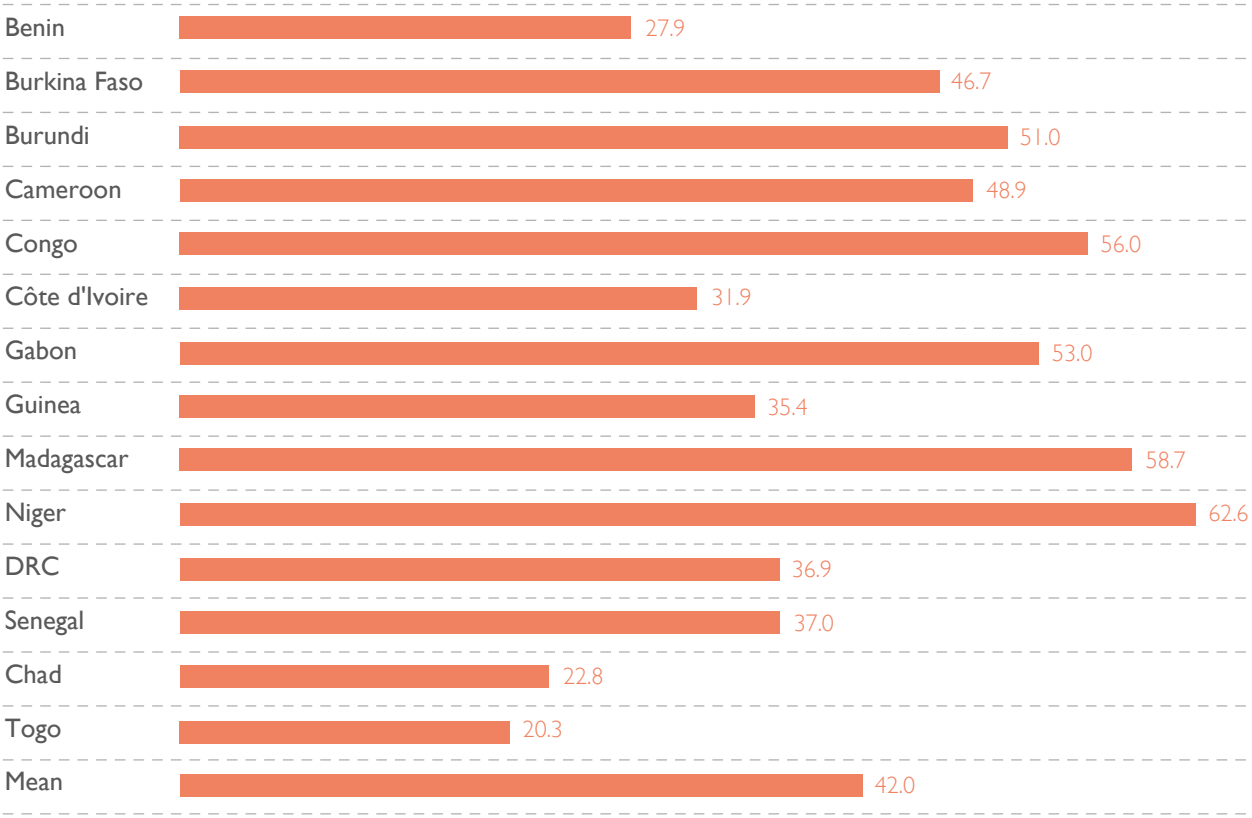


Figure 4.4 shows the differences between male and female teachers' test scores in the PASEC*2019* survey.

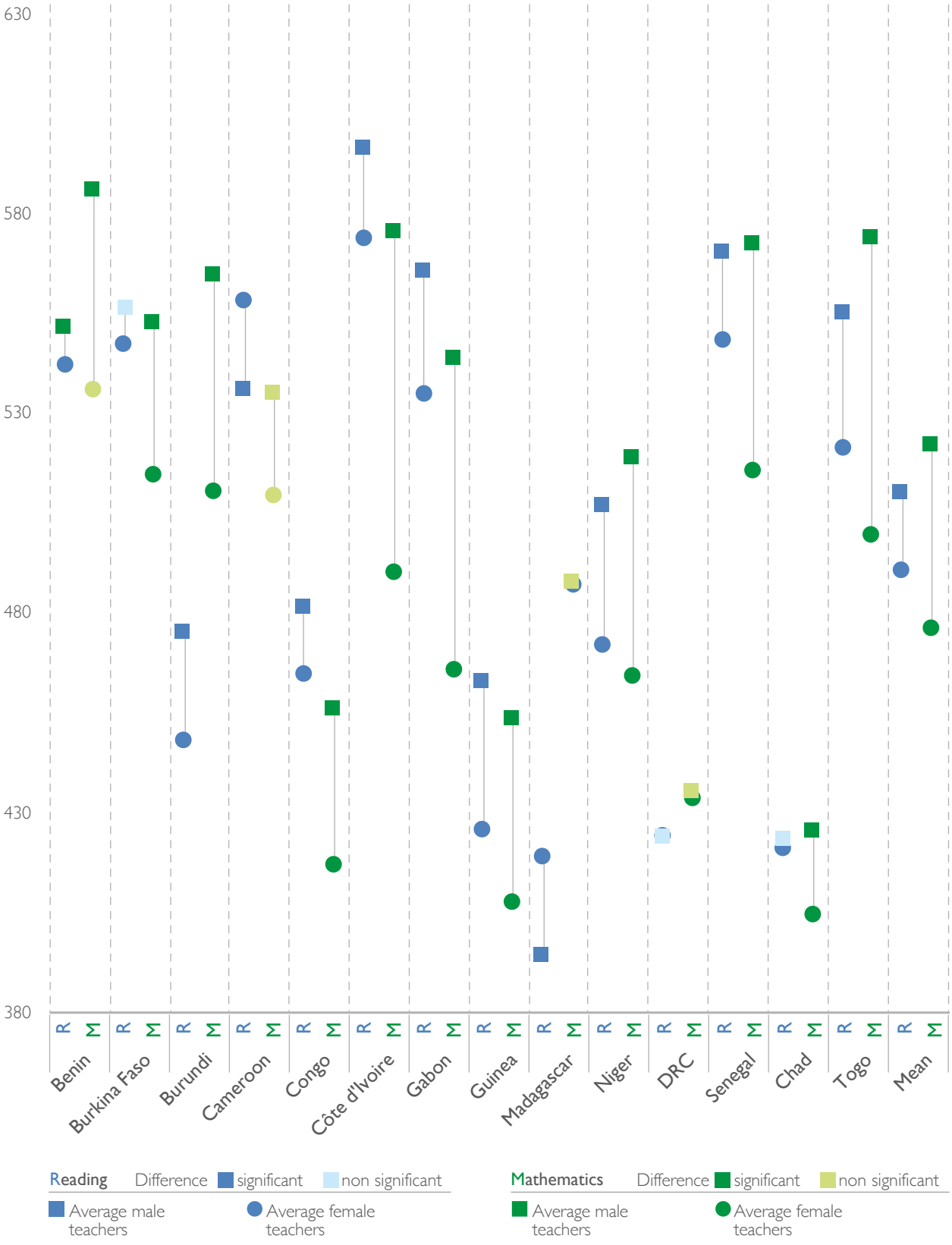
Male and female teachers obtained similar scores in reading comprehension in four countries (Benin, Burkina Faso, Chad and DRC). A significant difference in scores was observed in favour of male teachers in seven countries (Congo, Gabon, Guinea, Côte d'Ivoire, Niger, Senegal and Togo), varying between 16.6 points in Congo and 36.7 points in Guinea. On the other hand, in two countries (Cameroon, with a difference of 22.7 points, and Madagascar, with a difference of 25.0 points), female teachers significantly outperformed their male counter-parts.

In mathematics, male and female teachers obtained similar scores in two countries (Madagascar and DRC). In all other countries, male teachers scored significantly higher than their female counterparts; The score differences ranged from 20.8 points in Chad to 85.4 points in Côte d'Ivoire (see Figure 4.4).

There were thus two main findings: first, considerable variability in reading comprehension scores, and second, greater differences in mathematics scores in favour of male teachers in most countries (12 out of 14). This result could be related to the under-representation of girls in science subjects in secondary education in sub-Saharan African countries[31], given that future primary school teachers are increasingly being recruited at the end of secondary school (Hounkpodoté et al., 2017).

31. World Economic Forum Global Gender Gap Report 2016 http://www3.weforum.org/docs/GGGR16/WEF_Global_Gender_Gap_Report_2016.pdf

Figure 4.4: Differences between reading comprehension and mathematics scores by teachers' gender



4.2.2. Length of service of the teachers surveyed

The sub-Saharan context is generally characterised by the recruitment of young teachers who usually lack adequate support (teaching advice, inspections, etc.) to compensate for their lack of experience. However, there is some debate as to whether length of teaching experience has a positive effect on student outcomes. UNESCO argues that teachers' experience does have positive effects on their practices and therefore on learning outcomes (UNESCO-BREDA, 2009), but some studies claim that teachers' effectiveness, measured by their ability to ensure that students achieve the expected learning outcomes, is not always related to their experience (Bruns et al., 2011). According to the OECD, the number of years of teaching experience is not a good predictor of student outcomes. During the first three or four years, it does have a positive impact on students' results, but beyond that, the number of years of teaching have little effect (OECD, 2009).

Without claiming to arbitrate on this question, PASEC*2019* examined teachers' level of subject knowledge in light of the length of their experience in the profession. To this end, the number of years of teachers' experience was divided into four categories.

Figure 4.5 shows that the percentage of teachers with 5 years or less of service varied between 12.7% (Burundi) and 44.8% (Burkina Faso). For 6 to 10 years of service, the percentage varied between 20.0% (Togo) and 37.1% (Chad). For those with more than 20 years of service, the percentage varied between 2.6% (Niger) and 20.4% (DRC).

These data reveal a low proportion of teachers with more than 20 years of service: the average percentage for this category is about four times lower than for the other two categories.

This observation relates to the issue of retaining teachers in the profession[32] and the extent to which society values teachers (Farges, 2017), who may be more inclined to stay in the profession if it is seen as important by society and by themselves (Farges, 2017). There has been a noticeable decline in this social status: much of the prestige has been lost that the teaching profession acquired after independence in the countries of French-speaking sub-Saharan Africa[33]. This suggests that thought needs to be given to the conditions that will attract the best profiles and retain them in the profession for as long as possible[34] (Cooper and Alvarado, 2006).

Figure 4.5 provides information on the percentage of teachers surveyed according to these four categories.

32. https://teachertaskforce.org/node/361
33. https://www.jeuneafrique.com/mag/519438/societe/formation-lafrique-subsaharienne-une-Poore-eleve/
34. https://unesdoc.unesco.org/ark:/48223/pf0000259935

Figure 4.5: Distribution (%) of teachers by length of service

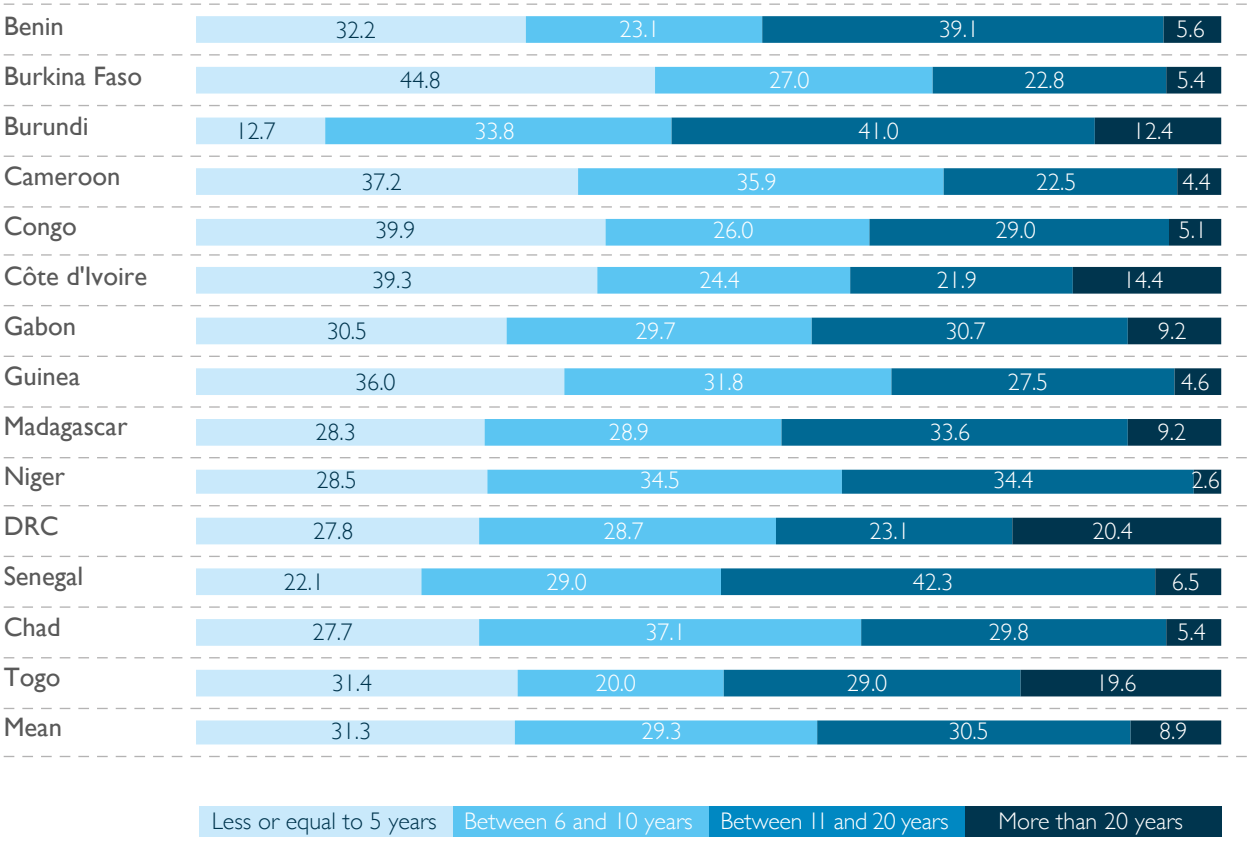


Figure 4.6 provides information on the scores of the teachers surveyed in reading comprehension and mathematics by length of service in the profession.

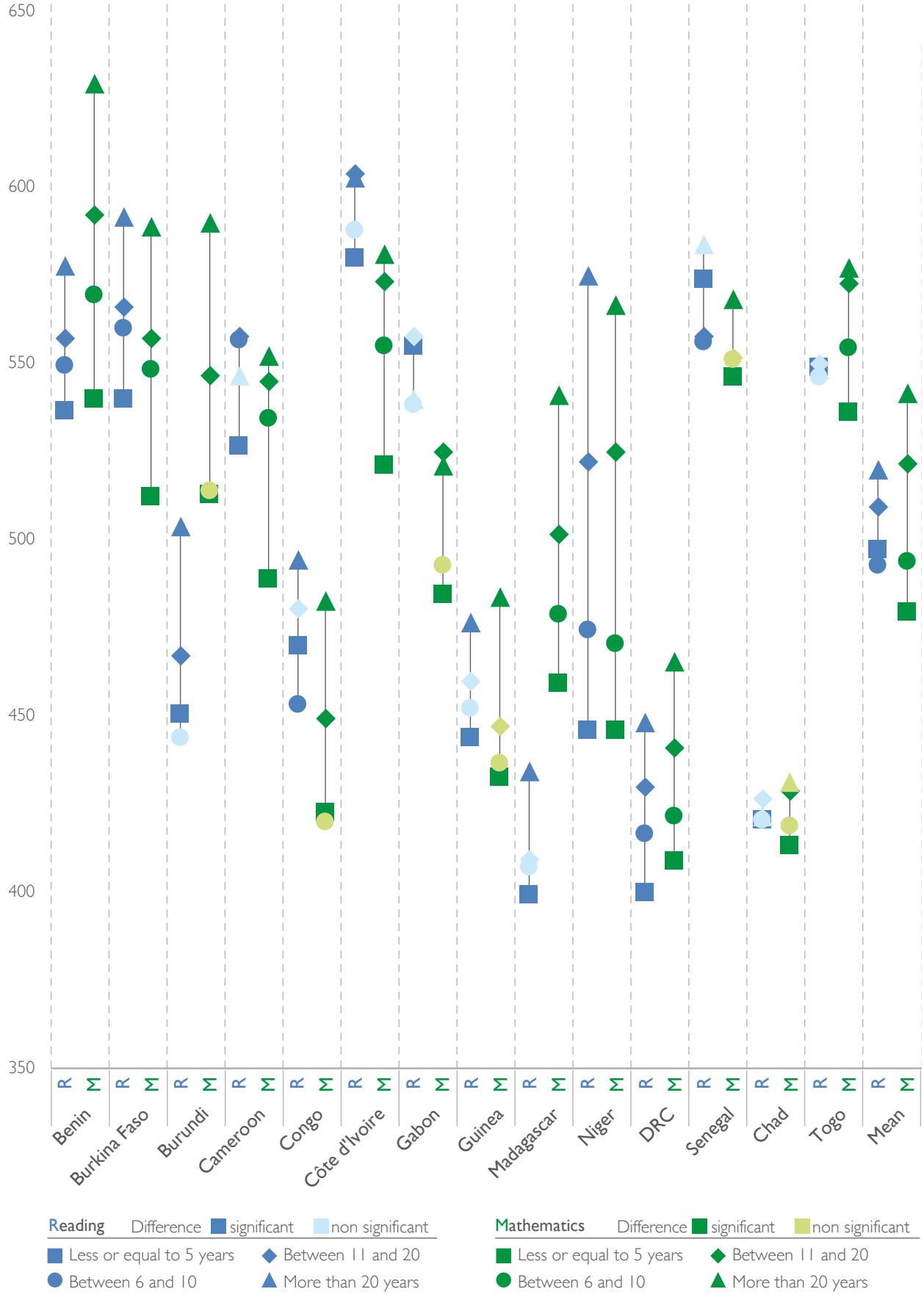
In reading comprehension, teachers with more than 20 years of service had higher scores than their younger colleagues in seven countries (Benin, DRC, Burkina Faso, Burundi, Côte d'Ivoire, Madagascar, Niger). Teachers with between 11 and 20 years of service outperformed their younger colleagues in six countries (Benin, Burkina Faso, Cameroon, DRC, Côte d'Ivoire, Niger). Teachers with between 6 and 10 years of service obtained higher scores than the youngest teachers in three countries (Burkina Faso, Cameroon, Niger).

In mathematics, teachers with more than 20 years of service outperformed those with 5 years or less in every country apart from Chad. The same trend was observed for the category of teachers with between 11 and 20 years of service, with the exception of those in Chad, Guinea and Senegal. Teachers with between 6 and 10 years of service obtained higher scores than the youngest teachers in seven countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar, Niger, Togo).

Both in reading comprehension and in mathematics, what could be described as a 'long service bonus' can be observed: teachers with a longer service record (more than 5 years) show greater subject knowledge and skills than novices (with no more than 5 years of service).

This is a trend already documented in several studies that draw attention to the teaching expertise that arises through practice and the sharing of experiences with peers over years of teaching (Tochon, 2004, 1993; Garmston, 1998; Hibbert, et al., 2011). This research shows the importance of enhancing this teaching expertise by combining it with other forms of recognised expertise (educational advisers and inspectors, university trainers, etc.) in the provision of support to new teachers and in pre-service education (Hibbert et al., 2011; Tochon, 2004).

Figure 4.6: Teachers' scores in reading comprehension and mathematics by length of service



4.2.3. Academic level of the teachers surveyed

Teachers in sub-Saharan Africa are generally characterised by a low level of education. Future teachers generally begin their pre-service training with a low level of education more than half are educated to upper secondary level (Akkari and Lauwerier, 2015), without necessarily having obtained the associated qualification (World Bank, 2005; Bonnet, 2007). Public sector teachers are usually recruited with a higher initial educational level than contract or community teachers (CONFEMEN, 2007).

This situation stems from the political choices of recent decades, such as the structural adjustment programmes that have led in many countries to the early retirement of qualified teachers (Lauwerier, 2013) and the closure and/or restructuring of teacher training colleges (Samaké, 2007).

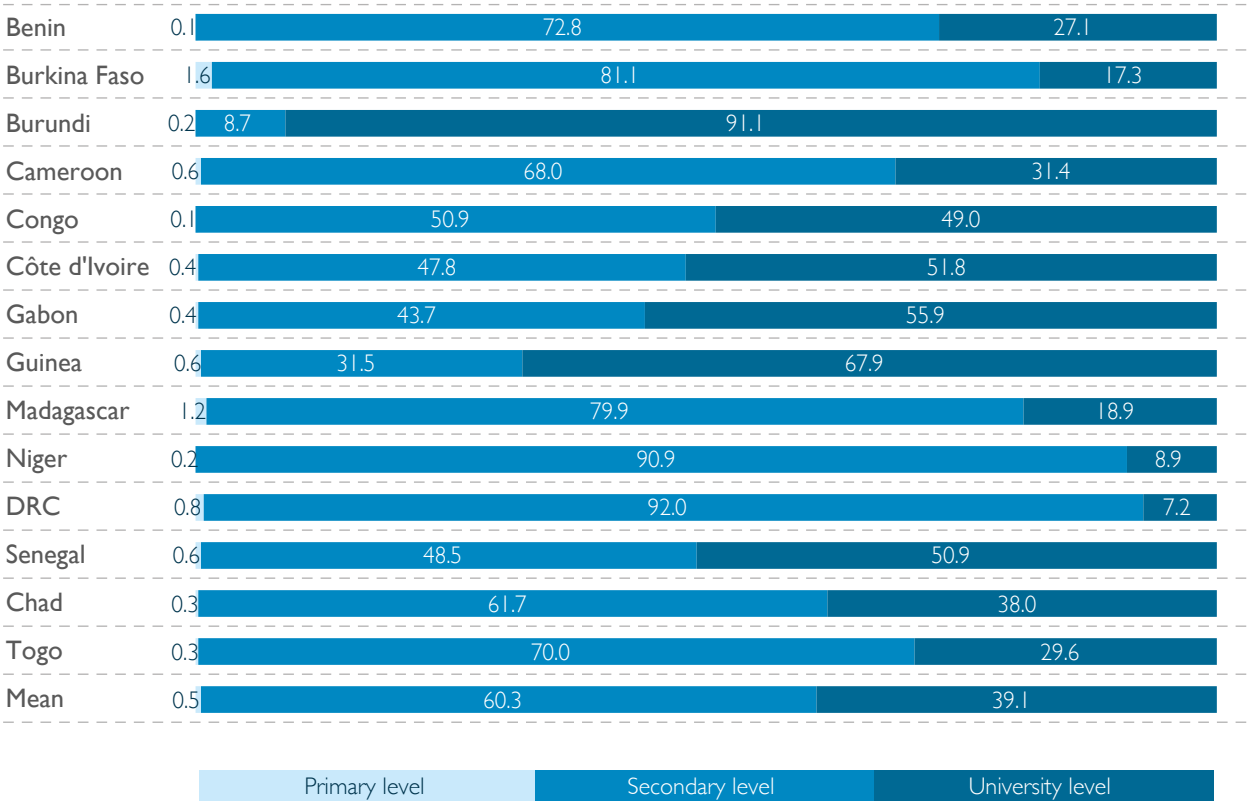
However, the numerous studies that have been conducted on the effect of teacher training on the quality of learning reach only tentative or conflicting conclusions. The work of Wilson, Floden, and Ferrini-Mundy (2002) argues that beyond a certain point, additional university degrees do not really improve teaching effectiveness. Similarly, Rivkin et al. (2005) conclude that there is no data to confirm that having a master's degree improves teaching skills. By contrast, Woessmann (2001), who analysed data from the TIMSS survey on the results of 13-year-old students in 39 countries, found a positive association between teachers' level of education and students' performance in mathematics and science.

These conflicting findings on the link between teachers' training and effectiveness suggest that it will be useful to analyse teachers' subject knowledge scores by level of education.

As part of the present survey, data on teachers' educational level were collected through the contextual questionnaire that was administered to them. For ease of analysis, three educational levels were distinguished: primary, secondary and university.

Figure 4.7 summarises the information collected through this questionnaire, indicating the distribution of teachers by educational level.

Figure 4.7: Distribution of teachers by educational level



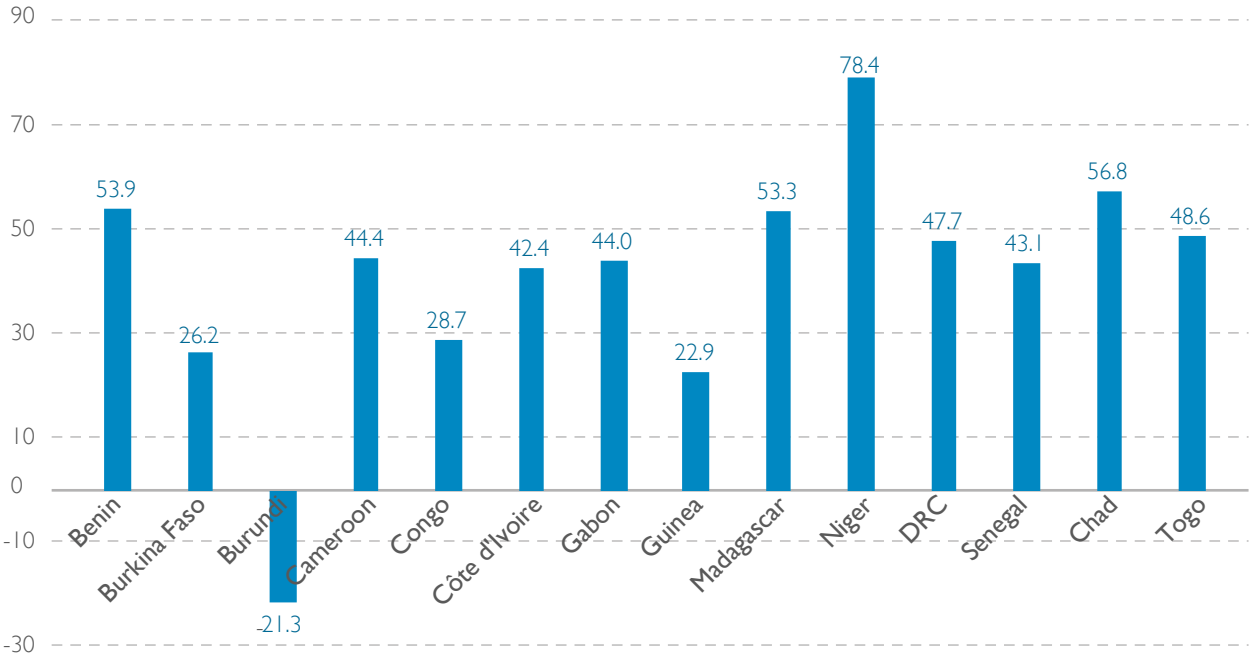
Analysis of this figure indicates that in all countries, almost all teachers were educated beyond primary level. Most teachers were educated to secondary level in nine out of fourteen countries, including the vast majority in Niger, DRC, Burkina Faso, Madagascar, Benin and Cameroon. In five countries (Burundi, Côte d'Ivoire, Gabon, Guinea, Senegal), more than 50% of teachers were educated to university level. Burundi had the highest percentage of university graduates (91.1%).

Four of the five countries with the highest percentage of university-level teachers (Côte d'Ivoire, Gabon, Burundi and Senegal) also had relatively high levels of subject knowledge and teaching knowledge. The situation of Côte d'Ivoire, where 51.8% of teachers were at university level, is especially illustrative:

- 87.8% of teachers were at Level 3 of the reading comprehension proficiency scale, with average scores of 589.3 points and 578.9 points in subject knowledge and teaching knowledge respectively;
- 52.6% of teachers were at Level 3 of the mathematics proficiency scale, with average scores of 548.3 points and 533.4 points in subject knowledge and teaching knowledge respectively.

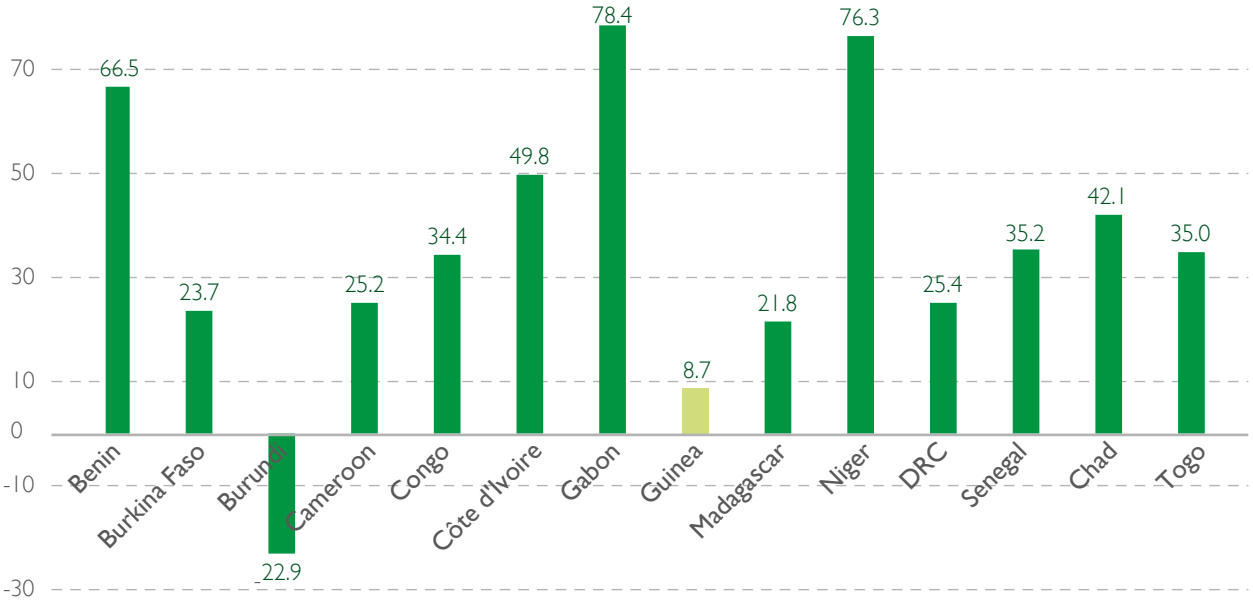
In order to explore this link in more detail, and given the low proportion (or even non-existence for some countries) of teachers educated to primary level, the differences in scores between teachers educated to secondary level and those educated to university level are presented in Figures 4.8 and 4.9.

Figure 4.8: Difference in reading comprehension scores between teachers educated to secondary level and those educated to university level



In all countries apart from Burundi, teachers educated to university level outperformed those educated to secondary level. The highest points difference was 78.4 in Niger. The smallest difference was observed in Burundi, in favour of teachers educated to secondary level. This result in Burundi seems surprising, and needs to be explored further.

Figure 4.9: Difference in mathematics scores between teachers educated to secondary level and those educated to university level



The same trend of university-educated teachers outperforming their colleagues educated to secondary level was observed in mathematics in every country except for Guinea, where the score difference between these two categories of teacher was not significant. As was the case for reading, the difference was in favour of teachers educated to secondary level in Burundi.

These observations explore a promising line of enquiry, and suggest the need for further study of the links between teachers' educational background and their level of subject and teaching knowledge. In particular, this could contribute to the debate mentioned in the introduction to this subsection on the added value of university training as regards teachers' level of knowledge and skills.

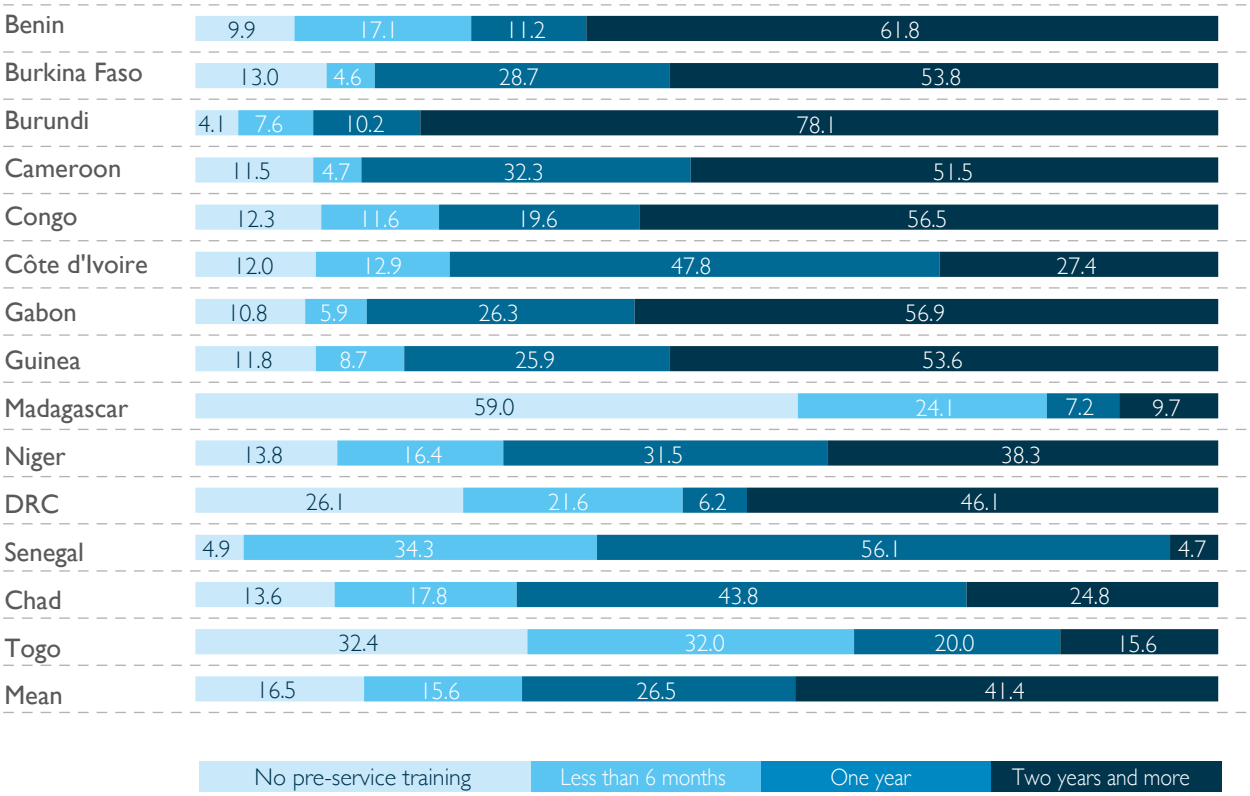
4.2.4. Pre-service education of the teachers surveye

The Education 2030 framework for action has led to a greater focus on improving the quality of education as set out in SDG4, and this in turn implies the need for sufficient numbers of qualified and motivated teachers (Dembélé and Sirois, 2018). Efforts to improve access to education within the framework of EFA (Education for All) have led the countries of sub-Saharan Africa to respond to a shortage of teachers with several measures including a reduction in the length of their pre-service professional education (World Bank, 2010; UNESCO, 2009).

In order to obtain updated information on this, a number of associated items were included in the teacher questionnaire for the PASEC*2019* assessment, as was also the case in PASEC*2014*.

Figure 4.10 shows the distribution of teachers by length of pre-service professional education.

Figure 4.10: Distribution of teachers by length of pre-service professional education



The proportion of teachers without pre-service professional education averaged 16.5% across the 14 countries, but varied widely between countries.

This percentage was particularly high in Madagascar (59.0%); it was 32.4% in Togo and 26.1% in the DRC; and the lowest percentages were observed in Burundi (4.1%) and Senegal (4.9%). Four countries had particularly high proportions with less than six months of pre-service education: Senegal (34.3%), Togo (32.0%), Madagascar (24.1%) and DRC (21.6%). The proportion of teachers who reported that they had received one year of pre-service education was 56.1% in Senegal, 47.8% in Côte d'Ivoire and 43.8% in Chad. Elsewhere, it varied between 6.2% in DRC and 32.3% in Cameroon.

The proportion of teachers who had received at least two years of pre-service professional education exceeded 50% in seven countries: Burundi (78.1%), Benin (61.8%), Gabon (56.9%), Congo (56.5%), Burkina Faso (53.8%), Guinea (53.6%) and Cameroon (51.5%).

These observations open the way to future thematic studies on the possible links between duration of pre-service education and teachers' level of knowledge, in order to gain information about the quality of education arrangements. The seven countries where more than 50% of teachers reported having received at least two years of pre-service education also tended to be characterised by relatively satisfactory levels of subject and teaching knowledge. In Gabon, for example, where 56.9% of teachers said they had received at least two years of education, the percentage of Level 3 teachers was 74.2% and 29.2% in reading comprehension and mathematics respectively; teachers' scores in reading comprehension teaching and mathematics teaching were 540.7 points and 521.4 points respectively.

4.2.5. In-service and additional teacher training

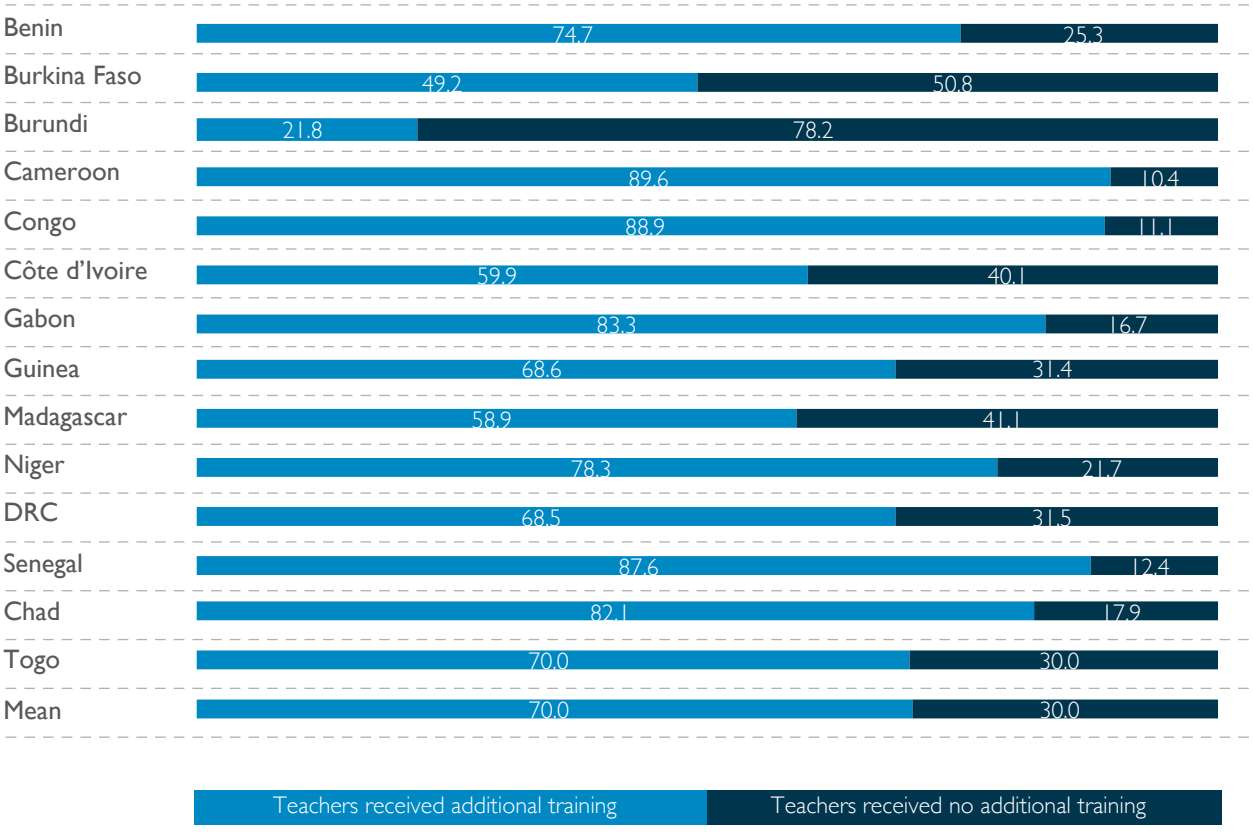
During their careers, teachers acquire or update their skills through in-service training activities: long-term training, peer training or mentoring, seminars, personal reading, training workshops and discussions (Savoie-Zajc et al., 1999; Youdi, 2006). The teaching skills covered are of a technical nature (Altet, 1994), enabling teachers to perform more effectively throughout their career (Baribeau, 2009; Bidjang, 2005) with a view to improving teaching/learning activity (Ekanga Lokoka, 2013; Masselter, 2004) and student outcomes (Etumangele, 2006; Mulele, 2017; Vita, 2014).

In-service training is of particular importance in the sub-Saharan context, as it provides a real opportunity to partly compensate for the shortcomings or even non-existence of preservice education (Lauwerier and Akkari, 2015).

The contextual data of PASEC*2019* and teachers' results in the knowledge and skills tests can be used to analyse their scores by additional training or not over the past two years (teaching internships, training seminars, educational resource and development units).

Figure 4.11 shows the distribution of teachers by additional in-service training.

Figure 4.11: Distribution of teachers by in-service training



It can be seen from Figure 4.9 that in the vast majority of countries (12 out of 14), a high proportion of teachers had received additional in-service training. The highest proportions were found in Cameroon (89.6%), Congo (88.9%), Senegal (87.6%), Gabon (83.3%) and Chad (82.1%).

In contrast, in two countries (Burkina Faso and Burundi) a majority of teachers had received no additional in-service training.

Figure 4.12: Difference between the reading comprehension scores of teachers who had received additional training and those who had not

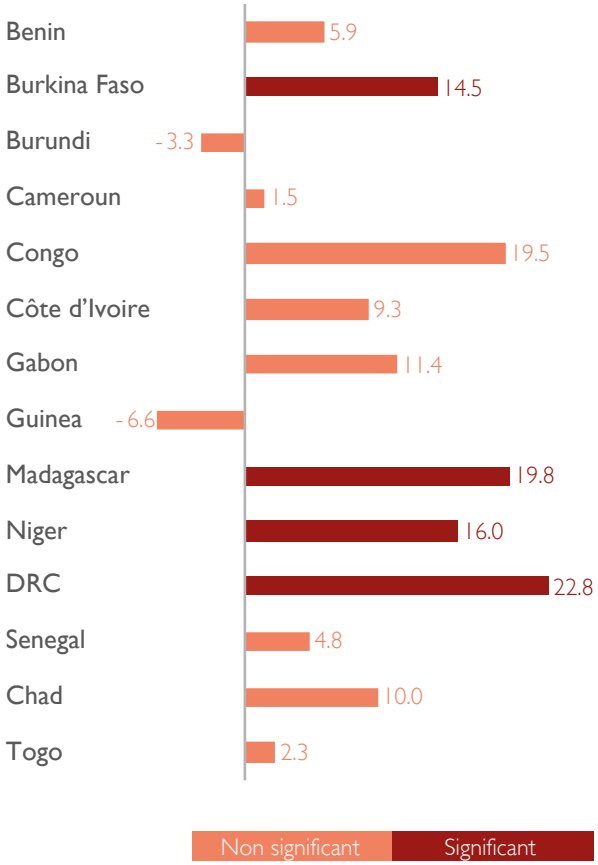
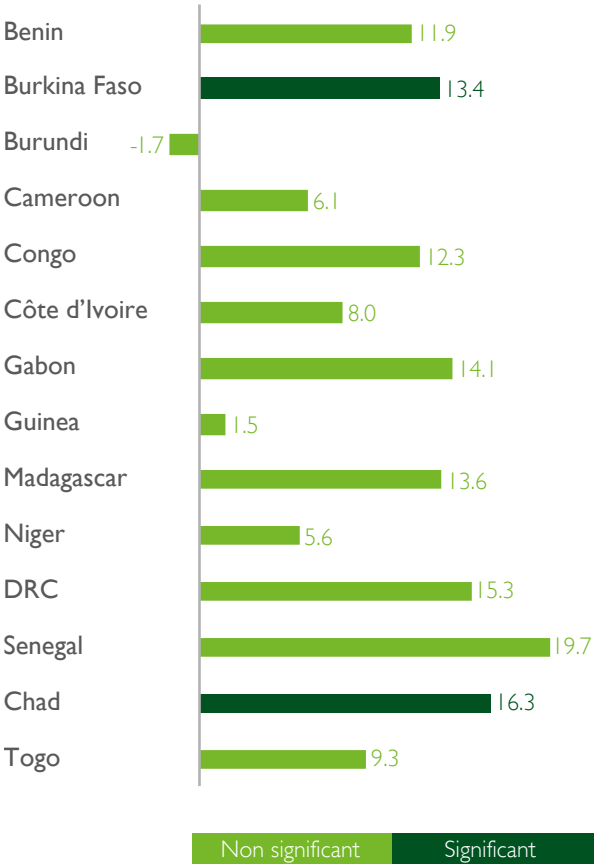


Figure 4.13: Difference between the mathematics scores of teachers who had received additional training and those who had not



In reading comprehension, teachers who had received additional training outperformed those who had not in four countries (Burkina Faso, Madagascar, Niger, DRC). For example, the difference was more than 22 points in DRC.

In mathematics, teachers who had received additional training outperformed those who had not in two countries (Burkina Faso and Chad): the difference was 13.4 points in Burkina Faso and 16.3 points in Chad. Else-where, the average scores did not differ significantly between the two categories of teachers.

These findings should not lead to the conclusion that in-service training is ineffective in teachers' professional development; rather, they raise questions about the quality of the training that the teachers reported having received. The effectiveness of in-service training may depend on certain criteria being satisfied[35]. One of these criteria, according to Salman (2014), is that training activities must meet the priority needs of the teachers concerned. Masselter (2004) stresses that in-service training should complement and nuance pre-service education, in particular by reflecting the reality of the classroom more closely (Masselter, 2004). To this end, Altet (1994) emphasises the need for in-service training to provoke and promote change among teachers to ensure successful learning.

35. http://www.cahiers-pedagogiques.com/En-quoi-la-formation-continue-des-enseignant-es-contribue-t-elle-au-developpement-des-competences-professionnelles

4.2.6. Mathematical content area on which the teachers surveyed spent the most time in class

In the questionnaire submitted to teachers, the following question was asked: 'In mathematics, on which content area do you spend most learning time?' Table 4.11 shows the responses to this question by country.

Table 4.11: Mathematical content area on which most learning time is spent

	Numbers and operations		Geometry and location		Measurement	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	82.9	1.2	11.8	1.0	5.3	0.7
Burkina Faso	85.8	1.0	10.1	0.9	4.1	0.5
Burundi	83.6	1.3	10.0	1.1	6.4	0.7
Cameroon	86.2	1.5	9.7	1.2	4.1	0.8
Congo	87.3	1.3	6.9	1.0	5.8	1.1
Côte d'Ivoire	94.7	0.8	4.6	0.7	0.8	0.3
Gabon	90.3	1.3	5.0	1.0	4.7	0.9
Guinea	78.9	2.3	16.3	2.1	4.8	1.1
Madagascar	85.1	1.7	9.4	1.3	5.4	1.1
Niger	82.9	1.1	13.0	0.9	4.1	0.7
DRC	86.5	1.3	8.2	1.0	5.3	0.8
Senegal	79.6	1.4	7.3	1.1	13.1	1.6
Chad	72.5	2.1	22.9	2.0	4.6	0.8
Togo	80.8	1.4	15.2	1.3	4.1	0.6
Mean	84.2	0.5	10.7	0.3	5.1	0.2

Analysis of these responses shows that the vast majority of teachers surveyed spent most time on numbers and operations (just under 85% on average). Conversely, teachers admitted that they spent very little time on geometry (10.7% on average) and even less time on measurement (5.1% on average).

This finding could reflect the time allocated to each of these content areas in official guidelines. However, Chopin (2006) indicates that this official time allocation tends to be modified by teachers depending on how comfortable they are teaching certain subjects or specific content areas within subjects. This suggests that this finding should instead be interpreted as an indication of teaching practice and linked to the satisfactory command of subject knowledge and skills in the area of numbers and operations displayed by teachers (see Section 4.1 of this report).

It is therefore not unreasonable to interpret the relatively low amount of time spent teaching geometry as an indication of the teachers' lower level of knowledge and skills in this area of mathematics. Research has shown that while primary school teachers find the teaching of mathematics in general to be difficult, geometry is the area where these difficulties are greatest (Boublil-Ekimova, 2010). Consequently, preservice education and in-service training should give an important place to mathematics and in particular to geometry, in order to prepare teachers more effectively for their work in the classroom. Such education should focus on the development of both subject and teaching knowledge and skills, as is clear from the observations in 4.1 and the numerous research results cited in the previous section.

4.2.7. Level of classroom equipment

The level of classroom equipment was analysed using a summary index, described in Box 4.2.

Box 4.2: Description of the classroom equipment index

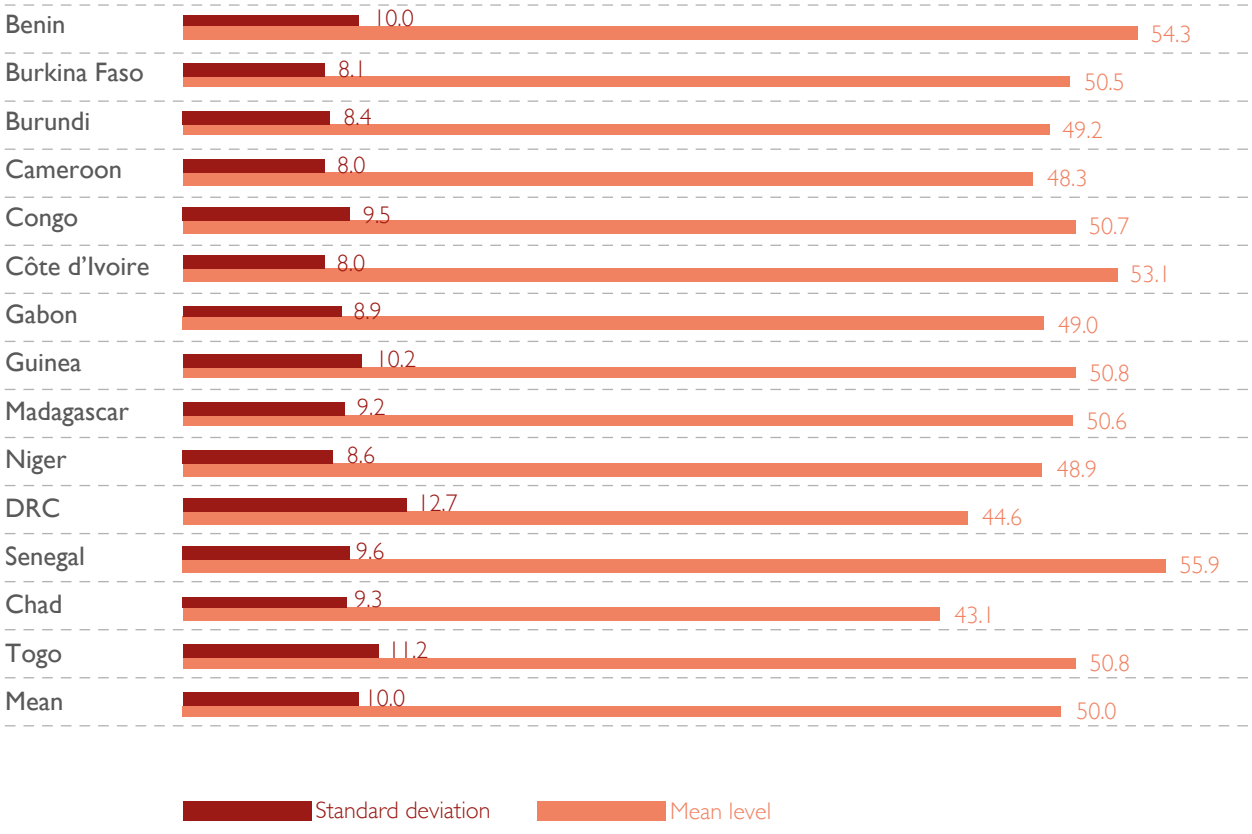
Information about educational equipment in the classrooms was collected through a series of questions concerning the availability of textbooks for students, documents and teaching materials for teachers and classroom furniture. The following items are relevant here: number of mathematics and reading textbooks available per student; availability of manuals, teaching guides, and reading and mathematics curricula for teachers; availability of teaching material (blackboard, chalk, dictionary, maps of the world, Africa and the country, measuring equipment such as set squares, compasses, rulers and clocks) and availability of classroom furniture (desks and chairs for teachers, cupboards and shelves for books, sufficient numbers of desks and seats), electricity.

The responses are summarised on a scale with a mean of 50 and a standard deviation of 10. The index is higher when classrooms are well equipped. The index is not in itself an indicator that specifically measures the level of equipment in classrooms relative to a predefined standard; rather, it aims to produce a classification on a single dimension using variables that measure classroom equipment.

Figure 4.14 shows the mean level of the classroom equipment index by country. It was 55.9 in Senegal (the highest level), 54.3 in Benin and 53.1 in Côte d'Ivoire. The lowest levels of the index were found in DRC (44.6) and Chad (43.1). Detailed analysis of the elements from which this index is constructed shows that there were schools in different countries that lacked classroom items such as a desk and chair for the teacher, teaching guides, blackboard rulers, bookshelves, etc. In some cases, there was not even a blackboard (either fixed to the wall or mobile).

On the same figure, the indicator of the variation(standard deviation) around the index mean in each country shows that the degree of homogeneity in the distribution of equipment between schools was unsatisfactory. Relatively high disparities were observed in DRC and Togo. Senegal combined the highest level of classroom equipment with relatively even distribution between schools compared to other countries.

Figure 4.14: Mean level and standard deviation of the classroom equipment index



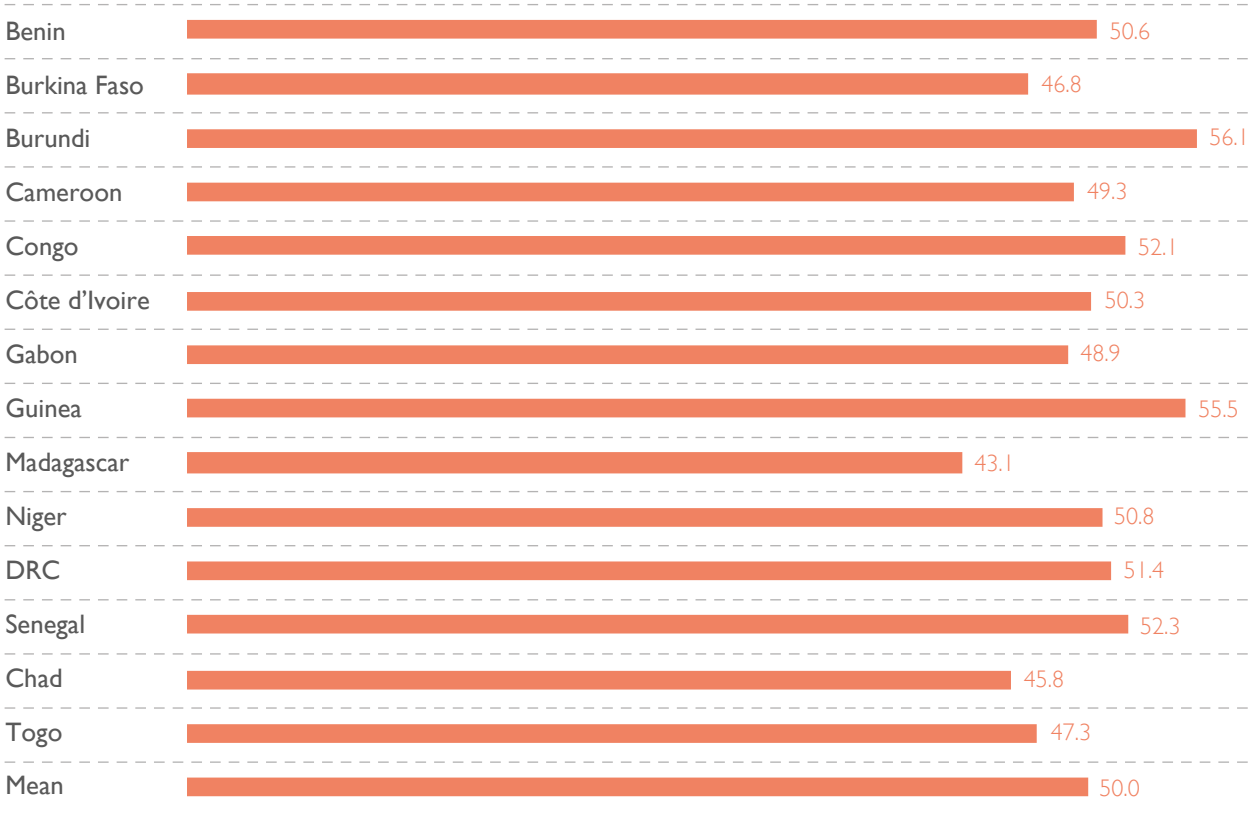
4.3. Teachers' perception of their material and social working conditions

4.3.1. Teachers' perception of their material and educational conditions

Teaching requires, among other things, the availability of certain material and educational conditions: a suitable physical environment, a curriculum, and quality teaching materials in sufficient quantity. Dilapidated school buildings, congested classrooms, staff rooms and absence of toilet facilities (IICBA, 2017), the availability of teaching and learning materials (Fullan & Hargreaves, 1997) are all factors cited in national studies as affecting teacher morale. According to the UNESCO Teacher Policy Development Guide, policies promoting teachers' employment and well-being have a direct and indirect impact on teacher morale and motivation. This in turn affects the attractiveness of the teaching profession, its retention capacity and staff engagement (IICBA, 2018). As part of the PASEC*2019* survey, the teacher questionnaire measured teachers' level of satisfaction with the material and educational conditions in which they worked.

Teachers' perception of their general working conditions was analysed through a specific index and values are shown by country in Figure 4.13. The highest index values were found in Burundi and Guinea, followed by Senegal and Congo, but inter-country variation was low (from 43.1 to 56.1).

Figure 4.15: Mean level of the index of perceived material and educational working conditions



Box 4.3: Description of the index of perceived working conditions

Teachers generally regarded school curricula as satisfactory. More than 57% considered the school curricula to be of high quality. This proportion was particularly high in Guinea (84.5%) and DRC (70.3%); elsewhere, it ranged between 36% in Burkina Faso and 66.7% in Congo (see Annex B4.30).
The quality of the buildings (see Annex B4.31) was judged to be good by more than 50% of teachers in six countries (Guinea, Congo, Benin, Burundi, Senegal and Côte d'Ivoire). This proportion was particularly low in Madagascar (21.6%), Chad (33.7%), Togo (33.9%) and DRC (38.1%).
The availability of school supplies was positively perceived by more than 50% of teachers in just one country (Benin). Elsewhere, it was perceived less positively, in particular in Madagascar (11.7%), Chad (17.8%) and Togo (18.8%). The proportion varied between 20.1% in Burkina Faso and 37.0% in DRC (see Annex B4.32).

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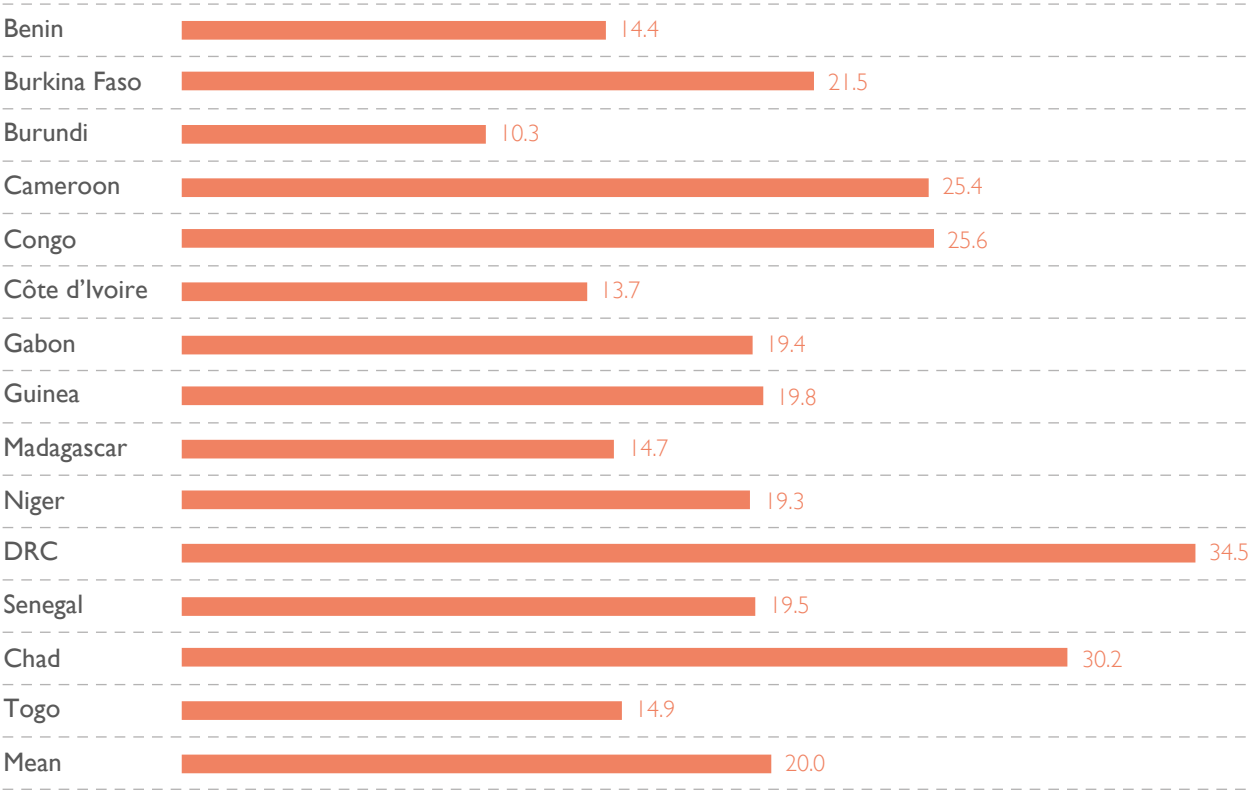
4.3.2. Perception of harassment in schools

Harassment has been identified as an extremely important stressor and factor in low self-esteem among victims (Debarbieux, 2001). Although research on harassment between peers has focused particularly on students in the school setting, it is accepted that the phenomenon also occurs between adults (Debarbieux, 2001). Studies by Shriberg (2007; 2008) in Liberia found that sexual violence and exploitation of students and teachers were common in schools, and little action was taken to ensure compliance with codes of professional conduct or to encourage male teachers to behave more professionally. According to recent studies in West Africa (Diallo, 2018; Coulibaly, 2013) teachers claim to have 'experienced sexual harassment' in schools. This bullying or sexual harassment of teachers can come from peers, students, parents of students or the management.

The PASEC*2019* survey made it possible to assess the prevalence of bullying and sexual harassment of teachers in schools in the different countries. These issues were raised in all countries. The proportion of teachers who reported the existence of this phenomenon varied between 34.5% in DRC and 10.3% in Burundi (see Figure 4.16).

Figure 4.16: Proportion of teachers who reported the existence of bullying within the school



Lower proportions of teachers reported the existence of sexual harassment than of bullying (Table 4.12).

Table 4.12: Proportion of teachers who reported the existence of sexual harassment within the school

	Percentage	Standard error
Benin	1,4	0,4
Burkina Faso	2,4	0,4
Burundi	1,2	0,3
Cameroon	2,7	0,7
Congo	3,3	0,8
Côte d'Ivoire	1,1	0,3
Gabon	3,2	1,0
Guinea	3,0	0,7
Madagascar	1,7	0,4
Niger	1,6	0,3
DRC	4,1	0,6
Senegal	1,9	0,5
Chad	5,4	1,1
Togo	1,5	0,4
Mean	2,4	0,2

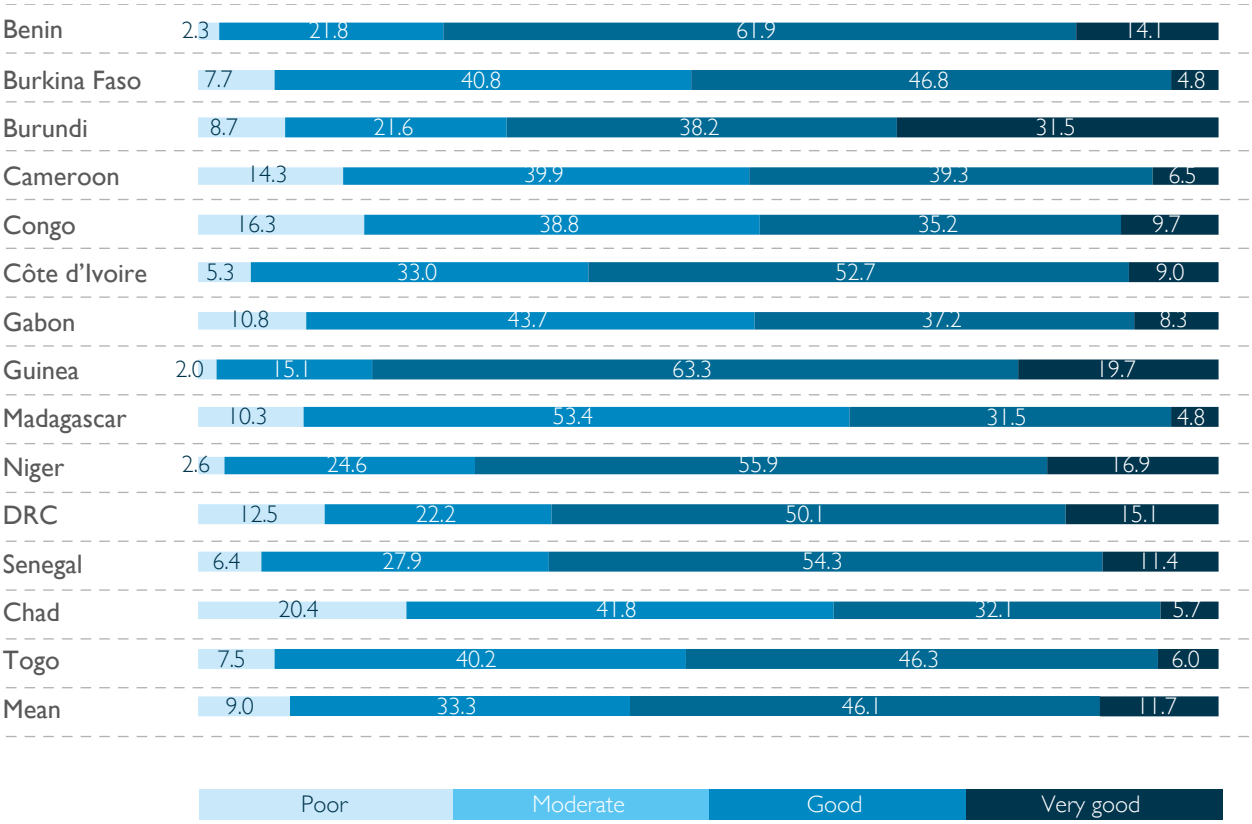
4.3.3. Perception of school management and of the quality of professional and community relationss

According to Michaelowa (2002) and Pontefract, Bonnet and Vivekanandan (2013), teachers' job satisfaction is a complex matter that goes beyond salary issues. A favourable environment, social status and the ability of teachers to make their voices heard at national level are also regarded as essential. Many studies have shown the decisive role of teachers' integration into the community and their recognition, especially by parents, as a motivating factor (Bennell and Akyeampong, 2007; Maroy, 2008; Nishimura et al., 2009).

According to Suchaut (2003), student outcomes improve when teachers are better integrated into the community. Other studies have shown that friendships between staff members (Hedges, 2002) and friendly teacher-student relations (Kouraogo and Ouedraogo, 2009) can also positively influence teacher retention in schools in remote areas. In the sub-Saharan context, the establishment of school management committees generally appears to have brought schools closer to communities and thus had a positive influence on teachers' motivation, by raising the status of education in the community and by involving parents in the maintenance of school facilities and teachers' accommodation (IICBA, 2017).

In the PASEC*2019* survey, an average of 57.7% of teachers expressed positive views about the management of their schools. This positive perception was observed in all countries except for Madagascar and Chad.

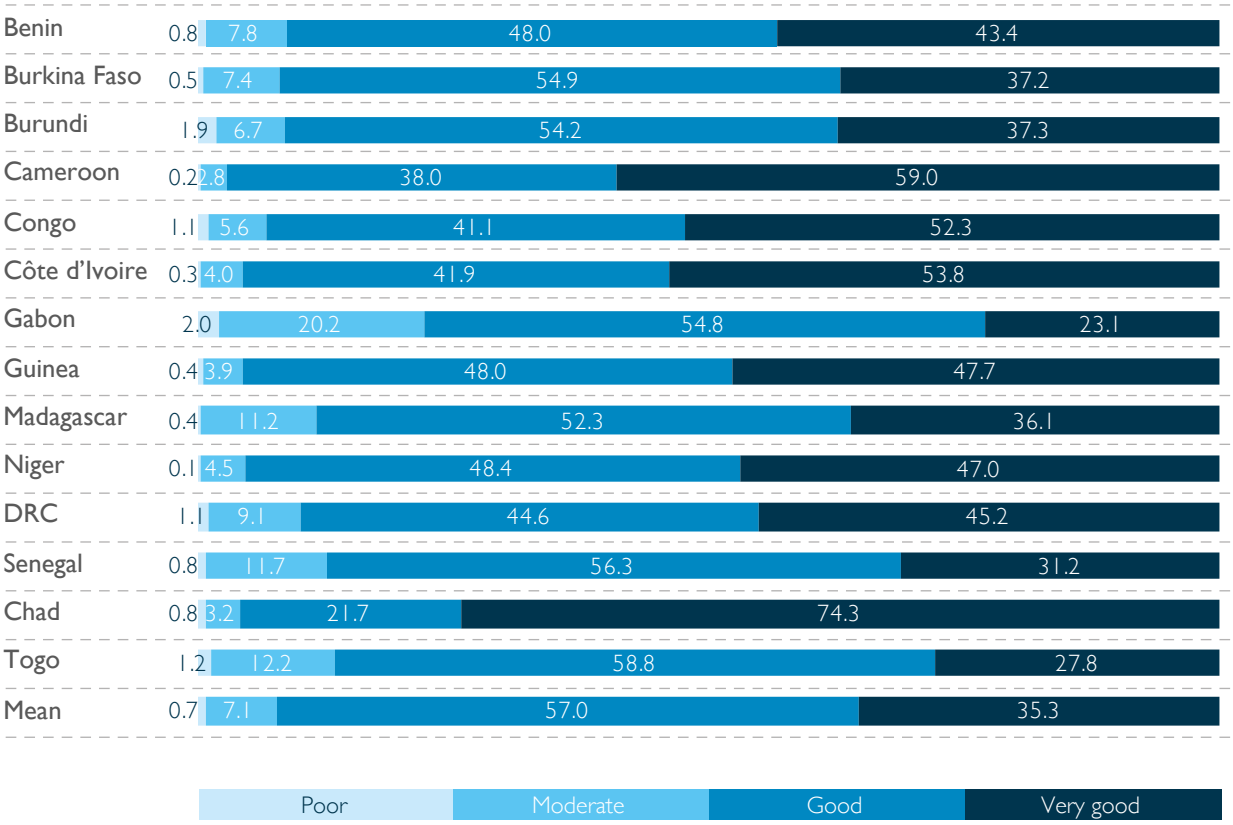
Figure 4.17: Proportion of teachers by perceived quality of school management



In all countries, a large majority of teachers considered relations between colleagues to be positive. The highest satisfaction levels were observed in Senegal, Guinea, Niger, DRC, Benin, Togo and Chad.

Figure 4.18 provides information on the proportion of teachers by the level of satisfaction with relations with their colleagues.

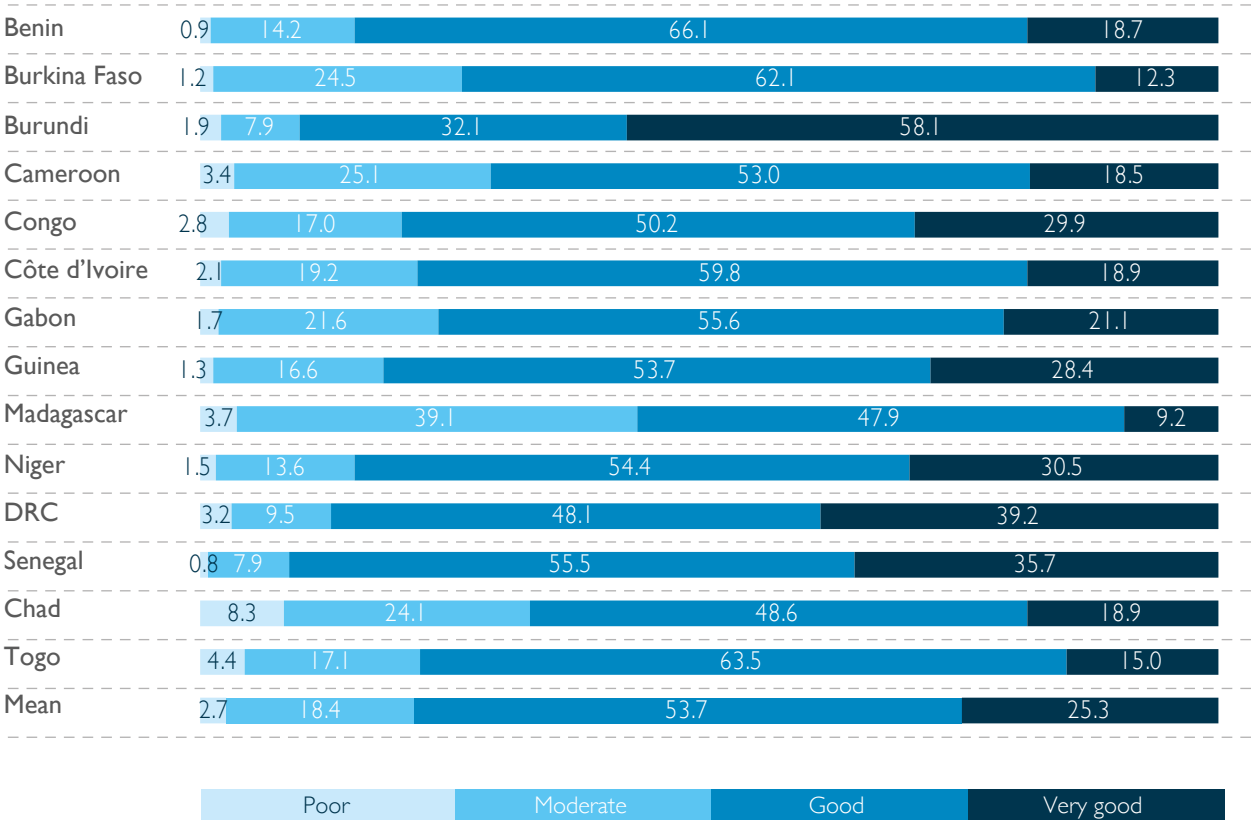
Figure 4.18: Proportion of teachers by perceived quality of relations with their colleagues



Relations with the community were also seen as positive by a large majority of teachers. The lowest proportions of positive perceptions were observed in Madagascar (57.2%) and Chad (67.6%). Elsewhere, the proportions varied between 71.5% in Cameroon and 91.3% in Senegal.

Figure 4.19 provides information on the proportion of teachers by perceived quality of relations with the community.

Figure 4.19: Proportion of teachers by perceived quality of relations with the community



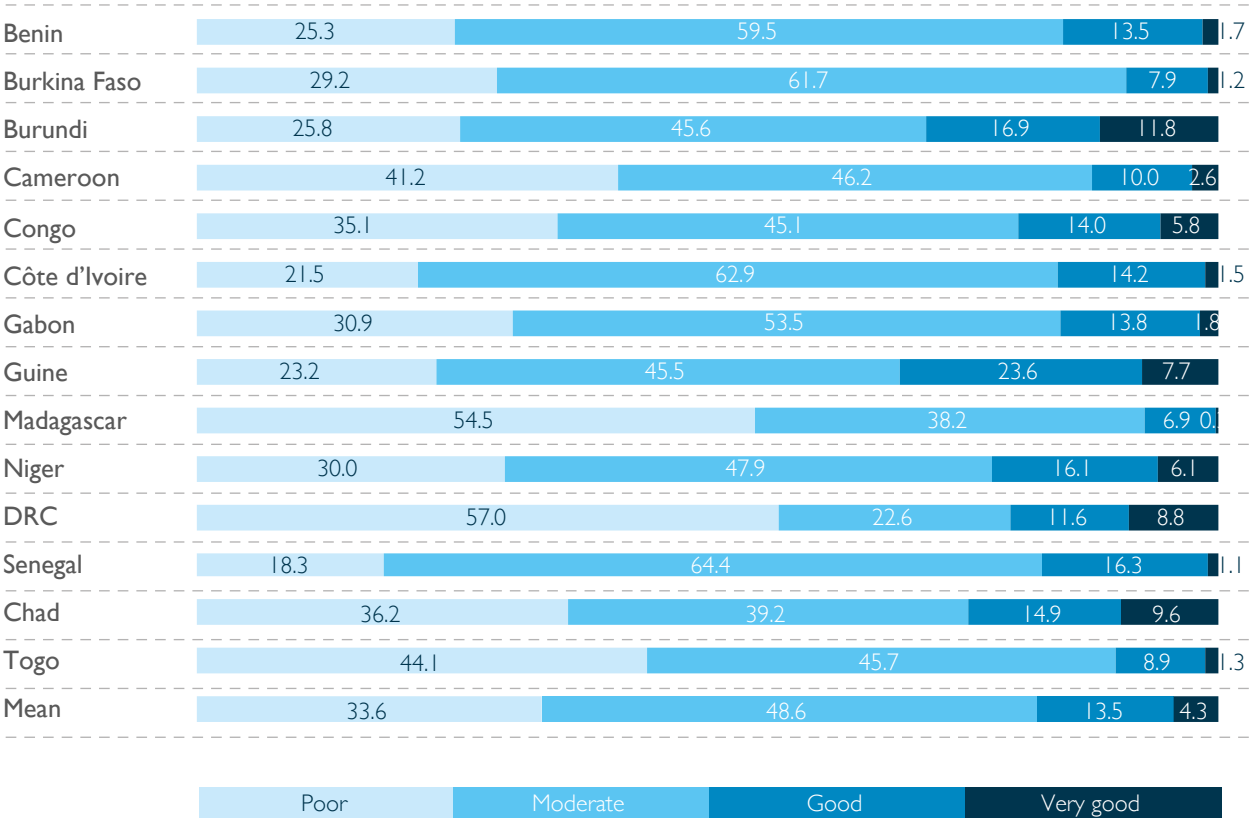
4.3.4. Teachers' perception of salary conditions

Salary is a decisive factor in the attractiveness of the teaching profession (OECD, 2005; Bennell & Akeampong, 2007; Maroy 2008) and is also one of the main factors affecting teachers' motivation and performance (African Union, 2016). In some sub-Saharan countries, teachers' salaries are at or even below the poverty line and teachers are unable to earn a decent living (African Union, 2016). According to Bennell & Akyeampong (2007), teachers are generally poorly paid; their salaries do not reflect their skill levels. The combination of low and irregular salaries with economic necessity means that teachers are often absent in order to supplement their income with secondary professional activities, or undeclared teaching work in other schools (IICBA, 2017; Rasera, 2005).

The PASEC*2019* survey analysed teachers' perceptions of the level and regularity of payment of their salaries. The vast majority of teachers had a negative perception of their salary level: 82% of teachers across the countries as a whole. In Burundi, 11.8% of teachers regarded the level of their salary as very good, while in Madagascar the figure was 0.3%.

Figure 4.20 shows teachers' assessment of their salary level.

Figure 4.20: Proportion of teachers by assessment of their salary level

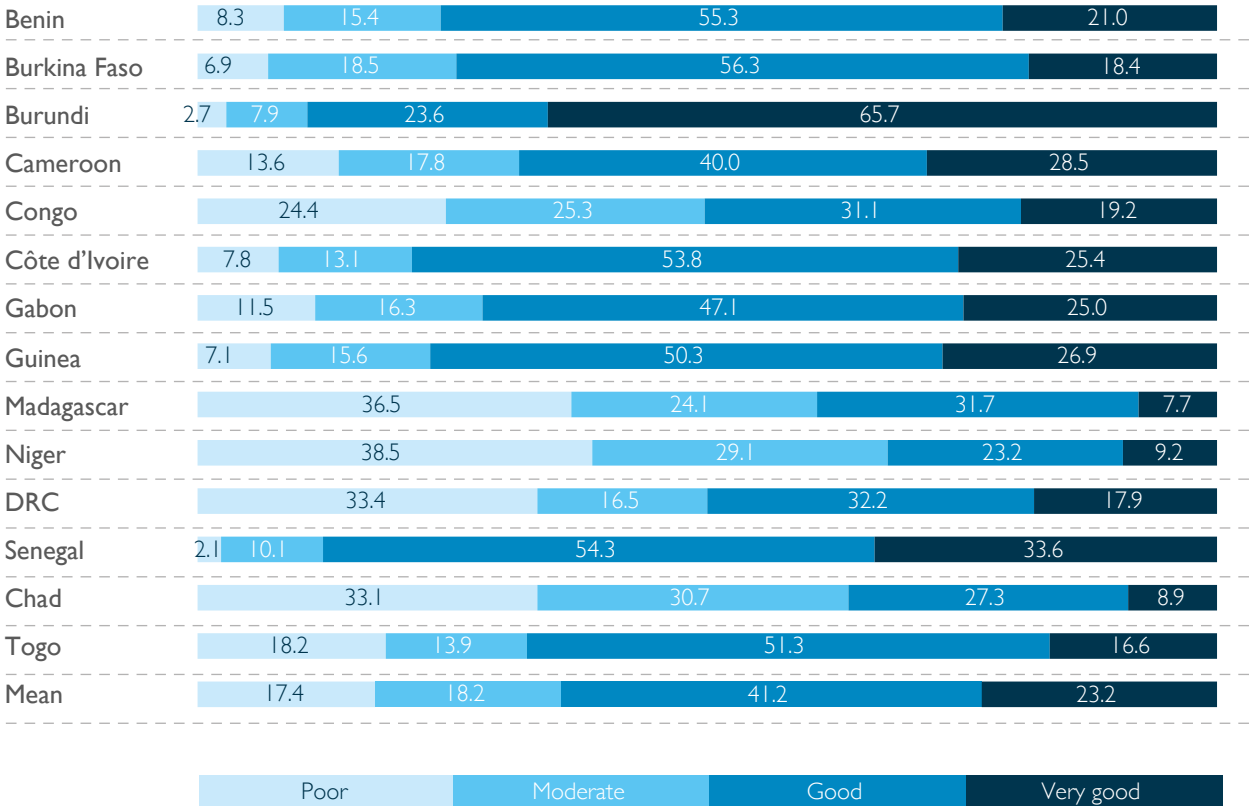


On the other hand, more than 50% of teachers reported that their salaries were paid regularly in most countries: Burundi (89.4%), Senegal (87.9%), Côte d'Ivoire(79.1%), Guinea (77.2%), Benin (76.3%), Burkina Faso (74.7%), Gabon (72.1%), Cameroon (68.6%), Togo (67.9%), Congo (50.3%), DRC (50.1%).

The lowest proportions were observed in Madagascar (39.4%), Chad (36.2%) and Niger (32.4%).

Figure 4.21 shows the distribution of teachers by level of satisfaction with the regularity of the payment of their salary.

Figure 4.2.1: Proportion of teachers by level of satisfaction with the regularity of the payment of their salary



4.3.5. Teachers' perceptions of promotion and training opportunities

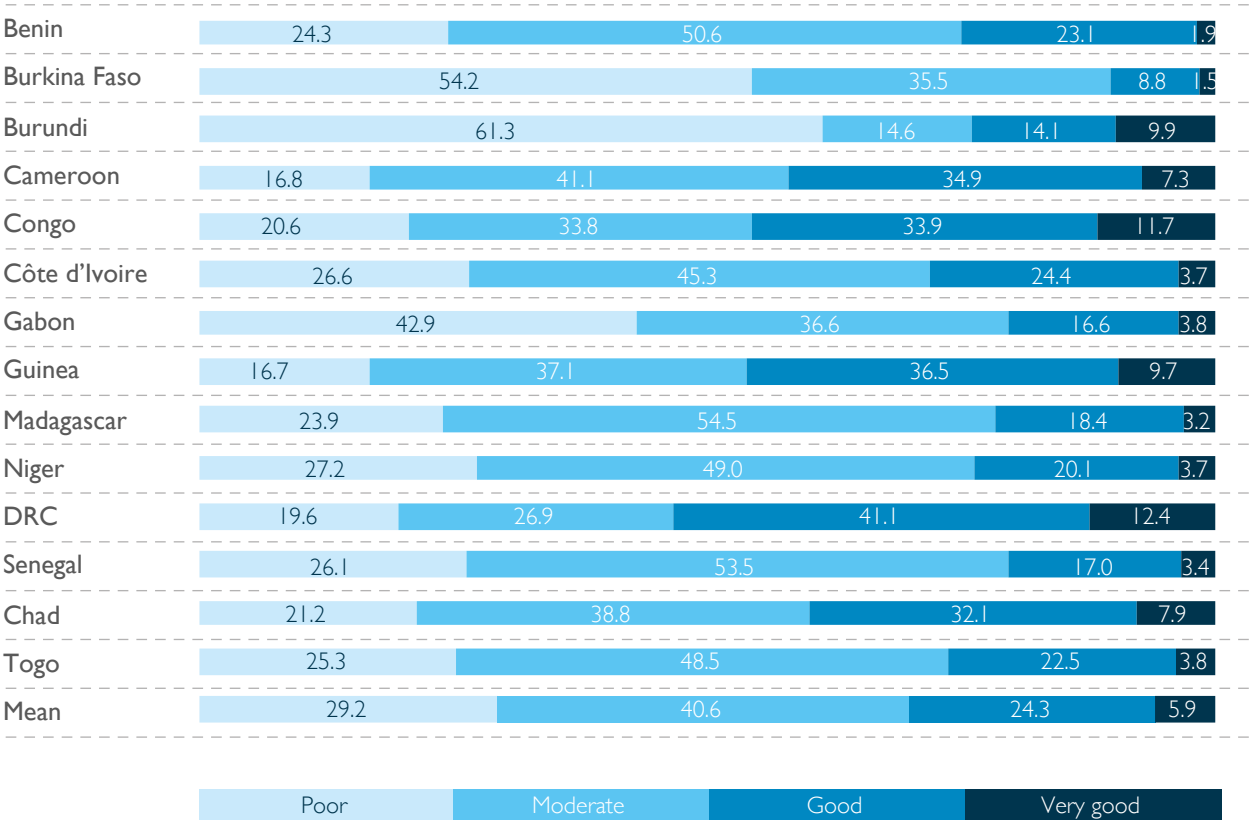
According to the UNESCO Teacher Policy Development Guide, the establishment of career plans that enable continuous progression and development throughout a career is essential for attracting, motivating and retaining teachers (UNESCO, 2005). This career planning should include financial and non-financial rewards and incentives to motivate teachers, ensuring equal opportunities in the pursuit of a career. Professional support for teachers, including in-service training and professional development, has an impact on the skills and knowledge that teachers bring to the classroom, but also on the profession's social status, on motivation and on the decision to become a teacher in the first place (African Union, 2016).

According to the African Union, the 'professionalisation' of teachers lacks a firm foundation on the continent, and the resources to put in place quality training and support frameworks are lacking in the budget allocations of ministries. Possibilities for career progression are limited in sub-Saharan Africa, and are not linked to the professionalisation of teaching. Teachers' career paths are not uniform and linear (African Union, 2016). Access to school principal positions, which is one of the few promotion opportunities they have, is generally based not on performance and merit, but on years of service and other non-professional factors (IICBA, 2017).

In the PASEC*2019* survey, the existence of training opportunities was rated very poorly by teachers in most countries: 69.8% of teachers overall regarded opportunities as average or poor. The highest proportions were recorded in Burkina Faso (89.7%), Senegal (79.6%), Gabon (79.6%), Madagascar (78.4%), Niger (76.2%), Burundi (76%), Benin (75.0%), Togo (73.7%) and Côte d'Ivoire (71.8%).

Figure 4.22 shows the distribution of teachers by their perceived quality of training opportunities.

Figure 4.22: Proportion of teachers by perceived quality of training opportunities



Most teachers in almost every country also rated promotion or professional advancement opportunities as very poor. The proportions that did so were particularly high in Gabon (87.3%), Madagascar (84.5%), Chad (83.3%) and Burkina Faso (82.5%); elsewhere, they varied between 47.8% in Côte d'Ivoire and 79.5% in Senegal.

Conclusion

By way of conclusion to this chapter, it should be noted that teachers in the PASEC*2019* survey countries showed a relatively satisfactory command of the subject content (reading comprehension and mathematics) taught at primary level. However, the proportion of teachers at Level 1 or below on the proficiency scales in reading comprehension (over 15%) and mathematics (over 35%) indicates that a considerable number of teachers had weaknesses in their grasp of the subject knowledge and skills (for reading comprehension and mathematics) taught in the countries.

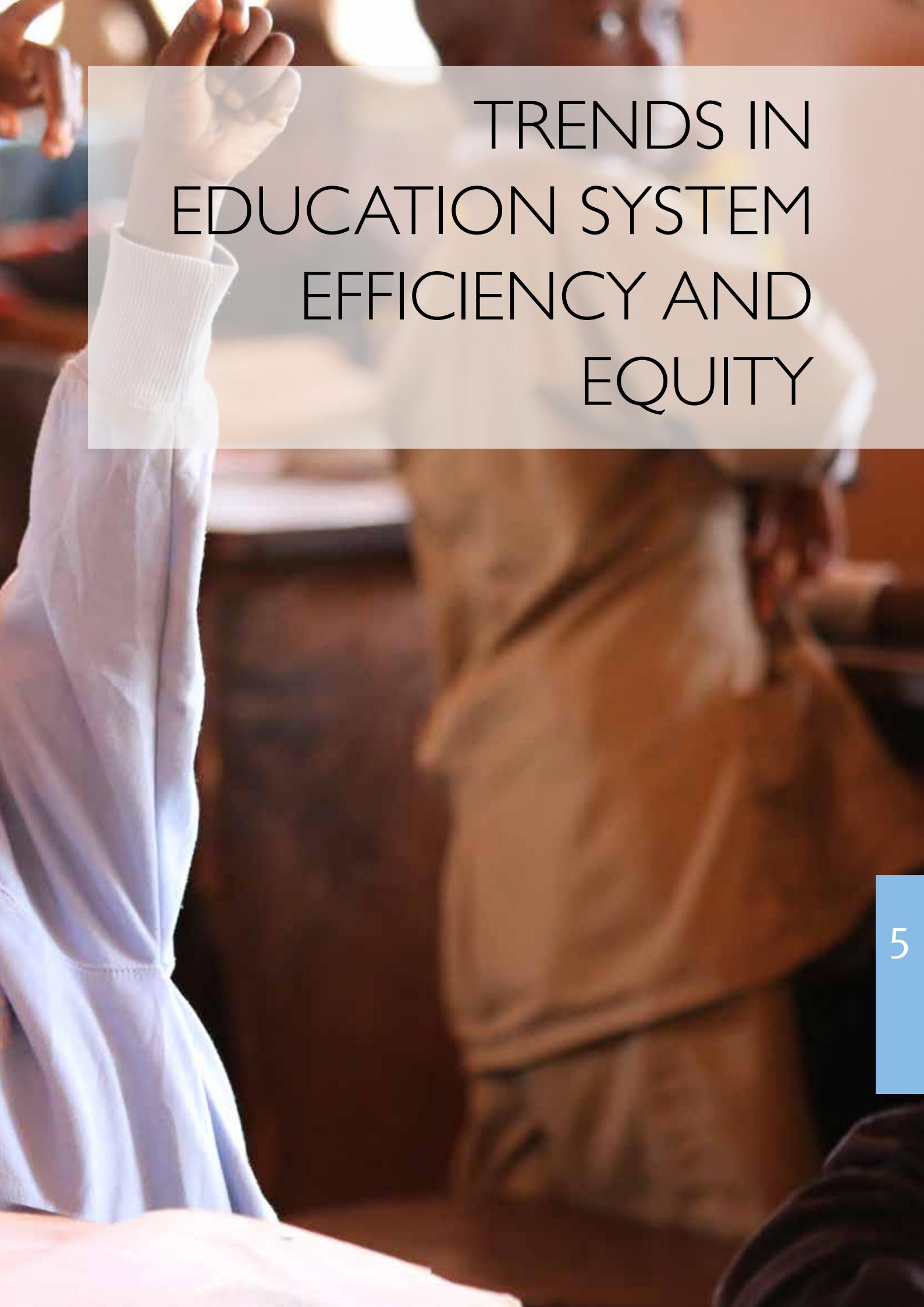
In terms of teaching knowledge and skills, the results show that, on average, teachers mostly experienced difficulties with analysing their educational approaches, choosing situations suited to learning objectives, spotting common errors and identifying their causes so as to help students progress in mathematics and reading comprehension.

The most striking results from the analysis of teachers' characteristics relate to their scores by length of service, level of education and access to in-service training. These results confirm that in most of the assessment countries, first, teachers educated to university level outperformed those educated to secondary level in the survey tests, and second, teachers who reported long teaching experience (between 11 and 20 years) outperformed their less experienced colleagues (at most 5 years) in these tests. Conversely, the results also showed that in most countries, teachers who had received in-service training scored no higher on the survey tests than those who had not.

Analysis of teachers' perceptions of their material and educational conditions showed that they were generally satisfied with the quality of curricula. However, their view of the condition of buildings and the availability of school supplies was less positive in most countries.

The analysis further found that in almost all countries, the majority of teachers expressed a favourable opinion on the management of their school, and reported that they had good relations with their colleagues and the community. Also, the vast majority of teachers across the countries as a whole perceived their salary conditions as unsatisfactory. Finally, in almost every country, they were for the most part dissatisfied with the opportunities for training and career advancement.

The lack of support for teaching knowledge and skills and teachers' lack of satisfaction with their working conditions are factors that may affect their motivation and effectiveness.



TRENDS IN EDUCATION SYSTEM EFFICIENCY AND EQUITY

The purpose of this chapter is to study trends in the efficiency and equity of the education systems between the first two cycles of the PASEC international survey, PASEC*2014* and PASEC*2019*. More specifically, it will provide education policy-makers with information about trends in students' performance in both early and late primary education, and explore those trends in terms of a number of disparities relating to gender, geographical area and type of school.

As Lafontaine and Simon (2008) note, the analysis of trends in student performance by means of cyclical international assessments constitutes a major advance from the point of view of measuring the efficiency and equity both of education systems and of education policies[36], since policy-makers have an interest in determining whether students' performance is improving or deteriorating, relative to their own education system, but also relative to the systems of other countries. In addition, it is useful to verify whether the observed average trend affects all students in the same way, regardless of their performance or demographic characteristics, or whether it is mainly confined to the highest-performing or most prosperous students. Efficiency and equity are inextricably linked in terms of the acquisition of skills and the chances of successful socio-professional integration[37].

This chapter therefore focuses exclusively on the ten countries that participated in both assessments: Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, Côte d'Ivoire, Niger, Senegal and Togo. It should be noted that the Nigerien students tested in Hausa and Zarma in 2019 and the Chadian students tested in Arabic in 2019 were not included in the comparisons with 2014, as all students in Niger and Chad were tested exclusively in French during the first cycle.

The quest for performance and equity is associated with a form of rationalisation of education systems in which assessment instruments play an important role, and the literature offers plenty of illustrations of the influence of methodology on the comparative assessment of systems' performance and/or equity. The methodological instruments used here make it possible to improve our understanding in two areas: equal opportunities, so that students' personal and social situation – such as gender, geographical area or type of school – does not prevent them from realising their educational potential; and inclusiveness, implying the acquisition of a certain minimum level of skills by all students. The PASEC*2019* study was designed to ensure the methodological validity of the comparison between educational performance as recorded in 2014 and in 2019. To this end, sampling plans, survey instruments and procedures for data collection, analysis of results and so on were implemented in 2019 in the same way as in 2014. If a change had to be made, it was devised in such a way as to minimise the impact on the results. Finally, these trend indicators required student performance in 2019 to be reported on the same scales as in 2014. The 2019 tests therefore include a number of questions that had been asked in 2014. These common questions, known as trend items, made it possible to obtain results in 2019 that could be equated with the scales created in 2014.

36. With regard to the PISA and TIMSS surveys assessing mathematical proficiency, an extremely rich literature describes the methodological frameworks of the major international surveys (such as PISA and TIMSS), supported by numerous studies in educational metrics, sociology and educational sciences. Since at least the 2000s, several journals including Mesure en éducation and Cahiers de la Recherche sur l'Éducation et les Savoirs (focusing more on the countries of the global south) have devoted articles and reports to the subject.

37. Readers are referred to the 'Reader's Guide' for the meaning of the asterisks next to some numbers.

5.1. Trends in student performance

5.1.1. Trends in education system performance at the start of primary education

Table 5.1 shows the mean performance in language of instruction in 2014 and in 2019, and the difference in performance between these two cycles.

Table 5.1: Mean performance in language of instruction by assessment cycle and country - Early primary

	2014		2019		Difference[37]	
	Mean	Standard error	Mean	Standard error	Estimation	Standard error
Benin	458.3	4.3	524.8	7.7	66.5***	8.9
Burkina Faso	513.8	6.3	493.5	9.7	-20.3	11.7
Burundi	627.7	5.7	625.0	4.5	-2.8	7.1
Cameroon	502.4	8.7	522.2	8.4	19.7	12.2
Congo	522.7	6.6	582.4	7.5	59.7***	10.2
Cote d'Ivoire	484.1	6.4	516.6	5.4	32.5***	8.0
Niger	435.2	7.7	512.1	10.5	76.9***	13.2
Senegal	501.9	9.5	557.1	9.3	55.3***	13.2
Chad	480.4	7.8	508.5	7.8	28.1**	12.7
Togo	473.6	6.8	474.9	7.2	1.3	9.1
Mean	500.0	2.1	532.5	2.3	32.5***	2.8

Across the ten countries that participated in both assessments, the mean performance in language of instruction improved considerably, from 500.0 to 532.5 points. This improvement was particularly marked in Niger (+76.9), Benin (+66.5), Congo (+59.7) and Senegal (+55.3). The mean performance in Niger had been among the lowest out of the ten countries in 2014 (435.2 points); in 2019 it was close to the level achieved by Côte d'Ivoire (512.1 points in Niger compared with 516.6 in Côte d'Ivoire). In four countries, Burkina Faso, Burundi, Cameroon and Togo, the difference in mean performance was not statistically significant. In other words, no change in mean performance was observed in these countries, and the differences should be regarded as random fluctuations.

However, the gains associated with the higher mean performance in language of instruction in several countries were offset by the increased inequity in most education systems that was recorded by this comparative study: in the vast majority of them, as the data shown in Table 5.2 indicate, the variability of performance (measured by standard deviation) increased noticeably between the two cycles, and substantially in three countries (Benin, Burkina Faso and Burundi). The higher the standard deviation, the greater the difference in performance between the lowest and top performers. An education system that amplifies performance inequalities between these two groups is less equitable than one that succeeds in minimising them. This increase in inequality between students may have resulted from the educational policies implemented during the period.

Table 5.2: Trends in written language performance between 2014 and 2019 at different proficiency levels - Early primary

	Standard deviation		P 10		P 25		P75		P 90	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Benin	38.2	7.3	25.5	10.8	34.9	8.0	85.0	12.8	128.6	22.9
Burkina Faso	33.8	12.0	-60.1	25.9	-12.5	14.1	-3.9	12.2	-4.6	14.7
Burundi	-1.4	5.1	-0.7	7.0	-2.2	9.0	-3.2	10.5	-2.1	15.5
Cameroon	33.0	6.5	-14.7	17.2	5.5	16.2	35.2	14.1	65.1	23.6
Congo	13.4	7.8	36.8	9.6	56.1	11.1	67.7	16.4	60.9	23.7
Cote d'Ivoire	8.6	5.7	18.7	8.2	27.3	7.7	39.5	10.1	46.5	19.5
Niger	28.7	10.7	51.6	19.0	53.0	12.0	85.2	19.3	139.3	38.6
Senegal	13.2	9.0	40.9	14.2	41.2	11.9	80.2	27.3	65.5	29.5
Chad	16.5	7.3	5.5	17.4	15.6	14.6	43.7	18.8	60.3	27.5
Togo	15.9	8.2	-15.3	13.3	-6.3	9.0	11.4	15.8	32.6	28.3
Mean	15.0	2.6	12.5	4.8	25.3	3.0	47.5	4.0	43.4	6.2

Note: Est.=Estimate; SE=Standard error
P10=10th percentile[38], representing the lowest-performing students
P25=25th percentile, representing low-performing students
P75=75th percentile, representing high-performing students
P90=90th percentile, representing the top-performing students

Thus, in Benin, the standard deviation in language of instruction was 67.4 points in 2014 and 105.6 in 2019, an increase of 38.2 points, as shown in Table 5.2. Although the mean performance in language of instruction improved by 66.5 points on the PASEC scale (see Table 5.1), the improvement was only around 25 points for the lowest-performing students, compared with nearly 130 points for the top performers. Benin is no exception: this trend can be identified in many countries. In Burkina Faso, the scores of low-performing students decreased substantially, whereas the top performers remained at the same level. The proliferation of armed attacks against teachers and students adversely affected security, further increasing the vulnerability of students who were already performing at a low level. In Burundi, meanwhile, students' performance showed no change at any proficiency level.

Table 5.3 shows the mean mathematics performance of students at the start of primary education by country and assessment cycle.

38. Percentile X (X being a value between 1 and 100) allows the observed sample to be split into two subgroups. The first subgroup consists of the X% of individuals with lower values, while the second consists of the 100 - X% of individuals with higher values. Each calculated percentile level characterises a high or low level of performance and has nothing to do with the proficiency scales defined in Chapter 2.

Table 5.3: Mean performance in mathematics by assessment cycle and country - Early primary

	2014		2019		Difference	
	Mean	Standard error	Mean	Standard error	Estimation	Standard error
Benin	454.7	5.4	525.1	7.2	70.4***	9.0
Burkina Faso	505.8	4.9	498.7	8.2	-7.1	10.3
Burundi	605.1	4.5	614.4	2.4	9.3	5.0
Cameroon	502.7	9.3	516.7	8.0	14.0	12.7
Congo	541.2	5.6	591.9	6.3	50.7***	8.8
Cote d'Ivoire	465.9	5.8	522.5	4.1	56.6***	6.8
Niger	437.4	8.3	526.6	8.9	89.2***	12.6
Senegal	521.4	8.9	563.4	6.1	42.1***	10.9
Chad	491.3	10.6	522.4	6.8	31.2**	13.7
Togo	474.5	6.1	489.4	5.3	14.9	7.6
Mean	500.0	2.1	537.5	1.9	37.5***	2.7

Across all countries combined, the improvement observed in language of instruction also occurred in mathematics, with the international mean rising from 500.0 to 537.5 points. The countries showing substantial rises in the mean level of performance included Benin (+70.4), Congo (+50.7), Niger (+89.2) and Senegal (+42.1), as was the case for language of instruction, but also Côte d'Ivoire (+56.6) and Chad (+31.2). In the four remaining countries (Burkina Faso, Burundi, Togo and Cameroon), the difference between the two cycles was not significant.

Table 5.4 presents the change in performance per country between 2014 and 2019 at different proficiency levels at the start of primary education.

Table 5.4: Trends in mathematics performance between 2014 and 2019 at different proficiency levels - Early primary

	Standard deviation		P 10		P 25		P75		P 90	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Benin	16.5	7.7	41.3	11.4	55.2	8.9	74.6	11.7	86.4	18.7
Burkina Faso	25.3	9.6	-31.7	19.5	-4.7	17.3	5.9	10.8	8.1	11.1
Burundi	-7.6	3.5	19.1	7.5	15.2	5.9	3.6	6.8	0.7	11.0
Cameroon	20.2	6.0	-5.4	18.7	2.2	16.8	30.6	15.1	38.2	15.2
Congo	12.3	6.4	39.1	10.3	47.8	10.2	49.6	14.7	62.8	18.7
Cote d'Ivoire	-6.0	5.4	41.8	9.8	56.3	9.5	54.8	10.2	38.4	12.9
Niger	10.8	7.6	63.9	17.9	71.3	13.1	99.0	17.2	96.0	24.0
Senegal	-12.8	8.4	54.0	15.3	53.9	14.1	28.3	14.5	37.7	23.4
Chad	-3.7	6.2	26.4	17.4	42.3	12.9	21.8	20.0	12.7	20.7
Togo	-3.0	4.3	19.3	9.2	19.0	9.3	14.2	10.7	12.0	14.1
Mean	1.5	2.5	31.8	3.6	42.2	3.9	33.1	3.6	30.5	4.7

Across the countries participating in this comparative study as a whole, no increase in the variability of performance in mathematics was observed (as the 1.5-point increase in the standard deviation between 2014 and 2019 was not statistically significant). However, some countries – namely Benin, Burkina Faso and Cameroon – did experience a rise in the variability of their mean performance. In contrast, the standard deviation in Burundi fell slightly. In the other countries, the variability in 2019 was no different statistically from that observed in 2014.

In addition, the improvement in performance was more pronounced for the top-performing students in mathematics, although to a lesser extent than in language of instruction. An analysis of the educational reforms undertaken in these countries could explain these trends. With this in mind, a questionnaire was sent to education officials in the ten PASEC*2014* countries to find out what education policy measures they implemented between 2015 and 2019. The questionnaire was also intended to throw light on whether these measures had helped improve the educational performance of students in the country. A summary of the responses provided by education officials can be found in Table 5.13 (cf. Section 5.4 below).

The rise in the mean level of performance in several countries, in both language and mathematics, represents an important achievement, which will need to be confirmed by the next PASEC study. The task for education officials in these countries now is to understand why some of the lowest educational performers have not managed to derive the same benefits from these reforms as the top performers, and then to take suitable measures to correct these growing inequalities.

5.1.2. Trends in education system performance at the end of primary education

Table 5.5 shows the mean performance of students in reading at the end of primary education.

Table 5.5: Trends in mean performance in reading by assessment cycle (2014, 2019) and country - Late primary

	2014		2019		Difference	
	Mean	Standard error	Mean	Standard error	Estimation	Standard error
Benin	523.4	4.6	585.7	6.4	62.3***	7.7
Burkina Faso	531.6	4.4	551.5	3.6	19.8***	5.3
Burundi	525.4	2.0	489.9	2.7	-35.5***	3.3
Cameroon	517.5	5.5	529.7	5.5	12.2	8.4
Congo	503.4	4.4	542.0	4.9	38.6***	6.7
Cote d'Ivoire	517.0	4.0	502.8	5.5	-14.2**	6.8
Niger	403.5	3.7	471.0	5.4	67.5***	6.3
Senegal	548.4	6.8	575.9	4.9	27.5***	8.2
Chad	432.5	6.7	450.6	5.8	18.1**	9.3
Togo	497.3	4.0	496.1	3.7	-1.2	5.6
Mean	500.0	1.8	519.8	1.8	19.8***	2.7

Several countries stood out for their substantial improvement in mean performance, namely Benin (+62.3) and Niger (+67.5), and to a lesser extent Congo (+38.6) and Senegal (+ 27.5). Burkina Faso and Chad showed an increase of nearly 20 points. Two countries' performance showed a significant downward trend: Burundi (-35.5) and Côte d'Ivoire (-14.2). Across the ten countries as a whole, an increase of around 20 points was observed; though less than that observed at the start of primary education, this was still significant.

Table 5.6 shows the trends in reading performance between the two assessment cycles at different proficiency levels (the 10th, 25th, 75th and 90th percentiles).

Table 5.6: Trends in reading performance between 2014 and 2019 at different proficiency levels - Late primary

	Standard deviation		P 10		P 25		P75		P 90	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Benin	-1.6	4.9	59.9	8.2	68.2	7.5	63.3	11.2	62.8	16.3
Burkina Faso	12.3	3.6	0.5	9.6	15.5	6.4	28.7	5.1	31.1	7.1
Burundi	7.8	2.8	-40.5	3.6	-42.7	3.6	-34.1	3.9	-23.4	5.7
Cameroon	10.5	4.7	2.6	10.6	6.8	9.7	20.5	9.4	21.9	9.3
Congo	15.9	3.3	8.2	8.4	18.8	8.1	57.7	8.0	51.8	9.5
Cote d'Ivoire	13.6	4.1	-19.2	7.1	-26.9	6.5	-5.6	11.1	14.4	12.4
Niger	24.9	4.6	40.4	7.1	44.1	4.8	97.7	11.3	113.1	11.6
Senegal	-15.6	4.8	54.7	11.2	46.3	10.5	10.3	9.3	5.2	13.7
Chad	10.9	5.5	15.8	11.1	13.6	8.7	20.4	14.1	32.3	13.7
Togo	12.4	2.8	-10.6	6.1	-15.0	5.8	13.5	8.4	20.5	8.9
Mean	7.6	1.6	14.8	2.8	10.8	2.9	28.7	3.1	32.5	4.4

There was a significant increase in the variability of reading performance between 2014 and 2019 in all countries apart from Benin and Senegal. Thus in most countries, the differences in performance between the lowest- and top-performing students had grown. As was the case at the start of primary education, the most significant progress was generally observed among the top-performing students. In Burundi, where the mean performance fell by around 35 points, the decrease was greater among low-scoring students. Senegal was the only country which succeeded in reducing performance inequalities between 2014 and 2019: its standard deviation decreased by 16 points. This country thus managed to meet one of the major challenges facing education systems, namely to improve the mean performance of students, and in particular of the lowest scorers, without affecting the performance of the highest scorers. This is a particularly encouraging result in terms of both the efficiency of the education system and its equity.

There was a significant improvement in the lowest-performing students in Benin and Niger. In Senegal, the improvement in performance was more noticeable among lower-scoring students; in Burundi, by contrast, a decrease was recorded in the scores of both the lowest- and top-performing students.

Table 5.7 shows that, along similar lines to the reading results at the end of primary education, Burundi's mean performance in mathematics decreased by nearly 50 points between 2014 and 2019. The same was true in Togo and Côte d'Ivoire, with decreases of 24.8 points and 21.7 points respectively. Only two countries saw their mean performance rise substantially: Benin (+ 36.9 points) and Niger (+ 56 points). Elsewhere, the differences in mean scores were not significant.

Table 5.7: Trends in mean performance in mathematics by assessment cycle (2014, 2019) and country - Late primary

	2014		2019		Difference	
	Mean	Standard error	Mean	Standard error	Estimation	Standard error
Benin	496.9	5.1	533.8	6.2	36.9***	7.7
Burkina Faso	539.5	4.4	547.2	4.0	7.7	5.8
Burundi	593.6	2.7	546.0	3.2	-47.6***	3.7
Cameroon	489.5	5.3	488.1	3.9	-1.4	7.1
Congo	481.4	4.0	489.1	3.5	7.7	5.3
Cote d'Ivoire	475.7	3.1	454.0	3.8	-21.7***	5.1
Niger	405.8	4.1	461.8	5.0	56.0***	6.4
Senegal	546.6	6.7	557.6	4.7	11.0	8.4
Chad	450.9	5.7	439.3	4.0	-11.6	7.0
Togo	520.2	5.0	495.4	3.9	-24.8***	6.5
Mean	500.0	1.9	501.4	1.5	1.4	2.5

Table 5.8 shows the trends in mathematics performance between the two assessment cycles at different proficiency levels (the 10th, 25th, 75th and 90th percentiles).

Table 5.8:Trends in mathematics performance between 2014 and 2019 at different proficiency levels - Late primary

	Standard deviation		P 10		P 25		P75		P 90	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Benin	-2.2	5.1	45.0	7.2	36.2	6.8	32.8	11.8	42.0	16.8
Burkina Faso	4.4	3.2	4.1	9.0	7.1	7.6	8.7	5.9	13.0	7.3
Burundi	4.9	2.6	-50.1	5.0	-54.0	4.0	-47.7	4.9	-37.8	7.2
Cameroon	-0.2	3.3	5.8	8.7	1.1	8.3	-8.8	8.8	-2.3	11.9
Congo	3.8	2.5	-0.1	6.9	5.3	6.1	10.2	7.3	11.4	7.9
Cote d'Ivoire	-1.4	2.7	-12.6	5.4	-21.1	5.9	-26.4	6.5	-19.7	7.9
Niger	14.2	4.8	45.4	7.5	41.5	5.3	63.4	9.2	86.9	15.1
Senegal	-12.9	4.5	32.9	9.7	24.7	10.3	-5.6	10.1	-3.2	11.0
Chad	-10.3	4.8	3.9	7.3	-3.8	5.7	-22.4	11.6	-32.7	14.3
Togo	1.4	3.3	-19.0	7.8	-30.2	7.2	-23.3	10.4	-15.1	9.7
Mean	-4.5	1.3	10.4	2.5	4.6	2.8	-6.0	3.0	-2.7	3.6

Niger was the only country that experienced a slight increase in the variability of mathematics performance in 2019 compared to 2014, with the performance of the higher-scoring students increasing more than that of the lower scorers. By contrast, Senegal – once again – and Chad were characterised by a significant decrease in variability. In Senegal, as was the case with the reading results, the lowest-performing students progressed more than the top performers. In Chad, the comparatively low variability resulted mainly from a downturn in the performance of the top-scoring students.

In overall terms, performance changes were observed at the start of primary education in both language of instruction and mathematics in six of the ten countries (Benin, Congo, Côte d'Ivoire, Niger, Senegal and Chad). Progress was greater in mathematics than in language in three of these countries (Benin, Côte d'Ivoire, Niger), and greater in language than in mathematics in the other three.

At the end of primary education, six of the ten countries experienced an improvement in reading performance, while two (Burundi and Côte d'Ivoire) experienced a downturn. Just two of the ten countries (Benin and Niger) saw progress in mathematics, while three others (Burundi, Côte d'Ivoire and Chad) recorded a decline in performance. Two countries (Benin, Niger) which experienced more progress in mathematics than in language at early primary level experienced more progress in reading than in mathematics at late primary level.

Congo, Senegal and Chad recorded no progress in mathematics, but did experience progress in reading. Burundi was the only country that experienced declines in both reading and mathematics.

The trends observed at both the start and the end of primary education might therefore seem particularly encouraging if analysis was confined to mean performance in mathematics, with significant improvements in many countries. However, in most cases, this rise in the level of student performance was more pronounced among the top scorers, and thus associated with an amplification of the variation in performance.

5.2. Trends in differences between schools

The previous section focused mainly on changes in the efficiency of education systems, with a particular focus on student performance. The issue of equity was more specifically addressed through examination of the differences between the lowest- and highest-performing students. Overall, these analyses revealed that the performance differences between these two groups of students had increased over the previous five years, particularly at the start of primary education and within the education systems that saw substantial progress between 2014 and 2019. It will be recalled that the top-performing students recorded much greater progress than the lowest performers during the period.

The objective of this section is to analyse in more detail trends in education system equity, as the increase in these differences in educational performance may be indicative of an amplification of other inequalities, such as those relating to students' gender, the socio-economic status of their family, the type of school attended (public or private) or the geographical area (urban or rural).

This section first discusses the trends in differences between schools. It then analyses performance trends by schools' geographical location, and ends with an examination of these trends by student gender and socio-economic status.

5.2.1. Trends in performance differences between schools at the start of primary education

From a statistical point of view, the differences in performance between schools are analysed by means of a breakdown of variance, which in this chapter is based on the use of multilevel regression models. Table 5.9 shows a breakdown of the variance both between schools and between students within schools. The greater the differences in performance between schools, the greater the variance between schools. If an education system were able to distribute students among schools according to a strictly random procedure, the average student population of each school would be similar and this random distribution would result in mean student performances that did not vary from school to school – apart from random fluctuations, of course. On the other hand, if the top-performing students are found in certain schools, whether public or private, and the lowest performers are confined to other institutions, schools' mean performance will differ and the variance between schools will increase.

The between-school variance and the within-school variance are usually synthesised in the form of a statistical term called the 'within-class correlation coefficient'[39], or Rho. This coefficient varies from 0 to 1: the closer it tends towards 0, the smaller the differences between schools, and the closer it tends towards 1, the greater these differences are. A coefficient of 0 would signify that the mean performance of all schools was to all intents and purposes perfectly identical, and that all performance differences were located within schools. Conversely, a coefficient of value 1 would mean that all the students in a given school showed exactly the same performance, which is unlikely in practice.

These variance breakdown indicators are usually regarded as highly informative about the level of equity achieved by education systems, as many educators and education policy-makers believe that the more performance varies from one school to another, the more parents' choice of school for their children will determine students' level of performance and hence their educational career. However, parents' choices are limited by existing provision, which varies greatly according to geographical area and political context (including factors such as unstable government and crises of various kinds), so that many demographers and sociologists argue that choices cannot really be made that reflect a family education strategy (Pilon, 2006; Lange, 2006).

Table 5.9 shows the variances between schools and within schools in reading for the assessments conducted in 2014 and 2019, as well as the within-class correlation coefficients (Rho).

39. The within-class correlation coefficient is a measure of the degree of homogeneity within a study population.

Table 5.9: Trends in variance of performance between schools and within schools in language of instruction between 2014 and 2019 - Early primary

	2014			2019		
	Between schools	Within schools	Rho	Between schools	Within schools	Rho
Benin	2491	2326	0,52	6210	4324	0,59
Burkina Faso	4371	4839	0,47	9609	4677	0,67
Burundi	2695	5788	0,32	3341	5457	0,38
Cameroon	4011	2746	0,59	7783	4409	0,64
Congo	5841	2813	0,67	7656	3489	0,69
Cote d'Ivoire	2095	2733	0,43	3203	2671	0,55
Niger	4381	3241	0,57	10092	3869	0,72
Senegal	6461	4379	0,60	8800	6329	0,58
Chad	2920	2387	0,55	4887	2247	0,69
Togo	5673	3300	0,63	7422	4350	0,63
Mean	4094	3455	0,54	6900	4182	0,61

Regardless of country and PASEC cycle (2014 or 2019), the differences between schools can be described as considerable. In 2014, seven out of ten education systems obtained a Rho coefficient greater than 0.5: in other words, in these countries there were more differences between schools than between students within schools. During this first cycle, Burkina Faso and Côte d'Ivoire had coefficients of between 0.4 and 0.5, and only Burundi's coefficient was less than 0.4 (0.32).

Increasing differences between the lowest- and highest-performing students were associated with increasing differences between schools: the average variance between schools was 4094 in 2014 and 6900 in 2019, an increase of 69%. At the same time, the variance between students within schools changed on average from 3455 to 4182 – an increase of 21%. This increase in variance between schools was particularly spectacular in Benin, Burkina Faso, Cameroon and Niger.

The results of the breakdown of variance in mathematics are somewhat different from those observed in language of instruction. First, as Tables 5.2 and 5.4 show, the increase in variability in early primary education was significantly greater in language than in mathematics. Thus, on average within the countries, the standard deviation increased by 19.5 in language, compared to 4.9 in mathematics[40].

Table 5.10 shows the variances between schools and within schools in mathematics performance, as well as the within-class correlation coefficients (Rho) for the two assessments.

40. In order to discount changes in average performance between countries, these values of 19.5 and 4.9 result from the calculation of the average of the national standard deviations. They therefore do not represent the change observed at the international level across all the countries.

Table 5.10: Trends in variance of performance between schools and within schools in mathematics between 2014 and 2019 - Early primary

	2014			2019		
	Between schools	Within schools	Rho	Between schools	Within schools	Rho
Benin	2538	5481	0,32	5344	5055	0,51
Burkina Faso	3186	4555	0,41	6958	4153	0,63
Burundi	968	2680	0,27	955	1969	0,33
Cameroon	3138	3156	0,50	4881	4347	0,53
Congo	3234	4014	0,45	5543	4111	0,57
Cote d'Ivoire	1773	4135	0,30	2706	2221	0,55
Niger	5155	5750	0,47	7025	6082	0,54
Senegal	5133	5727	0,47	3874	5141	0,43
Chad	3430	6050	0,36	3720	4601	0,45
Togo	4360	4705	0,48	4303	4130	0,51
Mean	3292	4625	0,40	4531	4181	0,50

First, as the average Rho coefficients indicate, the differences in mathematics were smaller than in language of instruction. However, they were still high, with an average coefficient of 0.4 in 2014 and 0.5 in 2019. These last two values also indicate that the differences between schools increased significantly between 2014 and 2019. On average, the variance between schools rose 38% (compared to 69% in language of instruction) from 3292 to 4531. By contrast, the variance between students within schools decreased by some 10% on average from 4625 to 4181.

Again, Benin and Burkina Faso experienced a significant increase in the variance between schools. Finally, as was the case for language of instruction, Burundi recorded the lowest degree of homogeneity. This result could be partly due to the use of the students' first language for instruction at the start of primary schooling, as Burundi was the only one of the ten countries to have tested all its students in their first language at the start of primary schooling in 2014 and 2019.

5.2.2. Trends in performance differences between schools at the end of primary education

Tables 5.11 and 5.12 show the breakdown of the variance of performance in reading and mathematics respectively.

Table 5.11: Trends in variance of performance between schools and within schools in reading between 2014 and 2019 - Late primary

	2014			2019		
	Between schools	Within schools	Rho	Between schools	Within schools	Rho
Benin	4781	4848	0,50	4808	3982	0,55
Burkina Faso	3566	3953	0,47	4421	4303	0,51
Burundi	802	1883	0,30	1371	1987	0,41
Cameroon	5280	4611	0,53	6335	5045	0,56
Congo	4975	3886	0,56	6653	4733	0,58
Cote d'Ivoire	3598	5584	0,39	4776	7042	0,40
Niger	3573	3383	0,51	7282	3552	0,67
Senegal	5581	5341	0,51	3808	3814	0,50
Chad	3858	2766	0,58	4595	3718	0,55
Togo	4494	4122	0,52	6894	3860	0,64
Mean	4051	4038	0,49	5094	4204	0,54

Table 5.12: Trends in variance of performance between schools and within schools in mathematics between 2014 and 2019 - Late primary

	2014			2019		
	Between schools	Within schools	Rho	Between schools	Within schools	Rho
Benin	4247	3847	0,52	3879	3295	0,54
Burkina Faso	3774	4902	0,44	4525	4214	0,52
Burundi	834	3567	0,19	1925	2941	0,40
Cameroon	4232	4298	0,50	4467	3815	0,54
Congo	3054	2956	0,51	3934	2693	0,59
Cote d'Ivoire	1709	3573	0,32	2157	2811	0,43
Niger	2757	3728	0,43	5250	2918	0,64
Senegal	5003	5276	0,49	4287	3800	0,53
Chad	3322	2798	0,54	2924	2283	0,56
Togo	5717	4877	0,54	6973	3538	0,66
Mean	3465	3982	0,45	4032	3231	0,54

In both early and late primary education, the differences had again increased between 2014 and 2019, although to a lesser extent. In reading, the average variance between schools rose from 4051 to 5094, an increase of 25%, whereas in mathematics it rose from 3465 to 4032, an increase of 16%. This increase was also reflected in the Rho coefficients, which changed from 0.49 to 0.54 in reading and from 0.45 to 0.54 in mathematics. On the other hand, at the end of primary schooling, on average, the within-school variance remained more or less stable in reading (changing from 4038 to 4204), whereas it fell substantially in mathematics from 3982 to 3231.

The greater increase in differences between schools at the start of primary education could in particular result from educational reforms that primarily targeted students at that stage. The possibility also cannot be excluded that changes occurred during the intervening five years in terms of encouraging students to stay in school. Policies encouraging education teams and/or parents at the start of education to keep their children in school, regardless of their educational difficulties, could have contributed to an increase in the differences between schools. This is because schools mainly serving disadvantaged groups would as a result have kept some of their struggling students in school who previously would have dropped out in order to go to work in the fields or down the mines or to engage in some other activity in the urban informal economy.

Various socio-political measures may thus have lowered students' average performance and hence increased the variation between schools. The changes observed are sufficiently significant to encourage researchers, experts and officials in the different countries to pursue quantitative and qualitative investigations through secondary studies.

5.2.3. Trends in performance by school location

In the context of sub-Saharan Africa, widening differences between schools could partly result from a gap between the average performance of students in rural schools and in urban schools that is even greater than suspected. For example, the implementation of a reform may be temporarily delayed in rural areas for reasons related to accessibility, contributing to increased inequalities in educational provision.

The questionnaire sent to and completed by school principals included a question about the location of the school[41].

The PASEC*2014* study had already highlighted the performance differences between students attending schools in rural areas and those at schools in urban areas. It will be recalled that, across all countries, the difference in performance in favour of students in urban schools was 45.8 points in language of instruction and 38.3 points in mathematics at the start of primary schooling. At the late primary stage, these differences were more significant: 77.5 points and 49.8 points respectively (see Tables B5.1 to B5.4 in the annexes).

Did these differences between rural and urban schools increase over the five years to 2019? In early primary language of instruction, across all countries, a statistically significant change of 17 points was observed. On the other hand, none of the changes within individual countries were significant. In early primary mathematics, there were no significant changes, either internationally or within any of the ten countries.

At the end of primary education, in both reading and mathematics, the changes were not significant either at international level or in the vast majority of countries. Significant changes were observed in only three countries: in Burundi, an increase in the differences in reading and mathematics by 21.8 points and 35.7 points respectively; in Togo, an increase in the difference in reading by 26.1 points; and in Senegal, a remarkable reduction in the difference in mathematics by 38.2 points.

Overall, these results therefore invalidate the hypothesis of a widening gap between rural and urban schools – the increase in differences between schools was not related to schools' locations.

Further analysis is needed both nationally and internationally in order to understand how differences between schools arise. Contextual variables such as type of school, social composition of schools, teachers' training and/or supervision, quality of infrastructure, etc. could be explanatory factors in this increase in the inequity of education systems observed by the present PASEC study.

41. In both 2014 and 2019, the response options were grouped together to create a dichotomous variable between urban and rural settings.

5.3. Trends in differences between students by certain individual or family characteristics

Following on from the previous section, the main purpose of which was to consider the increasing differences associated with the location of schools, this section examines two possible causes for the increase in performance differences, both between students and between schools. As the previous results indicate, in most countries, the lower-performing students had made less progress than their higher-performing counterparts. In view of this, it can therefore be conjectured that the differences between girls and boys and between socio-economically advantaged and disadvantaged children will have increased. Many other variables probably deserve to be investigated, but analysis of the causes for widening differences is worthy of a specific report in its own right. Subsequent secondary notes will be devoted to these different analyses.

5.3.1. Trends in educational performance by gender

Before the trends in differences by gender between 2014 and 2019 is discussed, it should be pointed out that the gender gap observed in the context of the PASEC studies has been relatively small. Across the countries as a whole, regardless of cycle or subject assessed, the difference has always been less than 10 points. In addition, at this level of analysis, none of the observed trends were statistically significant, as shown in Tables B5.5 to B5.8 in the annexes.

The same was true for trends at country level in most cases. However, significant trends were observed in early primary mathematics in Benin, Burundi and Côte d'Ivoire. A greater number of significant trends were observed at the end of primary education. In reading, for example, there were significant changes in Benin, Burundi and Senegal. In mathematics, there was a significant increase in the differences in favour of boys in Burkina Faso, Burundi, Chad, Congo and Senegal. By contrast, in Burundi, whereas girls had outperformed boys by 33 points in 2014, the situation was reversed in 2019 (with boys outperforming girls by 22.9 points).

The increase in performance differences observed at the start of primary schooling in particular was therefore unrelated to the gender gap. At the late primary stage several trends between 2014 and 2019 can be observed: the difference in favour of boys in mathematics was reduced in four countries; and there was a significant trend in reading, likewise in favour of girls, in two of the three countries.

The positive developments in favour of girls may derive from a twofold phenomenon of hyperselection and adaptation to school: according to a hypothesis already tested in research in educational sociology, young girls may develop strategies for adapting to school that enable some of them to counter the phenomenon of hyperselection. This hypothesis is also worthy of further investigation, and may be confirmed by research and secondary analysis.

5.3.2. Trends in performance by family environment

Population groups which are vulnerable for various reasons (social, health-related or due to climate problems or conflicts) are generally even more affected by an increase in differences. The growing differences in performance between students could therefore reveal inequalities in performance between children from socio-economically disadvantaged backgrounds and their more privileged classmates.

The PASEC*2014* and PASEC*2019* questionnaires included several questions relating to family environment. For the purpose of this comparative analysis by family environment, only the question relating to the presence of books in the home has been used, as this, as well as being a marker of the family's socio-economic level, signifies cultural openness and creates additional learning opportunities (PASEC, 2015).

42. https://www.globalpartnership.org/fr/blog/les-enfants-ameliorent-leurs-competences-en-mathematiques-au-niger

Tables B5.9 to B5.12 in the annexes show students' average performance in reading and in mathematics per cycle by the presence or absence of books in the home.

Across all countries, both at the beginning and at the end of schooling, no significant trends were observed.

Among the ten countries in this comparative study, the following main developments were observed: (i) an increase in performance differences by family resources (presence or absence of books) in Burundi, in both subjects at the early primary stage and in reading at the late primary stage, (ii) a reduction in differences in both subjects at the early primary stage in Senegal and (iii) an increase in performance differences in both reading and mathematics at the late primary stage in Côte d'Ivoire and Togo. Beyond these scattered changes, no general trend can really be discerned.

5.4. Context and measures of educational policies implemented by countries between 2015 and 2019

Partly as a follow-up to the publication of the results of the PASEC*2014* assessment, several countries implemented measures aimed at improving the performance of their education system. The most striking example was the urgent initiative to define a road map in Niger, where an assessment was carried out of all primary school teachers in the education system. In addition, certain technical and financial partners implemented urgent measures to support countries in redefining their strategy.

For example, in Niger, in connection with the 'School for All' project, the GPE[42] showed in 2018 that the children of Niger had made impressive progress in mathematics as a result of extra classroom time and joint, intensive support from teachers and communities. Some children's scores in mathematics doubled over a short period of three months in the project.

In Benin, social dialogue made it possible to bring recurring strike action by teachers to an end and hence increase the learning time during the school year. In addition, the country embarked on a major reform of school canteens. According to the World Bank (2019)[43], the establishment of canteens reduced the rate of absenteeism and school drop-out.

The impact of the school canteen project was the subject of a study[44] which found positive effects for more than 88% of the boys and 90% of the girls who benefited. According to the study, 'school officials commented positively on the impact of school canteens on the schooling, retention, attendance, output and academic performance of students, while students' parents emphasised that canteens had reduced the risk of their children dropping out and had a positive effect on their motivation to be at school and their work'.

In Burundi, according to the 2016 secondary data review report of the Education in an Emergency working group, 'the socio-political crisis that the country has experienced since April 2015 has exposed around 1.1 million Burundians throughout the country to physical and psychological threats, regardless of age, gender or ethnic group'. The report goes on to say that many girls and boys have suffered the effects of disrupted education. It also states that budget cuts have had a serious impact on the government's ability to finance and provide basic social services such as education. Additionally, the international sanctions imposed by donor countries have affected the country's economy and prevented parents from providing for their children.

43. https://www.banquemondiale.org/fr/news/feature/2019/05/06/benin-the-multiple-benefits-of-school-lunch?cid=ECR_FB_worldbank_FR_EXTP

44. http://documents1.worldbank.org/curated/en/314801542661746622/pdf/132215-FRENCH-WP-PUBLIC-19-11-2018-18-8-27-RapportIBMCANTINESJuilimgbk.pdf

With regard to Burkina Faso, the report published by Human Rights Watch in May 2020 shows that the increase in armed attacks against teachers, students and schools since 2017 has had and continues to have devastating repercussions on education provision that was already highly unequal.

In the CONFEMEN questionnaire relating to the education policy measures implemented between 2015 and 2019, the countries that responded[45] reported on the significant contribution of the PASEC*2014* assessment to the updating of indicators relating to the quality of their education system.

Table 5.13: Main education policy measures implemented by countries between 2015 and 2019

	Main measures	Direction[46] of trend in average performance in language of instruction and mathematics - Early primary		Direction of trend in average performance in reading and mathematics - Late primary	
Benin	Reorganisation of the school map Targeting of areas where educational performance indicators are critical Steering of interventions towards these areas as a priority Review of teacher training and school curricula Measures relating to educational access and retention Introduction of a new sector plan, developed with reference to the results of PASEC*2014*	↗	↗	↗	↗
Burundi	The results of PASEC*2014* have guided the ongoing educational reform[47]	=	=	↘	↘
Congo	Better steering and management of the education system through the response to human resource needs.	↗	↗	↗	=
Côte d'Ivoire	Project to improve the delivery of education services that targeted the northern educational zone, which had the lowest results in the PASEC*2014* assessment Introduction of the Education Sector Plan 2016-2025	↗	↗	↘	↘

45. The survey did not record any responses for Burkina Faso and Cameroon.

46. The performance trend direction is provided for information only, and does not indicate that there is a causal link with the measures mentioned in the first column.

47. https://www.globalpartnership.org/sites/default/files/plan_transitoire_education_du_burundi.pdf

Niger	Introduction of the Education and Training Sector Plan (2014-2024) Development of a quality roadmap Institutional reforms: creation of several education inspectorates and sectors to bring the education advisers closer to the teachers; regrouping of education types Curriculum reform with use of national languages in early education Promotion of preschool education Development of a national policy on girls' education (PNSF) Increase in the number of schools with school canteens Assessment of contract teachers (70% of teachers in primary education) Termination of contracts of contract teachers lacking the baseline skills covered by primary education Training of contract teachers who have mastered the baseline skills, but struggle with the content of the primary education curriculum Reform of pre-service teacher education; revision of the training design and method of assessing student teachers Reform of in-service training with educational supervision of teachers and specifications for each inspector and educational adviser Assignment of responsibility to school principals for the close supervision of teachers Training for all early grade teachers (CI-CP-CE1) in the teaching of reading and mathematics Promotion of a culture of assessment through training, awareness-raising of stakeholders, introduction of level tests at the start of the school year for all primary and teacher-training college students Introduction of a national assessment system (DNE)	↗	↗	↗	↗
Senegal	Affirmation of the value of pre-school learning with the acceptance in CP1 of 5-year-old children who have attended pre-school Limitation of the percentage of students authorised to repeat a grade to 5% of the student population	↗	↗	↗	=
Chad	Retraining of teachers at the teacher training colleges and of education advisers at the Departmental Centres for In-Service Training in Primary Education	↗	↗	↗	↘
Togo	Development and implementation of new curricula and textbooks for pre-school and primary school Construction of new teacher training colleges with recruitment and training of student teachers Training of teachers and awareness-raising in order to reduce grade repetition in primary school Grants to schools and research activities to improve the quality of primary schools	=	=	=	=

Note: = means no progress; ↘ means a decline in performance; ↗ means progress in performance

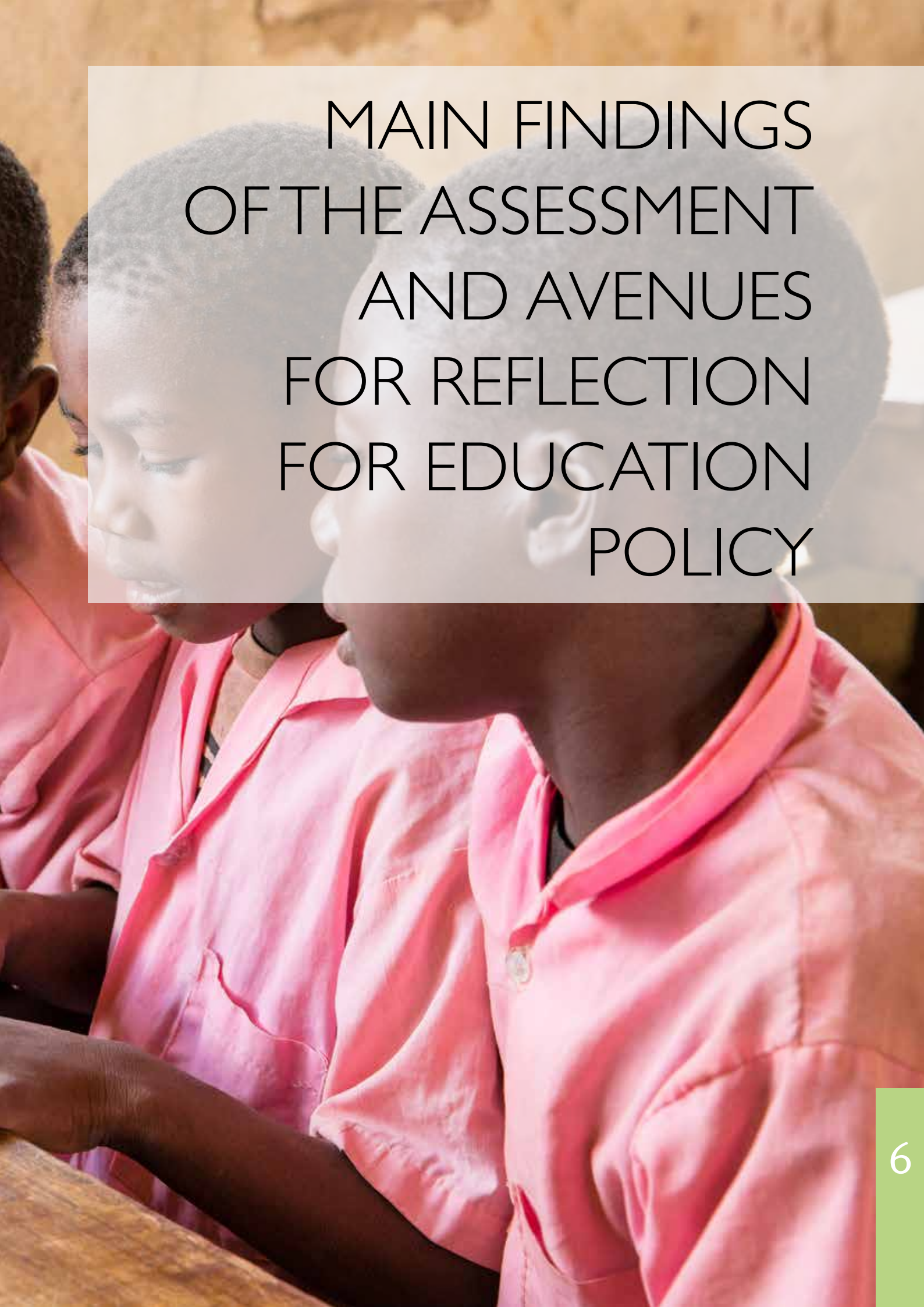
The analysis of education system trends between 2014 and 2019 identified an improvement in performance in a few countries, a decline in some countries and stagnation in others. The improvements may reflect the various measures implemented by countries in order to improve the quality of education and hence of learning, while the decline in some countries may be due to the specific situation there.

In support of the hypothesis on the reasons for performance improvements, for example, we could note the targeting of areas where PASEC*2014* identified education performance indicators in need of improvement in Benin, the establishment in the same country of a new sector plan aimed at improving the effectiveness and efficiency of the education system, and also the many reforms undertaken in Niger (for example, the reviewing of the level at which teachers are recruited with tests at several stages before their integration into the system, the reform of in-service training with the educational supervision of teachers, training for all early grade teachers in the teaching of reading and mathematics, and the intensified introduction of extra classroom time for certain pupils).

Although school principals reported in all ten countries that they organised extra hours of support for the lowest-performing students at both the start and end of primary education, the proportions of early primary students whose principals reported this were highest in Senegal (61.8%), Togo (56.5%), Niger (56.3%), Congo (48.8%) and Benin (46.4%). Two of these countries were the ones that had made the most progress in early primary education.

The analysis of trends in efficiency and equity also identified increasing differences in some cases, pointing to growing inequalities (between students and between schools). This finding suggests the need for governments to reduce these inequalities, given that all the sector plans in the ten countries identify the reduction of differences (in access, between genders, geographically, between urban and rural areas, in the distribution of teachers in different areas of the country, in the allocation of resources) as one of the policies during the period of implementation of the plan. It is therefore necessary to scrutinise the way in which these policies are implemented in the field.

Finally, it should be noted that the analyses carried out in this chapter are not exhaustive. Secondary analyses need to be performed at both national and international level in order to further improve our understanding and ability to explain the efficiency and equity of education systems. The PASEC*2019* national reports constitute a first step in this analysis.



MAIN FINDINGS OF THE ASSESSMENT AND AVENUES FOR REFLECTION FOR EDUCATION POLICY

Introduction

For the international community, meeting the challenge of quality education means improving students' learning while ensuring an acceptable level of retention throughout their school career. Student outcomes depend on countries' efforts to make educational provision more efficient and equitable. Specifically, such efforts concern the management of school supplies, classroom equipment, the provision of teachers at the right academic level and with proper preservice education and in-service training, the reduction of inequalities in the school environment, and so on.

Mindful of the importance of student learning in education systems, representatives of the global education community adopted SDG 4 by signing the Incheon Declaration at the World Education Forum in May 2015. The Declaration's ten targets are about supporting learning in all its forms in order to influence people's choices and create societies that are fairer, more inclusive and more sustainable. To foster progress towards the achievement of SDG 4 and its targets, the global education community adopted the Education 2030 framework for action in Paris in November 2015[48].

In response to this global initiative, African countries have developed a new education strategy for the African Union (AU)[49] called CESA (Continental Education Strategy for Africa) 16-25, covering the period from 2016 to 2025. Through this strategy, the African continent seeks to take on board the global goals more effectively, adapting them and making them compatible with its own goals. The strategy forms part of the AU's Agenda 2063[50] and makes it possible, among other things, to capitalise on post-2015 sector strategies such as STISA[51] (Science, Technology and Innovation Strategy for Africa) 2024, the revised Youth Decade Plan of Action[52] and the Continental Strategy for Technical and Vocational Education and Training[53], as well as new concerns about the education of young girls, school meals, school health, school administration and the teaching profession in terms of education, training and living and working conditions. CESA's fourth strategic objective is to ensure the acquisition of the required knowledge and skills and to improve completion rates at all levels and for all target groups, through national, regional and continental harmonisation processes.

All the countries participating in the PASEC*2019* assessment are committed to this strategy and have taken care to integrate it into their education sector plans and programmes in the form of areas which are now being treated as priorities. Depending on the initial level of inequalities observed in the field, each country plans to achieve objectives that will entail the improvement of both the quantitative and qualitative provision of education and the performance of learners over a defined period. In accordance with the education sector documents, several measures were developed or implemented from 2015 to 2019 to improve teaching and learning conditions (quality of buildings, teachers' qualifications, class sizes, availability of teaching and learning materials for students and teachers, quality of curricula, management of school time, school governance, etc.).

This chapter summarises the various findings arising from the analyses of the PASEC*2019* assessment data in order to set out some relevant avenues for reflection for education policy. In particular, it examines the effects of countries' measures on the results obtained.

48. http://uis.unesco.org/sites/default/files/documents/education-2030-incheon-framework-for-action-implementation-of-sdg4-2016-en.pdf

49. http://www.adeanet.org/fr/system/files/resources/cesa_16-25_french_v8_.pdf

50. https://au.int/sites/default/files/documents/36204-doc-agenda2063_popular_version_en.pdf

51. Science, technology and innovation strategy for Africa. Document accessible via the link https://au.int/sites/default/files/documents/37448-doc-stisa-2024_english.pdf

52. https://www.jeunesse.gov.bf/fileadmin/user_upload/plan_d_action_de_la_dn-cennie_africaine_52.pdf

53. https://au.int/sites/default/files/pressreleases/35308-pr-tvet-english_-_final_2.pdf

6.1. Student proficiency

6.1.1. Start of primary education

In the 14 countries participating in the PASEC*2019* assessment, the average performance at the start of primary education was estimated at 537.1 and 544.5 in language of instruction and mathematics respectively. These performance levels concealed various differences both between countries and within each country.

Across the 14 countries, more than 55% of students at the early primary stage had not reached the baseline level on the language of instruction proficiency scale. Such students experienced relatively significant learning difficulties in decoding writing and understanding short words, sentences and texts, as well as oral messages.

In view of this, measures for improved management of learning difficulties need to be implemented. Students need to receive explicit and systematic instruction[54] in the rules that govern the written code, to enable them to make links between written and spoken language[55]. Failure to master the basic processes of reading creates the risk of school dropout and illiteracy. Countries should continue to strengthen policies to promote the development of pre-school education, and if possible build on the recommendations given by CONFEMEN in its Reflection and Orientation Document for the 58th ministerial session: 'Promoting early childhood development and ensuring access to equitable and quality pre-school education: a foundation for successful learning'[56]. The provision of pre-school education is especially important given that mastery of the language of instruction is the key to other school learning, in particular for mathematics at early primary level.

Across the 14 countries participating in the assessment, an average of more than 71% of students had reached the baseline level in mathematics, including more than 37% who could recognise numbers up to 100, complete logical series, compare numbers, perform operations (addition and subtraction) on numbers less than 50 and use reasoning in basic problems. However, a significant portion of these students (28.8%) had difficulty handling concepts of location in space (below / above / beside) and recognising simple geometrical forms. Such students are more likely to encounter even greater difficulties in the rest of their schooling, especially as reasoning starts to become more important in problem-solving. It is therefore advisable to identify at this stage any students who are in this situation in order to implement monitoring and remedial measures.

The difficulties encountered by students in basic mathematical exercises raise questions about teaching practices with regard to quantity and number in the early primary grades. These difficulties may be linked to the level of students' comprehension and oral expression in the language of instruction. With this in mind, it would be useful to explore the relationship between students' first language and the language of instruction, as this may be a decisive factor in students' success, particularly at the early primary stage.

6.1.2. End of primary education

At the end of primary education, the average performance in the PASEC*2019* assessment across the participating countries was estimated at 519.7 and 498.4 points in reading and mathematics respectively. As at the start of primary education, these averages varied between countries and within countries.

In reading, more than half of students (52.1%) were below the baseline level, and therefore had difficulty learning to read. At this level of education, such students had difficulty in understanding isolated words derived from their daily life and isolated sentences, as well as in locating explicit information in short and medium texts by taking cues from the text and the questions. Some of them (5.9%) were routinely unable to apply the most basic knowledge and skills that the PASEC survey seeks to measure, even though they were about to enter lower secondary education.

In mathematics, more than 60% of students at the end of primary school were below the minimum or baseline level. These students found it difficult to answer short questions relating to the three cognitive processes covered by the mathematics test in the PASEC*2019* assessment: 1) knowing, 2) applying and 3) solving problems. In addition, they found it very difficult to perform elementary operations with decimals.

54. http://rire.ctreq.qc.ca/wp-content/uploads/2016/11/8-strategies-enseignement-hattie-marzano.pdf
55. http://bv.cdeacf.ca/EA_PDF/152789.pdf
56. https://www.confemen.org/wp-content/uploads/2019/06/DRO-2018-Version-finale.pdf

In both disciplines, whether at the beginning or at the end of primary schooling, students below the minimum proficiency levels experience multiple difficulties in acquiring the skills regarded as essential for continuing their education. This observation suggests the need to introduce or reinforce measures or activities promoting adaptation to school in order to help struggling students in terms of instruction, socialisation and qualification[57]. There is very little sign of such measures in the education sector plans of the countries participating in the PASEC*2019* assessment[58]. Involving various stakeholders (teachers, school principals, psychologists, social workers, parents of students, the local community, etc.) in managing struggling students could help improve the performance of the participating countries' education systems.

6.2. School environment and student performance

Among the background characteristics that can influence student performance, those relating to the school and out-of-school environment need to be considered. The results of the PASEC*2019* assessment reveal differences between schools in terms of student outcomes. More than 50% of the variation in reading and mathematics scores was explained by differences between schools. Improving the school environment could be used as a tool to increase equity within the framework of education policies. Countries should therefore reinforce policies on the allocation of educational resources according to the needs of different locations, schools and specific groups. Shortcomings in the quantity and quality of school infrastructure (classrooms, toilets, infirmary, library, canteen, etc.) and in human resources ('chalk in hand' teachers[59], social workers, psychologists, etc.) need to be addressed. Particular attention should also be paid to improving the governance of education systems. Decentralisation/deconcentration measures could, if designed and implemented judiciously in the field of education, promote effective management of differences between schools and thus make a positive contribution to student outcomes.

In terms of gender, it was observed that girls outperformed boys in reading while boys outperformed girls in mathematics. This was a familiar finding from the previous PASEC assessments, and the same point has been widely observed in international surveys of students' skills. Consequently, given the recurring nature of this observation, it would be advisable for countries to consider differentiated measures to increase the time and opportunities for reading among boys and to develop initiatives to improve girls' performance in mathematics. Additional studies to study socio-cultural, socio-economic and other factors outside school which may explain this difference could also be considered.

Most of the PASEC*2019* countries are characterised by a lack of access to pre-school education, which is confined to around a third of students. However, the results of the PASEC*2019* assessment show that pre-primary education has a special place in the development of children's basic skills, being positively linked to student learning outcomes. Many countries responded to SDG 4 by giving an important place to pre-school in the architecture of the education system and education sector plans after 2015. These measures did not yet seem to have borne fruit. The low rate of pre-school enrolment means that countries need to redouble their efforts to promote pre-school as a priority. Without a concerted effort, it will be difficult to achieve the goal of the 2030 Agenda of offering all children at least one year of pre-primary education.

Grade repetition had affected more than half of students during their primary schooling across all countries. This finding is concerning and raises questions about the internal efficiency of the participating countries' education systems. In addition, grade repetition appears to make it impossible for students to catch up with peers who have not repeated a grade. Here too, questions arise about the support given to students who are struggling at school. We therefore consider it vital to stress once again the importance of establishing a system for identifying, helping and monitoring students with learning difficulties to ensure that they adapt to school.

57. http://www.icem.ca/icem/adaptation.asp?titre=51

58. According to the results of a survey conducted by CONFEMEN's Observatory for the Quality of Education (OQE) on the basis of a questionnaire sent to the heads of national PASEC teams. The report on this survey, including both the responses to the questionnaire and an analysis of the education sector plans of these countries, will be published in early 2021.

59. A literal translation of a common expression used in French-speaking sub-Saharan Africa to refer to teachers actually in the classroom.

In terms of school management, in-service training for principals did not seem to have benefited all students so far, and particularly those with learning difficulties. The measures to strengthen the capacities of principals are therefore not really achieving the objectives set for them. A survey of the situation in this area and an assessment of the in-service training provided to principals are essential. This would involve examining the contents and methods of this training (situation analysis, reflective practices, etc.). Consideration should also be given to the pre-service education of school principals before they take up the position.

The PASEC*2019* countries' education systems are characterised by a largely public-sector education provision. However, the quality of education seems to be better in private schools versus public schools. Although countries' efforts need to converge on policies capable of ensuring quality education for all (SDG 4.1) on an equal footing, they must also focus on ensuring that public schools turn out a higher proportion of students with the necessary skills.

6.3. Teachers' characteristics, knowledge and skills

6.3.1. Teachers' knowledge and skills

The results of the PASEC*2019* survey show that a majority of teachers across the participating countries had a relatively satisfactory command of the subject content (reading comprehension and mathematics) taught at primary level. However, in view of the proportion of teachers located at Level 1 and below on the proficiency scales for reading comprehension (more than 15%) and mathematics (more than 35%), training measures targeting these teachers are urgently required. This training could be based on work focusing on the skills at each level of the reading comprehension and mathematics proficiency scales.

As well as paying special attention to teachers at Level 1 and below, it would also be appropriate to use specific training measures to maintain and reinforce the skills of those with a good command of the basic subject matter.

By contrast, teaching knowledge in reading comprehension and mathematics was much less sound. In other words, although teachers tended to have a good knowledge of the subject content they teach, they were much more likely to experience difficulties in analysing their educational approaches, choosing situations suited to the learning objectives, spotting common errors and identifying their causes so as to help students to progress.

All these findings indicate a need for pre-service education and/or in-service training extending beyond mastery of subject content and placing emphasis on the teaching of that content. Such education and training must reflect teachers' needs.

In view of these findings and of teachers' place in the learning process, there seems to be a need to promote an understanding of teaching as a profession requiring not just in-depth subject knowledge, but also specific professional skills (teaching skills, psychopedagogical skills, etc.) acquired and maintained through education, training and practice.

In this context, providing teachers with the necessary educational and teaching resources (books, digital tools, in particular computer hardware, software, access to digital platforms), so that they can improve their general level of culture and their professional qualifications is one possible direction worth exploring. The provision of these opportunities should be accompanied by encouragement and motivation of teachers to get involved in enhancing their knowledge and skills, so as to derive maximum benefit from them. This could improve student outcomes.

6.3.2. Teachers' experience and in-service training

The most striking results of the analysis of teachers' characteristics, knowledge and skills relate to their scores as a function of their length of service, level of academic education and participation in in-service training. These results give rise to two findings in most of the PASEC*2019* countries: first, teachers educated to university level outperformed those educated to secondary level in the survey tests, and second, teachers who reported long teaching experience (between 11 and 20 years) outperformed their less experienced colleagues (at most 5 years).

However, in most countries, teachers who had received in-service training scored no higher on the survey tests than those who had not. This result should not be perceived as calling into question in-service training, which has the recognised potential to enable teachers to improve their practices (Baribeau, 2009; Bidjang, 2005; Ekanga Lokoka, 2013; Masselter, 2004) and hence to give students better learning support (Etumangele, 2006; Mouélé, 2017; Vita, 2014). However, it does raise questions about the quality of these training programmes, and in particular their ability to take account of the specific needs of different categories of teachers (experienced/novices, university or secondary education, etc.).

These findings suggest that decision-makers and teachers should review the content and implementation of in-service training for teachers, and point to the need for particular attention to be paid to less experienced teachers in this context. They also indicate the need to make more use of the expertise of the most experienced teachers in pre-service education and in-service training. These important points should find their way into national policies on in-service training.

6.3.3. Teachers' perception of their material and social working conditions

In terms of working conditions, teachers generally regarded school curricula as satisfactory. However, their view of the quality of buildings and the availability of school supplies was negative in most countries.

In almost all countries, most teachers expressed a favourable opinion on the management of their school, and also reported that they had good relations with their colleagues and the community[60].

The vast majority of teachers across the countries as a whole were less happy about their salary conditions. The same was true of their training and career opportunities.

These results support the view that national strategies need to be introduced for the professional development of teachers, including the provision of a decent physical working environment and of training and career opportunities for all. Salary conditions need to be improved in order to boost teachers' motivation and make the profession more attractive.

More specifically, the introduction of an effective national strategy for appropriate in-service training (cf. previous paragraph) must enable teachers to improve their qualifications, modify or extend the scope of their activities, seek promotion, and stay informed about the latest developments in both content and methods in their subject areas and in the teaching profession.

An improvement in teachers' status is desirable, in line with the needs and challenges of national education contexts, in order to promote the effectiveness of teaching and so that teachers are able to devote themselves fully to their work because their remuneration ensures a reasonable standard of living for themselves and their families.

These various policy approaches relating to teachers should help to consolidate the positive school conditions which can already be perceived through teachers' upbeat assessment of school management and curricula, and to maintain good relations within the teaching workforce and between educators and the community.

60. School-level data collection methods cannot exclude a social desirability bias.

6.4. Trends in education system efficiency and equity

The two cycles (2014 and 2019) of the PASEC survey made it possible to analyse developments in the efficiency and equity of the education systems of the ten sub-Saharan African countries involved in both cycles. At least six main findings emerge from this analysis. (i) Inequalities in terms of skills in the different countries were found between students, but to a far greater extent between schools; (ii) the increase in differences between the lowest- and highest-performing was primarily accompanied by an increase in differences between schools; (iii) the extent of inequalities in performance among students varied from country to country; (iv) improvements in performance were more pronounced among the top performers; (v) performance differences increased between the lowest and highest performers; (vi) performance differences by gender had persisted and changed in the different subjects.

Improving the performance of students, especially the lowest-performing students, without adversely affecting the performance of the top performers represents a major challenge in terms of both the efficiency and the equity of education systems.

These various findings underline the need for governments to address certain inequalities, for example those of a geographical nature. Although social and geographical inequalities may be correlated, reducing inequalities of a geographical order is one of the challenges that education systems have set themselves in establishing sectoral education plans. It is therefore important to scrutinise the way in which policies to reduce geographical inequalities are implemented and to continue efforts to reduce these inequalities. With this in mind, it is important for resources (material, financial, human, etc.) to be distributed between schools (however remotely located) fairly.

The pursuit of the strategies put in place to reduce social inequalities in parallel with the reduction of geographical inequalities must take place within a framework that prevents any further widening of the gap between high- and low-performing students. The low performers should receive support to prevent the number of failing students from increasing.

Regarding the gender parity issue, there is a need to intensify efforts in favour of girls and to motivate them to learn mathematics. To this end, careful examination is needed of strategies for eliminating sexist stereotypes, which should include the community, teachers and school principals.

Conclusion

The results of the assessment once again demonstrate the impact of school context – material conditions and supplies of teaching and educational materials – on outcomes. However, the establishment of these conditions is often linked to factors external to schools, in particular the overall governance of the education system and the national distribution of resources, which may depend on national choices and practices in terms of decentralisation. Other factors include political choices regarding teacher training and educational approaches, in particular with regard to dominant paradigms (the skills-based approach) and linguistic issues (language of instruction / bilingualism) which also affect an education system's internal efficiency. To this must be added disparities between regions (urban, rural, isolated areas, conflict situations, etc.), differences between different types of school (public, private, etc.) and the possible effects of socio-cultural or socio-economic factors on results by gender.

These factors can be hard to control without the involvement of other actors, often outside schools, in particular researchers, academics and policy-makers, implying the need for partnerships to be formed for a more systemic approach to the problems of the education system.

In view of the foregoing analyses and the resulting lines of reflection for the countries, CONFEMEN's support for the countries will be stepped up, in keeping with the reasons for setting up this assessment in the first place –in particular, the desire to record student performance to provide input for education policies. The definition of roadmaps at national level, resulting from the use of the main results to improve learning and reduce disparities in the countries, constitutes a key element in establishing or redirecting national education policies.

To this end, it will be necessary (i) to follow the national strategies for achieving the targets of SDG 4 in order to increase the impact on the quality of learning outcomes and the efficiency of education systems; (ii) to work on the teacher issue in an effort to achieve high-quality learning outcomes and to explore in more detail the external factors in the quality of learning outcomes. In addition, secondary analyses should be carried out in order to explore certain issues in more detail.

Epilogue

This report on the second international assessment of PASEC (PASEC*2019*), bringing together fourteen countries, reflects CONFEMEN's missions, including the need to provide countries with evidence to help them manage their education systems more effectively. This second assessment also enables the countries involved in the first assessment (PASEC*2014*) to monitor the development of certain parameters of their education systems, particularly those relating to quality. The PASEC*2019* assessment introduced a major innovation: in addition to the assessment of student performance in the participating countries, a survey was conducted on teachers' command of subject-related and teaching knowledge and skills, in response to a request from the education community in the sub-Saharan countries for a better understanding of teachers' education and training needs. CONFEMEN is delighted with the success that its efforts have met with, in partnership with the participating countries and in collaboration with the main technical and financial partners, in particular the French Development Agency and the Swiss Agency for Development and Cooperation.

An analysis of the education systems of fourteen countries presented in this report has made it possible to study the link between school and external factors and students' learning outcomes, and to provide some information about teachers' mastery of subject content and teaching skills.

This international report will be supplemented by fourteen national reports: one for each participating country. The analyses carried out in this report will be reproduced at national level for each participating country; the national context will also be taken into account and certain complementary themes addressed. These fourteen national reports will be produced in 2021.

To facilitate access to and use of the data from this assessment by researchers and the education community with a view to providing input for education-related debates, PASEC will make these data, the operating manual and the technical report on the assessment available to them.

The countries' commitment to the new vision of education set out in Sustainable Development Goal 4, 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all', associated with the SDG 4 Framework for Action - Education 2030, which set guidelines for its implementation, implies the need for data to assess the level of attainment of SDG 4. The countries' participation in PASEC*2019* represents a response to this requirement, making data available that provide information about and enable the monitoring of certain SDG 4 indicators. The results of this assessment show that significant efforts still need to be made by the participating countries to be on track for 2030.

PASEC's next collective assessment is sure to cover a larger number of countries and will thus enable CONFEMEN to help more countries manage their education systems and to provide information on certain SDG 4 monitoring indicators for these countries.

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ANNEXES


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Annex A
Examples of PASEC*2019* test items

Annex AI. Examples of PASEC*2019* test items - Early primary

A1.1 Language of instruction test

A set of exercises reflecting the texts and questions that made up the PASEC*2019* language test accompanies the description of each level of the proficiency scale, to give an idea of the characteristics of the questions and the strategies used by students to answer them. These items have been placed in the public domain and are free of copyright.

A1.1.1 Level 4

Intermediate reader: moving towards independent reading and understanding sentences and texts.

Understanding a text

In order to respond orally to the questions in the 'Understanding a text' exercise chosen to illustrate this level, the student must read the text silently or aloud, understand a question asked orally, then answer the question by looking for explicit information in the text. In this exercise, the quality of reading is not correct-ed: only the answers to the comprehension questions are assessed. The student has time to reread the questions and the part of the text that relates to the question, if desired. This type of question is classified in the area 'reading comprehension'.

Goal: Understanding a text

Area: Reading comprehension

Content: The student is able, in a maximum of 15 seconds, to answer the questions on the basis of the material be-low

C'est la fête à l'école. Les maîtres et les maîtresses jouent de la musique dans la cour. Les petits élèves courent et les plus grands dansent.

1. Où se passe la fête ?
2. Que font les maîtres ?
3. Qui danse ?

For example, to answer Question 3, 'Who dances?', in a maximum of 15 seconds, the student can reread the question and/or look in the text for the part about the place where bread is sold. The way the question is introduced makes it easier to extract the information, as the verb is included in the question. The accept-ed oral answer is 'the big ones', 'the bigger ones' or 'the big students'.

A1.1.2 Level 3

Learner reader: moving towards the perfecting of decoding skills, listening skills and understanding of written words.

Examples of exercises illustrating the skills of students at Level 3

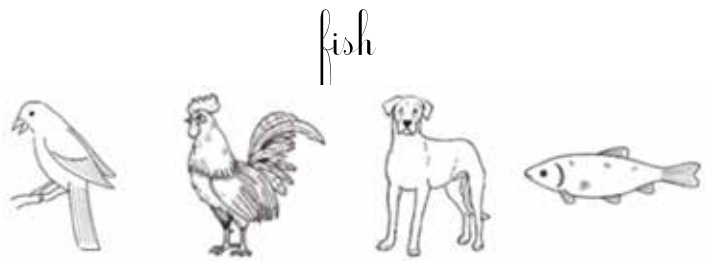
Decoding the meaning of words

The student is able, in a maximum of 15 seconds, to establish a graphophonetic correspondence in order to work out the meaning of an isolated familiar word. He or she must then show which image in a set of imag-es from the same lexical field matches the meaning of the word.

Goal: Understanding a text

Area: Reading comprehension

Content: The student is able, in a maximum of 15 seconds, to show which image goes with the word. (Fish) from the illustration below.



In this example, the student must read or find graphic clues in the word 'fish' to pick the image that match-es the word. These questions are classified in the area 'Reading comprehension'.

A1.1.3 Level 2

Emergent reader: towards developing decoding skills and strengthening listening comprehension skills.

Examples of exercises illustrating the skills of students at Level 2

Decoding the meaning of words

The student must show which in a set of four images from the same lexical field matches a word which is read out (in a maximum of 5 seconds).

Goal: Recognising vocabulary

Area: Listening comprehension

Content: The student is able, in a maximum of 5 seconds, to pick the horse from the other animals on the basis of the illustration below.

In this example, the student must pick the image that corresponds to the question: 'Show me the horse'. This item is classified in the area of 'Listening comprehension' and measures students' familiarity with eve-ryday vocabulary.

A1.1.4 Level 1

New reader: first contact with spoken and written language

Examples of exercises illustrating the skills of students at Level 1

Recognising vocabulary

The student must point to the part of the body specified in the question in a maximum of 5 seconds. In this example, the student must point to one of his/her feet, in response to the question: 'Show me your foot'.

Goal: Understanding vocabulary

Area: Listening comprehension

Content: The student is able to point to his/her foot in a maximum of 5 seconds.

A1.1.5 Below Level 1

Students at this level do not sufficiently demonstrate the skills in the language of instruction measured by this test. These students struggle with the knowledge and skills of Level 1.

A1. 2 Mathematics test

A set of exercises reflecting the questions that made up the PASEC 2019 mathematics test accompanies the description of each level of the proficiency scale, to give an idea of the characteristics of the questions and the strategies used by students to answer them. These items have been placed in the public domain and are free of copyright.

A1.2.1 Level 3

Examples of exercises illustrating the skills of students at Level 3

Adding two numbers whose sum is greater than 50

As an example of 'Adding two numbers whose sum is greater than 50', the task chosen to illustrate this level, the student must find the correct result of the sum '33 + 29' in maximum of 2 minutes, using rough paper and/or a slate.

Goal: Adding and subtracting

Area: Arithmetic

Content: The student is able to add 33 and 29 on the basis of the material below:

$$33+29 =$$

The student must use a suitable approach to find the correct answer in the given time. Possible ways of doing so include counting on fingers, drawing sticks, starting from the larger number, 33, and adding 29 units, or doing the written calculation with regrouping. This question is classified in the area 'arithmetic'.

A1.2.2 Level 2

Examples of exercises illustrating the skills of students at Level 2

Determining spatial location

The student must point to the image of the child who is in front of the box in a maximum of 5 seconds. He or she must identify the correct answer among five drawings each showing a child and one or more boxes in different spatial arrangements.

Goal: Determining spatial location

Area: Geometry, space and measurement

Content: The student is able to show which child is in front of the box on the basis of the material below:

An understanding of positional terms such as 'in front of', 'above', 'in the middle' or 'next to' is essential for determining spatial location and acquiring a more thorough understanding of geometry. This question is classified in the area 'geometry, space and measurement'.

A1.2.3 Level 1

Example of an exercise illustrating the skills of students at Level 1

Recognising numbers below 10 / Identifying written numbers

Students must orally identify number symbols chosen at random and placed in a grid.

Goal: Recognising figures and numbers

Area: Arithmetic

Correct answer: 1

Content: The student is able to read the first row of numbers on the basis of the material below:

2 9 3 6

This item measures students' ability to identify written number symbols. This exercise shows whether students are able to read the numbers between 1 and 20.

A1.2.4 Below Level 1

Students at this level do not sufficiently demonstrate the skills measured by this test. These students struggle with the knowledge and skills of Level 1.

Annex A1.3 Examples of early primary items relating to the sections 'Focus on students' results'

A1.3.1 Reading the letters of the alphabet with ease

The test administrator asks the student to say out loud the sound or name of as many letters of the alphabet as possible in one (1) minute. The letters are arranged randomly in a grid. The time taken to read each letter is measured with a timer; students who get stuck on a letter are invited to move on to the next one after five (5) seconds. Students are assessed on their ability to read easily and fluently. Two examples are given to ensure that all students understand what they have to do.

e	s	a	i	t
n	r	u	l	o
d	c	p	m	v
q	f	b	g	h
j	x	y	z	w
k				

A1.3.2 Reading familiar words with ease

The test administrator asks the student to read aloud many isolated and irregular words as possible in one (1) minute. The words are arranged in a 40-word grid according to their frequency of appearance in a number of primary school textbooks and on the basis of the MANULEX database (Lété, Sprenger-Charolles, Colé, 2004). The time taken to read the words is measured. Students who get stuck on a word are invited to move on to the next one after five (5) seconds. Students are assessed on their ability to read easily and fluently.

you	a	of	the	he
one	she	it	is	his
by	my	friend	mother	in
on	little	tuesday	bicycle	baby
for	read	fish	we	have
cat	big	see	verb	say

A1.3.3 Counting up to 100

The administrator asks the student to count from one to the highest number he or she can reach before mak-ing a mistake or hesitating (more than 5 seconds on a number) or until two (2) minutes have elapsed. The counting time is measured with a timer. The administrator records the last number that is read correctly or reached after 2 minutes. The student is encouraged at the start of the exercise by having the administrator count orally with him or her up to 3.

A1.3.4 Solving addition and subtraction problems

The test administrator asks the student to perform 6 calculations: 3 additions and 3 subtractions. The calcula-tions are presented one by one by the administrator, who shows it to the student on a sheet of paper and reads it out at the same time. They are presented in increasing order of difficulty. The student has a maximum of one minute for simple calculations (result below 20) and two minutes for harder calculations (result above 20). If the student exceeds the allotted time to complete the calculation, the administrator records an incor-rect answer and moves on to the next calculation. The student can use a slate or a sheet of paper to do this exercise, as in a classroom situation.

8 + 5 =
13 - 7 =
14 + 23 =
33 + 29 =
34 - 11 =
50 - 18 =

Annex A2. Examples of PASEC*2019* test items - Late primary

A.2. 1Reading test

A set of exercises reflecting the texts and questions that made up the PASEC 2019 test accompanies the description of each level of the proficiency scale, to give an idea of the characteristics of the questions and the strategies used by students to answer them. These items have been placed in the public domain and are free of copyright.

The following short literary text has been released so that two of its questions can illustrate Levels 4, 3 and 2 of the late primary proficiency scale.

The following text describes an everyday situation in a house. Read the text and answer the questions that follow.

"Here's some soap and water; wash yourselves! Scrub your arms and legs well".

– "I've finished. Can I have the towel please?"

– "Dry your hair too!"

– "Mum, my brother's throwing water at me."

– "Stop annoying your sister! I've put your clothes on the chair."

Texte inédit

A2.1.1 Level 4

What does the text describe?

A. ☐ A lesson

B. ☐ A meal

C. ☐ A game

D. ☐ Getting washed

When they read a text, students at this level are able to identify the author's intention, perceive the implicit meaning, and interpret a character's feelings. To answer the question about the text above, which has been chosen to illustrate this level, the student must have taken account of the different stages of the story and rely on his or her own experience and knowledge to infer the meaning of the story, which is about getting washed. This question is classified under the cognitive process of 'Interpreting and combining information' and relates to a short narrative text.

A2.1.2 Level 3

What does the character ask for in line 2?

A. ☐ Soap

B. ☐ Water

C. ☐ A towel

D. ☐ Clothes

To answer the question 'What does the character ask for in line 2?', which has been chosen to illustrate this level, the student must use the explicit information present in the second line of the text. This question is classified under the cognitive process of 'Extracting explicit information', since the information that needs to be used to find the answer, 'a towel', is clearly identifiable in the text.

A2.1.3 Level 2

Where does the story take place?

A. ☐ In a school

B. ☐ In a market

C. ☐ In a hospital

D. ☐ In a house

To answer the question 'Where does the story take place?', which has been chosen to illustrate this level, the student must use explicit information present in different parts of the document. It becomes clear from the presentation of the text that it describes a situation of daily life in a house. This question is classified under the cognitive process of 'Extracting explicit information', since the information that needs to be used is clearly identifiable in the text.

A2.1.4 Level 1

Tick the word that matches the image.

A. ☐ Ruler

B. ☐ Knife

C. ☐ Pen

D. ☐ Scissors

To answer the above question, which has been chosen to illustrate this level, the student must match the im-age to the appropriate written word.

A2.2 Mathematics test

A set of exercises reflecting the questions that made up the PASEC 2019 mathematics test accompanies the description of each level of the proficiency scale, to give an idea of the characteristics of the questions and the strategies used by students to answer them. These items have been placed in the public domain and are free of copyright.

A2.2.1 Level 3

Proportionality with rule of three

Mathematical goal: Numbers and operations

Cognitive processes: Solving problems

Correct answer: 2

A shopkeeper sells 12 doughnuts for F1,000.
What is the price of 84 doughnuts?

A. ☐ F 1 096

B. ☐ F 7 000

C. ☐ F 12 000

D. ☐ F 84 000

A2.2.2 Level 2

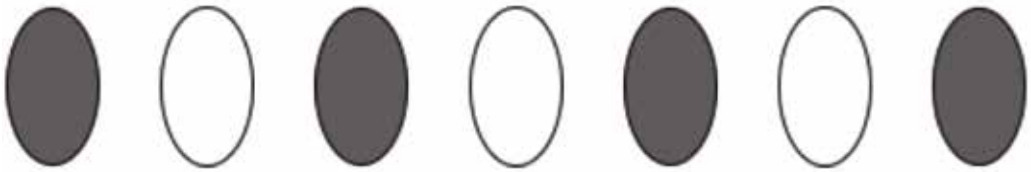
Understanding fractions

Mathematical goal: Numbers and operations

Cognitive processes: Knowing

Correct answer: 2

A shopkeeper sells 12 doughnuts for F1,000.
What is the price of 84 doughnuts?



A. ☐ 3/7

B. ☐ 4/7

C. ☐ 7/4

D. ☐ 4/3

A2.2.3 Level 1

Proportionality with rule of three

Mathematical goal: Quantities and measures

Cognitive processes: Knowing

Correct answer: 3

Which of the following units is used to express volume?

A. ☐ metres

B. ☐ square metres

C. ☐ cubic metres

D. ☐ decametres

Annex A3. Tools of the PASEC*2019* teacher survey

A.3. 1 Reading comprehension and mathematics

The PASEC*2019* teacher survey focused primarily on measuring teachers' command of the subject content they teach (mathematics and reading comprehension):

- Teachers master reading comprehension in the language of instruction, they can understand the meaning of what they read and have sufficient knowledge of the structures of the language to teach it as a school subject and use it as the language of instruction in primary education. The teacher has acquired the mathematical knowledge he or she is expected to teach and has sufficient reasoning capacity to solve the mathematics problems that primary students may be set.

The survey instruments assess the skills that students are expected to have acquired by the end of primary education, regardless of the class supervised by the teacher. The underlying principle here was that primary teachers must be able to teach at all levels of primary education, as they may be assigned to a class at a differ-ent level at any time. A further consideration was that all teachers need to be aware of the skills profile of a student at the end of the sixth grade. Teachers' work during a school year is part of a larger process, and con-tributes to the achievement of these end-of-cycle skills. It is therefore inconceivable for a teacher who is en-trusted with such a role to lack the knowledge and skills that he or she must impart to the students. Finally, from a cognitive point of view, a teacher who has not attained the level of late primary education will have difficulty using the available professional resources (teaching guides, websites, manuals) and benefiting from in-service training in the context of professional development.

This focus of the teacher survey on command of the subject content taught at the end of primary education was suggested in particular by the work of Hill and Ball (2004), who examined the types of mathematical knowledge required by teachers and described content knowledge in relation to students (Knowledge of con-tent and students)1. Hill and Ball argue that this knowledge is used, for example, to anticipate students' reason-ing or the degree of difficulty of the tasks they are set. Teachers also need to be able to recognise and inter-pret students' thinking. To do this, they must combine their mathematical understanding with their knowledge of the students and their mathematical reasoning. Hill and Ball then describe content knowledge in relation to teaching (Knowledge of content and teaching), presenting it as a combination of mathematics and teaching. Finally, they refer to knowledge of curricula.

In the PASEC teacher survey, the subject content assessed was consistent with the concepts defined in the referential framework for the student tests: explicit and implicit understanding of various texts and knowledge of mathematical concepts and procedures, the use of mathematical formulae and the solving of problems in-volving numbers and operations, measurement quantities and space and geometry. The items were also classi-fied according to three levels of complexity in the primary school curriculum with reference to the main teacher levels in primary education: basic, intermediate and expert. Thus, the tests assessed teachers' ability to master the subject matter of both early and late primary education. The tests were organised so as to offer a balanced distribution of items according to specific content areas, cognitive processes and levels of complexi-ty. Although it is obvious that teachers must have a thorough understanding of the taught subject content, the teaching/learning process is so complex and involves so many other components (teaching skills, knowledge of educational theory, attitudes, values, etc.) that the PASEC teacher survey did not examine the link between teachers' results and the performance of their students.

1. Dans le cadre de l'évaluation SACMEQ les enseignants sont concomitamment avec les élèves de fin de primaire sur les mêmes contenus en anglais ou en Mathematics selon la matière enseignée.

A.3. 2. Teaching reading comprehension

My first flight

The item 'My first flight' involves identification by teachers of the source of a student's misunderstanding.

A teacher asks a student to read a text. The student reads the following text aloud.

When I was little, I slept in an egg that was all white. My mother sat on me to keep me warm. One day, my mother got up, chirping. That's when I first met the dear one who had been sitting on me. As I wasn't able to fly yet, my mother would bring me food. Weeks went by, and it was time for me to make my first flight...

After the student has read the text aloud. the teacher asks the following question.

Who is telling the story?

The student replies:

A child.

The student's answer to this reading comprehension question is wrong.

What do you think needs to be worked on with this student? Tick the right answer. There is only one possible answer.

The student's response shows the need to...

A. ☐ Work on the literal meaning

B. ☐ Work on a longer text

C. ☐ Work on the implicit meaning > *X Correct answer*

D. ☐ Work on decoding text

A.3. 3. Teaching mathematics

A.3. 3. 1. Fatima's logic

The first, 'Fatima's logic', requires an analysis of the approach taken by a student (Fatima) to a task involving transcribing a whole natural number written in words into numerals.

The teachers are required to give an accurate analysis of Fatima's incorrect answer, which arose from translat-ing each pair of words as a number.

Fatima's teacher asks her to write in numerals the number

Five thousand three hundred and twenty-six

Fatima writes the following answer:

500030026

What is the most plausible explanation for the answer given by Fatima?

A. ☐ Fatima failed to read the number she was supposed to write in numerals

B. ☐ Fatima does not understand the place value chart properly

C. ☐ Fatima translated each pair of written words into a number > *X Correct answer*

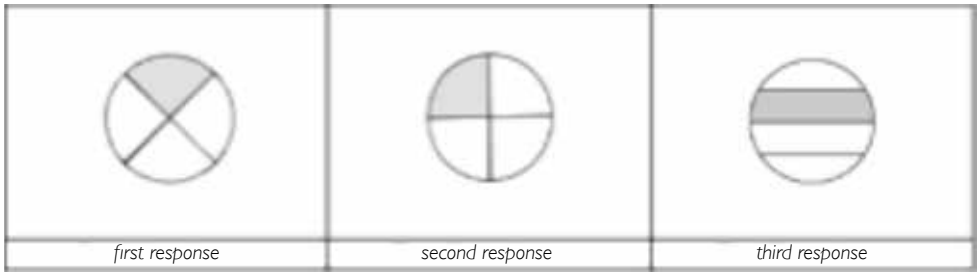
D. ☐ Fatima's logic is completely nonsensical.

A.3. 3. 2. A quarter of a disc

The item 'A quarter of a disc' is about fractions. Teachers are asked about the reason for the mistake and encouraged to pay attention to the concept of equal shares when dividing an object. In fact, only the first two student responses are correct (solution B).

A teacher asks his students to colour in grey the fraction representing one quarter of a disc.

When marking their work. he notices that three answers are often given.



Which of the following statements is correct?

A. ☐ Only the second answer is correct

B. ☐ Only the first and second answers are correct > *X Correct answer*

C. ☐ Only the second and third answers are correct

D. ☐ All three answers are correct

Annex B
Data from the PASEC2019 survey

Annex B1. Data for Chapter 1

Table B1.1: Planned and actual school samples and participation rates - Early primary

	Planned sample	Planned sample	Unweighted participation rate without replacement schools	Weighted participation rate without replacement schools	Unweighted participation rate with replacement schools	Weighted participation rate with replacement schools
Benin	116	116	100.0%	100.0%	100.0%	100.0%
Burkina Faso	150	131	84.9%	87.5%	87.3%	90.0%
Burundi	109	109	100.0%	100.0%	100.0%	100.0%
Cameroon	140	139	98.6%	98.9%	99.3%	99.1%
Congo	125	122	95.2%	98.6%	97.6%	99.2%
Côte d'ivoire	90	87	96.7%	97.1%	96.7%	97.1%
Gabon	95	93	91.6%	90.1%	97.9%	97.8%
Guinea	90	87	93.3%	94.1%	96.7%	96.8%
Madagascar	135	134	97.0%	97.8%	99.3%	99.6%
Niger	150	143	92.7%	92.0%	95.3%	95.7%
DRC	90	79	70.1%	72.0%	87.8%	90.2%
Senegal	90	87	95.6%	95.9%	96.7%	97.1%
Chad	150	144	94.7%	97.5%	96.0%	99.6%
Togo	140	140	100.0%	100.0%	100.0%	100.0%

Table B1.2: Planned and actual student samples and participation rates - Early primary

	Number of students sampled	Number of students participating	Number of students excluded	Number of students absent	Unweighted participation rate	Weighted participation rate
Benin	1654	1654	0	0	100.0%	100.0%
Burkina Faso	1932	1884	9	39	98.0%	97.9%
Burundi	1727	1664	4	59	96.6%	96.5%
Cameroon	2084	1780	28	276	86.7%	85.2%
Congo	1730	1553	2	175	89.9%	91.6%
Côte d'ivoire	1352	1332	0	20	98.5%	98.5%
Gabon	1216	1157	4	55	95.5%	95.3%
Guinea	1086	1086	0	0	100.0%	100.0%
Madagascar	2113	1883	7	223	89.4%	91.2%
Niger	1845	1730	0	115	93.1%	93.3%
DRC	1062	1050	0	12	98.9%	98.7%
Senegal	1345	1341	1	3	99.8%	99.7%
Chad	1843	1727	1	115	93.8%	94.0%
Togo	2200	2092	20	88	96.0%	96.2%

Table B1.3: Planned and actual school samples and participation rates - Late primary

	Planned sample	Planned sample	Unweighted participation rate without replacement schools	Weighted participation rate without replacement schools	Unweighted participation rate with replacement schools	Weighted participation rate with replacement schools
Benin	232	230	99.1%	99.1%	99.1%	99.1%
Burkina Faso	400	377	92.5%	93.8%	94.3%	95.6%
Burundi	218	216	99.1%	98.9%	99.1%	98.9%
Cameroon	280	276	97.5%	96.2%	98.6%	97.7%
Congo	250	245	95.2%	96.9%	98.0%	98.7%
Côte d'ivoire	180	179	99.4%	99.5%	99.4%	99.5%
Gabon	190	190	94.7%	97.6%	100.0%	100.0%
Guinea	180	179	98.3%	97.6%	99.4%	99.4%
Madagascar	265	265	97.7%	97.2%	100.0%	100.0%
Niger	286	284	96.5%	97.6%	99.3%	99.3%
DRC	267	246	79.1%	81.7%	92.1%	92.1%
Senegal	180	180	100.0%	100.0%	100.0%	100.0%
Chad	418	393	91.9%	94.9%	94.0%	96.6%
Togo	280	280	100.0%	100.0%	100.0%	100.0%

Table B1.4: Planned and actual student samples and participation rates - Late primary

	Number of students sampled	Number of students participating	Number of students excluded	Number of students absent	Unweighted participation rate	Weighted participation rate
Benin	3823	3823	0	0	100.0%	100.0%
Burkina Faso	6619	6499	12	108	98.4%	98.6%
Burundi	5039	4908	2	129	97.4%	97.6%
Cameroon	5151	4723	10	418	92.0%	94.5%
Congo	4062	3925	0	137	96.6%	96.5%
Côte d'ivoire	3844	3811	1	32	99.2%	99.1%
Gabon	3006	2930	8	68	97.7%	97.7%
Guinea	2826	2825	0	1	100.0%	100.0%
Madagascar	4940	4758	6	176	96.4%	97.1%
Niger	5917	5579	0	338	94.3%	94.8%
DRC	4489	4380	0	109	97.6%	97.8%
Senegal	3845	3832	0	13	99.7%	99.7%
Chad	4932	4824	0	108	97.9%	97.6%
Togo	6206	6117	3	86	98.6%	98.6%

Table B1.5: Number of participating teachers

	Number of participating teachers
Benin	1096
Burkina Faso	1946
Burundi	1743
Cameroon	1246
Congo	1159
Côte d'ivoire	974
Gabon	1186
Guinea	875
Madagascar	1391
Niger	1719
DRC	1844
Senegal	1190
Chad	1339
Togo	1433

Annex B2. Data for Chapter 2

Table B2.1: Percentage distribution of students on the PASEC2019 language of instruction proficiency scale - Early primary

	Level <1		Level 1		Level 2		Level 3		Level 4	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	8.5	1.5	23.0	2.0	30.9	2.2	19.6	1.9	18.1	2.5
Burkina Faso	16.8	2.8	18.4	1.7	30.6	2.1	21.0	2.1	13.2	1.9
Burundi	0.1	0.1	3.6	0.7	17.5	1.5	23.9	1.8	55.0	2.1
Cameroon	11.8	2.0	20.7	2.2	28.1	2.3	19.4	2.1	20.0	2.6
Congo	1.8	0.5	10.9	1.4	24.0	2.4	27.2	2.0	36.1	3.3
Cote d'ivoire	4.7	1.2	22.6	2.1	39.6	2.9	21.6	2.0	11.5	1.9
Gabon	0.4	0.3	6.1	1.4	27.5	3.7	25.6	2.7	40.5	5.1
Guinea	23.3	3.5	26.4	2.5	27.0	2.9	15.3	2.8	8.0	2.1
Madagascar	1.9	0.6	14.0	2.0	28.7	2.7	21.5	1.5	33.8	3.1
Niger	8.5	1.5	18.3	1.9	28.9	2.2	24.7	1.8	19.7	2.1
DRC	5.6	2.0	18.4	3.4	34.4	3.8	23.2	3.6	18.4	3.7
Senegal	5.4	1.1	19.7	2.0	27.3	2.3	18.2	1.8	29.5	3.4
Chad	9.6	2.3	23.9	2.9	32.5	2.8	20.9	2.9	13.1	2.7
Togo	23.7	2.5	29.7	2.0	22.2	1.9	12.8	1.5	11.7	1.7
Mean	8.7	0.5	18.3	0.5	28.5	0.6	21.1	0.5	23.5	0.8

Table B2.2: Percentage distribution of students on the PASEC2019 mathematics proficiency scale - Early primary

	Level <1		Level 1		Level 2		Level 3	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	11.0	1.4	27.1	1.9	33.1	2.1	28.9	2.6
Burkina Faso	15.2	2.5	23.7	1.9	40.1	2.3	21.1	2.3
Burundi	0.0	0.0	1.4	0.4	22.0	1.6	76.6	1.8
Cameroon	11.7	2.2	30.2	3.1	29.0	1.9	29.1	3.1
Congo	1.0	0.4	12.7	1.4	33.1	2.3	53.2	2.6
Cote d'ivoire	4.6	0.9	27.3	1.9	47.0	2.5	21.0	2.3
Gabon	0.4	0.3	11.1	2.2	29.3	3.2	59.2	4.4
Guinea	14.6	2.3	25.2	2.2	28.8	2.0	31.4	3.2
Madagascar	1.3	0.4	19.3	1.7	44.0	2.2	35.4	2.5
Niger	9.1	1.6	23.8	2.4	29.7	1.9	37.4	2.6
DRC	4.0	1.0	19.1	2.7	33.8	3.3	43.0	3.5
Senegal	3.6	0.9	17.3	1.9	35.7	2.0	43.4	2.7
Chad	9.7	1.7	25.8	2.0	37.9	2.0	26.6	2.6
Togo	16.6	1.9	36.4	1.9	28.4	1.9	18.6	2.0
Mean	7.3	0.4	21.5	0.5	33.7	0.6	37.5	0.6

Table B2.3: Percentage distribution of students by average number of letters read correctly in 1 minute - Early primary

	Less than 6 letters		Between 6 and 10 letters		Between 11 and 20 letters		More than 20 letters	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	24.6	2.0	26.1	1.8	25.1	1.5	24.3	2.2
Burkina Faso	23.8	2.4	9.7	1.3	24.2	1.8	42.2	3.0
Burundi	7.9	1.1	8.8	0.8	22.7	1.7	60.6	2.3
Cameroon	24.4	2.4	26.2	1.9	22.6	1.9	26.8	2.5
Congo	37.2	2.5	21.2	2.4	23.4	2.0	18.2	2.2
Cote d'ivoire	18.2	1.9	26.1	1.9	38.5	1.9	17.2	2.1
Gabon	18.4	3.1	16.2	1.9	27.1	2.3	38.3	4.8
Guinea	41.2	2.9	18.1	1.3	18.7	1.6	22.0	2.3
Madagascar	18.3	2.3	21.7	1.7	28.4	1.9	31.6	3.0
Niger	18.2	2.0	16.5	1.4	32.3	2.0	33.0	2.4
DRC	38.7	3.6	31.6	2.7	22.1	2.9	7.6	1.9
Senegal	11.4	1.3	16.8	1.9	29.1	2.5	42.8	3.1
Chad	30.2	2.8	35.9	2.1	23.7	2.0	10.2	1.2
Togo	24.7	1.7	25.1	1.4	29.2	1.7	21.0	1.6
Mean	24.1	0.5	21.4	0.6	26.3	0.5	28.2	0.7

Table B2.4: Percentage distribution of students by average number of words read correctly in 1 minute - Early primary

	0 word		1 to 5 words		6 to 10 words		11 to 20 words		more than 20 words	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	20.3	2.1	28.8	1.8	20.5	1.6	15.4	1.5	15.0	1.6
Burkina Faso	19.3	2.0	16.8	1.5	20.9	1.7	23.0	1.6	20.0	1.9
Burundi	3.2	0.5	20.7	1.9	12.6	1.1	23.8	1.8	39.7	2.1
Cameroon	33.7	3.0	24.3	1.8	11.8	1.5	12.8	1.5	17.4	2.4
Congo	29.4	1.6	25.5	2.1	13.4	1.3	17.0	1.8	14.8	1.8
Cote d'ivoire	28.3	2.3	35.6	1.8	21.6	1.5	8.5	1.0	6.0	1.4
Gabon	16.9	3.4	22.8	2.5	16.4	2.7	13.8	1.3	30.1	4.6
Guinea	44.4	3.5	26.1	2.2	11.1	1.5	11.3	1.5	7.1	1.6
Madagascar	20.1	1.6	23.7	2.2	9.1	1.0	24.9	1.9	22.3	2.9
Niger	20.3	1.9	33.0	2.2	15.7	1.1	17.2	1.4	13.7	2.1
DRC	38.6	4.3	25.8	3.3	12.1	1.5	17.3	3.4	6.1	2.0
Senegal	10.6	1.5	20.8	1.7	19.5	2.0	21.7	1.5	27.4	2.9
Chad	36.1	3.4	35.9	1.8	14.0	1.8	10.9	1.5	3.2	0.7
Togo	29.2	2.2	30.1	1.6	15.7	1.2	14.9	1.5	10.1	1.3
Mean	25.1	0.7	26.4	0.6	15.3	0.5	16.6	0.4	16.5	0.7

Table B2.5: Distribution of students by highest number reached in counting out loud - Early primary

	Up to 61		Between 61 and 80		Above 80	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	45.1	2.3	17.0	1.1	37.9	2.4
Burkina Faso	45.3	3.0	33.0	2.1	21.7	2.4
Burundi	50.2	2.1	11.8	1.4	38.0	2.3
Cameroon	53.9	3.0	17.8	1.5	28.3	2.2
Congo	37.6	2.3	24.5	1.7	37.9	2.8
Cote d'ivoire	58.8	2.9	17.7	1.8	23.6	1.9
Gabon	31.3	4.1	25.5	1.8	43.2	4.3
Guinea	39.9	3.0	22.3	1.8	37.8	3.0
Madagascar	45.8	3.0	15.7	1.4	38.5	2.9
Niger	36.9	1.9	17.6	1.2	45.5	2.2
DRC	42.3	3.7	15.8	1.7	41.9	3.4
Senegal	39.4	2.5	32.8	2.2	27.8	2.3
Chad	46.0	2.7	30.6	2.0	23.4	2.2
Togo	62.5	2.0	15.5	1.5	22.0	1.9
Mean	45.3	0.7	21.3	0.4	33.4	0.7

Table B2.6: Percentage of correct answers to addition and subtraction problems - Early primary

	8+5		13-7		14+23		33+29		34-11		50-18	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	63.4	2.2	40.2	2.7	45.7	2.1	27.0	1.9	34.8	2.1	21.0	2.0
Burkina Faso	66.4	2.4	55.6	2.6	43.5	2.5	27.2	2.5	40.0	2.8	25.9	2.4
Burundi	88.3	1.0	72.4	1.8	73.3	1.5	57.3	1.6	62.6	1.8	38.5	2.2
Cameroon	60.3	3.2	39.6	3.5	34.9	3.1	19.3	1.9	29.1	3.4	17.2	2.8
Congo	86.3	1.1	70.0	2.5	71.0	2.2	48.5	2.6	62.8	2.3	36.5	3.3
Cote d'ivoire	71.1	2.4	58.1	2.4	49.5	2.9	18.3	1.4	16.5	2.1	10.6	1.5
Gabon	82.6	2.4	58.0	3.4	58.2	4.3	33.3	4.4	48.6	4.4	19.1	3.0
Guinea	62.9	3.1	40.7	3.5	39.2	3.1	21.8	2.3	27.7	2.4	18.3	2.3
Madagascar	75.2	1.9	53.2	2.1	43.7	2.5	25.2	2.5	34.3	2.4	17.5	1.5
Niger	68.0	2.1	50.1	2.5	47.5	2.5	31.5	2.0	38.3	2.2	18.5	2.0
DRC	68.2	2.6	52.8	3.7	37.6	3.4	23.5	3.4	32.2	4.0	27.8	3.5
Senegal	77.9	2.2	62.5	2.6	56.5	2.3	36.6	2.5	49.5	2.5	34.7	2.4
Chad	68.8	2.5	47.7	3.0	45.1	3.9	23.1	3.0	37.6	3.8	20.4	3.2
Togo	53.0	1.9	22.5	1.9	33.1	2.0	18.9	1.9	17.5	1.7	7.6	1.2
Mean	70.9	0.5	51.7	0.6	48.4	0.8	29.3	0.7	37.9	0.7	22.4	0.6

Table B2.7: Students' average performance in language of instruction - Early primary

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P1	Standard error	P5	Standard error	P10	Standard error	P25	Standard error	P50	Standard error	P75	Standard error	P90	Standard error	P95	Standard error	P99	Standard error
Benin	524.8	7.7	105.6	7.6	319.3	17.6	377.3	8.3	407.1	7.3	454.4	6.7	511.3	7.5	577.2	10.9	666.6	18.7	719.8	22.7	854.9	52.0
Burkina Faso	493.5	9.7	126.2	10.3	69.4	37.7	266.7	42.7	344.6	23.8	439.3	12.5	504.6	6.5	564.5	8.6	631.3	9.6	676.6	17.0	787.3	26.5
Burundi	625.0	4.5	94.7	2.3	438.3	11.8	479.7	6.0	502.0	6.2	551.3	6.7	623.9	6.7	691.2	6.2	752.2	7.6	787.2	10.0	841.9	8.9
Cameroon	522.2	8.4	116.6	5.6	244.1	21.4	341.4	20.6	388.6	12.5	446.9	9.3	513.5	8.5	585.8	11.2	684.8	11.9	739.7	15.8	813.7	19.3
Congo	582.4	7.5	103.8	6.5	383.1	13.2	430.8	7.2	458.2	6.9	509.0	7.6	572.2	9.3	646.0	11.2	715.2	15.7	772.5	30.0	876.8	34.8
Cote d'ivoire	516.6	5.4	78.4	4.3	355.4	12.6	400.2	8.8	426.4	6.1	465.7	4.3	507.6	4.8	559.0	7.3	619.8	13.9	668.7	18.0	740.4	14.6
Gabon	610.3	14.5	118.7	6.9	417.5	15.0	461.1	10.7	481.6	6.3	519.7	8.5	579.4	15.9	692.8	31.1	789.8	22.9	832.7	21.1	898.6	36.6
Guinea	469.0	10.3	104.7	7.6	185.9	68.1	294.8	24.9	339.3	18.2	405.2	11.5	470.4	13.1	534.6	12.2	594.4	18.2	639.6	31.6	733.3	25.5
Madagascar	568.8	6.9	98.8	3.3	386.1	7.7	425.3	6.9	449.0	6.7	492.7	6.3	555.8	10.0	643.1	10.8	707.5	10.6	738.4	12.5	802.3	14.2
Niger	534.7	7.2	106.1	5.1	321.1	22.6	373.8	11.3	408.4	9.3	465.2	6.8	526.2	7.7	591.9	8.2	673.9	18.6	736.3	23.0	828.3	24.1
DRC	531.0	10.5	90.8	7.6	342.1	25.1	395.3	11.9	420.9	13.6	471.8	9.5	521.2	12.3	587.0	13.1	648.6	17.5	690.6	36.3	783.9	37.3
Senegal	557.1	9.3	120.4	5.0	337.3	13.7	396.6	7.6	424.7	7.7	469.3	8.3	532.7	10.8	635.4	21.4	730.1	19.1	784.2	18.7	877.8	24.1
Chad	508.5	7.8	88.6	5.1	309.5	16.1	364.6	18.5	401.1	12.5	449.7	9.0	502.4	9.5	564.4	8.6	628.8	16.6	666.9	11.9	726.8	13.8
Togo	474.9	7.2	111.4	6.1	237.7	25.4	313.5	16.3	347.9	9.5	402.4	6.8	460.5	6.6	537.1	10.3	626.6	18.0	684.8	17.3	781.7	17.1
Mean	537.1	2.3	114.7	2.3	274.4	14.0	368.7	4.3	406.9	3.2	464.1	2.0	525.6	2.2	603.7	3.4	691.5	5.2	743.9	5.2	835.1	7.7

Table B2.8: Students' average performance in mathematics - Early primary

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P1	Standard error	P5	Standard error	P10	Standard error	P25	Standard error	P50	Standard error	P75	Standard error	P90	Standard error	P95	Standard error	P99	Standard error
Benin	525.1	7.2	104.7	6.9	307.2	17.2	368.0	7.7	395.5	6.2	449.5	5.8	522.5	6.8	589.7	8.8	652.5	16.1	700.3	28.8	838.2	57.7
Burkina Faso	498.7	8.2	109.3	7.8	118.5	30.9	303.6	54.4	369.8	16.4	446.0	12.7	514.8	7.2	568.4	6.2	613.4	6.6	643.2	9.6	717.7	18.5
Burundi	614.4	2.4	54.4	1.5	482.1	8.0	522.9	5.3	545.3	4.6	580.3	2.8	614.1	3.6	649.7	3.1	683.6	5.4	704.9	5.2	744.5	7.5
Cameroon	516.7	8.0	101.4	4.9	274.6	40.0	366.2	16.1	393.6	10.2	443.1	8.4	512.7	10.0	589.8	9.8	648.4	11.6	686.1	12.8	749.4	21.9
Congo	591.9	6.3	96.2	5.3	401.3	14.9	446.1	7.5	471.5	6.2	526.6	5.3	585.6	6.8	650.4	9.1	716.9	16.2	764.0	19.8	851.3	30.8
Cote d'ivoire	522.5	4.1	72.4	2.6	368.6	9.0	403.1	5.5	424.6	6.4	469.0	8.4	527.5	4.4	568.9	4.3	615.1	8.0	641.1	7.5	696.0	16.5
Gabon	595.9	9.4	83.6	4.0	421.5	14.5	461.4	7.5	483.8	8.8	535.1	10.9	598.5	9.2	650.9	13.2	702.2	14.6	736.8	20.6	798.0	22.6
Guinea	519.3	9.4	111.5	5.8	250.8	41.7	339.9	24.1	378.6	11.7	441.6	11.3	522.5	14.5	599.8	14.0	658.8	7.7	691.1	15.9	773.3	36.3
Madagascar	549.7	3.8	70.6	2.4	394.7	11.6	433.3	7.5	455.1	4.3	500.9	5.7	552.0	5.7	596.8	6.2	638.2	5.4	664.7	8.7	717.1	11.6
Niger	544.9	6.4	111.5	4.3	310.2	19.3	373.7	6.8	405.5	10.8	464.4	8.2	541.7	8.1	621.2	10.0	689.7	14.3	734.7	14.3	814.3	16.2
DRC	567.8	8.2	109.2	7.2	346.1	13.8	408.1	9.3	438.8	9.8	494.5	11.3	558.8	10.2	629.9	8.9	704.8	23.1	770.7	36.3	872.8	32.7
Senegal	563.4	6.1	92.5	3.4	363.4	13.3	411.8	8.5	440.0	9.6	500.9	8.7	562.9	5.2	621.2	8.2	684.7	15.2	723.6	15.9	792.9	16.6
Chad	522.4	6.8	94.0	5.3	312.5	19.9	369.8	11.0	402.2	11.3	460.2	7.3	521.6	8.0	581.7	8.1	634.8	10.1	676.8	17.7	775.6	45.9
Togo	489.4	5.3	92.2	2.3	291.4	18.5	351.2	8.9	377.4	6.2	421.8	5.6	481.5	6.5	554.3	6.5	615.4	7.3	647.1	10.7	704.5	11.9
Mean	544.5	1.6	101.4	1.6	304.6	12.6	382.5	3.1	416.6	2.4	476.3	2.2	546.8	1.8	610.7	1.6	667.5	2.2	705.7	4.2	794.8	11.4

Table B2.9: Percentage distribution of students on the PASEC2019 reading proficiency scale - Late primary

	Level <1		Level 1		Level 2		Level 3		Level 4	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	0.6	0.2	6.8	0.8	17.5	1.2	29.5	1.6	45.5	2.7
Burkina Faso	3.3	0.8	9.1	0.8	20.9	0.9	33.7	1.1	33.0	1.4
Burundi	0.6	0.2	19.4	1.1	51.8	1.3	23.7	1.2	4.5	1.0
Cameroon	6.1	1.2	18.0	1.4	22.2	1.3	23.4	1.3	30.2	1.7
Congo	3.9	0.7	17.1	1.4	20.6	1.2	24.8	1.2	33.6	1.8
Cote d'ivoire	7.0	0.8	28.3	1.6	24.2	1.1	18.4	1.1	22.0	1.9
Gabon	0.1	0.1	1.6	0.6	5.0	0.8	17.1	1.4	76.3	1.8
Guinea	10.0	1.4	20.4	1.5	24.9	1.4	22.5	1.5	22.2	1.7
Madagascar	6.4	0.7	39.5	1.9	36.6	1.9	11.2	1.2	6.3	2.0
Niger	12.6	1.2	33.3	1.7	24.0	1.3	15.6	1.2	14.4	1.6
DRC	7.8	1.0	31.5	2.1	33.6	1.5	17.9	1.4	9.2	1.5
Senegal	1.0	0.4	6.0	0.9	18.3	1.3	33.6	1.7	41.1	2.2
Chad	14.5	1.8	36.1	1.8	27.2	1.4	14.5	1.4	7.6	1.2
Togo	7.9	0.8	28.7	1.5	24.5	1.2	19.5	1.0	19.4	1.1
Mean	5.9	0.3	21.1	0.4	25.1	0.4	21.8	0.4	26.1	0.6

Table B2.10: Percentage distribution of students on the PASEC2019 mathematics proficiency scale - Late primary

	Level < 1		Level 1		Level 2		Level 3	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	11.7	1.2	36.6	1.9	32.5	1.6	19.1	2.6
Burkina Faso	11.2	1.3	26.4	1.1	37.5	1.1	25.0	1.2
Burundi	3.8	0.6	35.3	1.6	42.9	1.4	18.0	1.5
Cameroon	30.1	2.0	36.9	1.6	21.8	1.4	11.1	1.0
Congo	25.5	1.7	41.1	1.6	25.7	1.5	7.7	0.9
Cote d'ivoire	42.1	2.0	40.7	1.6	14.6	1.4	2.6	0.6
Gabon	4.7	1.1	28.6	1.6	43.8	1.6	22.9	1.8
Guinea	28.7	2.1	38.9	1.7	25.6	1.7	6.8	1.2
Madagascar	36.0	2.0	42.4	1.9	15.3	1.4	6.3	1.7
Niger	43.7	2.1	33.8	1.3	14.6	1.1	7.9	1.3
DRC	37.2	2.4	44.4	1.9	15.2	1.9	3.2	1.1
Senegal	8.2	1.2	26.7	1.4	37.8	1.5	27.2	2.0
Chad	50.8	2.4	37.7	1.9	9.7	1.3	1.8	0.6
Togo	32.1	1.6	30.9	1.2	21.1	1.1	15.9	1.2
Mean	26.1	0.5	35.7	0.4	25.6	0.4	12.5	0.4

Table B2.11: Students' average performance in reading - Late primary

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P1	Standard error	P5	Standard error	P10	Standard error	P25	Standard error	P50	Standard error	P75	Standard error	P90	Standard error	P95	Standard error	P99	Standard error
Benin	585.7	6.4	98.6	3.8	378.6	7.3	425.7	5.7	457.2	6.7	518.6	5.2	584.3	6.7	650.9	9.5	716.2	11.2	754.7	15.3	821.0	18.7
Burkina Faso	551.5	3.6	94.5	3.1	304.3	27.6	387.0	11.1	427.7	7.8	493.0	4.5	557.2	3.2	614.4	2.9	665.6	3.8	697.2	6.2	761.5	8.1
Burundi	489.9	2.7	58.4	2.4	372.6	3.8	403.0	2.2	420.3	1.9	450.2	2.0	485.8	2.3	523.9	3.2	563.3	5.3	590.6	9.1	660.9	20.0
Cameroon	529.7	5.5	114.0	3.9	265.2	42.2	354.7	9.2	387.9	7.5	444.8	6.6	530.7	8.0	612.5	5.2	678.4	6.5	713.4	6.1	776.7	12.2
Congo	542.0	4.9	107.1	2.3	320.2	8.1	374.1	4.9	400.9	5.2	455.5	6.7	546.1	6.6	621.2	5.8	682.1	6.5	714.7	9.5	773.5	10.9
Cote d'ivoire	502.8	5.5	110.6	3.3	298.1	12.3	352.5	4.3	376.8	4.0	417.8	3.9	485.1	8.4	580.5	9.2	659.4	10.5	699.8	11.1	781.3	17.7
Gabon	644.7	3.7	79.6	2.9	420.8	18.2	501.8	9.5	541.3	8.1	598.2	4.7	650.7	3.9	698.1	4.3	739.5	4.2	764.4	5.9	814.0	10.0
Guinea	502.9	6.0	114.6	4.5	204.7	27.1	318.5	17.4	365.0	9.7	425.7	6.4	501.2	7.8	585.1	6.7	649.4	6.7	685.5	10.3	748.0	14.1
Madagascar	459.5	5.0	76.2	5.6	321.8	4.8	358.7	3.9	378.1	2.6	408.3	2.4	448.0	3.5	495.6	6.1	556.4	17.3	610.5	23.4	702.3	24.9
Niger	471.0	5.4	104.4	3.1	258.1	20.3	326.7	6.7	356.3	5.4	397.3	4.0	451.6	5.9	542.1	10.4	620.7	8.6	660.6	9.5	733.1	13.0
DRC	472.7	4.8	84.7	3.0	300.7	11.3	350.4	6.6	373.4	4.5	413.0	4.1	464.0	6.2	524.8	7.5	590.5	9.2	627.4	7.7	692.6	13.2
Senegal	575.9	4.9	90.4	3.4	364.3	14.5	424.4	9.6	461.1	6.6	517.7	5.2	575.8	4.8	634.2	5.8	690.8	9.6	727.1	12.2	791.2	17.4
Chad	450.9	5.7	93.6	4.0	214.9	36.3	316.8	12.1	347.9	8.0	391.1	4.9	440.4	5.2	506.9	9.4	577.4	9.2	620.3	9.8	688.4	9.8
Togo	496.1	3.7	106.2	1.8	298.2	7.7	350.7	4.0	372.8	3.1	414.1	3.6	479.7	6.1	571.6	4.8	644.7	5.9	688.1	5.6	757.2	8.6
Mean	519.7	1.5	110.2	1.1	290.5	6.6	359.0	2.1	386.5	1.5	436.0	1.6	511.4	1.9	599.2	2.1	669.5	2.1	707.9	2.6	774.3	5.0

Table B2.12: Students' average performance in mathematics - Late primary

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P1	Standard error	P5	Standard error	P10	Standard error	P25	Standard error	P50	Standard error	P75	Standard error	P90	Standard error	P95	Standard error	P99	Standard error
Benin	533.8	6.2	88.9	4.0	357.5	7.4	402.4	5.9	426.4	5.0	470.9	4.4	525.1	5.2	588.7	8.9	656.0	14.0	699.5	16.7	764.5	16.0
Burkina Faso	547.2	4.0	93.6	2.7	316.0	27.1	388.3	10.1	425.6	7.4	487.4	5.0	550.1	3.8	609.5	3.4	664.3	4.6	697.8	5.7	756.5	6.3
Burundi	546.0	3.2	70.9	2.2	404.2	6.1	440.2	3.1	459.9	3.7	496.2	2.7	539.9	3.4	589.3	4.4	640.2	5.9	673.6	7.5	738.2	17.7
Cameroon	488.1	3.9	94.4	2.3	299.8	11.2	351.7	7.2	377.0	5.7	421.3	5.0	477.9	5.2	545.8	5.3	617.4	7.6	662.4	9.0	734.1	13.0
Congo	489.1	3.5	80.1	2.0	322.0	8.0	364.2	6.1	387.9	4.9	432.2	4.0	485.6	3.6	542.4	4.7	596.6	5.5	628.7	5.7	684.0	9.3
Cote d'ivoire	454.0	3.8	71.4	2.3	307.3	9.0	349.5	3.9	369.5	3.8	403.4	2.8	446.9	3.9	499.2	5.0	550.6	6.9	582.3	9.1	639.7	9.6
Gabon	554.6	4.0	73.6	2.3	384.7	14.3	434.3	12.1	461.5	7.3	505.2	4.1	552.4	5.1	604.1	4.9	651.3	5.6	678.8	5.0	724.7	8.1
Guinea	482.3	4.7	85.0	3.4	270.7	32.9	349.6	7.4	377.3	5.0	424.9	5.5	481.9	5.7	540.5	5.3	592.1	6.2	622.2	9.2	677.1	14.0
Madagascar	468.3	5.1	81.7	4.9	308.8	14.3	355.3	5.0	377.5	4.5	413.1	3.1	457.4	4.3	511.0	6.5	579.5	20.1	623.7	17.7	703.3	23.7
Niger	461.8	5.0	92.2	3.9	287.0	16.3	341.2	4.1	362.9	3.4	398.7	3.6	445.8	4.6	511.5	7.3	591.5	13.0	638.6	13.8	728.0	21.7
DRC	462.1	4.6	70.6	3.7	326.3	6.6	362.0	4.8	381.2	3.8	413.4	3.0	453.6	5.1	502.8	7.1	555.2	10.6	590.0	14.9	665.9	28.0
Senegal	557.6	4.7	90.5	2.8	357.9	8.9	411.1	8.2	442.7	5.3	496.0	5.0	555.6	5.1	616.0	6.8	677.6	8.0	711.9	9.4	771.6	12.3
Chad	437.8	4.0	70.7	2.9	269.6	20.0	333.7	7.3	357.2	4.3	392.1	3.4	432.0	3.9	478.8	4.9	528.6	7.9	563.3	12.7	633.6	14.2
Togo	495.4	3.9	105.4	2.3	301.6	6.0	347.6	4.0	371.2	3.8	415.7	4.1	481.0	5.2	566.2	6.0	643.4	6.4	687.3	7.8	763.5	10.6
Mean	498.4	1.2	93.1	0.9	310.9	4.0	361.0	1.5	385.5	1.3	430.4	1.1	491.3	1.5	559.8	1.6	623.7	2.1	662.2	2.6	734.4	4.4

Table B2.13: Relationship between performance in language of instruction and mathematics at student and school level - Early primary

	Student level		School level	
	Correlation	Standard error	Correlation	Standard error
Benin	0.79	0.07	0.89	0.13
Burkina Faso	0.85	0.04	0.92	0.08
Burundi	0.54	0.12	0.70	0.20
Cameroon	0.80	0.07	0.89	0.12
Congo	0.73	0.08	0.81	0.11
Cote d'ivoire	0.73	0.09	0.85	0.14
Gabon	0.65	0.10	0.82	0.19
Guinea	0.74	0.08	0.85	0.14
Madagascar	0.63	0.11	0.70	0.12
Niger	0.70	0.11	0.78	0.14
DRC	0.54	0.12	0.67	0.17
Senegal	0.74	0.08	0.79	0.08
Chad	0.62	0.12	0.69	0.13
Togo	0.77	0.06	0.86	0.10

Table B2.14: Relationship between performance in language of instruction and mathematics at student and school level - Late primary

	Student level		School level	
	Correlation	Standard error	Correlation	Standard error
Benin	0.75	0.08	0.86	0.13
Burkina Faso	0.78	0.07	0.88	0.12
Burundi	0.63	0.11	0.76	0.16
Cameroon	0.75	0.07	0.84	0.11
Congo	0.73	0.08	0.85	0.13
Cote d'ivoire	0.76	0.08	0.83	0.10
Gabon	0.54	0.13	0.75	0.24
Guinea	0.73	0.08	0.80	0.10
Madagascar	0.77	0.07	0.89	0.13
Niger	0.77	0.09	0.85	0.11
DRC	0.65	0.10	0.72	0.13
Senegal	0.72	0.07	0.80	0.09
Chad	0.67	0.08	0.78	0.13
Togo	0.80	0.07	0.88	0.10

Annex B3. Data for Chapter 3

Table B3.1: GDP growth rate in 2019 and student scores in reading and mathematics by education level

	GDP growth rate in 2019	Start of primary education		End of primary education	
		Reading	Mathematics	Reading	Mathematics
Benin	6.9	524.8	525.1	585.7	533.8
Burkina Faso	5.7	493.5	498.7	551.5	547.2
Burundi	1.8	625.0	614.4	489.9	546.0
Cameroon	4.0	522.2	516.7	529.7	488.1
Congo	-0.9	582.4	591.9	542.0	489.1
Côte d'ivoire	6.9	516.6	522.5	502.8	454.0
Gabon	3.4	610.3	595.9	644.7	554.6
Guinea	5.6	469.0	519.3	502.9	482.3
Madagascar	4.8	568.8	549.7	459.5	468.3
Niger	5.8	534.7	544.9	471.0	461.8
DRC	4.4	531.0	567.8	472.7	462.1
Senegal	5.3	557.1	563.4	575.9	557.6
Chad	3.2	508.5	522.4	450.9	437.8
Togo	5.3	474.9	489.4	496.1	495.4

Table B3.2 : Breakdown of variance in reading and mathematics scores - Early primary

	Language			Mathematics		
	School variance	Student variance	Between-class correlation coefficient	School variance	Student variance	Between-class correlation coefficient
Benin	6809.6	4326.0	61.2%	5939.2	5058.1	54.0%
Burkina Faso	11064.7	4683.2	70.3%	7649.5	4158.3	64.8%
Burundi	3560.0	5460.7	39.5%	986.6	1969.7	33.4%
Cameroon	8662.1	4415.8	66.2%	5639.7	4356.8	56.4%
Congo	7012.0	3490.6	66.8%	4952.8	4111.0	54.6%
Côte d'ivoire	3514.6	2672.6	56.8%	3015.6	2222.5	57.6%
Gabon	6803.9	7235.2	48.5%	2842.0	4214.5	40.3%
Guinea	7470.8	3819.9	66.2%	6352.3	6385.1	49.9%
Madagascar	5170.6	4588.0	53.0%	1548.1	3451.4	31.0%
Niger	8027.8	3672.1	68.6%	6349.4	6354.4	50.0%
DRC	6408.2	1923.9	76.9%	5194.5	6656.9	43.8%
Senegal	8308.4	6329.6	56.8%	3491.1	5138.0	40.5%
Chad	5545.3	2249.9	71.1%	4872.4	4621.4	51.3%
Togo	8008.2	4350.8	64.8%	4362.1	4130.2	51.4%

Table B3.3 : Breakdown of variance in reading and mathematics scores - Late primary

	Reading			Mathematics		
	School variance	Student variance	Between-class correlation coefficient	School variance	Student variance	Between-class correlation coefficient
Benin	5454.7	3982.5	57.8%	4449.5	3295.4	57.5%
Burkina Faso	5009.4	4304.1	53.8%	4972.8	4214.6	54.1%
Burundi	1512.6	1987.3	43.2%	2143.7	2941.8	42.2%
Cameroon	8227.6	5053.9	61.9%	5100.3	3821.5	57.2%
Congo	6894.4	4735.9	59.3%	4072.9	2694.5	60.2%
Côte d'ivoire	5102.4	7044.0	42.0%	2290.4	2812.3	44.9%
Gabon	1657.2	4855.3	25.4%	2212.7	3469.7	38.9%
Guinea	7129.4	6476.4	52.4%	3772.0	3568.2	51.4%
Madagascar	3731.1	1731.9	68.3%	4352.8	2057.9	67.9%
Niger	7625.3	3552.9	68.2%	5763.7	2918.6	66.4%
DRC	3598.3	3479.6	50.8%	2887.3	2026.8	58.8%
Senegal	4355.5	3815.3	53.3%	4431.1	3800.7	53.8%
Chad	4892.9	3767.2	56.5%	2906.6	2295.3	55.9%
Togo	7372.8	3860.3	65.6%	7439.1	3538.7	67.8%

Table B3.4: Percentage of girls and students' performance in language of instruction - Early primary

	Girl		Girl		Boy		Gross difference between male and female students	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	47.2	1.1	518.8	8.0	530.2	8.0	11.4**	4.4	12.7***	4.4
Burkina Faso	47.1	1.6	491.5	11.0	495.3	10.7	3.8	9.5	-1.1	9.8
Burundi	48.6	1.4	633.3	5.7	617.1	4.6	-16.1***	5.1	-15.3***	5.2
Cameroon	50.1	1.8	523.2	8.7	521.3	10.0	-1.9	8.3	1.3	7.5
Congo	50.1	1.9	588.8	8.6	576.0	7.5	-12.8*	6.7	-11.3	7.1
Côte d'Ivoire	48.8	1.5	513.6	6.0	519.5	5.8	5.9	4.8	6.7	4.7
Niger	47.3	1.7	605.9	16.2	614.2	14.0	8.3	8.2	5.3	8.7
Senegal	49.3	1.7	471.2	10.9	467.0	10.8	-4.2	7.2	-2.0	6.7
Chad	47.0	1.6	575.1	7.4	563.3	7.7	-11.9*	6.3	-12.8**	5.8
Togo	46.5	1.7	538.7	7.7	531.4	8.4	-7.3	7.0	-4.4	6.1
Chad	49.7	2.8	528.0	11.5	533.9	10.8	5.9	7.3	3.3	7.8
Togo	54.3	1.9	559.4	10.5	554.5	9.1	-4.9	6.7	-2.9	6.5
Chad	44.2	2.2	503.4	8.1	512.5	8.6	9.1	6.0	7.8	6.4
Togo	47.2	1.1	475.9	6.7	474.0	8.8	-1.8	6.6	1.6	6.3
Mean	48.4	0.4	538.0	2.3	536.1	2.7	-1.9	2.0	-1.4	1.8

Table B3.5: Percentage of girls and students' performance in mathematics - Early primary

	Girl		Girl		Boy		Gross difference between male and female students	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	47.2	1.1	513.1	7.8	535.8	7.3	22.7***	4.9	23.8***	4.8
Burkina Faso	47.1	1.6	491.8	8.5	504.8	9.3	13*	7.1	9.5	7.5
Burundi	48.6	1.4	610.8	3.4	617.8	2.8	7*	4.1	7.6*	4.1
Cameroon	50.1	1.8	513.5	7.6	519.9	10.1	6.4	8.0	8.9	7.4
Congo	50.1	1.9	595.0	7.1	588.8	7.2	-6.2	6.8	-4.8	7.0
Côte d'Ivoire	48.8	1.5	515.9	4.7	528.8	4.6	12.9***	4.4	13.4***	4.3
Niger	47.3	1.7	585.9	9.9	606.6	9.6	20.7***	5.8	18.3***	6.4
Senegal	49.3	1.7	514.0	10.2	524.6	10.0	10.6	7.3	11.3	7.0
Chad	47.0	1.6	550.9	4.4	548.6	4.8	-2.3	5.3	-2.8	5.0
Togo	46.5	1.7	545.8	7.3	546.5	7.5	0.8	6.8	3.0	5.7
Chad	49.7	2.8	556.5	10.2	578.9	8.4	22.4**	9.1	19.1**	9.1
Togo	54.3	1.9	559.0	6.8	568.7	6.1	9.7**	4.5	11.7***	4.3
Chad	44.2	2.2	506.1	7.6	535.4	7.9	29.2***	7.0	28.4***	7.6
Togo	47.2	1.1	488.6	5.6	490.1	6.1	1.4	5.0	3.8	5.0
Mean	48.4	0.4	539.6	1.7	549.2	2.0	9.6***	2.0	9.7***	1.8

Table B3.6: Percentage of girls and students' performance in language of instruction - Late primary

	Girl		Girl		Boy		Gross difference between male and female students	Standard error	Difference controlling for local facilities index and socio-economic index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	48.0	1.1	589.1	7.4	582.7	5.8	-6.4*	3.7	-0.3	3.1
Burkina Faso	52.7	0.8	553.6	3.5	549.2	4.8	-4.4	4.2	-3.2	4.5
Burundi	55.7	0.9	487.5	3.0	493.0	2.7	5.5**	2.3	5.9**	2.3
Cameroon	47.2	1.1	532.9	6.4	527.2	5.6	-5.7	5.0	1.0	4.3
Congo	49.8	1.0	551.8	5.7	532.3	5.4	-19.4***	5.1	-16.7***	5.1
Côte d'Ivoire	46.0	0.9	504.3	5.7	501.5	6.1	-2.9	4.5	1.7	4.2
Niger	50.2	1.3	649.3	4.4	640.3	4.1	-8.9**	4.0	-7.9*	4.2
Senegal	45.5	1.1	504.7	7.0	501.5	6.3	-3.2	5.7	2.6	5.7
Chad	50.5	0.9	464.7	5.3	454.2	5.1	-10.5***	2.8	-9.1***	2.7
Togo	46.2	0.9	473.0	5.6	469.3	5.9	-3.7	3.9	3.0	3.6
Chad	49.3	1.2	467.2	5.9	478.0	4.4	10.8***	3.9	11.4***	3.5
Togo	55.3	1.1	580.1	5.8	570.7	5.0	-9.4*	4.8	-8.5*	4.3
Chad	40.5	1.4	443.6	7.2	455.8	5.2	12.2***	4.6	17.9***	5.0
Togo	50.6	0.8	498.4	4.1	493.7	3.9	-4.6	3.2	-0.3	3.1
Mean	49.1	0.3	523.0	1.7	516.4	1.5	-6.6***	1.2	-2.4**	1.1

Table B3.7 : Percentage of girls and students' performance in mathematics - Late primary

	Girl		Girl		Boy		Gross difference between male and female students	Standard error	Difference controlling for local facilities index and socio-economic index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	48.0	1.1	532.7	7.3	534.8	5.7	2.1	4.0	6.1*	3.6
Burkina Faso	52.7	0.8	547.0	3.9	547.4	5.2	0.4	4.4	1.5	4.7
Burundi	55.7	0.9	535.9	3.3	558.8	3.4	22.9***	2.3	23.1***	2.4
Cameroon	47.2	1.1	487.6	4.7	488.9	4.1	1.4	4.0	5.8	3.6
Congo	49.8	1.0	492.5	4.1	485.8	4.0	-6.7*	4.0	-5.1	4.0
Côte d'Ivoire	46.0	0.9	448.8	4.1	458.4	4.0	9.5***	2.9	11.7***	2.8
Niger	50.2	1.3	547.2	4.4	562.5	4.4	15.3***	3.7	16.1***	4.3
Senegal	45.5	1.1	479.6	5.4	484.5	4.8	4.9	4.0	8.5**	4.1
Chad	50.5	0.9	470.2	5.5	466.5	5.1	-3.7	2.9	-2.5	2.9
Togo	46.2	0.9	461.8	5.2	461.8	5.5	0.0	4.1	4.1	3.9
Chad	49.3	1.2	458.7	4.9	465.4	4.8	6.7**	3.3	7.8**	3.2
Togo	55.3	1.1	557.2	5.1	558.1	5.3	0.9	4.3	1.4	4.2
Chad	40.5	1.4	431.9	5.0	441.8	3.7	10***	3.4	13.5***	3.7
Togo	50.6	0.8	494.1	4.2	496.7	4.2	2.7	3.1	6.8**	2.9
Mean	49.1	0.3	498.5	1.5	498.4	1.2	-0.1	1.1	2.5**	1.0

Table B3.8 : Percentage of students by parental presence - Late primary

	Neither parent		One parent		Both parents	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	9.6	0.8	16.9	1.1	73.5	1.5
Burkina Faso	12.2	0.6	15.5	0.6	72.4	0.9
Burundi	6.1	0.5	16.6	1.1	77.3	1.2
Cameroon	10.3	0.8	20.2	0.9	69.5	1.3
Congo	7.5	0.6	20.8	1.3	71.7	1.4
Côte d'ivoire	16.1	1.0	20.7	0.8	63.2	1.5
Gabon	11.5	1.1	25.3	1.5	63.1	1.9
Guinea	14.1	1.1	19.2	1.1	66.7	1.7
Madagascar	11.1	0.9	18.3	0.9	70.6	1.3
Niger	8.6	0.6	14.9	0.7	76.5	0.9
DRC	7.8	0.7	17.7	1.2	74.5	1.5
Senegal	12.1	0.7	22.2	0.9	65.8	1.1
Chad	7.7	0.8	23.9	1.5	68.3	1.7
Togo	11.2	0.6	18.7	0.9	70.1	1.1
Mean	10.5	0.2	19.3	0.3	70.2	0.4

Table B3.9 : Student performance in reading by parental presence - Late primary

	Students living with neither parent		Difference in scores between students living with one parent and those living with neither parent		Difference in scores between students living with both parents and those living with neither parent	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	593.2	8.5	0	0.1	-0.1	0.1
Burkina Faso	567.8	5.0	-0.1	0.1	-0.2***	0.1
Burundi	501.2	4.8	-0.2***	0.1	-0.1*	0.0
Cameroon	565.9	8.3	-0.2**	0.1	-0.3***	0.1
Congo	554.6	9.5	-0.1	0.1	-0.1	0.1
Côte d'ivoire	520.0	7.0	-0.1*	0.1	-0.2***	0.1
Gabon	651.1	6.9	0	0.1	-0.1	0.1
Guinea	516.9	10.2	-0.2*	0.1	-0.1	0.1
Madagascar	464.1	5.8	-0.1*	0.1	0	0.1
Niger	478.4	9.7	-0.1	0.1	-0.1	0.1
DRC	478.5	8.7	-0.1	0.1	0	0.1
Senegal	590.0	6.5	-0.1*	0.1	-0.1**	0.1
Chad	475.0	8.2	-0.3***	0.1	-0.2***	0.1
Togo	514.4	7.7	0	0.1	-0.2**	0.1
Mean	536.5	2.5	-0.1***	0.0	-0.2***	0.0

Table B3.10: Student performance in mathematics by parental presence - Late primary

	Students living with neither parent		Difference in scores between students living with one parent and those living with neither parent		Difference in scores between students living with both parents and those living with neither parent	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	531.4	7.9	0	0.1	0	0.1
Burkina Faso	565.3	5.0	-0.1*	0.1	-0.2***	0.1
Burundi	547.2	5.7	-0.1*	0.1	0	0.1
Cameroon	501.9	6.5	-0.1	0.1	-0.1	0.1
Congo	498.1	7.7	-0.1	0.1	0	0.1
Côte d'ivoire	460.9	4.6	-0.1	0.1	-0.1	0.1
Gabon	555.5	8.6	0	0.1	0	0.1
Guinea	489.6	8.4	0	0.1	-0.1	0.1
Madagascar	472.1	6.5	-0.1	0.1	0	0.1
Niger	465.6	7.3	-0.1	0.1	0	0.1
DRC	458.3	7.0	0	0.1	0.1	0.1
Senegal	564.2	6.8	0	0.1	-0.1	0.1
Chad	449.5	6.1	-0.1*	0.1	-0.1**	0.1
Togo	510.9	6.8	-0.1	0.1	-0.2**	0.1
Mean	505.8	2.1	-0.1***	0.0	-0.1***	0.0

Table B3.11: Percentage of students helped with homework and difference in reading scores - Late primary

	Student helped with homework				Student not helped with homework		Gross difference between male and female students	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Average score	Standard error	Average score	Standard error				
Benin	79.2	1.7	590.0	6.7	573.5	8.2	16.6**	7.2	6.1	5.9
Burkina Faso	61.2	1.8	561.8	4.2	539.2	5.3	22.6***	6.2	12.3**	6.1
Burundi	61.9	2.0	496.1	3.7	483.4	2.6	12.7***	4.3	9.1**	3.7
Cameroon	69.1	1.6	547.4	5.9	521.2	8.3	26.2***	9.0	7.2	8.2
Congo	62.7	1.9	556.2	5.9	535.4	5.7	20.8***	6.8	13.2*	7.2
Côte d'ivoire	54.9	2.0	523.5	7.2	478.5	5.0	45***	7.6	17***	5.6
Gabon	76.9	1.5	647.9	3.7	640.8	6.7	7.1	5.9	4.1	6.2
Guinea	63.3	2.0	516.0	6.5	489.5	6.9	26.5***	6.7	17.5***	6.7
Madagascar	34.2	2.6	484.4	9.7	449.2	3.6	35.2***	8.6	23***	6.3
Niger	56.5	1.9	487.9	6.8	454.8	7.0	33.1***	8.6	13.6	10.3
DRC	53.2	2.3	477.9	5.6	471.4	5.9	6.4	5.0	1.9	5.5
Senegal	75.8	1.6	579.2	5.2	568.1	6.7	11*	6.3	3.0	6.1
Chad	53.8	1.9	455.7	7.7	445.6	5.3	10.1	6.7	4.4	6.5
Togo	78.2	1.5	504.2	4.1	478.3	6.4	25.8***	7.5	9.3	6.2
Mean	63.1	0.5	538.1	1.7	497.4	1.9	40.7***	2.1	23.1***	2.1

Table B3.12: Percentage of students helped with homework and difference in mathematics scores - Late primary

	Student helped with homework				Student not helped with homework		Gross difference compared with students not receiving help	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Average score	Standard error	Average score	Standard error				
Benin	79.2	1.7	536.4	6.5	527.2	8.0	9.2	7.0	2.4	6.2
Burkina Faso	61.2	1.8	554.2	4.6	539.9	6.0	14.3**	6.7	6.9	6.8
Burundi	61.9	2.0	552.0	4.0	539.6	3.8	12.3***	4.7	9**	4.3
Cameroon	69.1	1.6	499.8	4.8	479.4	6.1	20.4***	7.3	4.5	6.6
Congo	62.7	1.9	496.4	4.3	489.3	4.4	7.1	5.3	2.4	5.4
Côte d'ivoire	54.9	2.0	464.0	4.7	442.4	4.0	21.7***	5.0	8.9**	3.7
Gabon	76.9	1.5	556.4	3.9	553.1	6.6	3.3	5.4	0.9	5.5
Guinea	63.3	2.0	490.3	5.2	476.8	5.1	13.5**	5.3	7.2	5.6
Madagascar	34.2	2.6	490.0	9.7	459.8	4.6	30.2***	9.5	19.7***	7.0
Niger	56.5	1.9	476.7	6.3	446.7	5.8	30***	7.0	18.4**	8.9
DRC	53.2	2.3	465.6	5.3	462.5	5.0	3.0	4.4	3.1	5.1
Senegal	75.8	1.6	559.7	4.9	553.2	7.2	6.5	6.8	1.1	6.8
Chad	53.8	1.9	441.5	5.1	434.3	4.1	7.2	4.6	4.4	4.3
Togo	78.2	1.5	502.9	4.3	479.1	7.2	23.9***	8.4	8.0	6.8
Mean	63.1	0.5	511.1	1.5	484.1	1.6	27***	1.7	16.4***	1.8

Table B3.13: Distribution of students by parents' literacy - Late primary

	No literate parent		One literate parent		Both parents literate	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	23.8	1.3	37.0	1.2	39.2	1.8
Burkina Faso	31.6	1.1	34.7	1.0	33.7	1.3
Burundi	14.1	0.8	35.5	1.1	50.4	1.3
Cameroon	10.6	0.8	18.6	1.2	70.8	1.7
Congo	4.2	0.6	13.2	1.2	82.6	1.4
Côte d'ivoire	34.4	1.2	42.5	1.0	23.2	1.4
Gabon	4.3	0.7	10.6	1.1	85.1	1.7
Guinea	31.5	1.7	36.6	1.4	31.9	1.6
Madagascar	9.1	1.1	20.7	1.2	70.2	1.9
Niger	31.6	1.7	32.8	1.3	35.6	2.3
DRC	7.0	1.0	20.1	1.4	72.9	1.9
Senegal	17.8	1.2	37.9	1.2	44.3	1.8
Chad	19.3	1.5	36.6	1.6	44.1	2.0
Togo	21.7	1.2	33.5	1.2	44.7	1.5
Mean	19.2	0.3	29.9	0.4	50.9	0.6

Table B3.14: Student performance in reading by parents' literacy - Late primary

	Students living with neither parent		Difference in scores between students living with one literate parent and those living with no literate parents		Difference in scores between students living with two literate parents and those living with no literate parents	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	548.5	6.3	25.7***	5.8	66.8***	10.3
Burkina Faso	552.4	3.6	0.1	4.0	1	7.2
Burundi	483.8	3.4	1.8	3.3	13.3***	5.0
Cameroon	505.0	14.1	6.6	14.0	47.2***	14.7
Congo	515.8	15.0	1	13.6	37.9**	14.7
Côte d'ivoire	487.8	5.2	5.5	6.2	55.7***	11.7
Gabon	654.6	10.0	-5.9	8.9	-10.3	11.1
Guinea	477.1	9.0	31.5***	8.3	45.2***	11.3
Madagascar	438.3	5.4	11*	5.9	30.1***	8.0
Niger	464.0	9.6	-0.1	8.6	23.1**	11.2
DRC	463.6	11.7	-1.2	11.1	15.7	12.8
Senegal	570.9	6.0	-4.2	4.0	15.7**	7.4
Chad	443.1	7.9	8.3	7.2	12.7	9.3
Togo	455.8	5.7	34.2***	5.9	69.6***	7.4
Mean	498.4	2.6	10.2***	2.5	37.6***	3.1

Table B3.15: Student performance in mathematics by parents' literacy - Late primary

	Students living with neither parent		Difference in scores between students living with one literate parent and those living with no literate parents		Difference in scores between students living with two literate parents and those living with no literate parents	
				Standard error	Regression coefficient	Standard error
Benin	513.1	5.8	11.1**	5.3	39.4***	9.0
Burkina Faso	550.5	4.3	-2.1	4.1	-5.2	7.8
Burundi	536.2	4.7	6.1	4.6	17.3***	5.7
Cameroon	463.7	9.4	7.9	10.8	41.1***	10.1
Congo	471.4	11.8	5.6	10.6	25.2**	11.5
Côte d'ivoire	448.5	4.2	0.3	4.4	24.9***	7.7
Gabon	549.7	9.8	-3.9	9.7	5.4	10.4
Guinea	469.2	6.5	18***	6.4	23.3***	8.2
Madagascar	443.8	7.0	15.1**	6.9	33.8***	8.8
Niger	461.5	8.8	-6.3	8.0	8.8	10.4
DRC	456.2	9.8	-0.6	9.6	12.2	10.2
Senegal	556.0	6.6	-3.5	4.7	6	7.0
Chad	431.4	5.8	6.7	5.9	10.1	7.0
Togo	460.7	6.8	30.2***	6.7	57.7***	8.1
Mean	485.9	2.3	8***	2.1	22.9***	2.6

Table B3.16: Percentage of students with books at home and score difference in reading - Late primary

	Student had books at home				Student had no books at home		Difference	Standard error
	Percentage	Standard error	Average score	Standard error	Average score	Standard error		
Benin	71.6	1.7	598.4	7.7	557.4	5.9	40.9***	8.0
Burkina Faso	28.2	1.7	583.0	7.3	542.0	3.4	41***	7.5
Burundi	18.5	2.1	512.1	7.6	486.8	2.1	25.3***	7.2
Cameroon	56.2	1.6	567.8	5.3	508.4	7.0	59.5***	7.4
Congo	52.0	1.7	564.2	6.2	529.7	5.8	34.5***	7.5
Côte d'ivoire	43.5	2.0	533.8	8.4	479.3	4.7	54.5***	8.4
Gabon	72.1	1.4	653.7	4.0	627.8	5.5	25.9***	5.0
Guinea	54.6	2.3	522.6	7.2	487.7	8.0	34.9***	9.1
Madagascar	38.8	2.8	484.1	10.5	446.7	3.4	37.3***	10.8
Niger	27.6	2.0	509.2	9.0	459.5	6.2	49.7***	10.1
DRC	30.8	2.1	495.3	8.7	465.3	4.8	30***	8.2
Senegal	57.3	1.9	593.2	6.0	555.4	4.9	37.8***	6.0
Chad	33.3	1.8	466.1	7.6	445.8	6.2	20.3***	7.2
Togo	47.5	1.9	534.9	4.9	466.1	4.9	68.8***	7.0
Mean	45.3	0.5	557.7	2.2	494.9	1.6	62.8***	2.4

Table B3.17: Percentage of students with books at home and score difference in mathematics - Late primary

	Student had books at home				Student had no books at home		Difference	Standard error
	Percentage	Standard error	Average score	Standard error	Average score	Standard error		
Benin	71.6	1.7	542.1	7.6	515.9	5.5	26.2***	7.5
Burkina Faso	28.2	1.7	574.2	7.3	538.9	3.8	35.3***	7.4
Burundi	18.5	2.1	564.0	9.4	543.6	2.9	20.4**	9.5
Cameroon	56.2	1.6	517.7	4.5	465.8	5.1	51.9***	5.9
Congo	52.0	1.7	504.0	4.4	481.1	4.4	22.9***	5.4
Côte d'ivoire	43.5	2.0	470.2	5.8	441.8	3.4	28.4***	5.5
Gabon	72.1	1.4	561.5	4.4	540.7	4.8	20.8***	4.5
Guinea	54.6	2.3	493.5	6.0	475.0	5.1	18.6***	6.4
Madagascar	38.8	2.8	488.4	10.1	458.4	4.1	30.1***	10.4
Niger	27.6	2.0	483.3	7.7	455.7	5.9	27.6***	8.7
DRC	30.8	2.1	475.9	7.8	458.9	4.1	17**	6.7
Senegal	57.3	1.9	572.7	5.7	539.6	5.1	33***	5.9
Chad	33.3	1.8	444.7	5.4	435.8	4.3	8.9*	5.0
Togo	47.5	1.9	529.7	5.2	469.4	5.4	60.3***	7.4
Mean	45.3	0.5	520.3	1.9	485.4	1.3	34.9***	2.0

Table B3.18: Percentage of students by number of books at home - Late primary

	No books		Enough books to fill a book-shelf		Enough books to fill two book-shelves		Enough books to fill a bookcase	
	Percentage	Standard error	Average score	Standard error	Average score	Standard error	Average score	Standard error
Benin	2.4	0.5	69.4	2.1	17.6	1.5	10.7	1.2
Burkina Faso	15.3	1.6	62.9	2.0	14.6	1.5	7.1	0.9
Burundi	12.7	1.7	83.1	2.0	3.4	1.0	0.9	0.4
Cameroon	11.5	1.5	56.2	1.9	17.9	1.1	14.4	1.1
Congo	10.4	1.0	60.9	1.6	19.8	1.3	8.9	0.9
Côte d'ivoire	1.6	0.5	76.0	1.8	15.3	1.5	7.1	0.8
Gabon	7.0	0.9	75.8	1.4	13.9	1.2	3.3	0.5
Guinea	18.0	2.3	66.2	2.6	8.7	0.8	7.2	1.2
Madagascar	38.1	4.1	50.6	4.2	7.3	1.2	4.0	1.4
Niger	21.9	2.5	60.8	2.5	11.9	1.4	5.3	0.9
DRC	10.9	2.0	56.6	2.4	22.9	2.1	9.6	1.2
Senegal	6.7	0.9	59.5	1.6	20.9	1.4	12.9	1.0
Chad	24.9	2.2	50.0	2.6	17.5	2.1	7.6	1.2
Togo	9.3	1.2	73.7	1.7	12.6	1.0	4.4	0.7
Mean	12.9	0.5	64.5	0.7	14.9	0.3	7.7	0.3

Table B3.19: Student performance in reading by number of books at home - Late primary

	No books		Difference in scores between students with enough books to fill one bookshelf and those without any books		Difference in scores between students with enough books to fill two book-shelves and those without any books		Difference in scores between students with enough books to fill a book-case and those without any books	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	545.8	12.3	54***	14.0	50.5***	14.2	64.1***	15.8
Burkina Faso	526.9	11.7	62.7***	13.4	48.8***	15.3	55.6***	14.8
Burundi	505.5	10.4	9.5	9.5	-17.8	17.3	28.8	27.6
Cameroon	505.0	15.3	78.6***	14.9	64.3***	15.9	64.1***	14.2
Congo	524.4	7.7	61***	7.6	57.3***	13.3	11.9	13.7
Côte d'ivoire	480.7	20.9	52.4**	21.0	41*	21.5	89.6***	24.9
Gabon	597.4	18.3	57.8***	16.8	57.5***	18.9	43.1**	19.3
Guinea	518.2	12.6	7.5	13.5	17	18.8	38.1**	16.3
Madagascar	459.4	6.1	26.4**	12.5	22.5	20.3	35.5	39.3
Niger	482.0	11.9	31.4**	13.7	30.4	20.8	47.5*	25.8
DRC	489.2	15.2	21.8	18.8	-20.1	15.1	7.1	18.6
Senegal	546.2	9.4	53.7***	10.9	44.1***	12.7	52.9***	12.7
Chad	449.7	8.9	25.3***	9.1	8.5	10.1	30.6**	12.0
Togo	480.7	12.7	57.1***	13.1	66.6***	15.8	68.1***	16.7
Mean	496.2	3.4	67.9***	4.1	63.3***	4.6	69.9***	5.3

Table B3.20: Student performance in mathematics by number of books at home - Late primary

	No books		Difference in scores between students with enough books to fill one bookshelf and those without any books		Difference in scores between students with enough books to fill two book-shelves and those without any books		Difference in scores between students with enough books to fill a book-case and those without any books	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	503.2	12.2	40.7***	15.0	38.7***	14.5	39.7***	15.1
Burkina Faso	511.8	9.7	66.6***	12.0	64.3***	12.0	53.2***	15.4
Burundi	552.0	10.1	14.3	9.5	-25.9	16.2	56.1	36.0
Cameroon	472.4	10.5	51.6***	11.4	49.9***	13.4	56.8***	10.6
Congo	482.3	6.4	30.9***	6.5	38.4***	9.9	12.6	9.9
Côte d'ivoire	444.1	17.9	26.9	17.5	18	18.2	37.3*	21.6
Gabon	518.6	12.9	40.4***	11.4	63.1***	13.8	32.8**	16.4
Guinea	491.5	7.9	5	8.7	8.4	13.1	21.4*	12.6
Madagascar	475.9	5.2	13.6	12.1	8.1	17.6	35.4	42.0
Niger	466.7	9.3	20.3*	10.7	14.3	14.5	35	30.5
DRC	478.2	11.0	10.1	13.8	-25.7**	10.8	3.9	13.4
Senegal	529.3	13.2	47.9***	14.6	41***	15.2	54.1***	14.5
Chad	445.9	7.7	6	8.0	-14*	7.6	17*	9.0
Togo	485.0	10.2	47***	10.9	53.2***	14.2	52.9***	14.6
Mean	484.3	2.5	40***	2.9	37.3***	3.5	43.6***	4.3

Table B3.21: Percentage of students by frequency of hunger at school

	Never		Sometimes (once or twice per week)		Sometimes (once or twice per week)		Always	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	36.7	2.4	38.4	2.2	14.0	1.3	10.9	1.3
Burkina Faso	36.0	1.8	23.2	1.3	30.0	1.6	10.7	0.8
Burundi	19.7	1.6	32.0	1.5	18.1	1.2	30.2	1.7
Cameroon	23.2	1.4	34.7	1.4	22.1	1.3	20.0	1.2
Congo	33.7	1.7	34.9	1.9	14.2	1.0	17.2	1.3
Côte d'ivoire	28.3	1.7	23.0	1.4	39.0	1.7	9.7	0.7
Gabon	23.7	1.4	44.3	1.4	16.8	1.1	15.2	1.1
Guinea	27.5	2.2	39.7	2.6	20.1	1.9	12.7	1.4
Madagascar	28.5	2.7	27.3	2.5	23.3	2.2	20.9	2.4
Niger	23.7	1.9	27.4	2.0	35.9	2.2	13.1	1.4
DRC	24.6	1.5	20.4	1.4	20.4	1.5	34.7	2.0
Senegal	25.4	1.7	44.6	2.4	17.5	1.6	12.5	1.1
Chad	24.2	1.7	30.1	1.8	20.7	1.0	25.1	1.6
Togo	34.4	1.6	32.6	1.8	16.0	1.3	16.9	1.6
Mean	27.9	0.5	32.4	0.5	22.1	0.4	17.6	0.4

Table B3.22: Student performance in reading by frequency of hunger - Late primary

	Never		Some-times (once or twice per week)		Sometimes (once or twice per week)		Always	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	579.2	9.2	23.5**	9.4	-9.9	13.9	7.3	11.0
Burkina Faso	556.6	4.1	12.9**	5.3	-2	6.1	-43.4***	11.0
Burundi	491.2	4.6	7.7*	4.4	-6.4	5.3	-4.6	4.8
Cameroon	550.3	8.4	17.2**	8.3	-19.5*	11.8	-42.3***	11.0
Congo	548.4	8.5	19.6**	9.4	-9.7	12.4	-13.9	9.6
Côte d'ivoire	511.7	9.5	4.8	9.2	-16.6	10.1	-29.7**	11.6
Gabon	645.7	4.5	7.1	5.0	-3.9	8.6	-12.3*	6.8
Guinea	524.1	9.8	-6	11.1	-37.3***	12.5	-51.5***	13.8
Madagascar	451.1	5.4	30***	11.0	10.4	9.2	-1.3	8.4
Niger	475.9	8.2	22.1**	10.8	-6.5	10.5	-43.2***	10.6
DRC	487.1	8.7	8.2	9.3	-9.8	11.0	-30***	8.7
Senegal	577.9	4.7	12.6**	5.3	-3.4	12.7	-35.9***	9.5
Chad	465.3	5.8	2.9	10.2	-33.1***	6.4	-27.3***	8.9
Togo	497.1	5.7	27.5***	8.4	-12.2	10.4	-26.8***	8.8
Mean	528.5	2.4	19.8***	3.1	-18.8***	3.3	-35.4***	3.0

Table B3.23: Student performance in mathematics by frequency of hunger - Late primary

	Never		Sometimes (once or twice per week)		Sometimes (once or twice per week)		Always	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	531.1	8.4	14.3*	8.3	-10.2	11.1	0.8	11.2
Burkina Faso	554.1	4.9	11.5**	5.4	-9.3	6.0	-40***	11.3
Burundi	544.4	5.6	10.7*	5.8	-2.8	6.6	-1	6.2
Cameroon	505.1	8.0	5.5	7.7	-18.9**	9.2	-34***	9.9
Congo	495.7	5.9	8.8	7.1	-3.4	9.2	-13.7**	6.8
Côte d'ivoire	461.2	6.8	2.5	6.7	-13.6**	6.9	-21.8***	7.7
Gabon	560.3	3.9	-0.6	5.0	-4.3	8.3	-24.1***	6.0
Guinea	495.5	7.3	-1.2	8.8	-25.6**	10.1	-31.3***	9.1
Madagascar	459.1	6.4	29.1***	10.6	12.7	11.3	2.9	10.0
Niger	463.2	7.5	13.2	8.7	3.6	10.3	-32.2***	9.8
DRC	478.2	7.9	-3.8	8.3	-23.2***	8.1	-19.3**	7.9
Senegal	568.5	5.7	-0.9	6.2	-16.8	11.4	-46.1***	8.9
Chad	447.8	4.6	-0.8	6.8	-21.8***	5.8	-16**	6.6
Togo	499.1	5.9	22.2***	8.1	-21.3**	10.6	-25.9***	9.0
Mean	506.0	2.0	12.3***	2.6	-16.5***	2.9	-23.3***	2.8

Table B3.24: Percentage of students never involved in small-scale commerce and difference in reading scores - Late primary

	Never involved in small-scale commerce				Always. often or sometimes involved in small-scale commerce		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	59.4	1.9	594.0	7.8	577.5	6.7	16.5**	7.9
Burkina Faso	58.2	1.4	559.3	4.5	545.7	3.7	13.6***	4.5
Burundi	64.8	1.9	495.4	3.4	483.6	2.9	11.8***	3.5
Cameroon	50.0	1.7	572.6	6.4	514.4	5.2	58.3***	7.0
Congo	66.0	2.0	565.5	5.2	523.7	6.4	41.8***	6.8
Côte d'ivoire	66.5	1.5	508.5	6.2	492.6	6.7	16**	7.1
Gabon	74.1	1.9	653.8	2.9	627.6	9.0	26.2***	8.7
Guinea	65.1	2.1	518.6	6.5	487.2	8.2	31.5***	9.0
Madagascar	69.5	2.1	461.1	5.5	461.5	7.7	-0.4	7.8
Niger	48.4	1.7	491.5	5.9	458.3	6.2	33.2***	6.1
DRC	57.0	2.1	485.3	6.9	464.0	5.3	21.3***	7.1
Senegal	73.1	1.4	586.7	4.8	556.3	6.9	30.4***	5.8
Chad	44.2	1.8	467.9	6.9	441.3	6.1	26.6***	5.7
Togo	52.9	1.8	498.9	4.7	499.2	5.6	-0.4	7.4
Mean	60.9	0.5	537.0	1.8	504.8	1.7	32.3***	1.9

Table B3.25: Percentage of students never involved in small-scale commerce and difference in mathematics scores - Late primary

	Never involved in small-scale commerce				Always. often or sometimes involved in small-scale commerce		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	59.4	1.9	540.0	7.0	527.8	7.0	12.1*	6.6
Burkina Faso	58.2	1.4	554.5	4.8	541.8	4.1	12.7***	4.5
Burundi	64.8	1.9	551.3	3.7	539.8	4.1	11.5***	4.3
Cameroon	50.0	1.7	517.9	5.3	473.7	4.3	44.2***	6.0
Congo	66.0	2.0	504.2	4.0	478.9	4.5	25.3***	4.7
Côte d'ivoire	66.5	1.5	457.8	4.1	447.3	5.1	10.4**	5.1
Gabon	74.1	1.9	559.7	3.4	545.5	8.7	14.2*	8.3
Guinea	65.1	2.1	492.6	5.1	474.5	6.8	18.1**	7.2
Madagascar	69.5	2.1	471.1	5.6	468.0	7.4	3.1	7.3
Niger	48.4	1.7	470.6	5.6	457.9	6.0	12.7**	6.0
DRC	57.0	2.1	474.6	5.7	452.3	4.7	22.3***	5.4
Senegal	73.1	1.4	568.4	4.6	536.2	7.4	32.2***	6.6
Chad	44.2	1.8	449.0	5.0	431.6	4.3	17.4***	4.5
Togo	52.9	1.8	500.8	4.8	494.6	5.7	6.2	7.0
Mean	60.9	0.5	511.4	1.5	487.4	1.5	23.9***	1.7

Table B3.26: Percentage of students never involved in agricultural work and students' performance in reading - Late primary

	Never involved in agricultural work				Always. often or sometimes involved in agricultural work		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	49.4	2.4	624.4	8.3	551.2	5.2	73.2***	8.5
Burkina Faso	38.2	1.5	581.6	4.7	536.1	3.7	45.5***	4.5
Burundi	17.3	1.3	521.3	8.0	485.1	2.1	36.3***	7.6
Cameroon	36.2	2.3	582.9	6.9	520.0	5.5	62.8***	8.4
Congo	62.5	1.8	579.0	4.5	504.6	7.6	74.4***	8.0
Côte d'ivoire	41.7	2.1	540.6	9.4	476.4	5.2	64.2***	9.8
Gabon	61.1	1.6	658.2	3.4	629.3	6.7	29***	6.9
Guinea	59.1	2.2	526.9	6.2	478.4	9.1	48.6***	10.1
Madagascar	25.9	2.3	497.0	11.1	449.1	4.4	47.9***	10.9
Niger	36.0	2.0	498.3	6.4	460.1	6.4	38.2***	7.4
DRC	43.9	2.2	497.9	7.8	458.7	4.3	39.2***	6.7
Senegal	55.2	1.9	597.4	5.5	555.0	5.3	42.3***	5.3
Chad	26.2	1.5	476.4	7.8	444.6	5.8	31.8***	6.2
Togo	38.2	1.8	557.9	5.6	463.3	4.0	94.6***	6.8
Mean	42.3	0.5	564.1	2.3	495.0	1.5	69.1***	2.5

Table B3.27: Percentage of students never involved in agricultural work and students' performance in mathematics - Late primary

	Never involved in agricultural work				Always. often or sometimes involved in agricultural work		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	49.4	2.4	559.8	8.5	510.8	5.3	49***	8.3
Burkina Faso	38.2	1.5	570.0	4.6	535.9	4.3	34.1***	4.3
Burundi	17.3	1.3	571.8	8.5	542.1	3.2	29.7***	8.8
Cameroon	36.2	2.3	529.2	6.6	476.6	4.2	52.5***	7.8
Congo	62.5	1.8	510.0	3.9	471.2	5.2	38.8***	5.7
Côte d'ivoire	41.7	2.1	470.0	5.8	443.0	4.2	27***	6.5
Gabon	61.1	1.6	561.5	3.9	547.0	6.8	14.5**	7.1
Guinea	59.1	2.2	496.7	5.5	469.9	6.6	26.8***	7.7
Madagascar	25.9	2.3	500.1	10.8	460.1	5.5	40***	11.9
Niger	36.0	2.0	477.1	6.1	456.3	5.9	20.8***	6.7
DRC	43.9	2.2	481.9	6.2	451.5	4.4	30.4***	5.4
Senegal	55.2	1.9	574.2	5.5	541.5	5.0	32.8***	5.1
Chad	26.2	1.5	451.6	5.4	434.9	4.1	16.8***	4.7
Togo	38.2	1.8	550.5	6.1	465.9	4.3	84.6***	7.4
Mean	42.3	0.5	524.6	1.9	485.3	1.3	39.3***	2.1

Table B3.28: Percentage of students never involved in manual work or small trades and students' performance in mathematics - Late primary

	Never involved in manual work or small trades				Always, often or sometimes involved in manual work or small trades		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	77.7	1.6	596.5	7.6	555.7	5.7	40.8***	9.2
Burkina Faso	75.0	1.4	558.7	4.1	536.9	5.6	21.7***	6.1
Burundi	81.3	1.9	493.5	3.0	481.8	4.5	11.7**	5.1
Cameroon	60.9	1.8	565.1	5.2	510.2	6.4	54.9***	7.5
Congo	79.6	1.4	566.4	5.0	495.8	7.2	70.6***	7.7
Côte d'ivoire	80.8	1.3	509.6	5.8	476.1	7.8	33.5***	8.2
Gabon	78.3	1.7	651.8	3.3	627.1	8.0	24.7***	7.1
Guinea	75.8	1.5	516.7	5.6	476.2	9.1	40.5***	8.1
Madagascar	81.2	1.6	463.6	5.3	452.4	8.6	11.3	8.1
Niger	72.0	1.9	481.6	5.3	454.0	9.3	27.5***	9.1
DRC	71.3	2.1	480.0	5.6	467.4	6.0	12.6**	5.4
Senegal	78.7	1.5	588.3	5.0	540.5	6.5	47.8***	6.4
Chad	53.5	2.1	464.5	7.1	440.6	6.1	23.9***	6.4
Togo	78.1	1.5	501.2	3.9	490.1	6.6	11.1	6.9
Mean	74.9	0.5	533.4	1.7	497.4	1.7	36***	2.0

Table B3.29: Percentage of students never involved in manual work or small trades and students' performance in mathematics - Late primary

	Never involved in manual work or small trades				Always, often or sometimes involved in manual work or small trades		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	77.7	1.6	541.3	7.3	513.4	6.2	27.9***	8.7
Burkina Faso	75.0	1.4	554.2	4.2	533.3	6.2	20.8***	6.0
Burundi	81.3	1.9	549.4	3.3	537.5	6.2	11.9*	6.3
Cameroon	60.9	1.8	510.1	4.4	474.3	5.4	35.7***	6.1
Congo	79.6	1.4	507.0	3.6	456.0	5.3	51.1***	5.5
Côte d'ivoire	80.8	1.3	456.6	3.9	444.2	6.2	12.3**	5.8
Gabon	78.3	1.7	558.6	3.7	545.1	7.8	13.5**	6.8
Guinea	75.8	1.5	492.8	4.6	464.1	7.1	28.7***	6.4
Madagascar	81.2	1.6	471.4	5.6	464.9	8.2	6.5	8.6
Niger	72.0	1.9	467.2	4.8	455.0	8.8	12.3	8.2
DRC	71.3	2.1	468.5	4.8	457.5	5.7	11**	4.9
Senegal	78.7	1.5	568.9	4.7	524.0	6.7	44.9***	5.8
Chad	53.5	2.1	446.1	5.1	431.4	4.1	14.8***	4.6
Togo	78.1	1.5	500.1	4.3	488.2	6.5	11.9*	7.0
Mean	74.9	0.5	509.0	1.3	481.2	1.8	27.8***	1.8

Table B3.30: Percentage of students never involved in domestic work and students' performance in reading - Late primary

	Never involved in domestic work				Always, often or sometimes involved in domestic work		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	11.2	1.1	601.8	10.9	585.8	6.3	16*	8.8
Burkina Faso	11.7	1.0	550.4	9.9	553.6	3.3	-3.1	9.2
Burundi	5.3	0.8	493.8	9.1	491.3	2.7	2.5	9.1
Cameroon	11.2	1.2	542.7	12.5	543.7	4.7	-1	12.3
Congo	17.9	1.2	556.9	6.5	551.4	5.3	5.5	7.1
Côte d'ivoire	17.7	1.6	515.3	10.2	500.4	5.6	14.8	9.8
Gabon	13.9	1.1	649.7	5.8	646.6	4.2	3	6.8
Guinea	14.3	1.7	527.3	12.3	505.5	5.8	21.8*	12.0
Madagascar	2.9	0.5	447.5	9.7	461.9	5.2	-14.5	9.6
Niger	6.7	0.7	456.8	8.5	475.3	5.4	-18.5**	8.3
DRC	17.0	1.5	492.2	9.7	472.6	5.1	19.6**	8.0
Senegal	18.9	1.5	578.2	7.6	578.9	5.3	-0.8	8.0
Chad	13.9	1.2	454.2	7.2	453.3	6.4	0.9	8.4
Togo	6.0	0.8	508.0	11.4	498.3	3.6	9.7	11.3
Mean	12.0	0.4	538.3	3.3	522.5	1.5	15.8***	3.2

Table B3.31: Percentage of students never involved in domestic work and students' performance in mathematics - Late primary

	Never involved in domestic work				Always, often or sometimes involved in domestic work		Difference	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error		
Benin	11.2	1.1	549.5	9.7	533.5	6.2	15.9**	8.8
Burkina Faso	11.7	1.0	544.5	9.6	549.4	3.6	-4.9	9.2
Burundi	5.3	0.8	544.5	10.9	547.4	3.1	-3	9.1
Cameroon	11.2	1.2	501.6	9.6	495.2	3.7	6.4	12.3
Congo	17.9	1.2	502.6	6.6	495.0	3.6	7.5	7.1
Côte d'ivoire	17.7	1.6	459.8	6.4	453.1	4.0	6.7	9.8
Gabon	13.9	1.1	545.1	6.2	557.8	4.3	-12.7**	6.8
Guinea	14.3	1.7	494.6	8.6	485.6	4.6	8.9	12.0
Madagascar	2.9	0.5	454.2	9.4	471.0	5.2	-16.8*	9.6
Niger	6.7	0.7	445.7	7.9	465.3	5.0	-19.6***	8.3
DRC	17.0	1.5	476.3	7.1	462.7	4.9	13.6**	8.0
Senegal	18.9	1.5	563.1	8.7	559.3	4.7	3.7	8.0
Chad	13.9	1.2	441.7	5.2	439.4	4.3	2.4	8.4
Togo	6.0	0.8	507.7	12.9	497.0	3.8	10.7	11.3
Mean	12.0	0.4	505.4	2.7	501.7	1.3	3.7	2.6

Table B3.32: Percentage of students who had attended kindergarten or preschool and performance in language of instruction - Early primary

	Percentage of students who had attended kindergarten or preschool	Standard error	Average performance of students who had attended kinder-garten or pre-school	Standard error	Average performance of students who had not attended kinder-garten or pre-school	Standard error	Difference	Standard error
Benin	27.5	2.4	562.3	13.8	514.3	7.4	-48***	13.6
Burkina Faso	8.1	1.6	582.9	15.9	486.3	10.0	-96.6***	19.4
Burundi	24.1	1.9	649.4	9.2	619.9	5.1	-29.5***	10.3
Cameroon	50.7	3.6	568.6	8.2	492.0	16.3	-76.6***	17.8
Congo	33.8	3.3	635.9	14.3	558.6	7.0	-77.4***	16.6
Cote d'ivoire	23.7	2.9	566.9	9.2	501.3	5.3	-65.6***	9.8
Gabon	72.4	2.7	624.8	17.9	567.5	10.6	-57.2***	16.5
Guinea	29.2	3.6	536.9	11.5	440.3	10.9	-96.6***	15.1
Madagascar	41.7	2.7	592.8	10.2	555.3	6.5	-37.5***	9.8
Niger	31.9	3.1	578.7	12.0	517.3	7.4	-61.4***	12.7
DRC	21.8	5.1	572.3	18.9	521.4	8.6	-50.9***	18.6
Senegal	37.0	3.0	586.0	13.1	539.2	9.7	-46.8***	12.5
Chad	7.0	1.5	582.2	22.9	504.1	8.3	-78.1***	24.9
Togo	45.2	2.3	506.2	8.9	453.9	8.7	-52.3***	10.3
Mean	32.3	1.0	583.2	4.1	517.3	2.3	-65.8***	4.9

Table B3.33: Percentage of students who had attended kindergarten or preschool and performance in mathematics - Early primary

	Percentage of students who had attended kindergarten or preschool	Standard error	Average performance of students who had attended kinder-garten or pre-school	Standard error	Average performance of students who had not attended kinder-garten or pre-school	Standard error	Difference	Standard error
Benin	27.5	2.4	547.2	13.9	518.1	6.9	-29.1**	13.5
Burkina Faso	8.1	1.6	567.1	10.4	494.0	8.5	-73.1***	13.2
Burundi	24.1	1.9	615.8	3.3	611.4	2.8	-4.4	3.8
Cameroon	50.7	3.6	550.7	7.6	495.6	15.7	-55***	16.6
Congo	33.8	3.3	625.0	11.3	580.5	6.3	-44.4***	12.3
Cote d'ivoire	23.7	2.9	560.3	7.9	512.3	4.4	-48***	9.0
Gabon	72.4	2.7	606.3	11.9	576.5	10.3	-29.8**	14.4
Guinea	29.2	3.6	579.2	9.5	492.5	11.3	-86.7***	14.7
Madagascar	41.7	2.7	560.7	5.2	545.2	4.1	-15.6***	5.3
Niger	31.9	3.1	584.4	12.5	531.2	7.5	-53.3***	14.3
DRC	21.8	5.1	594.4	17.8	544.2	6.8	-50.2***	16.9
Senegal	37.0	3.0	576.3	7.9	555.4	6.7	-20.9***	7.8
Chad	7.0	1.5	567.6	14.9	518.2	7.2	-49.4***	16.6
Togo	45.2	2.3	509.1	4.9	476.0	7.3	-33.1***	7.0
Mean	32.3	1.0	574.8	2.9	530.6	1.8	-44.2***	3.5

Table B3.34: Percentage of students who had attended kindergarten or preschool and performance in language of instruction - Late primary

	Percentage of students who had attended kindergarten or preschool	Standard error	Average performance of students who had attended kinder-garten or pre-school	Standard error	Average performance of students who had not attended kinder-garten or pre-school	Standard error	Difference	Standard error
Benin	45.3	2.2	618.3	9.4	560.3	5.0	-58***	8.7
Burkina Faso	12.0	0.8	595.1	7.6	547.8	3.3	-47.3***	6.5
Burundi	24.2	1.7	514.1	7.4	484.0	1.8	-30.1***	7.3
Cameroon	52.2	1.8	573.5	5.8	500.9	6.4	-72.6***	7.5
Congo	48.3	1.6	575.0	4.7	521.9	6.9	-53.1***	7.5
Cote d'ivoire	21.2	1.7	561.3	12.4	487.5	4.7	-73.8***	12.1
Gabon	69.1	1.4	654.0	3.9	628.8	4.9	-25.1***	4.2
Guinea	44.6	2.2	533.0	7.0	484.7	6.7	-48.3***	7.3
Madagascar	35.9	2.5	498.1	11.3	441.3	3.3	-56.7***	11.9
Niger	32.0	1.7	499.2	7.6	460.8	6.1	-38.4***	8.0
DRC	26.9	1.9	492.4	8.7	468.0	5.1	-24.4***	8.3
Senegal	43.0	1.9	591.7	7.6	565.5	4.3	-26.1***	7.2
Chad	24.9	1.5	456.3	9.5	449.9	5.5	-6.4	8.0
Togo	40.0	1.5	538.8	5.8	473.9	3.7	-64.8***	5.5
Mean	37.1	0.5	562.2	2.3	500.0	1.5	-62.2***	2.4

Table B3.35: Percentage of students who had attended kindergarten or preschool and performance in mathematics - Late primary

	Percentage of students who had attended kindergarten or preschool	Standard error	Average performance of students who had attended kinder-garten or pre-school	Standard error	Average performance of students who had not attended kinder-garten or pre-school	Standard error	Difference	Standard error
Benin	45.3	2.2	560.4	9.4	513.2	4.7	-47.1***	8.4
Burkina Faso	12.0	0.8	584.6	7.6	544.3	3.8	-40.3***	6.3
Burundi	24.2	1.7	565.8	7.6	541.3	2.8	-24.5***	7.7
Cameroon	52.2	1.8	522.5	4.9	461.8	4.7	-60.7***	6.2
Congo	48.3	1.6	508.3	3.9	479.6	5.0	-28.7***	5.7
Cote d'ivoire	21.2	1.7	483.7	7.6	446.3	3.6	-37.4***	7.5
Gabon	69.1	1.4	562.4	4.4	541.2	4.8	-21.2***	4.5
Guinea	44.6	2.2	499.6	5.9	475.0	4.7	-24.6***	5.0
Madagascar	35.9	2.5	505.5	11.1	451.3	4.9	-54.2***	12.7
Niger	32.0	1.7	480.5	7.0	455.2	5.8	-25.2***	7.8
DRC	26.9	1.9	473.8	7.6	460.4	4.6	-13.4*	7.1
Senegal	43.0	1.9	560.3	6.7	557.1	4.8	-3.2	6.3
Chad	24.9	1.5	439.7	5.9	437.7	4.0	-2.0	5.0
Togo	40.0	1.5	534.7	5.5	475.5	4.2	-59.2***	5.6
Mean	37.1	0.5	524.3	2.0	487.8	1.2	-36.5***	2.0

Table B3.36: Mean difference in socio-economic level between students by attendance of kindergarten or preschool - Late primary

	Regression coefficient	Standard error
Benin	6.6***	0.6
Burkina Faso	7.1***	0.6
Burundi	6.8***	0.9
Cameroon	9.3***	0.8
Congo	7.9***	0.5
Cote d'ivoire	8.4***	0.7
Gabon	4.1***	0.5
Guinea	6.3***	0.6
Madagascar	5.9***	0.8
Niger	10.4***	0.8
DRC	6.6***	0.7
Senegal	4.3***	0.5
Chad	7.7***	0.7
Togo	7.8***	0.5
Mean	8.5***	0.2

Table B3.37: Percentage of students who had repeated second grade and performance in language of instruction - Early primary

	Percentage d'élèves redoublants	Standard error	Mean des non redoublants	Standard error	Mean des redoublants	Standard error	Difference	Standard error
Benin	19.9	1.2	529.3	8.1	521.8	8.7	-7.5	9.0
Burkina Faso	10.8	1.4	496.5	10.8	477.5	10.6	-19.0	14.9
Burundi	57.2	2.4	648.8	5.4	610.5	5.2	-38.3***	6.3
Cameroon	21.6	2.0	539.6	8.6	498.7	13.8	-41***	12.5
Congo	26.1	1.8	595.2	8.8	554.8	8.6	-40.5***	11.1
Cote d'ivoire	12.6	1.6	518.1	6.0	507.9	7.7	-10.2	9.1
Gabon	31.2	2.3	618.0	17.2	583.9	10.7	-34.1***	12.8
Guinea	19.7	2.4	469.5	11.4	467.1	12.4	-2.4	13.8
Madagascar	31.9	2.1	581.1	8.2	548.9	6.2	-32.1***	7.7
Niger	23.1	2.0	534.6	9.2	543.5	7.4	8.9	11.6
DRC	17.9	2.2	535.6	10.4	513.7	13.4	-21.9*	12.3
Senegal	17.1	2.2	563.7	9.8	529.8	11.9	-33.9***	11.2
Chad	23.0	1.8	508.9	7.8	510.2	12.1	1.3	9.6
Togo	20.1	1.7	484.3	7.9	451.0	10.6	-33.3***	9.6
Mean	23.7	0.5	538.8	2.8	538.0	2.8	-0.8	4.0

Table B3.38 : Percentage of students who had repeated second grade and performance in mathematics - Early primary

	Percentage d'élèves redoublants	Standard error	Mean des non redoublants	Standard error	Mean des redoublants	Standard error	Difference	Standard error
Benin	19.9	1.2	529.1	7.7	515.0	8.5	-14.1	9.2
Burkina Faso	10.8	1.4	502.7	9.2	481.3	10.3	-21.4	14.3
Burundi	57.2	2.4	619.5	3.2	607.1	2.8	-12.4***	3.6
Cameroon	21.6	2.0	530.9	8.4	497.5	12.8	-33.4***	11.2
Congo	26.1	1.8	604.4	7.1	571.4	7.6	-33***	8.3
Cote d'ivoire	12.6	1.6	525.2	4.4	513.3	7.0	-12.0	8.0
Gabon	31.2	2.3	603.2	11.3	583.7	7.1	-19.5**	7.9
Guinea	19.7	2.4	518.9	10.7	513.3	11.7	-5.6	13.6
Madagascar	31.9	2.1	557.5	4.3	538.8	4.5	-18.6***	4.8
Niger	23.1	2.0	545.0	7.5	556.5	9.3	11.5	10.1
DRC	17.9	2.2	557.6	8.5	540.0	14.4	-17.6	13.6
Senegal	17.1	2.2	568.6	6.7	539.2	8.1	-29.5***	9.2
Chad	23.0	1.8	522.5	7.3	516.6	8.5	-5.9	7.9
Togo	20.1	1.7	494.8	5.5	475.5	9.2	-19.3**	7.9
Mean	23.7	0.5	544.6	2.0	545.1	2.5	0.5	3.2

Table B3.39: Distribution of students by number of grades repeated - Late primary

	Student never repeated a grade		Student repeated a grade once		Student repeated a grade twice		Student repeated more than twice	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	37.7	1.7	39.9	1.1	16.5	1.0	5.9	0.6
Burkina Faso	51.7	1.3	35.8	1.0	10.5	0.7	2.0	0.2
Burundi	23.4	1.1	29.0	1.1	26.8	0.8	20.8	1.0
Cameroon	52.5	1.6	32.3	1.4	10.2	0.8	5.0	0.6
Congo	46.9	1.8	34.6	1.2	13.3	1.1	5.3	0.6
Côte d'ivoire	47.7	1.5	35.8	1.2	13.3	0.8	3.2	0.4
Gabon	28.5	1.6	27.3	1.2	22.7	1.4	21.5	1.2
Guinea	49.3	1.9	41.1	1.6	7.3	0.7	2.3	0.3
Madagascar	37.6	1.7	37.4	1.2	18.0	1.1	7.0	0.5
Niger	64.2	1.7	31.2	1.5	3.7	0.5	0.9	0.2
DRC	59.3	1.7	33.2	1.5	5.7	0.7	1.8	0.4
Senegal	52.4	1.6	35.2	1.3	9.5	0.7	2.9	0.5
Chad	49.3	1.8	33.1	1.8	10.2	1.0	7.4	0.9
Togo	42.9	1.3	40.1	0.9	13.4	0.7	3.7	0.3
Mean	45.9	0.5	34.7	0.4	13.0	0.2	6.4	0.2

Table B3.40: Student performance and performance differences in reading by number of repeated grades - Late primary

	Student never repeated a grade		Difference in scores between students who had repeated a grade once and those who had never done so		Difference in scores between students who had repeated a grade twice and those who had never done so		Difference in scores between students who had repeated a grade more than twice and those who had never done so	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	623.4	9.6	-46.3	7.6	-75.8***	10.3	-89.3***	11.5
Burkina Faso	563.5	5.6	-16.1	4.7	-23.2***	7.5	-39.7***	12.8
Burundi	513.8	6.6	-24.2	5.7	-29.2***	6.2	-36.1***	6.8
Cameroon	564.5	5.9	-38.8	8.0	-63***	8.1	-105.1***	13.2
Congo	584.4	5.1	-56.4	5.7	-83.8***	12.2	-115.6***	10.8
Côte d'ivoire	539.9	8.0	-63.7	7.0	-82.9***	7.7	-91.2***	12.9
Gabon	661.2	5.1	-12.4	6.9	-19.6**	7.7	-30.1***	7.2
Guinea	519.1	8.5	-23.9	9.3	-26.1**	12.0	-59.7***	18.4
Madagascar	481.0	9.2	-28.7	7.9	-39.7***	10.0	-51.4***	11.0
Niger	482.8	6.0	-26.3	6.2	-42.3***	9.8	-71.3***	17.1
DRC	479.9	5.5	-15.3	4.6	-0.8	7.8	-15.9	16.1
Senegal	598.2	6.6	-40.2	6.0	-50.2***	7.7	-95.3***	16.3
Chad	458.8	5.6	0.7	6.5	-31.2**	12.4	-56.1***	10.1
Togo	532.8	5.1	-57.6	5.1	-62.8***	7.5	-73.9***	9.3
Mean	538.8	2.2	-28.9	2.0	-31.5***	2.9	-33***	3.9

Table B3.41: Student performance and performance differences in mathematics by number of repeated grades - Late primary

	Student never repeated a grade		Difference in scores between students who had repeated a grade once and those who had never done so		Difference in scores between students who had repeated a grade twice and those who had never done so		Difference in scores between students who had repeated a grade more than twice and those who had never done so	
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error
Benin	564.1	9.8	-39.3***	7.4	-58.7***	10.0	-65.3***	11.5
Burkina Faso	557.9	6.1	-14.2***	5.2	-20.8***	7.5	-36.7***	12.1
Burundi	570.4	6.4	-24***	5.1	-31.7***	6.2	-36.7***	6.7
Cameroon	516.0	5.1	-39.5***	6.0	-56.3***	6.8	-69.5***	7.2
Congo	514.2	4.1	-32.7***	4.5	-44.4***	8.6	-66.9***	8.9
Côte d'ivoire	473.3	5.3	-33***	4.4	-43.3***	5.4	-45.9***	10.1
Gabon	573.0	5.9	-22.4***	6.3	-23.2***	7.6	-25.9***	6.8
Guinea	492.2	6.1	-12.4**	6.3	-8.4	8.3	-36.1**	14.2
Madagascar	485.5	8.7	-21.7***	7.9	-32.8***	9.8	-45.2***	10.8
Niger	471.6	5.6	-22***	5.7	-37.9***	10.4	-61.8***	14.2
DRC	466.5	4.9	-9.1**	4.5	4.4	6.2	-11.4	14.9
Senegal	575.6	6.2	-32.3***	5.1	-43.3***	7.8	-69.2***	16.7
Chad	443.4	3.9	-0.9	4.3	-19.6**	7.9	-39.4***	8.2
Togo	527.7	5.1	-51.3***	4.9	-54.5***	7.4	-57.7***	10.8
Mean	511.5	1.8	-20.9***	1.6	-18.7***	2.3	-16.9***	3.1

Table B3.42: Relationship between performance in language of instruction and mathematics and student age, controlling for grade repetition - Early primary

	Language				Mathematics			
	Coefficient with respect to grade repetition		Regression coefficient with respect to age		Coefficient with respect to grade repetition		Regression coefficient with respect to age	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Benin	6.2	8.6	-8.8	5.6	15.1*	9.1	6.9	5.7
Burkina Faso	18.7	15.1	6.9	6.3	21.0	14.5	9.1*	5.4
Burundi	33***	6.0	-7.5**	3.6	14.6***	3.6	3.1	2.3
Cameroon	29.4**	12.3	-23***	6.5	24**	10.5	-16***	5.0
Congo	16**	7.9	-36.9***	8.6	17.2***	6.3	-23.8***	7.5
Côte d'ivoire	5.9	8.8	-13.9***	5.0	11.1	7.9	-2.6	4.3
Gabon	7.5	8.8	-36.2***	6.4	6.1	6.7	-18.3***	4.3
Guinea	3.2	13.4	7.5	8.6	8.2	13.1	23.3***	7.6
Madagascar	31.9***	7.2	-0.7	4.6	22.5***	4.6	11.3***	2.8
Niger	-9.2	11.4	-9.1	18.3	-11.2	10.2	10.8	14.4
DRC	17.6	13.6	-7.7	12.0	12.6	13.4	-9.0	7.8
Senegal	35.3***	11.3	5.4	6.3	31.4***	9.2	11**	4.6
Chad	-0.5	9.0	1.5	5.7	11.3	7.5	10.8**	5.5
Togo	29.7***	9.5	-8.6	9.5	17.2**	7.8	-0.1	6.9
Mean	-0.8	3.8	-2.4	2.6	1.9	3.2	5.8***	1.6

Table B3.43: Relationship between performance in language of instruction and mathematics and student age. controlling for grade repeti-tion - Late primary

	Language				Mathematics			
	Coefficient with respect to grade repetition		Regression coefficient with respect to age		Coefficient with respect to grade repetition		Regression coefficient with respect to age	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Benin	33.9***	5.5	-28.7***	4.1	29.4***	5.5	-20.7***	3.9
Burkina Faso	7.9	4.8	-23.9***	3.0	6.5	5.4	-22.4***	3.2
Burundi	20.2***	4.7	-10***	2.3	23.4***	4.7	-7.6**	3.0
Cameroon	40.9***	7.0	-27.8***	4.4	38.2***	5.1	-24***	3.2
Congo	38.7***	6.8	-38.1***	3.9	16.2***	5.3	-28.5***	3.4
Côte d'ivoire	65.2***	7.7	-10.5*	6.3	33.9***	4.9	-5.3	3.9
Gabon	-4.6	6.1	-21.8***	2.7	5	5.9	-17.6***	2.5
Guinea	22.6**	9.3	-15.5***	4.1	11.4*	6.1	-10.1***	2.9
Madagascar	26.4***	7.0	-18.1***	3.2	19.4***	7.1	-19***	3.5
Niger	27.3***	6.9	-7.3	7.7	23.5***	6.1	-4.4	6.7
DRC	6.9	4.3	-15.9***	3.4	3.9	4.2	-8.5***	3.1
Senegal	45.5***	4.9	-11.8*	6.4	35.1***	4.8	-15.4***	4.4
Chad	13.7**	6.5	-9.4***	3.2	9.7**	4.3	-5.6**	2.6
Togo	53.5***	5.2	-15.9***	2.4	47.5***	5.0	-11.8***	2.6
Mean	17.5***	1.9	-25.1***	1.3	14***	1.5	-13.6***	1.1

Table B3.44: Percentage of students attending schools in rural areas and difference in student scores in language of instruction - Early primary

	School located in a rural area		School located in a rural area		School located in a urban area		Gross difference compared with students in rural schools	Standard error	Difference controlling for local facilities index	Standard error
	Mean	Standard error	Regression coefficient	Standard error	Regression coefficient	Standard error				
Benin	579.2	9.2	23.5**	9.4	-9.9	13.9	7.3	11.0	11.0	11.0
Burkina Faso	556.6	4.1	12.9**	5.3	-2	6.1	-43.4***	11.0	11.0	11.0
Burundi	491.2	4.6	7.7*	4.4	-6.4	5.3	-4.6	4.8	4.8	4.8
Cameroon	550.3	8.4	17.2**	8.3	-19.5*	11.8	-42.3***	11.0	11.0	11.0
Congo	548.4	8.5	19.6**	9.4	-9.7	12.4	-13.9	9.6	9.6	9.6
Côte d'ivoire	511.7	9.5	4.8	9.2	-16.6	10.1	-29.7**	11.6	11.6	11.6
Gabon	645.7	4.5	7.1	5.0	-3.9	8.6	-12.3*	6.8	6.8	6.8
Guinea	524.1	9.8	-6	11.1	-37.3***	12.5	-51.5***	13.8	13.8	13.8
Madagascar	451.1	5.4	30***	11.0	10.4	9.2	-1.3	8.4	8.4	8.4
Niger	475.9	8.2	22.1**	10.8	-6.5	10.5	-43.2***	10.6	10.6	10.6
DRC	487.1	8.7	8.2	9.3	-9.8	11.0	-30***	8.7	8.7	8.7
Senegal	577.9	4.7	12.6**	5.3	-3.4	12.7	-35.9***	9.5	9.5	9.5
Chad	465.3	5.8	2.9	10.2	-33.1***	6.4	-27.3***	8.9	8.9	8.9
Togo	497.1	5.7	27.5***	8.4	-12.2	10.4	-26.8***	8.8	8.8	8.8
Mean	528.5	2.4	19.8***	3.1	-18.8***	3.3	-35.4***	3.0	3.0	3.0

Table B3.45: Percentage of students attending schools in rural areas and difference in student scores in reading - Late primary

	School located in a rural area		School located in a rural area		School located in a urban area		Gross difference compared with students in rural schools	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	59.8	3.5	545.8	5.9	645.1	8.8	99.3***	10.8	69.3***	14.1
Burkina Faso	61.9	2.6	528.3	4.2	585.9	9.7	57.6***	11.4	49.1***	13.1
Burundi	79.9	2.0	481.7	2.0	521.1	9.1	39.4***	9.2	24.5***	8.6
Cameroon	56.9	3.4	482.6	7.9	580.8	9.1	98.2***	12.2	60.9***	13.3
Congo	26.7	2.1	469.4	10.8	570.2	5.1	100.9***	11.8	75.5***	13.6
Côte d'ivoire	56.7	3.3	469.1	5.3	545.8	10.1	76.7***	11.6	-15.4	23.2
Gabon	17.3	2.4	603.0	16.1	649.7	3.3	46.7***	16.5	34.6*	18.1
Guinea	41.6	3.5	479.2	11.8	518.4	7.7	39.2***	14.0	-2.0	17.5
Madagascar	73.7	3.9	439.2	3.8	519.4	12.3	80.2***	14.0	42.2***	12.4
Niger	67.5	2.2	446.3	6.9	529.3	6.2	83***	9.6	68.7***	15.1
DRC	45.2	3.6	458.0	6.1	485.7	6.6	27.7***	9.1	14.3	10.8
Senegal	58.7	3.3	549.2	5.1	613.9	9.1	64.8***	11.1	35.5***	14.7
Chad	57.1	3.3	425.6	6.9	483.8	9.8	58.2***	12.2	43.4***	17.3
Togo	59.1	2.1	451.4	4.6	559.2	6.5	107.7***	8.1	55.9***	10.4
Mean	54.7	0.8	481.8	1.7	563.7	2.7	81.9***	3.4	27.4***	4.9

Table B3.46: Percentage of students attending schools in rural areas and difference in student scores in mathematics - Early primary

	School located in a rural area		School located in a rural area		School located in a urban area		Gross difference compared with students in rural schools	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	64.8	4.4	507.7	6.7	557.0	16.5	49.3***	18.6	43.7	26.6
Burkina Faso	67.0	4.5	494.9	13.8	521.4	12.9	26.4	18.1	29.8	25.0
Burundi	80.2	3.6	611.9	3.2	624.5	4.4	12.7**	6.1	6.5	7.0
Cameroon	57.0	4.5	495.8	13.7	550.6	9.3	54.8***	16.3	50.2**	21.5
Congo	29.7	3.9	537.8	7.2	613.1	8.0	75.3***	11.5	76.9***	13.5
Côte d'ivoire	57.0	5.0	507.4	7.1	540.3	7.0	33***	11.9	-28.0	27.2
Gabon	19.6	6.5	545.3	11.5	608.1	9.1	62.9***	12.9	39.1**	17.7
Guinea	46.4	5.1	488.8	16.5	541.9	8.2	53.1***	17.6	51.9***	17.3
Madagascar	74.1	3.8	541.4	3.9	566.3	6.8	25***	7.5	13.5	8.5
Niger	66.1	3.7	522.3	8.6	595.7	11.1	73.3***	14.1	49.5***	17.0
DRC	50.7	7.2	544.6	13.1	592.2	17.6	47.6**	22.5	44.1*	24.2
Senegal	56.0	4.8	555.3	7.8	575.8	10.1	20.5	12.8	-0.7	20.5
Chad	72.8	4.3	511.9	7.6	548.7	16.8	36.7*	19.2	36.8**	16.0
Togo	61.6	3.0	465.2	7.5	525.3	8.0	60.1***	10.8	33.2**	14.1
Mean	57.6	1.2	524.3	2.1	572.0	2.7	47.6***	3.4	38.3***	5.2

Table B3.47: Percentage of students attending schools in rural areas and score difference in mathematics - Late primary

	School located in a rural area		School located in a rural area		School located in a urban area		Gross difference compared with students in rural schools	Standard error	Difference controlling for local facilities index	Standard error
	Percentage	Standard error	Mean	Standard error	Mean	Standard error				
Benin	59.8	3.5	505.9	5.5	575.3	10.5	69.4***	11.9	55.6***	14.7
Burkina Faso	61.9	2.6	528.8	5.2	573.5	9.7	44.7***	11.6	38.6***	13.3
Burundi	79.9	2.0	539.1	3.2	571.4	8.8	32.2***	9.2	18.1*	10.4
Cameroon	56.9	3.4	450.3	5.2	527.6	7.1	77.3***	8.8	45.6***	11.6
Congo	26.7	2.1	445.7	7.5	505.8	4.0	60.1***	8.4	48.1***	9.8
Côte d'ivoire	56.7	3.3	438.3	4.1	474.3	6.8	36***	8.0	-5.6	16.5
Gabon	17.3	2.4	513.8	16.4	560.4	4.0	46.6***	17.1	26.4	18.5
Guinea	41.6	3.5	471.4	8.3	491.1	6.7	19.7*	11.1	0.6	14.5
Madagascar	73.7	3.9	450.2	5.4	523.1	12.9	72.9***	15.8	41.3***	14.6
Niger	67.5	2.2	444.3	6.4	501.0	7.0	56.8***	9.7	53.3***	13.7
DRC	45.2	3.6	460.7	6.8	464.1	6.4	3.5	9.2	-5.2	10.9
Senegal	58.7	3.3	544.1	5.5	576.8	9.2	32.8***	11.6	0.1	15.9
Chad	57.1	3.3	421.7	4.8	458.1	6.5	36.3***	8.0	25.6**	10.7
Togo	59.1	2.1	455.0	5.0	552.5	6.8	97.4***	9.0	47.9***	10.6
Mean	54.7	0.8	477.5	1.4	522.7	2.2	45.2***	2.6	11.3***	3.7

Table B3.48: Distribution of students according to school status - Early primary

	Public		Private		Community	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	71.6	2.7	28.4	2.7	0.0	0.0
Burkina Faso	63.6	3.8	32.0	4.0	4.4	2.2
Burundi	93.9	2.5	6.1	2.5	0.0	0.0
Cameroon	69.6	4.0	27.7	3.5	2.7	2.2
Congo	47.6	4.4	49.7	4.3	2.7	1.7
Côte d'ivoire	79.0	5.5	17.9	5.1	3.0	2.1
Gabon	67.1	5.8	32.9	5.8	0.0	0.0
Guinea	66.4	4.0	32.3	4.2	1.3	1.3
Madagascar	64.0	5.0	34.7	5.0	1.3	1.0
Niger	93.9	2.1	6.1	2.1	0.0	0.0
DRC	71.6	6.0	23.8	5.5	4.6	2.7
Senegal	85.0	4.7	15.0	4.7	0.0	0.0
Chad	74.1	5.2	9.0	2.5	16.9	4.5
Togo	70.1	2.1	27.6	2.1	2.2	0.4
Mean	72.3	1.4	24.9	1.2	2.8	0.6

Table B3.49: Student performance and performance differences in language of instruction by school status - Early primary

	Public		Private						Community					
	Mean	Standard error	Mean	Standard error	Difference compared with students attending public schools	Standard error	Difference compared with students attending public schools, controlling for local facilities index	Standard error	Mean	Standard error	Difference compared with students at-ending community schools	Standard error	Difference compared with students attending community schools, controlling for local facilities index	Standard error
Benin	498.1	6.7	592.1	20.2	94***	20.5	88***	21.6			0***	0.0	0***	0.0
Burkina Faso	507.2	8.4	473.0	35.9	-34.2	37.5	-47.3	40.2	495.1	58.2	-12.1	60.0	-35.1	68.0
Burundi	618.3	7.1	668.8	37.9	50.4	39.5	43.3	38.2			0***	0.0	0***	0.0
Cameroon	502.8	11.4	595.2	15.1	92.4***	20.1	83.4***	21.5	406.0	19.4	-96.8***	23.0	-98.2***	22.9
Congo	542.4	9.2	624.2	9.5	81.9***	14.4	75.4***	15.2	549.4	16.4	7.0	18.8	10.7	21.8
Cote d'ivoire	504.8	5.9	572.3	16.8	67.6***	18.1	40.2***	14.1	494.7	15.3	-10.1	16.6	9.8	9.6
Gabon	600.5	20.6	627.8	22.9	27.2	30.0	14.5	27.4	541.2	5.8	0***	0.0	0***	0.0
Guinea	441.7	12.4	520.9	14.6	79.2***	19.1	78.3***	17.2	536.2	32.9	99.5***	13.5	99.2***	12.6
Madagascar	556.9	7.3	587.5	16.7	30.5	19.3	8.2	16.6	523.9	5.4	-20.7	35.7	-7.2	37.0
Niger	529.1	6.8	644.1	38.2	115***	37.2	57.2	47.3			0***	0.0	0***	0.0
DRC	518.4	13.2	549.7	38.1	31.3	40.5	22.0	38.1	500.3	18.2	5.5	14.5	6.1	16.1
Senegal	543.3	10.4	626.1	31.1	82.8**	33.7	64.6	43.8			0***	0.0	0***	0.0
Chad	504.0	9.2	533.5	22.5	29.4	25.1	17.5	22.5	521.3	15.0	-3.7	19.6	-2.8	18.9
Togo	444.9	8.1	542.1	14.9	97.3***	18.1	73.3***	14.8	502.7	13.1	76.5***	17.0	41.9	33.9
Mean	521.5	2.7	577.2	6.3	55.7***	7.2	38.7***	7.2			-18.9	13.0	-18.9	13.0

Table B3.50: Student performance and performance differences in mathematics by school status - Early primary

	Public		Private						Community					
	Mean	Standard error	Mean	Standard error	Difference compared with students attending public schools	Standard error	Difference compared with students attending public schools, controlling for local facilities index	Standard error	Mean	Standard error	Difference compared with students at-ending community schools	Standard error	Difference compared with students attending community schools, controlling for local facilities index	Standard error
Benin	504.9	6.2	575.8	18.3	70.9***	18.8	65.1***	20.2			0***	0.0	0***	0.0
Burkina Faso	510.4	7.8	485.7	29.2	-24.7	30.2	-35.7	33.3	510.3	30.2	-0.1	32.1	-18.9	39.9
Burundi	609.9	3.6	620.7	20.0	10.8	20.7	4.5	19.4			0***	0.0	0***	0.0
Cameroon	500.6	11.0	577.9	11.2	77.2***	16.0	68.2***	15.4	419.4	17.5	-81.3***	21.0	-82.4***	20.8
Congo	571.2	8.9	615.3	8.3	44.1***	12.6	35.3***	13.7	560.1	15.0	-11.1	17.2	-6.1	21.4
Cote d'ivoire	513.7	5.8	563.7	13.2	50***	16.0	31.2**	14.7	508.2	22.3	-5.5	23.1	8.2	29.1
Gabon	594.4	14.4	598.6	9.6	4.2	16.7	-3.6	14.4			0***	0.0	0***	0.0
Guinea	497.4	13.0	565.2	10.3	67.8***	16.5	69.9***	14.6	542.7	4.2	45.2***	13.8	46.2***	12.1
Madagascar	548.5	4.4	549.5	6.7	0.9	7.9	-13.1*	7.7	522.5	9.8	-26.1**	10.9	-18.0	11.3
Niger	542.2	7.0	607.4	13.2	65.1***	13.4	11.5	25.3			0***	0.0	0***	0.0
DRC	557.3	9.6	577.3	30.9	20.0	32.6	9.3	31.1	522.4	22.2	-34.9	24.4	-36.6	25.7
Senegal	556.8	6.4	594.5	20.0	37.7*	21.1	19.6	25.2			0***	0.0	0***	0.0
Chad	521.5	9.9	533.2	16.1	11.7	19.4	2.8	24.5	517.2	14.5	-4.3	19.6	-3.7	19.0
Togo	468.2	6.5	534.7	7.1	66.4***	10.1	49***	9.4	530.3	7.7	62***	10.0	37.0	35.8
Mean	534.3	2.1	569.3	4.7	35.1***	5.4	21.6***	5.4	514.5	11.1	-19.8*	11.2	-19.8*	11.2

Table B3.5.1: Distribution of students by type of school attended - Late primary

	Public		Private		Community	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	62.8	2.7	37.2	2.7	0.0	0.0
Burkina Faso	68.1	2.3	29.2	2.0	2.7	1.0
Burundi	93.6	2.0	6.4	2.0	0.0	0.0
Cameroon	67.5	2.4	29.6	2.1	2.8	1.6
Congo	53.1	2.6	44.8	2.6	2.1	0.9
Côte d'ivoire	83.4	2.9	15.7	2.8	0.9	0.6
Gabon	63.9	3.3	36.1	3.3	0.0	0.0
Guinea	60.0	2.8	39.5	2.9	0.5	0.5
Madagascar	66.6	3.5	30.6	3.3	2.8	1.0
Niger	95.7	0.8	4.3	0.8	0.0	0.0
DRC	74.7	3.8	20.0	3.4	5.2	1.6
Senegal	81.8	3.5	18.2	3.5	0.0	0.0
Chad	67.2	3.1	12.6	2.5	20.2	2.8
Togo	66.1	1.4	33.0	1.4	0.9	0.6
Mean	71.4	0.7	25.9	0.7	2.7	0.3

Table B3.52: Student performance and performance differences in reading by school status - Late primary

	Public		Private						Community					
	Mean	Standard error	Mean	Standard error	Difference compared with students attending public schools	Standard error	Difference compared with students attending public schools, controlling for local facilities index	Standard error	Mean	Standard error	Difference compared with students at-ending community schools	Standard error	Difference compared with students attending community schools, controlling for local facilities index	Standard error
Benin	553.8	5.0	639.5	11.8	85.7***	12.5	52.6***	12.4			0***	0.0	0***	0.0
Burkina Faso	552.8	3.9	552.6	9.9	-0.3	11.1	-27.9**	12.2	465.9	67.7	-86.9	68.4	-134.9**	63.7
Burundi	484.0	2.4	563.5	24.5	79.5***	24.6	61.5***	24.2			0***	0.0	0***	0.0
Cameroon	501.2	7.0	590.0	11.0	88.8***	13.7	49.7***	13.8	473.8	17.5	-27.4	18.9	-25.4	17.9
Congo	504.4	8.1	585.5	4.5	81.1***	9.2	54.4***	8.6	554.1	20.8	49.7**	22.1	43.5*	25.1
Cote d'ivoire	488.7	5.1	577.3	19.3	88.6***	19.7	42***	15.9	506.1	5.8	17.3**	7.9	42.3***	11.4
Gabon	643.0	5.8	639.1	5.0	-3.9	7.8	-10.5	7.2			0***	0.0	0***	0.0
Guinea	482.2	7.8	532.0	10.1	49.8***	12.7	23.0	15.7	486.9	8.5	4.7	11.4	-2.1	11.5
Madagascar	440.0	4.0	506.9	13.2	66.8***	14.6	37.2***	12.6	411.8	9.8	-28.3**	11.1	-28.5**	14.2
Niger	468.0	5.7	603.8	17.9	135.8***	18.6	87.8***	18.6			0***	0.0	0***	0.0
DRC	465.9	5.0	509.6	8.0	43.7***	8.7	35.8***	9.6	439.8	12.5	-26.1*	13.6	-24.2*	13.5
Senegal	559.3	3.6	647.3	15.6	88***	16.4	56***	21.0			0***	0.0	0***	0.0
Chad	438.5	7.4	523.6	9.6	85.1***	11.5	57.7***	12.8	445.3	9.2	6.7	11.3	8.0	11.1
Togo	461.5	4.0	561.0	6.7	99.5***	7.7	51.5***	8.5	606.3	72.0	144.8**	72.5	102.3***	22.4
Mean	501.4	1.5	575.5	3.9	74.1***	4.1	30.7***	4.1	457.8	7.8	-43.6***	8.0	-43.6***	8.0

Table B3.53: Student performance and performance differences in mathematics by school status - Late primary

	Public		Private						Community					
	Mean	Standard error	Mean	Standard error	Difference compared with students attending public schools	Standard error	Difference compared with students attending public schools, controlling for local facilities index	Standard error	Mean	Standard error	Difference compared with students at-ending community schools	Standard error	Difference compared with students attending community schools, controlling for local facilities index	Standard error
Benin	511.3	4.6	572.9	12.0	61.6***	12.6	43.3***	12.3			0***	0.0	0***	0.0
Burkina Faso	550.5	4.3	543.2	9.8	-7.3	11.0	-31.2***	11.5	456.3	49.4	-94.2*	50.1	-136***	46.6
Burundi	543.1	3.5	592.0	28.5	48.8*	28.9	28.6	27.9			0***	0.0	0***	0.0
Cameroon	460.1	4.4	544.4	8.8	84.3***	10.5	57.2***	11.2	458.4	18.0	-1.7	17.7	-0.4	17.3
Congo	464.7	5.7	516.8	4.4	52.1***	7.5	38.3***	7.4	510.9	21.6	46.2**	22.3	43.3*	25.4
Cote d'ivoire	445.5	3.5	496.4	13.1	51***	13.5	31**	12.7	502.5	13.0	57***	13.3	67.8***	10.7
Gabon	547.5	5.8	560.8	7.1	13.3	9.1	7.0	8.4			0***	0.0	0***	0.0
Guinea	469.8	6.0	501.5	8.4	31.7***	10.5	24.2*	13.0	447.2	7.9	-22.6**	9.7	-26.2***	9.9
Madagascar	451.8	5.7	510.1	13.8	58.3***	16.3	32.1***	14.0	417.0	11.4	-34.8***	12.9	-35.2***	13.2
Niger	459.0	5.2	559.5	26.2	100.5***	26.4	74.7***	27.7			0***	0.0	0***	0.0
DRC	460.3	5.6	482.1	10.0	21.8*	11.3	17.3	12.1	432.9	12.0	-27.4**	13.3	-26.8**	13.2
Senegal	547.9	4.0	600.9	15.2	53***	15.9	26.5	19.2			0***	0.0	0***	0.0
Chad	431.5	5.2	484.2	7.7	52.7***	9.1	40.3***	10.0	428.1	7.1	-3.4	8.7	-2.6	8.8
Togo	463.8	4.3	555.8	7.2	92***	8.4	47.9***	9.1	584.8	97.2	121.0	97.7	79.2*	47.1
Mean	485.4	1.2	534.8	3.3	49.4***	3.5	25.6***	3.5	442.8	6.2	-42.6***	6.4	-42.6***	6.4

Table B3.54: Class size - Early primary

	Class size	Standard error	Standard deviation	Standard error
Benin	39.9	1.4	13.7	1.1
Burkina Faso	48.4	1.6	23.0	0.9
Burundi	54.0	1.3	15.0	0.7
Cameroon	48.4	2.6	36.1	3.9
Congo	47.4	2.0	25.5	1.9
Côte d'ivoire	35.4	1.8	13.9	1.9
Gabon	39.3	2.2	17.1	1.4
Guinea	47.0	2.4	20.5	2.0
Madagascar	38.8	1.4	14.2	1.1
Niger	38.8	1.0	12.4	0.7
DRC	36.8	1.6	13.5	1.2
Senegal	41.5	2.1	17.0	1.3
Chad	55.0	2.4	26.8	2.2
Togo	39.8	1.4	16.4	1.2
Mean	43.6	0.5	20.9	0.7

Table B3.55: Class size - Late primary

	Class size	Standard error	Standard deviation	Standard error
Benin	26.7	1.1	12.9	0.9
Burkina Faso	42.4	1.1	22.7	1.1
Burundi	40.5	1.0	16.5	1.2
Cameroon	39.7	1.7	26.9	1.6
Congo	57.2	2.5	42.7	4.1
Côte d'ivoire	31.1	0.8	11.6	0.7
Gabon	36.6	2.0	20.5	6.3
Guinea	40.9	1.9	23.7	1.9
Madagascar	29.2	1.3	15.5	2.0
Niger	40.7	1.2	17.4	1.2
DRC	43.9	2.6	23.8	2.2
Senegal	33.1	1.0	13.0	0.7
Chad	39.9	1.8	25.6	2.0
Togo	30.2	0.6	10.6	0.6
Mean	38.0	0.4	23.1	0.8

Table B3.56 : Change in class size of participating students in the PASEC2014 and PASEC2019 assessments

	PASEC*2014*	PASEC*2019*
Benin	35.5	26.7
Burkina Faso	68.3	42.4
Burundi	44.1	40.5
Cameroon	47.5	39.7
Congo	55.2	57.2
Côte d'ivoire	43.5	31.1
Gabon	39.6	40.7
Guinea	42.8	33.1
Madagascar	46.4	39.9
Niger	36.1	30.2
DRC	36.8	1.6
Senegal	41.5	2.1
Chad	55.0	2.4
Togo	39.8	1.4
Mean	43.6	0.5

Table B3.57: Percentage of students attending a school with or without a library - Early primary

	Students attending a school with a library		Students attending a school without a library	
	Percentage	Standard error	Percentage	Standard error
Benin	7.9	2.9	92.1	2.9
Burkina Faso	5.4	3.0	94.6	3.0
Burundi	2.6	1.5	97.4	1.5
Cameroon	12.1	3.3	87.9	3.3
Congo	5.9	2.9	94.1	2.9
Côte d'ivoire	7.0	2.2	93.0	2.2
Gabon	10.0	5.0	90.0	5.0
Guinea	5.0	2.9	95.0	2.9
Madagascar	12.2	4.1	87.8	4.1
Niger	5.6	2.5	94.4	2.5
DRC	14.9	6.5	85.1	6.5
Senegal	21.3	5.7	78.7	5.7
Chad	2.8	2.4	97.2	2.4
Togo	4.4	2.0	95.6	2.0
Mean	8.3	1.0	91.7	1.0

Table B3.58: Percentage of students attending a school with or without a library - Late primary

	Students attending a school with a library		Students attending a school without a library	
	Percentage	Standard error	Percentage	Standard error
Benin	8.6	2.4	91.4	2.4
Burkina Faso	5.5	1.7	94.5	1.7
Burundi	6.0	1.9	94.0	1.9
Cameroon	9.2	2.0	90.8	2.0
Congo	6.9	2.2	93.1	2.2
Côte d'ivoire	7.3	2.2	92.7	2.2
Gabon	8.3	2.4	91.7	2.4
Guinea	5.8	2.6	94.2	2.6
Madagascar	14.4	3.4	85.6	3.4
Niger	4.4	1.3	95.6	1.3
DRC	14.4	3.1	85.6	3.1
Senegal	22.1	4.3	77.9	4.3
Chad	1.7	0.8	98.3	0.8
Togo	3.8	1.3	96.2	1.3
Mean	8.4	0.7	91.6	0.7

Table B3.59: Percentage of students attending a school with an infirmary or first aid equipment (first aid box) - Early primary é

	Percentage of students attending a school with an infirmary or first aid equipment (first aid box)		Percentage of students attending a school without an infirmary or first aid equipment (first aid box)	
	Percentage	Standard error	Percentage	Standard error
Benin	43.3	4.3	56.7	4.3
Burkina Faso	12.9	3.2	87.1	3.2
Burundi	0.8	0.8	99.2	0.8
Cameroon	63.5	5.8	36.5	5.8
Congo	41.7	5.0	58.3	5.0
Côte d'ivoire	10.7	3.5	89.3	3.5
Gabon	36.4	8.3	63.6	8.3
Guinea	27.3	4.7	72.7	4.7
Madagascar	16.9	4.8	83.1	4.8
Niger	14.2	2.8	85.8	2.8
DRC	8.0	4.2	92.0	4.2
Senegal	59.6	5.1	40.4	5.1
Chad	6.4	1.8	93.6	1.8
Togo	17.9	3.0	82.1	3.0
Mean	26.0	1.3	74.0	1.3

Table B3.60: Percentage of students attending a school with an infirmary or first aid equipment (first aid box) - Late primary

	Percentage of students attending a school with an infirmary or first aid equipment (first aid box)		Percentage of students attending a school without an infirmary or first aid equipment (first aid box)	
	Percentage	Standard error	Percentage	Standard error
Benin	44.8	4.0	55.2	4.0
Burkina Faso	20.8	2.9	79.2	2.9
Burundi	3.4	1.5	96.6	1.5
Cameroon	63.2	3.6	36.8	3.6
Congo	43.0	3.7	57.0	3.7
Côte d'ivoire	15.0	2.9	85.0	2.9
Gabon	32.0	4.5	68.0	4.5
Guinea	30.5	4.3	69.5	4.3
Madagascar	24.1	3.7	75.9	3.7
Niger	14.5	2.2	85.5	2.2
DRC	14.0	4.0	86.0	4.0
Senegal	62.2	3.9	37.8	3.9
Chad	12.3	2.5	87.7	2.5
Togo	19.6	2.6	80.4	2.6
Mean	28.6	0.9	71.4	0.9

Table B3.61 : Average level of local facilities index - Early primary

	Average level of local facilities index	Standard error	Standard deviation	Standard error
Benin	50.8	0.8	9.7	0.4
Burkina Faso	50.1	1.1	10.2	0.6
Burundi	45.2	0.8	7.8	0.6
Cameroon	50.1	0.8	9.3	0.5
Congo	53.6	0.8	9.7	0.4
Côte d'ivoire	50.6	1.1	11.5	0.5
Gabon	56.2	1.8	9.9	1.1
Guinea	49.1	1.0	8.9	0.8
Madagascar	46.3	1.1	9.3	0.8
Niger	50.2	0.7	10.4	0.5
DRC	47.2	1.1	8.0	1.2
Senegal	54.1	0.9	10.2	0.4
Chad	47.1	0.8	7.7	0.5
Togo	49.3	0.8	9.8	0.5
Mean	50.0	0.3	10.0	0.2

Table B3.62: Average level of local facilities index - Late primary

	Average level of local facilities index	Standard error	Standard deviation	Standard error
Benin	51.8	0.7	9.7	0.4
Burkina Faso	50.7	0.6	10.6	0.4
Burundi	45.4	0.6	8.3	0.6
Cameroon	49.9	0.7	9.2	0.3
Congo	53.4	0.7	10.3	0.4
Côte d'ivoire	51.0	0.7	11.6	0.3
Gabon	55.3	0.8	9.3	0.5
Guinea	49.8	0.7	9.1	0.5
Madagascar	45.8	0.8	9.8	0.8
Niger	48.4	0.5	10.2	0.4
DRC	49.2	0.7	8.0	0.5
Senegal	53.2	0.6	9.7	0.4
Chad	47.1	0.5	7.9	0.4
Togo	49.3	0.5	10.1	0.4
Mean	50.0	0.2	10.0	0.1

Table B3.63: Average difference between scores in language of instruction of students in a given school and students whose local facilities index was one unit lower - Early primary

	Regression coefficient of reading scores with respect to local facilities index	Standard error	Regression coefficient of reading scores with respect to local facilities index, controlling for school infrastructure index	Standard error
Benin	2.2	0.6	0.5	0.7
Burkina Faso	0.8	0.8	-0.6	0.9
Burundi	1.8	0.7	1.6	0.8
Cameroon	2.7	1.3	-2.1	1.3
Congo	2.4	0.6	0.1	0.6
Côte d'ivoire	3.1	0.5	2.4	0.6
Gabon	4.2	1.0	1.8	0.9
Guinea	1.8	1.3	-0.2	1.1
Madagascar	2.7	0.9	0.2	1.0
Niger	3.7	0.8	2.5	0.8
DRC	1.5	1.9	0.7	1.8
Senegal	2.4	0.9	1.7	1.0
Chad	1.6	1.2	1.7	1.3
Togo	4.6	0.9	3.3	0.7
Mean	2.6	0.2	1.0	0.2

Table B3.64: Average difference between scores in mathematics of students in a given school and students whose local facilities index was one unit lower - Early primary

	Regression coefficient of mathematics scores with respect to local facilities index	Standard error	Regression coefficient of mathematics scores with respect to local facilities index, controlling for school infrastructure index	Standard error
Benin	1.8	0.6	0.5	0.7
Burkina Faso	0.7	0.6	-0.1	0.7
Burundi	0.9	0.3	0.8	0.4
Cameroon	2.4	1.2	-1.4	1.2
Congo	2.0	0.5	0.6	0.6
Côte d'ivoire	2.2	0.4	1.5	0.6
Gabon	2.5	0.7	1.1	0.8
Guinea	1.3	1.2	-0.3	1.1
Madagascar	1.3	0.4	0.3	0.5
Niger	3.0	0.8	2.3	0.9
DRC	1.3	1.6	0.7	1.5
Senegal	1.6	0.6	1.1	0.7
Chad	1.1	1.3	1.4	1.7
Togo	3.3	0.5	2.4	0.5
Mean	1.9	0.1	0.8	0.2

Table B3.65: Average difference between scores in reading of students in a given school and students whose local facilities index was one unit lower - Late primary

	Regression coefficient of reading scores with respect to local facilities index	Standard error	Regression coefficient of reading scores with respect to local facilities index, controlling for school infrastructure index	Standard error
Benin	4.1	0.6	2.3	0.7
Burkina Faso	2.0	0.5	0.3	0.6
Burundi	1.3	0.5	1.2	0.5
Cameroon	4.8	0.8	0.4	0.9
Congo	2.9	0.5	0.9	0.5
Côte d'ivoire	4.0	0.5	2.9	0.6
Gabon	1.3	0.5	0.6	0.5
Guinea	3.1	0.8	1.8	1.2
Madagascar	3.3	0.7	0.3	0.6
Niger	3.1	0.5	2.5	0.5
DRC	1.2	0.5	0.1	0.5
Senegal	3.1	0.4	1.5	0.6
Chad	3.6	0.6	2.9	0.8
Togo	4.9	0.4	3.3	0.4
Mean	4.2	0.2	2.2	0.2

Table B3.66: Average difference between scores in mathematics of students in a given school and students whose local facilities index was one unit lower - Late primary

	Regression coefficient of mathematics scores with respect to local facilities index	Standard error	Regression coefficient of mathematics scores with respect to local facilities index, controlling for school infrastructure index	Standard error
Benin	2.6	0.6	1.6	0.8
Burkina Faso	1.5	0.5	0.1	0.6
Burundi	1.2	0.5	1.1	0.5
Cameroon	3.7	0.5	0.1	0.6
Congo	1.6	0.4	0.3	0.3
Côte d'ivoire	1.8	0.3	1.2	0.5
Gabon	1.8	0.5	0.9	0.5
Guinea	1.8	0.5	1.1	0.7
Madagascar	2.9	0.7	-0.2	0.6
Niger	2.1	0.5	1.7	0.5
DRC	0.7	0.5	-0.1	0.4
Senegal	2.1	0.5	0.8	0.5
Chad	2.2	0.4	1.9	0.6
Togo	4.7	0.4	3.3	0.5
Mean	2.6	0.1	1.1	0.2

Table B3.67: Average level of school infrastructure index - Early primary

	Average level of school infrastructure index	Standard error	Standard deviation	Standard error
Benin	51.6	0.5	7.3	0.5
Burkina Faso	49.8	0.7	7.1	1.1
Burundi	45.8	0.6	6.8	0.3
Cameroon	47.0	0.9	11.8	0.6
Congo	53.6	1.0	10.0	0.8
Côte d'ivoire	48.8	1.0	9.5	0.6
Gabon	56.0	1.6	10.6	1.2
Guinea	51.9	0.7	8.5	0.6
Madagascar	51.2	1.0	8.8	0.9
Niger	46.2	0.6	8.3	0.6
DRC	50.2	1.6	8.8	1.2
Senegal	59.0	0.9	8.9	0.9
Chad	41.9	0.9	9.3	0.6
Togo	47.1	0.7	9.5	0.6
Mean	50.0	0.3	10.0	0.2

Table B3.68: Average level of school infrastructure index - Late primary

	Average level of school infrastructure index	Standard error	Standard deviation	Standard error
Benin	52.3	0.6	8.8	0.7
Burkina Faso	50.0	0.3	7.1	0.4
Burundi	46.4	0.5	8.0	0.6
Cameroon	46.8	0.7	12.3	0.4
Congo	53.2	0.5	9.2	0.6
Côte d'ivoire	49.2	0.6	9.4	0.7
Gabon	55.1	0.9	10.6	0.6
Guinea	52.7	0.5	7.9	0.5
Madagascar	50.8	0.7	8.8	0.7
Niger	44.9	0.4	8.1	0.3
DRC	50.0	0.7	8.1	0.7
Senegal	59.0	0.8	9.4	0.7
Chad	42.8	0.7	9.1	0.3
Togo	46.8	0.4	9.4	0.4
Mean	50.0	0.2	10.0	0.2

Table B3.69: Average difference between scores in language of instruction of students in a given school and students whose school infra-structure index was one unit lower - Early primary

	Regression coefficient of language of instruction scores with respect to school infrastructure index	Standard error	Regression coefficient of language of instruction scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	5.4	1.2	3.8	1.0
Burkina Faso	4.5	1.2	4.2	1.3
Burundi	1.4	0.7	0.8	0.8
Cameroon	4.9	0.6	4.2	0.8
Congo	5.1	0.8	4.4	0.9
Côte d'ivoire	3.1	0.5	2.5	0.6
Gabon	4.7	0.8	1.8	0.7
Guinea	5.0	1.1	5.0	1.0
Madagascar	3.9	1.0	2.1	0.8
Niger	4.8	0.8	3.7	0.8
DRC	1.8	1.8	2.4	1.9
Senegal	2.3	0.8	1.9	0.9
Chad	0.2	0.9	0.1	1.1
Togo	5.0	0.8	3.0	0.9
Mean	2.7	1.0	3.3	0.3

Table B3.70 : Average difference between scores in mathematics of students in a given school and students whose school infrastructure index was one unit lower - Early primary

	Regression coefficient of mathematics scores with respect to school infrastructure index	Standard error	Regression coefficient of mathematics scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	4.3	1.3	2.6	1.0
Burkina Faso	2.9	1.0	2.6	1.1
Burundi	0.8	0.4	0.7	0.5
Cameroon	4.0	0.6	3.5	0.7
Congo	3.4	0.8	3.1	0.9
Côte d'ivoire	2.4	0.5	1.9	0.6
Gabon	2.8	0.6	1.5	0.5
Guinea	3.8	1.0	4.1	1.0
Madagascar	1.7	0.4	1.3	0.4
Niger	3.2	0.5	3.0	0.8
DRC	1.2	0.8	1.5	1.0
Senegal	1.7	0.6	1.3	0.6
Chad	-0.4	0.8	-0.6	0.9
Togo	3.3	0.5	1.9	0.7
Mean	2.6	0.2	2.6	0.2

Table B3.7.1: Average difference between scores in reading of students in a given school and students whose school infrastructure index was one unit lower - Early primary

	Regression coefficient of reading scores with respect to school infrastructure index	Standard error	Regression coefficient of reading scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	5.2	0.7	3.4	0.8
Burkina Faso	5.2	0.5	4.1	0.5
Burundi	1.1	0.5	0.6	0.4
Cameroon	5.1	0.4	4.3	0.4
Congo	5.6	0.5	5.0	0.5
Côte d'ivoire	4.4	0.6	3.9	0.7
Gabon	1.4	0.3	0.9	0.4
Guinea	3.9	0.8	3.6	0.9
Madagascar	5.0	0.7	3.9	0.6
Niger	3.3	0.6	3.1	0.7
DRC	2.7	0.5	2.3	0.6
Senegal	4.3	0.6	3.7	0.6
Chad	2.4	0.7	2.0	0.8
Togo	5.5	0.4	3.1	0.5
Mean	4.8	0.2	4.2	0.2

Table B3.72: Average difference between scores in mathematics of students in a given school and students whose school infrastructure index was one unit lower - Late primary

	Regression coefficient of mathematics scores with respect to school infrastructure index	Standard error	Regression coefficient of reading scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	3.2	0.6	1.3	0.7
Burkina Faso	4.3	0.5	3.2	0.5
Burundi	1.1	0.5	0.7	0.5
Cameroon	4.2	0.3	3.4	0.3
Congo	3.6	0.4	3.2	0.4
Côte d'ivoire	2.3	0.5	2.0	0.5
Gabon	1.8	0.4	0.9	0.4
Guinea	1.9	0.6	1.9	0.7
Madagascar	4.7	0.7	3.2	0.6
Niger	2.1	0.7	2.1	0.7
DRC	1.7	0.6	1.2	0.6
Senegal	3.2	0.5	2.7	0.5
Chad	1.2	0.4	1.0	0.5
Togo	5.2	0.4	2.7	0.5
Mean	3.4	0.1	2.7	0.2

Table B3.73: Average difference between scores in language of instruction of students in a given school and students whose classroom equipment index was one unit lower - Early primary

	Regression coefficient of language of instruction scores with respect to school infrastructure index	Standard error	Regression coefficient of language of instruction scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	6.3	1.4	4.3	1.3
Burkina Faso	4.5	1.4	1.7	1.7
Burundi	2.5	1.3	2.3	1.6
Cameroon	7.1	1.7	2.6	1.6
Congo	4.9	1.8	1.8	1.1
Côte d'ivoire	4.2	1.1	2.3	1.1
Gabon	10.7	0.9	9.5	1.0
Guinea	1.5	1.3	-0.1	0.8
Madagascar	5.9	0.7	4.6	0.8
Niger	5.1	1.0	2.7	1.0
DRC	0.2	1.2	-1.1	1.2
Senegal	3.3	2.2	1.8	2.3
Chad	0.5	1.0	0.4	1.4
Togo	7.1	1.4	4.4	1.5
Mean	3.3	0.4	1.0	0.4

Table B3.74: : Average difference between scores in mathematics of students in a given school and students whose classroom equipment index was one unit lower - Early primary

	Regression coefficient of mathematics scores with respect to school infrastructure index	Standard error	Regression coefficient of mathematics scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	5.8	1.4	4.3	1.3
Burkina Faso	3.2	1.1	1.1	1.5
Burundi	0.5	0.6	0.1	0.8
Cameroon	5.2	1.1	1.5	1.5
Congo	3.1	1.8	1.0	1.5
Côte d'ivoire	3.5	1.0	2.0	1.1
Gabon	5.5	0.9	4.2	1.3
Guinea	0.3	1.2	-1.0	1.0
Madagascar	2.0	0.7	1.2	0.8
Niger	2.4	1.0	0.5	1.3
DRC	0.1	0.7	-0.8	0.9
Senegal	2.6	1.3	1.5	1.3
Chad	0.1	1.0	0.5	1.2
Togo	4.8	0.7	3.1	0.9
Mean	1.9	0.3	0.0	0.3

Table B3.75: Average difference between scores in reading of students in a given school and students whose classroom equipment index was one unit lower - Late primary

	Regression coefficient of reading scores with respect to school infrastructure index	Standard error	Regression coefficient of reading scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	5.9	0.9	3.4	1.1
Burkina Faso	5.6	0.7	3.9	0.7
Burundi	2.2	0.6	1.9	0.6
Cameroon	8.1	1.0	3.4	0.7
Congo	5.6	1.0	2.0	0.9
Côte d'ivoire	5.2	1.3	2.0	1.3
Gabon	3.2	0.5	1.9	0.9
Guinea	2.7	1.2	1.2	1.7
Madagascar	4.7	0.8	2.6	0.7
Niger	2.1	1.0	0.8	1.1
DRC	1.9	0.5	0.7	0.6
Senegal	4.9	0.9	2.4	0.9
Chad	2.9	0.9	1.9	1.1
Togo	7.4	0.4	5.0	0.6
Mean	4.8	0.2	2.0	0.3

Table B3.76: Average difference between scores in reading of students in a given school and students whose classroom equipment index was one unit lower - Late primary

	Regression coefficient of mathematics scores with respect to school infrastructure index	Standard error	Regression coefficient of reading scores with respect to school infrastructure index, controlling for classroom equipment index	Standard error
Benin	4.7	1.0	3.7	1.3
Burkina Faso	5.1	0.8	3.9	0.8
Burundi	2.0	0.6	1.6	0.6
Cameroon	7.0	0.6	3.3	0.6
Congo	3.6	0.8	1.3	0.7
Côte d'ivoire	2.6	0.8	1.0	0.9
Gabon	3.7	0.6	3.0	0.9
Guinea	1.2	0.9	0.4	1.2
Madagascar	5.3	0.7	3.5	0.8
Niger	1.0	1.0	0.1	0.9
DRC	1.4	0.5	0.8	0.5
Senegal	4.4	0.9	2.6	0.9
Chad	1.9	0.6	1.4	0.7
Togo	7.3	0.5	5.2	0.7
Mean	4.0	0.2	2.2	0.2

Table B3.77: Percentage of students attending schools run by a woman and difference in reading performance by school principal's gender - Late primary

	School principal is female				School principal is male			
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference between students whose school principal is male and female	Standard error
Benin	22.5	3.4	615.0	14.6	577.2	6.9	-37.8**	16.5
Burkina Faso	14.3	2.7	584.9	10.6	545.6	5.2	-39.3***	13.4
Burundi	20.6	3.0	501.1	7.0	486.9	2.9	-14.2*	7.6
Cameroon	24.9	2.9	605.0	8.5	500.4	7.1	-104.6***	11.6
Congo	26.3	3.5	551.4	12.5	539.5	6.6	-12.0	14.7
Côte d'ivoire	12.1	2.7	550.3	19.8	496.3	5.7	-54.0**	21.1
Gabon	37.4	4.3	645.7	5.2	639.5	5.9	-6.2	8.0
Guinea	16.0	2.9	498.3	11.0	502.3	6.9	4.1	12.9
Madagascar	53.9	3.8	483.1	8.4	432.5	6.5	-50.6***	11.4
Niger	26.7	2.6	501.2	11.8	463.5	7.0	-37.6**	14.9
DRC	14.8	3.5	494.3	20.4	469.1	5.2	-25.2	23.0
Senegal	10.7	2.5	649.3	7.6	569.2	6.5	-80.1***	11.1
Chad	11.8	3.3	496.5	16.6	444.2	6.5	-52.3***	17.3
Togo	15.1	2.5	517.2	13.2	492.7	4.9	-24.5	16.0
Mean	21.9	0.9	546.6	4.0	510.9	1.9	-35.7***	4.8

Table B3.78: Percentage of students attending schools run by a woman and difference in mathematics performance by school principal's gender - Late primary

	School principal is female				School principal is male			
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference between students whose school principal is male and female	Standard error
Benin	22.5	3.4	556.9	15.1	527.1	6.4	-29.7*	16.6
Burkina Faso	14.3	2.7	574.5	8.7	542.1	5.4	-32.4***	11.1
Burundi	20.6	3.0	551.2	8.0	544.8	3.6	-6.5	9.0
Cameroon	24.9	2.9	545.3	9.6	464.7	4.8	-80.6***	11.8
Congo	26.3	3.5	489.1	10.1	488.3	4.7	-0.8	11.9
Côte d'ivoire	12.1	2.7	475.7	12.7	451.0	4.1	-24.7*	13.7
Gabon	37.4	4.3	551.7	5.2	553.0	6.3	1.4	7.9
Guinea	16.0	2.9	478.6	10.7	482.6	5.3	4.1	11.9
Madagascar	53.9	3.8	492.8	7.9	440.5	8.1	-52.2***	12.0
Niger	26.7	2.6	478.7	10.7	457.2	6.2	-21.5	13.2
DRC	14.8	3.5	483.6	17.3	459.2	5.0	-24.5	18.7
Senegal	10.7	2.5	616.0	11.2	552.6	5.8	-63.4***	13.2
Chad	11.8	3.3	455.9	14.5	434.6	4.2	-21.3	14.6
Togo	15.1	2.5	514.5	12.5	492.1	4.9	-22.4	14.9
Mean	21.9	0.9	516.8	3.4	492.5	1.6	-24.3***	4.1

Table B3.79 : Distribution of students by school principal's length of service - Early primary

	5 years or less		6 to 10 years		11 to 20 years		More than 20 years	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	54.5	5.8	18.7	4.4	21.4	4.6	5.4	2.4
Burkina Faso	37.0	5.2	27.5	5.5	27.7	5.0	7.7	3.0
Burundi	58.6	5.0	32.1	5.3	8.0	2.8	1.3	1.3
Cameroon	39.3	5.1	40.4	5.5	15.6	3.6	4.7	2.4
Congo	51.2	5.2	24.3	4.7	22.4	4.2	2.2	1.3
Côte d'ivoire	53.0	5.6	24.5	4.5	19.4	4.6	3.1	2.2
Gabon	48.9	6.8	33.5	6.0	17.4	4.4	0.2	0.2
Guinea	38.2	6.6	40.1	6.9	14.1	5.2	7.5	3.8
Madagascar	54.8	4.2	20.0	4.4	17.0	3.4	8.2	3.8
Niger	33.7	4.1	16.2	3.3	46.7	3.7	3.4	1.3
DRC	28.3	6.8	27.9	7.0	20.4	6.7	23.5	6.3
Senegal	46.1	6.2	25.1	5.3	23.8	4.5	5.0	2.7
Chad	71.9	4.2	21.5	4.2	6.7	2.1	0.0	0.0
Togo	29.2	4.5	25.0	4.4	38.3	5.0	7.5	2.4
Mean	46.3	1.3	26.7	1.5	21.4	1.2	5.5	0.8

Table B3.80 : Distribution of students by school principal's length of service - Late primary

	5 years or less		6 to 10 years		11 to 20 years		More than 20 years	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	53.2	3.8	18.2	2.8	20.9	3.8	7.7	2.8
Burkina Faso	41.2	3.1	25.8	3.0	25.9	3.5	7.0	2.0
Burundi	65.2	3.6	23.3	3.4	10.9	2.3	0.7	0.7
Cameroon	43.2	4.0	32.8	3.7	18.7	3.2	5.3	1.8
Congo	51.3	3.4	26.3	3.9	20.2	3.0	2.1	0.8
Côte d'ivoire	47.3	4.2	26.9	3.9	22.4	3.6	3.3	1.5
Gabon	52.2	5.2	33.0	4.0	14.6	3.6	0.2	0.2
Guinea	46.1	4.6	28.3	3.4	20.2	3.4	5.4	2.2
Madagascar	52.7	3.6	23.6	3.1	16.4	3.3	7.3	2.5
Niger	37.0	3.1	20.0	3.0	40.1	3.2	2.8	1.1
DRC	32.6	4.1	20.5	3.5	23.3	4.2	23.6	4.0
Senegal	40.3	5.2	29.3	4.7	27.7	3.9	2.7	1.3
Chad	66.8	3.9	23.6	3.3	9.4	2.5	0.2	0.2
Togo	29.7	3.0	23.0	2.7	41.0	3.6	6.3	1.6
Mean	47.1	1.1	25.3	1.0	22.4	1.1	5.3	0.6

Table B3.81: Distribution of students by school principal's level of education - Early primary

	Primary level		Secondary level		University level	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	0.0	0.0	57.0	5.6	43.0	5.6
Burkina Faso	3.5	2.4	64.4	5.6	32.1	5.2
Burundi	0.0	0.0	10.7	3.1	89.3	3.1
Cameroon	1.1	1.1	67.6	4.3	31.3	4.6
Congo	0.0	0.0	56.6	5.0	43.4	5.0
Côte d'ivoire	0.6	0.6	40.6	6.4	58.8	6.4
Gabon	0.4	0.4	41.4	6.0	58.1	5.9
Guinea	3.9	3.9	21.2	4.5	74.9	5.6
Madagascar	0.5	0.5	68.7	5.1	30.9	5.1
Niger	0.0	0.0	56.4	4.6	43.6	4.6
DRC	0.0	0.0	89.2	4.4	10.8	4.4
Senegal	0.0	0.0	45.1	6.0	54.9	6.0
Chad	1.6	1.6	41.0	5.9	57.3	5.7
Togo	0.0	0.0	69.3	4.4	30.7	4.4
Mean	0.8	0.4	51.4	1.5	47.8	1.5

Table B3.82: Distribution of students by school principal's level of education - Late primary

	Primary level		Secondary level		University level	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	0.0	0.0	57.2	3.9	42.8	3.9
Burkina Faso	1.1	0.6	69.5	2.9	29.4	2.9
Burundi	0.4	0.4	10.4	1.9	89.1	1.9
Cameroon	1.8	1.0	64.6	3.5	33.7	3.5
Congo	0.0	0.0	50.8	4.2	48.0	4.1
Côte d'ivoire	0.4	0.4	43.7	4.1	55.9	4.1
Gabon	0.3	0.3	35.2	4.6	64.2	4.6
Guinea	0.8	0.6	19.1	3.7	80.2	3.8
Madagascar	0.1	0.1	70.4	4.1	29.6	4.1
Niger	0.4	0.3	58.4	3.7	40.7	3.7
DRC	0.0	0.0	86.7	3.3	13.3	3.3
Senegal	1.2	1.0	39.6	4.6	59.3	4.7
Chad	1.8	1.4	35.8	3.9	62.3	3.9
Togo	0.5	0.5	73.6	2.8	25.9	2.8
Mean	0.6	0.2	50.8	1.0	48.5	1.0

Table B3.83 : Percentage of students whose school principal had not received in-service training and difference in language of instruction performance - Early primary

	No in-service training		No in-service training		In-service training received		Gross difference compared with students whose school principal had not received in-service training	
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	54.8	5.3	522.4	12.0	527.8	13.9	5.4	20.8
Burkina Faso	57.1	5.7	497.0	18.5	494.4	15.8	-2.6	25.3
Burundi	40.4	4.2	620.2	9.6	629.6	8.1	9.4	14.8
Cameroon	16.0	4.8	548.2	25.5	523.3	8.7	-24.9	26.6
Congo	20.6	4.4	518.4	12.6	599.3	9.9	80.8***	19.1
Côte d'ivoire	32.4	4.7	512.1	8.8	519.5	8.4	7.4	14.0
Gabon	8.9	3.8	614.0	15.5	601.2	14.4	-12.8	21.5
Guinea	30.4	5.9	474.5	17.0	463.4	13.7	-11.1	23.1
Madagascar	24.2	4.8	567.0	17.6	567.1	9.0	0.1	21.4
Niger	20.4	3.8	528.1	23.0	537.9	8.8	9.8	26.2
DRC	7.5	4.2	523.2	39.0	531.4	13.7	8.1	41.8
Senegal	38.0	5.6	539.8	13.6	567.7	12.4	28.0	18.1
Chad	37.0	5.6	494.0	16.6	513.1	8.0	19.1	18.6
Togo	10.6	2.3	470.4	28.7	475.4	7.9	5.0	31.1
Mean	28.7	1.4	527.9	5.3	540.0	3.6	12.1	63.2

Table B3.84: Percentage of students whose school principal had not received in-service training and difference in mathematics perfor-mance - Early primary

	No in-service training		No in-service training		In-service training received		Gross difference compared with students whose school principal had not received in-service training	
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	54.8	5.3	525.6	12.2	524.4	11.8	-1.3	19.5
Burkina Faso	57.1	5.7	504.9	16.2	499.4	11.4	-5.6	19.6
Burundi	40.4	4.2	615.9	5.1	613.4	4.2	-2.5	7.9
Cameroon	16.0	4.8	534.6	26.4	518.0	8.1	-16.5	26.5
Congo	20.6	4.4	545.6	10.4	603.9	8.3	58.3***	15.3
Côte d'ivoire	32.4	4.7	519.2	8.4	525.3	7.0	6.1	13.3
Gabon	8.9	3.8	631.8	19.3	587.7	9.5	-44.2**	22.2
Guinea	30.4	5.9	525.0	15.7	515.2	12.3	-9.8	20.5
Madagascar	24.2	4.8	552.4	11.4	547.8	4.3	-4.5	12.9
Niger	20.4	3.8	555.4	24.4	543.4	7.1	-12.0	27.2
DRC	7.5	4.2	587.7	8.2	565.9	11.4	-21.8	14.0
Senegal	38.0	5.6	561.3	10.2	564.7	7.8	3.4	13.0
Chad	37.0	5.6	516.8	16.1	525.1	8.7	8.3	19.9
Togo	10.6	2.3	484.0	21.8	489.9	5.8	5.9	23.6
Mean	28.7	1.4	540.9	4.4	545.7	2.7	4.7	24.8

Table B3.85: Percentage of students whose school principal had not received in-service training and difference in reading performance - Late primary

	No in-service training		No in-service training		In-service training received		Gross difference compared with students whose school principal had not received in-service training	
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	49.3	3.9	581.4	9.4	591.0	9.5	9.6	13.9
Burkina Faso	56.5	3.5	545.1	6.5	558.6	7.9	13.6	11.7
Burundi	44.8	3.6	485.8	3.3	493.4	4.0	7.5	5.2
Cameroon	13.8	2.4	519.6	11.7	528.2	6.6	8.5	14.2
Congo	25.1	3.4	507.8	12.7	555.3	6.4	47.5***	15.4
Côte d'ivoire	33.3	4.1	491.7	10.2	508.6	8.0	16.9	14.6
Gabon	13.5	3.5	642.7	7.5	641.0	4.8	-1.7	9.0
Guinea	33.2	4.7	504.7	13.2	500.1	8.5	-4.6	17.6
Madagascar	24.9	3.3	473.3	14.4	455.8	5.8	-17.5	16.4
Niger	25.7	3.0	456.8	10.9	479.4	6.1	22.6*	12.5
DRC	10.5	2.4	467.9	10.8	473.3	4.7	5.3	12.4
Senegal	34.2	4.0	571.4	7.4	578.0	7.2	6.6	11.2
Chad	28.4	3.4	454.3	9.7	449.9	7.7	-4.4	12.7
Togo	13.4	2.1	469.1	14.0	500.1	4.3	31**	15.7
Mean	29.2	0.9	516.5	3.4	520.0	2.1	3.5	22.4

Table B3.86: Percentage of students whose school principal had not received in-service training and difference in mathematics perfor-mance - Late primary

	No in-service training		No in-service training		In-service training received		Gross difference compared with students whose school principal had not received in-service training	
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	49.3	3.9	530.9	8.7	537.3	9.5	6.4	13.4
Burkina Faso	56.5	3.5	544.1	6.7	549.1	7.9	5.1	11.2
Burundi	44.8	3.6	538.9	4.4	552.6	4.4	13.7**	6.3
Cameroon	13.8	2.4	478.4	13.1	486.7	4.3	8.3	14.4
Congo	25.1	3.4	465.5	8.8	498.1	4.6	32.6***	10.9
Côte d'ivoire	33.3	4.1	448.0	6.8	457.1	5.3	9.1	9.4
Gabon	13.5	3.5	543.9	11.4	552.9	5.0	8.9	12.6
Guinea	33.2	4.7	492.2	10.2	476.2	6.2	-16.0	13.1
Madagascar	24.9	3.3	480.6	14.4	465.2	5.9	-15.5	16.4
Niger	25.7	3.0	448.2	8.6	468.1	5.9	19.8*	10.5
DRC	10.5	2.4	468.2	7.9	461.9	5.2	-6.3	9.6
Senegal	34.2	4.0	554.4	7.9	558.8	6.8	4.4	11.3
Chad	28.4	3.4	438.8	6.9	437.2	5.1	-1.6	8.4
Togo	13.4	2.1	475.6	14.2	498.3	4.7	22.7	16.0
Mean	29.2	0.9	501.8	2.7	496.3	1.7	-5.5	35.1

Table B3.87 : Percentage of students whose school had been inspected at least once in the previous two years - Late primary

	The school was inspected in the previous two years		The school was not inspected in the previous two years	
	Percentage	Standard error	Percentage	Standard error
Benin	87.2	2.2	12.8	2.2
Burkina Faso	89.9	2.3	10.1	2.3
Burundi	85.6	2.4	14.4	2.4
Cameroon	96.8	1.5	3.2	1.5
Congo	91.8	1.8	8.2	1.8
Côte d'ivoire	72.4	3.2	27.6	3.2
Gabon	89.4	2.5	10.6	2.5
Guinea	95.6	1.9	4.4	1.9
Madagascar	39.5	3.6	60.5	3.6
Niger	87.1	2.0	12.9	2.0
DRC	95.4	1.7	4.6	1.7
Senegal	78.2	3.9	21.8	3.9
Chad	92.2	2.0	7.8	2.0
Togo	88.4	2.1	11.6	2.1
Mean	84.8	0.7	15.2	0.7

Table B3.88 : Percentage of students whose school organised parent meetings - Late primary

	Organisation of meetings with students' parents		No organisation of meetings with students' parents	
	Percentage	Standard error	Percentage	Standard error
Benin	98.4	1.1	1.6	1.1
Burkina Faso	96.1	1.3	3.9	1.3
Burundi	99.2	0.6	0.8	0.6
Cameroon	97.5	0.7	2.5	0.7
Congo	95.9	1.7	4.1	1.7
Côte d'ivoire	95.3	2.0	4.7	2.0
Gabon	100.0	0.0	0.0	0.0
Guinea	93.7	2.5	6.3	2.5
Madagascar	95.5	1.4	4.5	1.4
Niger	97.5	0.8	2.5	0.8
DRC	98.8	0.8	1.2	0.8
Senegal	96.1	1.5	3.9	1.5
Chad	93.3	1.8	6.7	1.8
Togo	99.1	0.6	0.9	0.6
Mean	96.9	0.4	3.1	0.4

Table B3.89 : Percentage of students whose school officially gave the top-performing students encouragement (honour rolls. prizes. scholarship. gifts. etc.) - Late primary

	The school officially gave encouragements to top-performing students		The school did not officially give encouragements to top-performing students	
	Percentage	Standard error	Percentage	Standard error
Benin	86.5	2.5	13.5	2.5
Burkina Faso	54.3	3.0	45.7	3.0
Burundi	30.3	3.5	69.7	3.5
Cameroon	53.9	3.3	46.1	3.3
Congo	78.2	3.1	21.8	3.1
Côte d'ivoire	41.9	4.2	58.1	4.2
Gabon	67.3	4.3	32.7	4.3
Guinea	69.2	4.4	30.8	4.4
Madagascar	67.3	3.4	32.7	3.4
Niger	64.0	3.6	36.0	3.6
DRC	36.5	3.9	63.5	3.9
Senegal	83.1	3.3	16.9	3.3
Chad	57.6	4.1	42.4	4.1
Togo	51.0	3.1	49.0	3.1
Mean	60.1	1.0	39.9	1.0

Table B3.90 : Percentage of students whose school organised support hours for the lowest performers - Early primary

	The school organised support hours for the lowest performers		The school did not organise support hours for the lowest performers	
	Percentage	Standard error	Percentage	Standard error
Benin	46.4	4.5	53.6	4.5
Burkina Faso	32.9	5.6	67.1	5.6
Burundi	23.3	3.7	76.7	3.7
Cameroon	42.3	5.7	57.7	5.7
Congo	48.8	5.0	51.2	5.0
Côte d'ivoire	35.9	5.7	64.1	5.7
Gabon	46.0	8.0	54.0	8.0
Guinea	57.7	6.1	42.3	6.1
Madagascar	41.9	4.1	58.1	4.1
Niger	56.3	4.3	43.7	4.3
DRC	34.2	6.8	65.8	6.8
Senegal	61.8	7.0	38.2	7.0
Chad	41.3	7.0	58.7	7.0
Togo	56.5	4.6	43.5	4.6
Mean	44.9	1.7	55.1	1.7

Table B3.91: Percentage of students whose school organised support hours for the lowest performers - Late primary

	The school organised support hours for the lowest performers		The school did not organise support hours for the lowest performers	
	Percentage	Standard error	Percentage	Standard error
Benin	85.9	2.8	14.1	2.8
Burkina Faso	86.9	2.5	13.1	2.5
Burundi	47.9	3.9	52.1	3.9
Cameroon	75.1	3.2	24.9	3.2
Congo	80.8	2.7	19.2	2.7
Côte d'ivoire	59.6	4.0	40.4	4.0
Gabon	79.8	3.7	20.2	3.7
Guinea	77.7	3.6	22.3	3.6
Madagascar	71.9	3.9	28.1	3.9
Niger	73.2	3.4	26.8	3.4
DRC	69.7	3.6	30.3	3.6
Senegal	86.4	3.2	13.6	3.2
Chad	52.9	3.9	47.1	3.9
Togo	89.4	2.0	10.6	2.0
Mean	74.1	0.9	25.9	0.9

Table B3.92: Distribution of students by number of weekly hours of support provided to the lowest performers - Early primary

	5 hours or more		4 hours		3 hours		2 hours		1 hour or less	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	9.5	4.6	18.6	6.2	23.2	6.0	41.3	8.4	7.4	3.0
Burkina Faso	29.3	8.3	16.3	7.2	3.2	2.8	39.5	9.2	11.7	6.2
Burundi	37.7	8.7	24.6	9.0	3.0	2.9	24.2	8.8	10.5	7.9
Cameroon	13.7	6.5	13.3	5.7	16.3	5.7	33.4	8.1	23.3	6.5
Congo	30.4	6.1	12.0	4.8	30.0	5.5	23.7	6.8	3.8	3.5
Côte d'ivoire	9.3	5.5	21.6	8.0	9.5	5.8	38.3	8.5	21.2	8.1
Gabon	13.4	7.3	53.0	10.7	5.0	4.1	14.4	6.2	14.3	8.2
Guinea	27.5	10.7	18.4	7.1	17.8	7.1	30.9	8.6	5.4	3.8
Madagascar	19.4	6.3	12.2	4.5	3.3	2.0	49.0	9.3	16.1	4.2
Niger	3.8	2.0	17.3	4.9	21.0	6.5	47.7	4.9	10.2	4.5
DRC	0.0	0.0	2.3	2.0	41.5	10.5	24.5	11.6	31.6	12.3
Senegal	18.8	4.6	59.3	7.3	9.0	4.5	11.2	3.2	1.7	1.2
Chad	24.8	6.7	15.2	6.7	26.9	7.7	26.4	9.0	6.8	1.6
Togo	8.6	4.2	19.6	4.5	23.3	5.6	29.9	5.1	18.6	4.8
Mean	17.0	1.8	23.1	2.0	17.0	1.7	30.9	1.7	12.0	1.5

Table B3.93: Distribution of students by number of weekly hours of support provided to the lowest performers - Late primary

	5 hours or more		4 hours		3 hours		2 hours		1 hour or less	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	38.0	4.3	34.3	4.3	7.2	1.9	14.8	3.6	5.8	1.8
Burkina Faso	62.5	3.4	18.8	3.1	8.0	2.3	7.7	1.9	3.1	1.2
Burundi	55.6	5.9	16.7	4.3	11.8	3.4	11.3	3.3	4.6	2.2
Cameroon	24.8	4.0	28.9	4.4	18.5	3.4	23.3	3.9	4.5	1.8
Congo	37.5	5.2	19.3	3.5	18.2	4.0	25.0	4.6	0.0	0.0
Côte d'ivoire	23.4	4.8	29.4	4.9	15.2	3.8	22.9	3.7	9.1	3.2
Gabon	35.0	5.4	27.4	5.1	16.4	4.3	18.3	3.9	2.9	2.3
Guinea	31.7	5.3	32.8	5.4	15.5	4.0	18.3	4.5	1.8	1.1
Madagascar	36.3	4.8	19.6	4.3	9.6	3.0	28.7	4.2	5.8	2.4
Niger	10.4	2.5	27.9	3.6	16.7	3.1	41.1	4.7	3.9	1.5
DRC	32.0	6.0	14.5	4.6	29.8	5.3	14.3	2.8	9.4	3.6
Senegal	57.3	4.7	35.0	4.3	1.6	0.7	5.3	1.9	0.8	0.6
Chad	23.2	4.3	18.4	4.8	20.5	3.9	35.2	5.5	2.7	1.4
Togo	51.3	3.5	20.6	3.0	12.1	2.2	14.1	2.0	1.9	0.8
Mean	37.9	1.2	25.1	1.1	13.8	0.8	19.4	1.0	3.8	0.4

Annex B4. Data for Chapter 4

Table B4.1: Percentage distribution of teachers on the PASEC2019 reading comprehension proficiency scale

	Level <1		Level 1		Level 2		Level 3	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	0.1	0.1	1.7	0.5	22.7	1.8	75.6	1.9
Burkina Faso	1.2	0.3	4.9	0.8	18.4	1.9	75.5	1.8
Burundi	0.2	0.2	15.4	1.1	54.5	1.5	29.9	1.5
Cameroon	0.4	0.3	5.1	1.2	22.3	2.0	72.3	2.1
Congo	2.0	0.6	17.8	1.5	43.5	2.1	36.7	2.3
Côte d'ivoire	0.1	0.1	1.3	0.7	10.9	1.3	87.8	1.5
Gabon	0.4	0.4	3.8	1.1	21.7	2.1	74.2	2.3
Guinea	4.3	0.9	23.7	1.7	41.2	2.3	30.8	2.2
Madagascar	3.8	0.7	41.4	2.1	43.6	2.1	11.2	1.7
Niger	0.5	0.3	13.3	1.3	43.5	2.1	42.7	1.7
DRC	3.9	0.7	33.3	1.9	46.5	1.6	16.3	1.7
Senegal	0.0	0.0	1.7	0.8	16.3	1.9	81.9	2.2
Chad	5.6	1.1	32.6	2.3	43.3	2.3	18.5	1.5
Togo	0.0	0.0	3.0	0.5	22.7	1.2	74.3	1.3
Mean	1.6	0.1	14.2	0.4	32.2	0.5	52.0	0.5

Table B4.2: Teachers' average performance in reading comprehension

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P 1	Standard error	P 5	Standard error	P 10	Standard error	P 25	Standard error	P 50	Standard error	P 75	Standard error	P 90	Standard error	P 95	Standard error	P 99	Standard error
Benin	548.4	2.9	73.4	1.8	376.5	15.6	428.3	7.6	455.7	8.1	498.8	5.3	546.9	4.0	597.9	6.7	644.7	6.0	670.0	5.9	718.5	14.9
Burkina Faso	550.4	3.3	92.4	3.1	285.3	20.4	376.4	19.8	434.7	10.8	499.0	4.6	558.3	4.4	610.1	5.0	661.8	5.4	689.0	7.2	741.6	10.7
Burundi	461.5	2.3	66.0	1.2	323.5	6.4	356.4	5.3	377.3	2.9	414.1	3.0	458.6	3.2	508.1	3.6	549.5	5.0	571.9	5.1	614.9	7.7
Cameroon	542.7	4.0	84.5	3.1	331.6	20.3	390.6	10.4	429.3	10.2	489.7	7.3	547.9	4.8	599.4	8.3	649.5	7.5	674.9	10.7	722.7	15.1
Congo	467.3	3.8	83.6	2.6	270.2	22.3	329.0	10.9	359.6	9.4	410.3	6.5	468.7	5.9	525.5	5.4	574.1	9.6	605.5	8.5	654.2	15.9
Cote d'ivoire	589.3	3.6	81.1	2.6	389.1	13.0	449.9	13.1	486.5	9.5	536.2	6.2	590.8	4.3	644.2	6.1	689.8	6.1	718.7	7.3	769.7	12.3
Gabon	548.5	4.2	85.0	3.1	322.3	32.4	401.8	15.1	440.3	11.2	495.9	6.5	551.6	5.3	607.5	5.2	651.6	8.6	681.2	12.0	738.2	20.9
Guinea	449.7	4.4	93.1	2.6	235.8	17.7	296.6	10.2	327.7	10.1	385.3	8.1	451.4	7.2	515.0	8.7	565.2	6.7	598.0	11.6	666.1	19.1
Madagascar	407.3	3.4	70.2	2.7	255.6	8.4	300.2	5.4	321.3	5.6	360.4	4.2	401.1	3.4	450.6	6.8	503.2	8.9	533.8	14.4	583.6	14.5
Niger	484.5	2.5	82.4	1.8	311.1	9.7	355.3	6.1	379.7	7.7	425.2	3.3	481.9	4.2	539.6	4.7	593.4	5.8	625.1	5.1	684.2	14.3
DRC	420.9	3.4	76.2	2.1	251.8	16.2	298.9	6.4	323.8	5.2	367.1	3.9	419.3	4.0	472.7	4.9	520.6	7.8	548.8	9.3	596.8	11.7
Senegal	561.8	3.3	73.1	2.7	379.2	18.8	439.2	11.3	466.1	8.1	514.7	6.1	562.1	4.6	610.4	5.8	656.1	6.4	680.6	5.5	722.6	12.9
Chad	420.8	3.2	83.4	2.4	232.0	19.9	287.6	11.2	315.1	5.7	363.5	4.4	419.8	6.9	477.2	5.2	527.2	5.7	555.0	8.3	616.3	19.6
Togo	546.8	2.4	76.5	1.7	359.4	10.0	415.7	6.0	448.4	5.3	495.7	3.9	551.0	3.4	599.9	3.2	642.6	6.0	667.1	4.4	715.0	5.5
Mean	500.0	1.0	100.0	0.6	275.4	4.1	334.8	2.2	367.6	1.6	428.4	1.6	502.8	1.2	571.6	1.3	628.7	1.8	660.8	1.9	717.7	3.0

Table B4.3: Teachers' average performance in teaching reading comprehension

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P 1	Standard error	P 5	Standard error	P 10	Standard error	P 25	Standard error	P 50	Standard error	P 75	Standard error	P 90	Standard error	P 95	Standard error	P 99	Standard error
Benin	536.2	3.6	89.3	2.9	328.1	15.9	395.1	7.8	426.7	7.8	472.7	6.3	536.2	6.6	596.5	6.4	650.4	7.4	685.9	10.8	743.6	20.8
Burkina Faso	543.1	3.9	103.4	2.4	292.1	17.2	367.8	11.5	407.4	9.6	473.2	8.2	547.0	4.3	614.8	5.2	673.6	6.6	706.8	8.3	762.1	13.7
Burundi	457.0	3.3	80.2	2.9	248.0	15.3	320.2	12.5	358.0	7.0	407.2	5.7	459.1	4.1	508.4	5.1	558.0	5.9	587.1	9.3	638.1	15.2
Cameroon	539.4	4.4	92.9	2.9	332.5	22.6	388.7	13.2	419.1	6.8	473.0	7.3	539.1	5.9	604.5	8.7	659.5	8.5	690.7	10.1	751.3	14.6
Congo	430.1	5.2	111.2	4.1	129.7	35.6	228.9	16.3	282.5	16.1	364.0	8.9	437.9	6.6	503.0	9.6	566.3	8.5	600.9	13.1	667.4	27.5
Cote d'ivoire	578.9	4.9	100.7	3.2	336.8	17.7	407.7	14.7	450.9	10.3	508.5	8.0	582.4	7.6	652.0	8.5	702.4	10.8	734.2	10.5	796.9	19.1
Gabon	540.7	4.5	95.1	3.2	317.5	22.2	381.0	15.3	418.2	8.9	475.6	8.5	542.5	7.0	607.7	6.8	661.4	7.9	692.6	9.4	753.2	17.8
Guinea	460.4	2.7	53.1	1.9	334.1	10.9	376.4	11.8	395.7	4.9	426.5	5.0	457.2	4.5	495.4	4.3	527.1	4.8	547.6	6.2	594.9	28.2
Madagascar	450.5	2.5	53.6	1.8	325.6	8.7	366.1	5.4	385.4	4.8	415.2	3.5	448.5	3.0	484.1	4.3	520.9	7.0	542.6	8.9	585.6	10.5
Niger	487.4	2.7	75.3	2.2	311.6	16.6	368.8	7.3	395.3	6.5	434.9	3.9	485.4	3.5	537.4	6.3	586.3	5.6	616.6	7.4	665.0	13.0
DRC	437.4	2.8	51.8	2.4	304.4	18.7	357.0	6.6	375.3	4.3	404.8	3.4	436.3	3.0	469.4	3.3	502.6	4.3	522.6	9.6	568.6	10.4
Senegal	572.5	4.9	95.7	3.2	332.1	44.3	409.0	15.7	448.0	7.3	510.2	10.5	576.5	6.7	639.9	4.6	688.5	9.4	721.4	10.9	778.6	22.4
Chad	436.9	4.5	78.7	3.6	224.7	40.4	304.4	11.2	338.4	11.2	389.3	7.6	440.4	5.8	488.8	6.4	533.7	6.8	558.7	8.0	610.3	14.8
Togo	529.6	3.3	88.5	2.2	335.5	12.0	387.7	7.3	416.8	4.5	467.7	4.7	527.8	5.9	589.2	4.5	644.7	8.2	677.9	9.0	740.1	10.7
Mean	500.0	1.1	100.0	0.9	267.1	9.0	351.2	3.2	384.9	1.9	432.9	1.3	490.5	1.6	565.6	2.2	636.3	2.2	674.8	2.4	741.4	4.6

Table B4.4: Percentage distribution of teachers on the PASEC2019 mathematics proficiency scale

	Level <1		Level 1		Level 2		Level 3	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	1.6	0.6	9.3	1.2	28.7	2.1	60.5	2.0
Burkina Faso	4.1	0.9	14.6	1.3	36.5	1.7	44.7	1.8
Burundi	1.4	0.4	17.1	1.3	37.8	1.8	43.7	1.9
Cameroon	3.2	0.9	22.9	1.7	36.9	1.8	37.0	2.2
Congo	19.5	1.8	45.9	2.3	27.9	2.5	6.8	1.3
Côte d'ivoire	3.0	0.9	14.6	1.3	29.8	1.9	52.6	1.7
Gabon	5.6	1.0	26.9	1.9	37.6	2.2	29.9	2.1
Guinea	19.1	1.9	42.9	2.6	26.3	2.7	11.6	2.0
Madagascar	8.1	0.9	30.4	1.8	37.4	2.0	24.1	2.0
Niger	6.8	1.0	32.2	1.9	38.9	2.1	22.1	1.6
DRC	19.0	1.3	46.2	2.0	28.1	2.3	6.7	1.2
Senegal	0.9	0.5	11.9	1.7	35.0	2.4	52.2	2.7
Chad	25.6	2.1	43.4	2.5	25.6	2.2	5.4	0.8
Togo	1.9	0.5	14.1	1.3	29.9	1.6	54.2	1.8
Mean	8.5	0.3	26.6	0.4	32.6	0.5	32.3	0.5

Table B4.5: Teachers' average performance in mathematics

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P 1	Standard error	P 5	Standard error	P 10	Standard error	P 25	Standard error	P 50	Standard error	P 75	Standard error	P 90	Standard error	P 95	Standard error	P 99	Standard error
Benin	571.1	3.5	93.4	2.3	341.4	25.8	416.0	11.9	452.9	4.6	506.3	4.7	573.2	5.0	636.2	7.4	690.5	5.6	722.7	6.4	778.8	13.6
Burkina Faso	532.2	3.4	91.2	2.5	298.6	22.8	373.9	11.8	414.7	11.1	474.5	5.3	535.9	4.8	594.1	4.3	646.3	5.9	675.3	6.1	727.2	10.5
Burundi	536.3	3.1	86.4	1.7	359.1	5.8	400.0	5.6	425.0	5.0	473.3	4.9	530.7	5.6	600.0	5.4	651.7	5.3	681.6	8.7	734.1	7.9
Cameroon	517.5	4.5	88.3	2.9	312.6	24.7	380.6	13.8	405.5	7.5	452.5	5.9	516.5	6.5	579.1	7.5	633.0	9.0	667.1	10.0	717.7	11.6
Congo	430.7	4.4	74.3	2.4	277.0	9.1	316.4	8.3	338.4	5.5	379.1	6.2	426.3	5.1	477.6	7.4	531.6	8.8	560.6	7.5	616.3	15.1
Cote d'ivoire	548.3	3.6	94.0	2.7	326.6	20.7	389.6	13.3	420.6	8.5	484.3	6.8	552.9	5.9	614.9	4.0	665.5	7.4	697.3	10.8	745.3	15.8
Gabon	501.2	3.9	89.0	2.5	314.0	14.3	360.0	10.8	386.9	7.0	436.2	6.0	499.5	5.8	562.3	6.6	620.6	7.7	655.6	8.7	706.3	12.0
Guinea	437.0	4.9	86.8	3.4	239.6	24.0	304.2	8.7	336.0	5.1	377.9	6.0	427.7	9.9	497.4	10.3	556.6	13.3	589.1	11.3	629.1	15.5
Madagascar	485.3	3.3	87.4	2.3	301.1	9.9	348.2	3.7	374.3	5.9	420.6	4.8	483.8	6.1	545.5	6.3	602.8	6.9	635.7	8.4	684.7	15.0
Niger	484.0	3.3	83.5	1.9	306.5	10.9	354.0	6.4	380.5	5.5	425.4	3.0	479.0	3.9	538.8	5.6	596.8	5.6	629.3	10.2	692.3	13.8
DRC	431.0	3.6	74.3	2.2	277.4	12.4	319.2	5.5	340.5	3.2	378.1	3.8	425.0	4.2	480.0	7.1	527.8	6.7	561.1	11.3	620.6	17.6
Senegal	550.3	4.4	79.6	3.1	367.5	15.6	416.8	9.1	443.6	8.6	495.9	7.6	551.5	6.1	605.5	5.4	653.6	10.2	680.5	9.1	727.2	19.2
Chad	419.3	3.6	77.5	2.0	241.2	22.2	302.9	6.9	325.3	4.3	363.8	5.7	416.7	7.5	471.0	5.4	522.0	8.6	549.6	9.5	609.5	19.3
Togo	556.1	3.2	96.1	2.1	343.6	25.6	399.0	9.7	428.7	8.4	487.8	6.2	557.3	6.6	624.0	4.9	679.9	5.8	708.8	9.5	774.7	16.2
Mean	500.0	1.0	100.0	0.8	290.9	4.1	343.3	2.3	372.0	2.3	426.3	1.4	497.6	1.7	570.7	1.7	632.7	2.5	667.4	2.8	727.9	3.9

Table B4.6: Teachers' average performance in teaching mathematics

	Mean		Standard deviation		Percentile 1		Percentile 5		Percentile 10		Percentile 25		Percentile 50		Percentile 75		Percentile 90		Percentile 95		Percentile 99	
	Mean	Standard error	Standard deviation	Standard error	P 1	Standard error	P 5	Standard error	P 10	Standard error	P 25	Standard error	P 50	Standard error	P 75	Standard error	P 90	Standard error	P 95	Standard error	P 99	Standard error
Benin	551.7	3.6	84.0	2.1	354.0	19.3	411.3	5.9	441.6	7.7	492.6	7.4	555.6	5.1	611.5	5.3	657.8	7.7	685.8	9.2	737.1	20.1
Burkina Faso	558.3	3.1	92.4	2.3	313.6	43.4	406.7	10.8	442.5	5.6	500.5	6.8	561.0	3.6	621.6	5.5	672.8	4.9	703.6	7.7	756.6	9.0
Burundi	493.9	2.4	75.2	1.5	333.7	11.4	376.0	5.9	399.3	4.9	439.3	4.2	490.6	3.5	544.2	4.8	596.5	5.4	621.4	5.1	670.5	7.6
Cameroon	518.8	4.7	84.8	3.1	330.2	27.9	383.0	9.0	410.3	8.5	463.3	8.3	515.7	6.1	575.0	8.4	631.2	9.6	666.1	13.9	711.7	12.6
Congo	442.8	4.0	75.0	2.1	277.4	17.5	321.3	5.6	349.8	5.3	391.2	4.3	441.6	5.2	492.7	5.4	542.5	8.6	570.1	10.2	616.1	13.1
Cote d'ivoire	533.4	4.9	95.9	3.2	281.2	20.6	366.2	15.0	406.5	12.0	472.3	10.3	538.0	6.1	603.3	6.6	652.6	6.5	680.0	7.5	724.2	10.3
Gabon	521.4	4.5	100.3	3.9	262.9	40.3	352.9	10.6	392.1	13.7	460.4	6.6	524.0	5.6	587.3	6.4	645.8	12.8	681.6	11.2	739.9	17.5
Guinea	409.0	4.7	84.8	3.6	190.0	26.2	259.1	20.1	305.3	12.6	354.5	5.9	413.1	7.1	467.0	4.7	513.5	7.4	542.0	9.0	596.1	13.9
Madagascar	479.9	3.5	85.8	2.7	303.8	7.3	348.5	8.7	373.3	6.9	418.7	5.9	475.4	5.6	536.6	6.2	589.1	12.2	633.1	14.0	712.0	16.5
Niger	518.3	3.1	76.7	2.4	342.9	18.2	396.4	7.4	421.6	4.8	467.4	3.6	515.9	5.1	569.0	3.7	616.6	4.8	645.4	8.7	710.3	20.5
DRC	411.1	4.5	72.8	3.2	243.3	10.4	293.3	5.5	318.5	6.9	364.6	5.8	411.7	4.9	455.9	5.4	501.8	7.8	529.1	13.0	598.7	30.8
Senegal	553.3	4.4	84.1	2.8	343.7	17.7	413.9	13.6	445.9	8.7	496.6	8.1	555.2	7.2	611.1	6.2	659.0	7.3	688.1	8.1	742.8	21.8
Chad	438.1	3.3	79.4	2.2	247.0	14.5	313.3	16.3	339.3	4.7	384.4	5.6	436.9	5.6	492.1	4.8	540.3	6.1	570.6	6.3	623.6	20.1
Togo	570.1	3.4	88.3	2.1	359.9	16.2	425.9	7.0	456.2	5.0	510.8	5.6	570.9	4.8	630.9	5.5	682.7	7.5	714.7	7.5	767.1	9.7
Mean	500.0	1.1	100.0	0.9	269.4	6.2	339.4	2.2	372.7	2.3	430.5	1.7	498.8	1.6	569.4	1.3	630.6	2.2	664.9	2.8	726.3	4.1

Table B4.7. Percentage of female teachers who participated in the PASEC2019 survey

	Percentage	Standard error
Benin	27.9	1.6
Burkina Faso	46.7	1.4
Burundi	51.0	1.7
Cameroon	48.9	1.8
Congo	56.0	1.8
Côte d'ivoire	31.9	1.7
Gabon	53.0	2.4
Guinea	35.4	2.0
Madagascar	58.7	2.2
Niger	62.6	2.0
DRC	36.9	1.8
Senegal	37.0	2.1
Chad	22.8	1.8
Togo	20.3	1.4
Mean	42.0	0.6

Table B4.8.1: Female/male teachers' average performance in reading comprehension

	Percentage of female teachers		Female teachers' average performance		Male teachers' average performance		Difference in reading comprehension scores between male and female teachers	
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	27.9	1.6	542.6	4.7	551.6	3.2	9.0	5.2
Burkina Faso	46.7	1.4	547.7	3.8	556.3	5.0	8.5	5.9
Burundi	51.0	1.7	448.3	3.0	475.3	2.9	27***	3.9
Cameroon	48.9	1.8	558.6	4.2	535.9	6.5	-22.7***	7.2
Congo	56.0	1.8	464.8	5.2	481.4	5.0	16.6***	6.1
Côte d'ivoire	31.9	1.7	574.0	6.0	596.5	3.7	22.5***	6.1
Gabon	53.0	2.4	535.0	5.9	565.6	5.9	30.5***	7.9
Guinea	35.4	2.0	426.1	6.3	462.8	5.4	36.7***	7.8
Madagascar	58.7	2.2	419.3	5.0	394.3	4.0	-25***	6.5
Niger	62.6	2.0	472.1	3.7	506.8	3.9	34.7***	5.9
DRC	36.9	1.8	424.4	6.2	423.5	3.4	-0.9	6.6
Senegal	37.0	2.1	548.6	5.4	570.7	3.6	22.1***	5.8
Chad	22.8	1.8	421.3	7.2	422.8	3.6	1.6	7.9
Togo	20.3	1.4	521.7	5.1	555.2	2.8	33.6***	6.1
Mean	42.0	0.6	490.7	1.5	510.1	1.3	19.4***	2.1

Table B4.8.2: Female/male teachers' average performance in mathematics

	Percentage of female teachers		Female teachers' average performance		Male teachers' average performance		Difference in reading comprehension scores between male and female teachers	
	Percentage	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	27.9	1.6	536.1	4.9	585.7	4.1	49.6***	6.2
Burkina Faso	46.7	1.4	514.5	4.2	552.7	4.5	38.2***	5.7
Burundi	51.0	1.7	510.2	4.2	564.3	4.3	54.1***	5.7
Cameroon	48.9	1.8	509.2	4.7	534.8	7.3	25.6***	8.5
Congo	56.0	1.8	416.7	5.9	455.8	5.3	39.1***	6.3
Côte d'ivoire	31.9	1.7	490.1	6.0	575.5	3.8	85.4***	6.3
Gabon	53.0	2.4	465.7	5.3	543.9	4.4	78.2***	5.8
Guinea	35.4	2.0	407.5	5.7	453.4	6.1	45.9***	7.1
Madagascar	58.7	2.2	487.3	4.8	487.3	5.6	0.0	7.7
Niger	62.6	2.0	464.1	3.9	518.8	4.7	54.7***	5.9
DRC	36.9	1.8	433.5	6.2	434.8	3.6	1.3	6.3
Senegal	37.0	2.1	515.5	5.6	572.3	4.6	56.8***	6.0
Chad	22.8	1.8	404.5	7.4	425.3	3.8	20.8***	7.6
Togo	20.3	1.4	499.4	6.2	573.6	3.6	74.2***	6.9
Mean	42.0	0.6	475.9	1.5	521.6	1.3	45.8***	1.9

Table B4.9: Percentage of teachers by length of service

	5 years or less		6 to 10 years		11 to 20 years		More than 20 years	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	32.2	1.5	23.1	1.5	39.1	1.7	5.6	0.7
Burkina Faso	44.8	1.7	27.0	1.2	22.8	1.2	5.4	0.5
Burundi	12.7	1.2	33.8	1.6	41.0	1.7	12.4	1.0
Cameroon	37.2	2.0	35.9	1.9	22.5	1.6	4.4	1.0
Congo	39.9	2.1	26.0	2.0	29.0	1.7	5.1	0.9
Côte d'ivoire	39.3	2.1	24.4	1.5	21.9	1.7	14.4	1.4
Gabon	30.5	2.0	29.7	1.6	30.7	2.1	9.2	1.2
Guinea	36.0	2.1	31.8	1.7	27.5	1.8	4.6	1.1
Madagascar	28.3	2.1	28.9	1.4	33.6	1.7	9.2	1.0
Niger	28.5	1.4	34.5	1.4	34.4	1.4	2.6	0.5
DRC	27.8	1.9	28.7	1.6	23.1	1.3	20.4	1.6
Senegal	22.1	1.6	29.0	1.5	42.3	2.2	6.5	1.0
Chad	27.7	1.8	37.1	1.8	29.8	1.6	5.4	0.9
Togo	31.4	1.5	20.0	1.1	29.0	1.3	19.6	1.0
Mean	31.3	0.5	29.3	0.4	30.5	0.4	8.9	0.3

Table B4.10.1: Performance of teachers in reading comprehension by length of service

	5 years or less		6 to 10 years		11 to 20 years		More than 20 years		Difference in scores between teachers with 6 to 10 years of service and teachers with 5 years or less of service		Difference in scores between teachers with 11 to 20 years of service and teachers with 5 years or less of service		Difference in scores between teachers with more than 20 years of service and teachers with 5 years or less of service	
	Mean	Standard error	Mean	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error	Difference	Standard error	Difference	Standard error
Benin	536.0	4.9	548.5	6.2	556.4	4.0	577.3	9.7	12.	6.8	20.4***	6.6	41.3***	10.7
Burkina Faso	539.1	4.5	559.3	5.6	565.4	5.9	590.8	10.4	20.1***	7.3	26.3***	7.6	51.7***	10.8
Burundi	449.7	8.0	443.3	3.8	466.7	3.1	503.2	4.6	-6.4	8.7	16.9	8.8	53.4***	8.8
Cameroon	525.9	5.6	555.9	6.2	557.0	7.6	546.2	14.7	30***	8.0	31.1***	8.7	20.3	15.0
Congo	469.1	6.3	452.6	6.5	479.9	6.3	494.0	11.5	-16.5	8.9	10.8	8.3	24.8	13.3
Côte d'ivoire	579.1	5.4	587.3	6.3	603.3	5.3	602.0	7.3	8.2	7.3	24.2***	7.7	22.9***	8.4
Gabon	554.5	6.2	537.8	8.5	557.0	6.6	539.5	10.5	-16.7	10.7	2.5	7.6	-15.0	12.5
Guinea	443.1	8.7	451.4	6.7	459.3	7.5	475.9	17.1	8.3	10.9	16.2	11.6	32.7	19.0
Madagascar	398.6	5.5	406.8	5.1	408.6	4.6	434.0	12.8	8.2	7.4	9.9	6.9	35.4***	13.5
Niger	445.4	4.2	473.6	4.5	521.6	3.2	574.1	12.1	28.2***	5.9	76.2***	5.1	128.7***	12.7
DRC	399.6	4.4	415.9	4.8	429.5	5.5	447.5	6.5	16.3***	5.2	29.9***	6.9	48***	7.8
Senegal	573.2	5.7	555.2	6.7	557.0	4.9	583.1	8.3	-18**	7.6	-16.2	8.3	9.9	9.4
Chad	419.7	6.6	419.8	4.9	426.3	5.5	420.8	10.9	0.1	8.3	6.6	8.2	1.2	12.9
Togo	548.1	4.0	545.7	5.6	549.3	4.1	547.4	5.6	-2.4	7.2	1.2	5.3	-0.6	6.4
Mean	496.4	1.6	492.1	1.9	508.5	1.6	519.3	2.9	-4.3	2.5	12.1***	2.5	22.9***	3.6

Table 4.10.2: Performance of teachers in mathematics by length of service

	5 years or less		6 to 10 years		11 to 20 years		More than 20 years		Difference in scores between teachers with 6 to 10 years of service and teachers with 5 years or less of service		Difference in scores between teachers with 11 to 20 years of service and teachers with 5 years or less of service		Difference in scores between teachers with more than 20 years of service and teachers with 5 years or less of service	
	Mean	Standard error	Mean	Standard error	Mean	Standard error	Mean	Standard error	Difference	Standard error	Difference	Standard error	Difference	Standard error
Benin	539.2	6.1	569.0	6.9	591.7	5.3	628.9	11.0	29.8***	8.6	52.5***	8.3	89.7***	12.6
Burkina Faso	511.3	4.1	547.4	5.4	556.4	5.3	588.0	10.2	36.1***	6.1	45.1***	6.5	76.7***	10.9
Burundi	512.2	9.1	513.2	5.2	546.1	3.6	589.4	6.0	1.0	8.8	33.9***	9.5	77.2***	10.3
Cameroon	488.3	5.3	534.0	6.2	544.3	6.5	551.3	14.5	45.7***	7.5	56.1***	7.9	63***	15.4
Congo	422.2	6.7	419.6	5.0	449.0	6.6	482.3	10.5	-2.6	6.7	26.8***	8.2	60.1***	12.1
Côte d'ivoire	520.4	6.7	554.0	6.8	572.7	6.5	580.2	8.2	33.6***	10.0	52.3***	9.5	59.8***	11.1
Gabon	483.9	8.3	492.2	7.4	524.3	7.6	520.2	10.2	8.3	11.5	40.4***	11.3	36.3***	13.4
Guinea	432.3	7.6	435.8	6.8	446.6	7.4	483.2	20.8	3.6	9.2	14.4	9.4	50.9**	20.5
Madagascar	458.9	6.9	478.0	6.5	501.2	5.9	540.1	12.7	19.1**	8.9	42.4***	7.9	81.3***	15.9
Niger	445.3	4.9	469.8	4.2	524.6	4.9	565.8	11.2	24.5***	5.6	79.2***	6.1	120.5***	12.2
DRC	408.0	4.6	421.3	5.4	440.7	5.4	465.1	6.8	13.2	6.9	32.7***	6.3	57.1***	7.8
Senegal	545.2	6.5	550.4	8.6	550.8	5.6	567.4	8.7	5.2	8.0	5.6	8.6	22.2**	10.3
Chad	412.7	5.9	418.2	4.7	428.2	6.7	431.1	11.5	5.5	7.3	15.6	8.7	18.4	13.4
Togo	535.2	4.6	553.9	6.4	572.0	5.9	576.5	6.9	18.7**	8.2	36.8***	6.9	41.3***	8.2
Mean	478.9	1.7	493.0	2.1	520.8	1.8	540.9	3.2	14.1***	2.7	41.9***	2.5	62***	4.0

Table B4.1.1. Distribution of teachers by educational level

	Primary level		Secondary level		University level	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	0.1	0.1	72.8	1.5	27.1	1.5
Burkina Faso	1.6	0.4	81.1	0.9	17.3	0.9
Burundi	0.2	0.1	8.7	0.9	91.1	0.9
Cameroon	0.6	0.3	68.0	1.7	31.4	1.8
Congo	0.1	0.1	50.9	2.0	49.0	2.0
Côte d'ivoire	0.4	0.2	47.8	2.1	51.8	2.1
Gabon	0.4	0.3	43.7	2.2	55.9	2.3
Guinea	0.6	0.3	31.5	2.0	67.9	2.0
Madagascar	1.2	0.4	79.9	1.9	18.9	1.9
Niger	0.2	0.2	90.9	0.8	8.9	0.8
DRC	0.8	0.3	92.0	1.0	7.2	1.1
Senegal	0.6	0.2	48.5	2.3	50.9	2.3
Chad	0.3	0.2	61.7	2.2	38.0	2.2
Togo	0.3	0.1	70.0	1.3	29.6	1.3
Mean	0.5	0.1	60.3	0.4	39.1	0.4

Table B4.12: Performance of teachers in reading comprehension by educational level (secondary and university)

	Performance of teachers educated to secondary level		Performance of teachers educated to university level		Score differences between teachers educated to secondary level and those educated to university level	
	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	534.5	3.3	588.4	4.9	53.9***	5.8
Burkina Faso	549.5	3.3	575.7	8.4	26.2***	7.8
Burundi	481.2	7.4	459.8	2.3	-21.3***	7.7
Cameroon	530.0	4.8	574.4	6.1	44.4***	7.6
Congo	456.2	3.4	484.9	5.6	28.7***	5.8
Côte d'ivoire	568.2	4.7	610.5	3.9	42.4***	5.3
Gabon	525.4	6.2	569.4	5.1	44.0***	7.2
Guinea	437.8	7.9	460.7	5.0	22.9***	8.7
Madagascar	398.3	3.4	451.6	7.9	53.3***	8.7
Niger	478.0	2.6	556.4	8.1	78.4***	8.4
DRC	419.6	3.9	467.3	11.4	47.7***	12.3
Senegal	539.9	5.3	583.1	3.5	43.1***	6.8
Chad	401.4	3.9	458.2	5.1	56.8***	6.6
Togo	533.3	3.0	581.9	4.1	48.6***	5.3
Mean	488.5	1.1	524.4	1.6	35.9***	1.8

Table B4.13: Performance of teachers in mathematics by educational level (secondary and university)

	Performance of teachers educated to secondary level		Performance of teachers educated to university level		Score differences between teachers educated to secondary level and those educated to university level	
	Mean	Standard error	Mean	Standard error	Difference	Standard error
Benin	554.1	4.0	620.5	6.5	66.5***	7.9
Burkina Faso	532.1	3.4	555.9	7.0	23.7***	6.8
Burundi	557.1	8.0	534.2	3.2	-22.9***	8.5
Cameroon	511.5	5.7	536.7	5.5	25.2***	7.5
Congo	416.2	3.6	450.5	6.3	34.4***	6.2
Côte d'ivoire	523.4	5.2	573.2	4.0	49.8***	6.7
Gabon	458.3	5.3	536.7	5.1	78.4***	6.7
Guinea	434.1	9.3	442.8	5.3	8.7	9.8
Madagascar	482.6	4.2	504.4	7.2	21.8**	8.9
Niger	477.7	3.4	554.1	7.8	76.3***	8.1
DRC	431.0	3.9	456.3	10.2	25.4***	10.3
Senegal	532.4	5.9	567.6	4.6	35.2***	6.7
Chad	405.0	4.4	447.1	4.8	42.1***	6.2
Togo	547.3	3.8	582.3	5.0	35.0***	6.1
Mean	489.5	1.2	523.2	1.8	33.7***	2.1

Table B4.14. Distribution of teachers by length of pre-service professional education

	No pre-service training		Less than 6 months		One year		Two years and more	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	9.9	1.3	17.1	1.2	11.2	0.8	61.8	1.9
Burkina Faso	13.0	1.2	4.6	0.6	28.7	1.3	53.8	1.6
Burundi	4.1	0.9	7.6	1.6	10.2	0.9	78.1	2.0
Cameroon	11.5	1.4	4.7	1.1	32.3	2.0	51.5	2.3
Congo	12.3	1.6	11.6	1.5	19.6	1.6	56.5	1.7
Côte d'ivoire	12.0	1.8	12.9	1.3	47.8	2.6	27.4	2.2
Gabon	10.8	1.7	5.9	0.9	26.3	2.0	56.9	2.3
Guinea	11.8	1.3	8.7	1.4	25.9	1.9	53.6	2.1
Madagascar	59.0	2.8	24.1	2.6	7.2	1.1	9.7	1.5
Niger	13.8	1.2	16.4	1.1	31.5	1.3	38.3	1.4
DRC	26.1	2.8	21.6	1.9	6.2	0.8	46.1	2.7
Senegal	4.9	1.1	34.3	2.5	56.1	2.6	4.7	0.7
Chad	13.6	1.6	17.8	1.6	43.8	2.2	24.8	1.4
Togo	32.4	1.9	32.0	1.6	20.0	1.1	15.6	1.2
Mean	16.5	0.4	15.6	0.5	26.5	0.4	41.4	0.5

Table B4.15. Percentage of teachers who had received additional and in-service training in the previous two years

	Percentage	Standard error
Benin	74.7	1.9
Burkina Faso	49.2	1.6
Burundi	21.8	2.3
Cameroon	89.6	1.1
Congo	88.9	1.8
Côte d'ivoire	59.9	2.8
Gabon	83.3	2.0
Guinea	68.6	2.3
Madagascar	58.9	3.1
Niger	78.3	1.7
DRC	68.5	2.7
Senegal	87.6	1.4
Chad	82.1	1.8
Togo	70.0	1.6
Mean	70.0	0.6

Table B4.16: Average difference in reading comprehension scores between teachers who had received additional and in-service training in the previous two years and those who had not

	Percentage	Standard error
Benin	5,9	5,9
Burkina Faso	14,4***	5,5
Burundi	-3,3	6,0
Cameroon	1,5	11,4
Congo	19,5	10,6
Côte d'ivoire	9,3	7,1
Gabon	11,4	11,6
Guinea	-6,6	9,1
Madagascar	19,8***	6,8
Niger	16,0**	7,8
DRC	22,8***	8,0
Senegal	4,8	9,1
Chad	10,0	7,3
Togo	2,3	4,6

Table 4.17: Average difference in mathematics scores between teachers who had received additional and in-service training in the previous two years and those who had not

	Score differences	Standard error
Benin	11.9	7.4
Burkina Faso	13.4**	5.5
Burundi	-1.7	7.1
Cameroon	6.1	12.0
Congo	12.3	9.1
Côte d'ivoire	8.0	7.4
Gabon	14.1	9.0
Guinea	1.5	9.0
Madagascar	13.6	8.7
Niger	5.6	7.1
DRC	15.3	8.1
Senegal	19.7	10.4
Chad	16.3**	7.5
Togo	9.3	6.2
Mean	70.0	0.6

Table 4.18: Distribution of teachers by the area on which they spent the most teaching time in mathematics

	Numbers and operations		Geometry and location		Measurement	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	82.9	1.2	11.8	1.0	5.3	0.7
Burkina Faso	85.8	1.0	10.1	0.9	4.1	0.5
Burundi	83.6	1.3	10.0	1.1	6.4	0.7
Cameroon	86.2	1.5	9.7	1.2	4.1	0.8
Congo	87.3	1.3	6.9	1.0	5.8	1.1
Côte d'ivoire	94.7	0.8	4.6	0.7	0.8	0.3
Gabon	90.3	1.3	5.0	1.0	4.7	0.9
Guinea	78.9	2.3	16.3	2.1	4.8	1.1
Madagascar	85.1	1.7	9.4	1.3	5.4	1.1
Niger	82.9	1.1	13.0	0.9	4.1	0.7
DRC	86.5	1.3	8.2	1.0	5.3	0.8
Senegal	79.6	1.4	7.3	1.1	13.1	1.6
Chad	72.5	2.1	22.9	2.0	4.6	0.8
Togo	80.8	1.4	15.2	1.3	4.1	0.6
Mean	84.2	0.5	10.7	0.3	5.1	0.2

Table B4.19: Mean level and standard deviation of the classroom equipment index

	Index mean	Standard error	Index standard deviation	Standard error
Benin	54.3	0.3	10.0	0.5
Burkina Faso	50.5	0.2	8.1	0.2
Burundi	49.2	0.5	8.4	0.7
Cameroon	48.3	0.4	8.0	0.7
Congo	50.7	0.4	9.5	0.5
Côte d'ivoire	53.1	0.3	8.0	0.3
Gabon	49.0	0.5	8.9	0.7
Guinea	50.8	0.4	10.2	0.6
Madagascar	50.6	0.4	9.2	0.5
Niger	48.9	0.3	8.6	0.6
DRC	44.6	0.5	12.7	0.5
Senegal	55.9	0.4	9.6	0.4
Chad	43.1	0.3	9.3	0.4
Togo	50.8	0.4	11.2	0.4
Mean	50.0	0.1	10.0	0.1

Table B4.20: Distribution of teachers by number of days absent in the previous two months

	No days of absence		1 to 5 days of absence		6 to 10 days of absence		More than 10 days of absence	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	70.4	1.6	27.4	1.5	1.5	0.3	0.6	0.3
Burkina Faso	34.5	1.7	59.6	1.8	3.3	0.5	2.6	0.5
Burundi	26.5	2.2	65.5	2.1	6.4	0.6	1.6	0.3
Cameroon	37.0	2.4	55.4	2.4	6.4	0.8	1.2	0.4
Congo	39.5	2.4	48.9	2.2	9.1	1.1	2.5	0.6
Côte d'ivoire	37.0	2.3	55.9	2.3	4.8	0.8	2.3	0.6
Gabon	35.6	2.4	52.3	2.4	8.7	1.1	3.3	0.7
Guinea	35.1	2.5	57.3	2.5	6.2	1.2	1.3	0.4
Madagascar	40.2	3.2	49.8	3.1	7.8	1.1	2.2	0.5
Niger	21.4	1.8	72.5	1.8	5.2	0.8	0.9	0.2
DRC	51.6	2.2	40.2	1.9	7.1	1.0	1.1	0.3
Senegal	24.8	2.1	67.2	2.0	5.8	0.7	2.2	0.5
Chad	20.4	1.9	62.6	2.2	13.1	1.4	3.9	0.8
Togo	48.1	1.7	40.0	1.5	9.5	0.9	2.4	0.5
Mean	37.4	0.7	53.9	0.6	6.7	0.2	2.0	0.1

Table B4.21: Average level of index of teachers' perceived working conditions

	Index mean	Standard error	Index standard deviation	Standard error
Benin	50.6	0.3	7.6	0.3
Burkina Faso	46.8	0.3	8.5	0.2
Burundi	56.1	0.5	11.7	0.4
Cameroon	49.3	0.3	8.6	0.2
Congo	52.1	0.4	10.1	0.3
Côte d'ivoire	50.3	0.4	8.6	0.4
Gabon	48.9	0.4	8.5	0.3
Guinea	55.5	0.4	10.0	0.3
Madagascar	43.1	0.5	9.4	0.4
Niger	50.8	0.4	9.5	0.3
DRC	51.4	0.4	10.7	0.3
Senegal	52.3	0.5	7.8	0.3
Chad	45.8	0.5	11.4	0.4
Togo	47.3	0.3	8.1	0.3
Mean	50.0	0.1	10.0	0.1

Table B4.22: Distribution of teachers reporting the existence of bullying or harassment within the school

	Bullying		Sexual harassment	
	Percentage	Standard error	Percentage	Standard error
Benin	14.4	1.7	1.4	0.4
Burkina Faso	21.5	1.5	2.4	0.4
Burundi	10.3	1.3	1.2	0.3
Cameroon	25.4	2.0	2.7	0.7
Congo	25.6	1.8	3.3	0.8
Côte d'ivoire	13.7	1.4	1.1	0.3
Gabon	19.4	1.5	3.2	1.0
Guinea	19.8	1.9	3.0	0.7
Madagascar	14.7	2.1	1.7	0.4
Niger	19.3	1.6	1.6	0.3
DRC	34.5	2.4	4.1	0.6
Senegal	19.5	1.4	1.9	0.5
Chad	30.2	1.9	5.4	1.1
Togo	14.9	1.3	1.5	0.4
Mean	20.0	0.4	2.4	0.2

Table B4.23: Distribution of teachers by perception of quality of school management

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	14.1	1.5	61.9	1.9	21.8	1.6	2.3	0.5
Burkina Faso	4.8	0.6	46.8	1.5	40.8	1.4	7.7	1.0
Burundi	31.5	2.1	38.2	2.0	21.6	1.5	8.7	1.3
Cameroon	6.5	0.9	39.3	2.5	39.9	2.4	14.3	1.3
Congo	9.7	1.0	35.2	2.6	38.8	2.6	16.3	1.6
Côte d'ivoire	9.0	1.3	52.7	2.2	33.0	2.0	5.3	1.0
Gabon	8.3	1.4	37.2	2.2	43.7	2.1	10.8	1.6
Guinea	19.7	2.4	63.3	2.4	15.1	1.7	2.0	0.5
Madagascar	4.8	1.4	31.5	2.5	53.4	2.7	10.3	1.3
Niger	16.9	1.5	55.9	2.0	24.6	1.7	2.6	0.6
DRC	15.1	1.4	50.1	2.5	22.2	2.2	12.5	1.9
Senegal	11.4	1.2	54.3	2.3	27.9	2.3	6.4	1.1
Chad	5.7	0.7	32.1	2.0	41.8	2.0	20.4	1.9
Togo	6.0	0.8	46.3	1.6	40.2	1.7	7.5	0.8
Mean	11.7	0.3	46.1	0.6	33.3	0.5	9.0	0.3

Table B4.24: Distribution of teachers by perception of relations with their colleagues

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	35.3	1.8	57.0	1.8	7.1	1.0	0.7	0.3
Burkina Faso	27.8	1.4	58.8	1.5	12.2	1.0	1.2	0.3
Burundi	74.3	1.8	21.7	1.6	3.2	0.6	0.8	0.3
Cameroon	31.2	2.1	56.3	2.1	11.7	1.2	0.8	0.3
Congo	45.2	2.0	44.6	1.8	9.1	1.1	1.1	0.4
Côte d'ivoire	47.0	2.1	48.4	1.9	4.5	0.7	0.1	0.1
Gabon	36.1	2.2	52.3	1.8	11.2	1.4	0.4	0.2
Guinea	47.7	2.5	48.0	2.2	3.9	1.0	0.4	0.2
Madagascar	23.1	2.3	54.8	2.6	20.2	2.3	2.0	0.5
Niger	53.8	1.6	41.9	1.6	4.0	0.5	0.3	0.2
DRC	52.3	2.1	41.1	2.0	5.6	1.0	1.1	0.3
Senegal	59.0	2.3	38.0	2.2	2.8	0.6	0.2	0.1
Chad	37.3	2.0	54.2	2.0	6.7	1.0	1.9	0.6
Togo	37.2	1.6	54.9	1.5	7.4	0.8	0.5	0.2
Mean	43.4	0.6	48.0	0.5	7.8	0.3	0.8	0.1

Table B4.25: Distribution of teachers by perception of relations with the community

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	18.7	1.3	66.1	1.7	14.2	1.3	0.9	0.3
Burkina Faso	12.3	0.9	62.1	1.4	24.5	1.5	1.2	0.3
Burundi	58.1	2.2	32.1	1.9	7.9	1.3	1.9	0.4
Cameroon	18.5	1.3	53.0	1.9	25.1	1.8	3.4	0.7
Congo	29.9	1.5	50.2	1.6	17.0	1.3	2.8	0.7
Côte d'ivoire	18.9	1.4	59.8	1.9	19.2	1.7	2.1	0.6
GaGood	21.1	2.1	55.6	2.0	21.6	2.0	1.7	0.6
Guinea	28.4	2.4	53.7	2.5	16.6	1.6	1.3	0.4
Madagascar	9.2	1.7	47.9	2.5	39.1	2.8	3.7	0.8
Niger	30.5	1.6	54.4	1.9	13.6	1.4	1.5	0.6
DRC	39.2	1.9	48.1	2.0	9.5	1.2	3.2	0.6
Senegal	35.7	2.2	55.5	2.0	7.9	0.9	0.8	0.3
Chad	18.9	1.7	48.6	2.3	24.1	1.5	8.3	0.9
Togo	15.0	1.2	63.5	1.5	17.1	1.3	4.4	0.8
Mean	25.3	0.5	53.7	0.5	18.4	0.4	2.7	0.2

Table 4.26: Distribution of teachers by perception of salary level

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	1.7	0.5	13.5	1.3	59.5	1.7	25.3	1.8
Burkina Faso	1.2	0.3	7.9	0.9	61.7	1.4	29.2	1.6
Burundi	11.8	1.4	16.9	1.9	45.6	2.2	25.8	2.1
Cameroon	2.6	0.6	10.0	1.2	46.2	2.4	41.2	2.4
Congo	5.8	0.7	14.0	1.6	45.1	2.2	35.1	2.2
Côte d'ivoire	1.5	0.5	14.2	1.4	62.9	2.1	21.5	2.0
Gabon	1.8	0.6	13.8	1.7	53.5	2.1	30.9	2.1
Guinea	7.7	1.4	23.6	2.1	45.5	2.3	23.2	2.2
Madagascar	0.3	0.1	6.9	1.0	38.2	2.5	54.5	2.4
Niger	6.1	0.7	16.1	1.3	47.9	1.9	30.0	2.2
DRC	8.8	1.1	11.6	1.0	22.6	2.1	57.0	2.7
Senegal	1.1	0.3	16.3	1.6	64.4	2.3	18.3	2.4
Chad	9.6	1.1	14.9	1.5	39.2	1.9	36.2	2.2
Togo	1.3	0.3	8.9	0.8	45.7	1.8	44.1	1.9
Mean	4.3	0.2	13.5	0.4	48.6	0.5	33.6	0.5

Table B4.27: Distribution of teachers by perception of regularity of salary payment

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	21.0	1.8	55.3	1.6	15.4	1.5	8.3	1.1
Burkina Faso	18.4	1.1	56.3	1.4	18.5	1.4	6.9	0.7
Burundi	65.7	2.3	23.6	1.7	7.9	1.3	2.7	0.7
Cameroon	28.5	2.3	40.0	2.0	17.8	1.5	13.6	1.6
Congo	19.2	1.8	31.1	2.6	25.3	1.8	24.4	2.3
Côte d'ivoire	25.4	2.1	53.8	2.4	13.1	1.7	7.8	1.3
Gabon	25.0	2.4	47.1	2.6	16.3	1.5	11.5	1.7
Guinea	26.9	2.6	50.3	2.4	15.6	1.6	7.1	0.9
Madagascar	7.7	1.1	31.7	2.1	24.1	1.9	36.5	1.7
Niger	9.2	0.9	23.2	1.4	29.1	2.0	38.5	2.2
DRC	17.9	2.2	32.2	2.0	16.5	1.4	33.4	2.8
Senegal	33.6	2.3	54.3	2.5	10.1	1.4	2.1	0.6
Chad	8.9	1.6	27.3	2.0	30.7	2.1	33.1	2.4
Togo	16.6	1.5	51.3	1.8	13.9	1.1	18.2	1.3
Mean	23.2	0.5	41.2	0.6	18.2	0.4	17.4	0.4

Table B4.28: Distribution of teachers by perception of training opportunities

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	1.9	0.4	23.1	1.6	50.6	2.0	24.3	1.7
Burkina Faso	1.5	0.4	8.8	0.9	35.5	1.5	54.2	1.9
Burundi	9.9	1.5	14.1	1.5	14.6	1.3	61.3	2.5
Cameroon	7.3	0.9	34.9	2.2	41.1	2.0	16.8	1.6
Congo	11.7	1.5	33.9	2.3	33.8	2.2	20.6	2.0
Côte d'ivoire	3.7	0.8	24.4	2.1	45.3	2.3	26.6	2.3
Gabon	3.8	0.9	16.6	2.0	36.6	2.1	42.9	2.0
Guinea	9.7	1.9	36.5	2.2	37.1	2.2	16.7	1.9
Madagascar	3.2	1.1	18.4	2.1	54.5	2.6	23.9	2.4
Niger	3.7	0.9	20.1	1.4	49.0	1.9	27.2	1.9
DRC	12.4	1.2	41.1	2.2	26.9	1.8	19.6	2.1
Senegal	3.4	1.1	17.0	1.6	53.5	1.9	26.1	2.2
Chad	7.9	1.3	32.1	1.8	38.8	2.2	21.2	1.7
Togo	3.8	0.7	22.5	1.4	48.5	1.4	25.3	1.6
Mean	5.9	0.3	24.3	0.5	40.6	0.5	29.2	0.6

Table B4.29: Distribution of teachers by perception of promotion opportunities

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	2.0	0.5	19.8	1.5	32.2	1.5	46.0	2.0
Burkina Faso	2.1	0.6	15.4	1.3	38.5	1.7	43.9	2.0
Burundi	21.1	1.8	27.1	1.9	17.6	1.5	34.3	2.4
Cameroon	3.5	0.7	17.2	1.5	30.0	1.8	49.3	2.3
Congo	4.1	0.8	16.4	1.6	26.2	2.2	53.3	2.0
Côte d'ivoire	10.8	1.3	41.4	2.0	31.1	2.0	16.8	1.9
Gabon	1.8	0.6	10.9	1.5	27.8	2.0	59.5	1.7
Guinea	10.7	1.6	34.2	2.3	34.5	2.1	20.6	1.9
Madagascar	1.4	0.4	14.2	2.3	34.0	2.5	50.4	2.8
Niger	4.2	0.6	23.3	1.4	32.2	1.6	40.3	2.0
DRC	8.8	1.1	35.0	2.0	20.8	1.4	35.4	2.8
Senegal	3.5	1.0	17.0	1.4	36.0	1.7	43.5	2.3
Chad	3.5	0.7	13.2	1.2	24.0	2.1	59.2	2.4
Togo	2.3	0.4	24.8	1.3	27.9	1.6	45.1	1.7
Mean	5.8	0.3	22.2	0.4	29.5	0.5	42.4	0.6

Table B4.30: Distribution of teachers by perception of quality of school curricula

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	6.9	1.0	53.3	1.9	35.1	1.9	4.8	0.8
Burkina Faso	3.4	0.6	32.5	1.7	53.0	1.7	11.1	1.1
Burundi	30.4	2.3	36.2	2.2	22.6	1.9	10.9	1.6
Cameroon	7.1	0.9	43.1	2.1	42.7	2.0	7.1	1.1
Congo	19.2	1.5	47.5	2.0	30.0	1.9	3.4	0.7
Côte d'ivoire	4.4	0.8	39.4	2.1	46.1	2.3	10.1	1.5
Gabon	8.4	1.4	51.0	1.9	36.7	2.0	4.0	0.7
Guinea	23.0	2.7	61.5	2.7	12.8	1.4	2.7	0.6
Madagascar	5.0	1.2	38.3	2.5	51.7	2.6	5.1	1.0
Niger	11.3	1.2	42.3	1.8	38.6	1.7	7.9	1.2
DRC	28.8	1.7	41.5	2.1	21.7	2.0	8.1	1.3
Senegal	6.4	0.9	57.3	1.9	33.8	2.1	2.5	0.6
Chad	15.2	1.3	44.8	1.9	35.4	2.0	4.5	0.7
Togo	5.9	0.8	41.0	1.7	40.7	2.0	12.4	1.4
Mean	12.4	0.4	44.9	0.5	35.9	0.5	6.8	0.3

Table B4.31: Distribution of teachers by perception of quality of school buildings

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	14.9	1.6	44.2	2.0	27.2	1.8	13.7	1.6
Burkina Faso	6.2	0.9	35.3	2.1	38.4	1.8	20.1	1.6
Burundi	23.9	1.8	31.9	2.3	22.7	1.8	21.5	2.2
Cameroon	12.1	1.8	35.2	2.6	31.2	2.3	21.5	2.4
Congo	20.1	2.3	37.0	2.3	32.1	2.2	10.9	1.4
Côte d'ivoire	13.7	1.9	37.1	2.5	30.5	2.2	18.7	2.3
Gabon	12.0	1.8	33.6	2.6	38.9	2.7	15.5	2.1
Guinea	16.8	1.9	43.8	2.9	30.8	2.3	8.6	1.2
Madagascar	3.2	1.0	15.4	1.5	44.2	2.7	37.1	2.8
Niger	10.5	1.2	30.4	1.8	30.2	1.7	28.9	2.1
DRC	12.4	1.7	25.6	2.2	24.2	2.4	37.9	3.0
Senegal	12.0	1.7	40.9	2.3	31.8	1.9	15.3	2.0
Chad	11.1	1.6	20.1	1.8	23.7	2.0	45.1	3.0
Togo	7.8	1.2	28.2	1.6	31.1	1.6	32.9	1.8
Mean	12.6	0.5	32.8	0.6	31.2	0.6	23.4	0.5

Table B4.32: Distribution of teachers by perception of availability of school supplies

	Very good		Good		Moderate		Poor	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Benin	11.2	1.2	42.2	1.8	38.7	1.8	7.9	1.3
Burkina Faso	2.7	0.6	17.5	1.2	56.5	1.5	23.3	1.7
Burundi	10.3	1.8	23.7	1.6	38.9	2.2	27.1	2.4
Cameroon	6.2	1.5	22.3	2.0	45.1	2.1	26.4	1.5
Congo	10.5	1.5	19.7	1.6	46.2	2.1	23.7	1.8
Côte d'ivoire	4.5	1.1	19.4	1.6	48.5	2.2	27.5	2.2
Gabon	4.8	1.1	21.2	1.7	41.6	1.9	32.4	1.9
Guinea	11.3	2.0	37.0	2.2	39.5	2.0	12.1	1.5
Madagascar	1.2	0.4	10.6	1.7	52.6	3.1	35.7	2.9
Niger	10.0	1.1	20.0	1.7	47.5	2.0	22.5	1.8
DRC	9.1	1.0	27.9	2.1	35.2	2.6	27.8	2.6
Senegal	7.4	1.0	26.2	1.9	52.1	1.9	14.4	1.3
Chad	4.4	0.8	13.4	1.9	40.9	2.1	41.3	2.5
Togo	2.4	0.6	16.4	1.3	50.8	2.0	30.4	1.7
Mean	6.8	0.3	22.6	0.4	45.4	0.6	25.2	0.5

Annex B5. Data for Chapter 5

Table B5.1: Difference in performance by location of school and assessment cycle (2014, 2019), in language of instruction - Early primary

	2014						2019						Change in difference	
	Rural		Urban		Difference		Rural		Urban		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	442.4	6.7	477.4	6.3	35.0	9.3	502.5	7.8	566.0	17.0	63.6	19.6	28.6	20.2
Burkina Faso	489.1	6.0	542.8	12.2	53.7	13.7	484.4	15.2	521.7	18.6	37.3	23.4	-16.4	26.6
Burundi	623.9	6.4	652.0	11.3	28.1	13.9	615.5	5.4	663.1	12.1	47.6	14.4	19.5	17.7
Cameroon	475.5	12.2	556.2	12.3	80.7	17.7	496.4	13.9	562.7	12.5	66.3	19.0	-14.4	24.1
Congo	485.7	8.2	576.0	11.1	90.2	15.2	515.2	8.3	609.6	9.0	94.4	13.4	4.2	19.8
Côte d'ivoire	462.9	7.8	512.9	7.9	50.0	11.5	493.1	7.1	544.9	9.4	51.8	13.2	1.8	16.7
Niger	425.3	7.8	471.7	23.7	46.4	24.8	476.0	11.5	580.7	16.7	104.7	18.2	58.3	31.0
Senegal	463.7	12.4	530.6	16.4	67.0	22.7	534.2	10.1	588.2	15.5	54.1	18.0	-12.9	32.4
Chad	465.4	9.1	498.0	12.4	32.6	13.8	497.2	9.5	529.6	12.2	32.4	15.7	-0.2	18.9
Togo	437.8	8.1	531.0	11.6	93.2	13.3	437.3	9.6	529.9	12.1	92.6	15.9	-0.6	19.2
Mean	483.0	2.3	528.8	4.6	45.8	5.6	507.8	3.3	570.6	4.6	62.8	5.8	17.0	7.8

Table B5.2: Difference in performance by location of school and assessment cycle (2014. 2019). in mathematics - Early primary

	2014						2019						Change in difference	
	Rural		Urban		Difference		Rural		Urban		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	432.5	7.6	480.6	7.6	48.1	10.6	507.7	6.7	557.0	16.5	49.3	18.6	1.2	19.2
Burkina Faso	493.8	7.2	524.6	7.7	30.7	10.6	494.9	13.8	521.4	12.9	26.4	18.1	-4.3	19.8
Burundi	603.7	5.2	614.4	7.2	10.8	9.4	611.9	3.2	624.5	4.4	12.7	6.1	1.9	10.1
Cameroon	479.5	13.2	548.6	8.9	69.1	16.0	495.8	13.7	550.6	9.3	54.8	16.3	-14.3	21.6
Congo	520.9	8.7	571.8	7.2	50.9	12.7	537.8	7.2	613.1	8.0	75.3	11.5	24.4	17.1
Côte d'ivoire	449.8	9.3	488.8	9.0	39.0	15.3	507.4	7.1	540.3	7.0	33.0	11.9	-6.1	19.4
Niger	429.4	8.8	470.6	23.3	41.1	24.5	497.6	11.2	584.2	15.3	86.5	18.0	45.4	30.5
Senegal	497.4	12.9	538.7	14.4	41.3	20.8	555.3	7.8	575.8	10.1	20.5	12.8	-20.9	26.5
Chad	470.4	10.7	514.9	15.5	44.5	15.7	511.9	7.6	548.7	16.8	36.7	19.2	-7.8	24.5
Togo	442.1	8.1	527.0	8.8	84.8	11.3	465.2	7.5	525.3	8.0	60.1	10.8	-24.8	15.9
Mean	486.0	2.5	524.3	4.2	38.3	5.4	520.3	2.8	566.3	3.4	46.0	4.4	7.7	6.7

Table B5.3: Difference in performance by location of school and assessment cycle (2014, 2019), in reading - Late primary

	2014						2019						Change in difference	
	Rural		Urban		Difference		Rural		Urban		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	475.2	5.3	570.9	7.5	95.7	9.8	545.8	5.9	645.1	8.8	99.3	10.8	3.7	13.6
Burkina Faso	508.2	3.6	560.0	8.2	51.8	9.1	528.3	4.2	585.9	9.7	57.6	11.4	5.8	14.8
Burundi	522.2	2.2	539.8	3.9	17.6	4.3	481.7	2.0	521.1	9.1	39.4	9.2	21.8	10.0
Cameroon	474.7	6.2	593.9	7.1	119.2	9.6	482.6	7.9	580.8	9.1	98.2	12.2	-21.0	16.8
Congo	458.3	5.9	536.1	8.3	77.8	9.0	469.4	10.8	570.2	5.1	100.9	11.8	23.0	14.8
Côte d'ivoire	478.7	4.9	557.5	5.3	78.8	7.2	469.1	5.3	545.8	10.1	76.7	11.6	-2.1	13.5
Niger	389.5	3.5	457.3	10.8	67.8	11.8	446.3	6.9	529.3	6.2	83.0	9.6	15.1	16.1
Senegal	503.2	5.9	584.0	12.2	80.8	14.5	549.2	5.1	613.9	9.1	64.8	11.1	-16.0	17.2
Chad	414.4	7.2	454.2	9.8	39.8	12.6	426.2	7.0	483.9	10.4	57.8	12.9	18.0	19.7
Togo	465.3	5.1	546.9	7.4	81.6	9.5	451.4	4.6	559.2	6.5	107.7	8.1	26.1	12.7
Mean	467.7	2.0	545.2	3.7	77.5	4.5	485.8	2.2	566.8	3.3	81.1	4.3	3.6	6.3

Table B5.4: Difference in performance by location of school and assessment cycle (2014. 2019). in mathematics - Late primary

	2014						2019						Change in difference	
	Rural		Urban		Difference		Rural		Urban		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	457.2	5.5	536.0	8.0	78.8	10.2	505.9	5.5	575.3	10.5	69.4	11.9	-9.5	14.9
Burkina Faso	519.1	4.2	564.1	8.3	45.0	9.6	528.8	5.2	573.5	9.7	44.7	11.6	-0.3	15.1
Burundi	594.1	2.9	590.7	5.8	-3.4	6.2	539.1	3.2	571.4	8.8	32.2	9.2	35.7	9.6
Cameroon	453.6	5.4	553.7	7.4	100.2	9.1	450.3	5.2	527.6	7.1	77.3	8.8	-22.9	13.7
Congo	458.0	3.9	498.4	7.3	40.3	8.4	445.7	7.5	505.8	4.0	60.1	8.4	19.8	11.9
Côte d'ivoire	456.9	4.3	495.5	4.1	38.6	6.0	438.3	4.1	474.3	6.8	36.0	8.0	-2.5	9.7
Niger	395.2	4.0	446.4	10.2	51.1	11.4	444.3	6.4	501.0	7.0	56.8	9.7	5.6	15.5
Senegal	506.9	5.6	577.9	12.2	70.9	14.3	544.1	5.5	576.8	9.2	32.8	11.6	-38.2	17.4
Chad	441.0	7.1	462.8	10.2	21.7	13.3	422.8	4.9	461.2	6.8	38.4	8.3	16.6	15.3
Togo	490.6	6.0	566.0	10.1	75.4	12.1	455.0	5.0	552.5	6.8	97.4	9.0	22.0	15.3
Mean	479.2	2.1	529.0	3.6	49.8	4.5	481.6	1.7	527.9	2.8	46.3	3.5	-3.5	5.1

Table B5.5: Difference in performance by student gender and assessment cycle (2014. 2019). in language of instruction - Early primary

	2014						2019						Change in difference	
	Boys		Girls		Difference		Boys		Girls		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	457.2	5.3	459.6	5.3	2.4	6.1	530.2	8.0	518.8	8.0	-11.4	4.4	-13.7	8.0
Burkina Faso	509.3	6.9	518.1	7.4	8.8	6.4	495.3	10.7	491.5	11.0	-3.8	9.5	-12.6	11.4
Burundi	625.2	7.2	629.9	7.6	4.7	9.5	617.1	4.6	633.3	5.7	16.1	5.1	11.4	10.9
Cameroon	506.0	10.4	499.0	8.5	-7.0	7.8	521.3	10.0	523.2	8.7	1.9	8.3	8.9	12.0
Congo	520.0	8.8	525.4	7.0	5.4	9.0	576.0	7.5	588.8	8.6	12.8	6.7	7.5	10.6
Côte d'ivoire	489.4	6.3	478.4	7.9	-11.0	6.1	519.5	5.8	513.6	6.0	-5.9	4.8	5.1	6.9
Niger	436.9	8.5	432.9	8.6	-4.1	7.4	506.9	11.4	518.1	11.7	11.2	9.9	15.3	12.8
Senegal	505.8	11.8	497.7	12.0	-8.0	14.8	554.5	9.1	559.4	10.5	4.9	6.7	13.0	14.3
Chad	487.4	8.1	472.6	9.5	-14.8	7.9	512.5	8.6	503.4	8.1	-9.1	6.0	5.7	10.5
Togo	473.7	8.0	473.6	7.8	-0.1	8.2	474.0	8.8	475.9	6.7	1.8	6.6	1.9	10.7
Mean	499.1	2.7	500.9	2.6	1.8	3.3	529.8	2.8	533.7	2.6	3.9	2.4	2.0	3.7

Table B5.6: Difference in performance by student gender and assessment cycle (2014. 2019). in mathematics – Early primary

	2014						2019						Change in difference	
	Boys		Girls		Difference		Boys		Girls		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	452.1	5.1	457.4	8.4	5.3	8.5	535.8	7.3	513.1	7.8	-22.7	4.9	-28.0	10.6
Burkina Faso	510.3	6.4	501.5	5.1	-8.9	6.1	504.8	9.3	491.8	8.5	-13.0	7.1	-4.1	8.9
Burundi	600.5	4.2	609.2	6.1	8.7	5.8	617.8	2.8	610.8	3.4	-7.0	4.1	-15.7	7.4
Cameroon	512.3	11.0	493.4	9.2	-19.0	8.9	519.9	10.1	513.5	7.6	-6.4	8.0	12.6	12.4
Congo	543.2	8.5	539.2	6.1	-4.0	9.5	588.8	7.2	595.0	7.1	6.2	6.8	10.2	11.1
Côte d'ivoire	478.6	6.3	452.4	6.4	-26.3	5.4	528.8	4.6	515.9	4.7	-12.9	4.4	13.4	6.3
Niger	445.0	9.1	427.5	9.3	-17.5	8.0	526.8	9.9	526.4	10.5	-0.4	9.9	17.1	12.8
Senegal	528.6	9.9	513.6	12.4	-15.0	14.1	568.7	6.1	559.0	6.8	-9.7	4.5	5.3	14.1
Chad	513.9	11.4	466.6	11.6	-47.3	8.7	535.4	7.9	506.1	7.6	-29.2	7.0	18.1	12.2
Togo	478.3	7.6	470.3	7.3	-8.0	8.7	490.1	6.1	488.6	5.6	-1.4	5.0	6.5	9.5
Mean	504.6	2.8	495.2	2.5	-9.4	3.3	540.9	2.3	533.1	2.0	-7.9	2.2	1.5	3.8

Table B5.7: Difference in performance by student gender and assessment cycle (2014. 2019). in reading - Late primary

	2014						2019						Change in difference	
	Boys		Girls		Difference		Boys		Girls		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	527.1	5.7	520.1	4.6	-7.0	4.6	582.7	5.8	589.1	7.4	6.4	3.7	13.4	5.8
Burkina Faso	533.7	5.6	529.6	4.0	-4.1	3.8	549.2	4.8	553.6	3.5	4.4	4.2	8.5	5.7
Burundi	520.1	2.6	531.8	2.1	11.7	2.6	493.0	2.7	487.5	3.0	-5.5	2.3	-17.2	3.3
Cameroon	509.4	5.6	527.2	6.7	17.8	5.7	527.2	5.6	532.9	6.4	5.7	5.0	-12.1	7.7
Congo	498.4	5.7	508.4	4.8	10.0	5.9	532.3	5.4	551.8	5.7	19.4	5.1	9.4	8.1
Côte d'ivoire	514.8	4.4	519.6	5.1	4.8	5.2	501.5	6.1	504.3	5.7	2.9	4.5	-1.9	6.7
Niger	406.1	4.2	400.1	4.2	-6.0	4.1	469.3	5.9	473.0	5.6	3.7	3.9	9.7	5.6
Senegal	550.7	7.4	546.3	7.3	-4.4	5.7	570.7	5.0	580.1	5.8	9.4	4.8	13.8	6.7
Chad	438.6	6.8	420.9	7.3	-17.6	4.8	456.1	5.2	442.3	7.4	-13.8	4.8	3.8	6.2
Togo	494.7	4.1	500.4	4.7	5.7	3.9	493.7	3.9	498.4	4.1	4.6	3.2	-1.1	5.3
Mean	496.3	2.0	504.2	1.8	7.9	1.5	515.8	1.8	523.5	2.0	7.7	1.4	-0.1	1.9

Table B5.8: Difference in performance by student gender and assessment cycle (2014. 2019). in mathematics - Late primary

	2014						2019						Change in difference	
	Boys		Girls		Difference		Boys		Girls		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	494.0	6.6	499.5	4.6	5.5	5.0	534.8	5.7	532.7	7.3	-2.1	4.0	-7.6	6.2
Burkina Faso	546.2	5.4	533.0	4.2	-13.3	3.9	547.4	5.2	547.0	3.9	-0.4	4.4	12.9	6.0
Burundi	578.6	3.2	611.8	2.8	33.1	3.2	558.8	3.4	535.9	3.3	-22.9	2.3	-56.0	4.2
Cameroon	488.5	5.4	490.7	6.6	2.2	5.7	488.9	4.1	487.6	4.7	-1.4	4.0	-3.5	6.8
Congo	488.9	4.4	473.8	5.0	-15.1	4.9	485.8	4.0	492.5	4.1	6.7	4.0	21.8	5.6
Côte d'ivoire	482.0	3.4	468.2	3.6	-13.8	3.1	458.4	4.0	448.8	4.1	-9.5	2.9	4.3	4.4
Niger	408.9	4.4	401.7	4.7	-7.2	3.9	461.8	5.5	461.8	5.2	0.0	4.1	7.2	5.7
Senegal	556.5	8.1	537.7	6.7	-18.8	6.5	558.1	5.3	557.2	5.1	-0.9	4.3	18.0	6.9
Chad	458.5	6.0	436.6	6.4	-21.9	5.0	443.1	3.8	433.5	5.1	-9.6	3.5	12.3	5.8
Togo	523.9	5.3	515.8	5.7	-8.0	4.7	496.7	4.2	494.1	4.2	-2.7	3.1	5.4	6.0
Mean	500.4	2.2	499.5	1.9	-0.9	1.7	500.1	1.5	502.4	1.7	2.3	1.3	3.2	2.1

Table B5.9: Difference in performance by presence of books in the home and assessment cycle (2014, 2019), in language of instruction - Early primary

	2014						2019						Change in difference	
	No books		Books		Difference		No books		Books		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	433.9	4.4	483.0	5.0	49.2	5.4	496.9	6.6	557.5	12.0	60.6	12.3	11.4	12.8
Burkina Faso	488.2	7.6	542.3	8.4	54.0	9.2	464.0	12.9	544.2	9.2	80.3	15.1	26.2	18.4
Burundi	634.0	7.8	620.9	6.7	-13.0	9.4	620.5	5.5	642.3	7.1	21.8	8.5	34.9	12.2
Cameroon	471.5	8.9	540.5	7.8	69.0	9.1	497.5	7.9	577.4	12.7	79.9	12.7	10.9	14.7
Congo	496.5	7.1	574.2	9.3	77.6	11.0	554.3	7.1	626.2	11.7	71.9	13.9	-5.7	18.7
Côte d'ivoire	465.7	5.3	505.5	9.1	39.7	8.8	494.8	5.7	545.7	7.8	50.9	9.1	11.2	13.4
Niger	413.4	7.4	492.0	12.5	78.5	13.2	484.0	9.2	573.7	18.1	89.7	17.7	11.1	21.3
Senegal	447.1	7.7	538.0	11.3	90.9	11.9	532.0	10.8	570.7	10.6	38.7	10.9	-52.2	15.8
Chad	473.5	7.7	516.2	15.1	42.8	15.8	494.7	7.8	559.0	10.5	64.3	9.4	21.5	18.2
Togo	456.8	6.6	504.2	14.6	47.4	16.6	441.0	8.5	525.9	10.0	84.9	11.3	37.5	21.2
Mean	478.3	2.3	532.2	3.2	53.9	3.7	508.6	3.2	570.2	3.0	61.6	4.1	7.8	5.5

Table B5.10: Difference in performance by presence of books in the home and assessment cycle (2014, 2019), in mathematics - Early primary

	2014						2019						Change in difference	
	No books		Books		Difference		No books		Books		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	SE
Benin	430.8	6.6	480.3	7.5	49.5	8.8	500.7	7.0	551.0	11.0	50.3	12.1	0.9	14.9
Burkina Faso	493.2	6.9	520.7	7.2	27.5	9.7	478.0	10.7	536.5	7.4	58.5	11.7	31.0	15.8
Burundi	609.3	6.5	599.7	4.0	-9.6	6.8	609.8	2.8	618.7	3.7	8.9	3.9	18.5	8.4
Cameroon	474.9	10.6	532.5	7.0	57.6	9.3	501.5	8.2	554.8	11.3	53.3	10.0	-4.3	13.0
Congo	526.1	6.8	569.4	7.1	43.4	9.5	575.7	6.5	622.4	10.1	46.8	11.7	3.4	15.6
Côte d'ivoire	453.3	5.5	481.2	8.1	27.9	8.2	505.6	5.0	547.5	5.6	41.9	7.5	14.0	11.5
Niger	410.3	8.2	509.1	10.4	98.7	11.9	502.2	8.5	580.0	16.3	77.8	17.4	-21.0	20.0
Senegal	477.6	8.6	553.1	10.2	75.5	11.5	549.2	6.8	570.7	6.9	21.6	6.5	-53.9	13.0
Chad	482.8	10.6	529.1	16.5	46.3	15.5	506.7	6.4	570.0	10.2	63.3	9.7	17.0	19.3
Togo	458.0	6.7	502.4	11.5	44.4	13.4	462.6	6.6	528.8	6.3	66.2	7.3	21.7	16.4
Mean	481.6	2.5	527.0	3.0	45.5	3.7	519.4	2.7	566.1	2.3	46.7	3.6	1.3	5.6

Table B5.11: Difference in performance by presence of books in the home and assessment cycle (2014, 2019), in reading - Late primary

	2014						2019						Change in difference	
	No books		Books		Difference		No books		Books		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	ET
Benin	499.7	5.5	543.3	6.8	43.6	8.8	557.4	5.9	598.4	7.7	40.9	8.0	-2.7	10.9
Burkina Faso	516.0	5.2	545.0	4.6	29.0	4.7	542.0	3.4	583.0	7.3	41.0	7.5	12.0	9.3
Burundi	524.7	2.1	528.5	3.4	3.7	3.4	486.8	2.1	512.1	7.6	25.3	7.2	21.6	8.0
Cameroon	474.6	6.3	533.7	6.9	59.1	8.1	508.4	7.0	567.8	5.3	59.5	7.4	0.4	10.5
Congo	467.2	5.2	534.2	7.1	67.1	8.5	529.7	5.8	564.2	6.2	34.5	7.5	-32.6	11.1
Côte d'ivoire	499.9	5.2	530.0	5.2	30.1	6.7	479.3	4.7	533.8	8.4	54.5	8.4	24.4	11.3
Niger	391.6	3.3	436.8	7.7	45.2	8.3	459.5	6.2	509.2	9.0	49.7	10.1	4.5	12.9
Senegal	512.1	6.7	568.6	8.9	56.5	10.6	555.4	4.9	593.2	6.0	37.8	6.0	-18.6	12.8
Chad	426.4	8.8	455.1	12.0	28.6	13.9	446.0	6.2	464.5	8.0	18.5	7.6	-10.2	17.3
Togo	480.5	5.8	506.5	5.3	26.0	7.9	466.1	4.9	534.9	4.9	68.8	7.0	42.8	9.2
Mean	474.9	2.1	526.9	2.3	52.0	2.8	497.5	1.8	556.8	2.6	59.3	2.8	7.3	4.0

Table B5.12: Difference in performance by presence of books in the home and assessment cycle (2014, 2019), in mathematics - Late primary

	2014						2019						Change in difference	
	No books		Books		Difference		No books		Books		Difference			
	Mean	SE	Mean	SE	Est.	SE	Mean	SE	Mean	SE	Est.	SE	Est.	ET
Benin	483.2	6.9	510.6	6.7	27.4	9.0	515.9	5.5	542.1	7.6	26.2	7.5	-1.2	10.6
Burkina Faso	527.6	5.5	550.3	4.8	22.8	5.4	538.9	3.8	574.2	7.3	35.3	7.4	12.5	9.1
Burundi	593.1	2.6	595.4	4.6	2.2	4.3	543.6	2.9	564.0	9.4	20.4	9.5	18.2	9.7
Cameroon	450.1	6.0	503.2	6.1	53.1	7.4	465.8	5.1	517.7	4.5	51.9	5.9	-1.2	9.0
Congo	457.1	4.2	502.0	7.5	44.9	8.5	481.1	4.4	504.0	4.4	22.9	5.4	-22.0	10.3
Côte d'ivoire	468.8	4.5	481.3	3.8	12.5	5.3	441.8	3.4	470.2	5.8	28.4	5.5	15.9	7.8
Niger	396.0	4.2	433.6	6.9	37.6	7.6	455.7	5.9	483.3	7.7	27.6	8.7	-10.0	11.6
Senegal	514.1	6.1	565.7	9.0	51.6	9.9	539.6	5.1	572.7	5.7	33.0	5.9	-18.6	12.6
Chad	454.4	8.5	467.3	10.6	12.9	12.9	437.1	4.3	446.9	5.7	9.8	5.2	-3.1	14.8
Togo	501.2	7.1	530.9	6.8	29.8	10.0	469.4	5.4	529.7	5.2	60.3	7.4	30.6	11.0
Mean	486.4	2.3	517.7	2.3	31.3	2.8	489.5	1.5	522.8	2.2	33.3	2.5	2.0	3.6

Annex C

List of those from the participating countries who contributed to the completion of the various tasks involved in the PASEC*2019* assessment

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- Mr Ibrahima IV BAH
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- Mr Khalil DIARRA
- Mr Alioune Badara DIOP
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- Mr Roger DAIBIBE
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- Mr Kossi Kpomégni TSALI
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Annex D
List of members of CONFEMEN's Permanent Technical Secretariat

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- Mr Youga NDIAYE, *Internal Auditor*
- Ms Samia AROUNA, *General Secretary's Office Assistant*
- Mr Hilaire HOUNKPODOTE, *PASEC Coordinator*
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Since its creation in 1960, the Conference of the Ministers of Education of French-Speaking Countries (CONFEMEN) has worked to promote education and vocational and technical training. It represents a forum for shared values, expertise and active solidarity, which today has 44 member states and governments.

The CONFEMEN Programme for the Analysis of Education Systems (PASEC) is a tool for steering the education systems of CONFEMEN's member states and governments with a view to improving the quality of education. Created in 1991, it aims to provide information on the changing performance of education systems, as an aid to the development and monitoring of education policy.

The PASEC*2019* international assessment had 14 participating countries: Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, the Democratic Republic of Congo, Gabon, Guinea, Côte d'Ivoire, Madagascar, Niger, Senegal and Togo. The assessment measured students' proficiency level in the language of instruction and in mathematics at the start and end of primary schooling. Teachers' command of subject content and teaching methods in reading comprehension and mathematics was also analysed, as were relationships between the performance of the education systems in the countries assessed and certain contextual factors relating to students, teachers and school principals. Finally, changes in the efficiency and equity of the education systems of the ten countries that participated in the 2014 and 2019 cycles were also analysed.

This report presents the main results of the PASEC*2019* assessment. In-depth analyses will be conducted in secondary reports.

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