# Education Service Delivery in Mozambique:
## A Second Round of the Service Delivery Indicators Survey[1]

*Marina Bassi, Octavio Medina and Lúcia Nhampossa*

## I.    Introduction

*Significant financial effort yet not translated into education quality*

Mozambique has invested significantly in education over the last decades, making the sector a high priority in the Government policy agenda. Between 2008 and 2018, education spending in Mozambique averaged 19.1 percent of total government expenditure and 6.3 percent of GDP, well above the average in Sub-Saharan African countries (16.7 percent of public expenditure and 4.1 percent of GDP) and low-income countries (16.5 percent of public expenditure and 3.8 percent of GDP.[2]

This financial effort over decades resulted in important progress in terms of access, especially in lower primary education, which practically reached universal coverage. Nonetheless, the country still faces critical deficits in other key education outcomes, such as school completion and levels of student learning. Less than half of the children that start primary schooling get to the last year, and only one in five make it to the last year of secondary education. National and regional learning assessments show that very few students in early primary achieve the academic skills expected for their grade level. Compared to other countries in the region, Mozambique underperforms in terms education quality.[3] Low levels of learning, high repetition and dropout results in swollen enrollment in the early grades and substantial rates of out-of-school children, among the highest in the region. The actual demographic context of high fertility rates indicates that pressure on the expansion of the education system will continue.

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[2] UNICEF (2019)
[3] World Bank (2018a), World Bank (2016)

The Ministry of Education and Human Development of Mozambique (MINEDH) is currently leading the preparation of the next strategic plan for the sector, which will include priority actions to improve school retention and education quality over the next ten years.[4] An accurate diagnosis is a critical starting point to guide the identification of the most effective actions.

This report presents the findings of the second round of the Service Delivery Indicators Survey (SDI) in Mozambique. The SDI analyses the performance of the education sector by assessing the quality of service delivery at the school level. SDI has been implemented in nine countries in Africa, including Mozambique in 2014.[5] The study includes a set of indicators that measures teachers and principals' ability and effort, as well as the availability of key inputs and resources that contribute to the functioning of a school. These metrics enable education authorities and schools to identify gaps and track progress over time (and across countries). The analysis is centered around three main questions: what do providers know? (teacher ability), what do providers do? (teacher effort), and what do providers have to work with? (input availability).

### Brief recap: What did the SDI 2014 show?

In 2014, the SDI showed that the biggest challenge in Mozambique was the low level of knowledge and pedagogical skills among teachers.[6] The average score on the Portuguese and math assessment of a sample of primary teachers was 29%, and only 0.3% managed at least 80% of the content they needed to teach. Measures of pedagogical skills exposed even greater gaps. Students, teachers and principals' absenteeism was alarmingly high. On average, 45% of the teachers were absent from school during an unannounced visit conducted by the SDI field team, and 11% were in the school but not in the classroom when they were supposed to be teaching. Teachers' absence from schools resulted in a huge loss of teaching time. Students received 39% of the total 4 hours of teaching they should be receiving

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[4] The new plan will be guided by the changes to the National Education Law, recently approved (December 2018) by the National Parliament. Among others, the revised law extends mandatory (and free) education from 7 to 9 years. It also changes the length of the primary and secondary education cycles (reducing primary from 7 to 6 years and extending secondary from 5 to 6 years), which will have major implications in the distribution of schools, and teachers' deployment and training.

[5] The SDI was launched in 2010 as the result of the partnership of the World Bank, the African Development Bank and the African Consortium of Economic Research. In addition to Mozambique (2014, 2018), countries that implemented SDI surveys to date are Tanzania (2010, 2014), Senegal ((2010), Kenya (2012), Nigeria (2013), Togo (2013), Uganda (2013), Niger (2015) and Madagascar (2016).

[6] Details on Molina and Martin (2015).

per day. Teachers' absenteeism was correlated with principal's absenteeism, which was on average 44%. More than half of the students were not in school in a regular school day. In terms of infrastructure availability, Mozambique was above other countries that implemented SDI around 2014. Most students had textbooks (69%) and most schools had the minimum teaching materials (77%). Despite most schools having toilets (75%), the minimum infrastructure indicator was low because toilets were not clean or not accessible.

Table 1: Summary of recent SDI surveys

| Indicator | Mozambique 2014 | Mozambique 2018 | Madagascar 2016 | Niger 2015 | Tanzania 2014 |
|---|---|---|---|---|---|
| **What providers know (ability)** | | | | | |
| Math Score (out of 100) | 30.4 | 43.1 | 45 | 27 | 63 |
| Language Score (out of 100) | 32.3 | 40.9 | 23 | 48 | 42 |
| **What providers do (effort)** | | | | | |
| Teacher Absenteeism % | 45.0 | 29.8 | 30.6 | 16.6 | 14.4 |
| **What providers have to work with (availability of inputs)** | | | | | |
| Fraction of Students with Textbooks | 68.0 | 70.4 | 10.3 | 8.7 | 25.3 |
| Minimum Equipment Index | 77.0 | 68.0 | 65.0 | 23.4 | 61.4 |
| Minimum Infrastructure Index | 29.0 | 27.6 | 20.2 | 19.7 | 40.4 |
| Observed Student Teacher Ratio | 21.0 | 23.1 | 36.6 | 38.1 | 43.5 |
| **What students know (learning)** | | | | | |
| Language Score (out of 100) | 19.0 | 31.2 | 44.5 | 21.7 | 37 |
| Math Score (out of 100) | 25.0 | 31.4 | 56.7 | 11.5 | 58 |
| Total (out of 100) | 21.0 | 31.3 | 50.6 | 21.3 | 40 |

## II.   SDI 2018: New measures of service delivery in schools in Mozambique

### *Sample, Methodology and Implementation*

Data collection was conducted between July and October 2018. The sample included 337 public schools (166 of which were also included in 2014) and was designed to ensure national representativeness and comparability with SDI 2014. As in 2014, the sample was stratified, with strata constructed according to school location (urban/rural) and size (small/large).[7] [8] Private schools represent less than 5%

*SDI 2018 at a Glance*

| | |
|---|---|
| *337 schools* | *821 teachers* |
| *317 principals* | *2,503 students* |
| *963 parents* | *279 classes observed* |

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[7] Details of the sampling methodology are included in Annex I.

[8] The original sample included 403 schools, with 203 schools also included in the 2014 sample. For different reasons 66 schools were left out of the sample. As reported by the data collection firm, 38 of

total schools in primary education and were excluded from the sample design (the same approach was used in 2014). Instruments remained unchanged except for a few additions. First, a new classroom observation tool – *Teach* - was implemented. *Teach* was developed by the World Bank and measures not only the time spent on learning (as other classroom observation tools like the one implemented in the SDI 2014), but also the quality of teaching practices that help develop students' learning and socioemotional skills.[9] Second, new instruments were added to measure students' socioemotional skills. One of the instruments (Harter scale) has been broadly used to capture students' perception of their own competences. The survey also included Challenging Situations Task, an instrument that presents children with challenging situations (i.e. a child ruins the drawing of another child, or a child is excluded from playing a game by other children) and asks how s/he would feel in that situation and what s/he would do. Third, a new module was added to interview parents and caregivers. This questionnaire asks about parents and caregivers' involvement in students' education and their perceptions about students' behaviors and traits. Finally, a principal questionnaire was added to Module 3.

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these schools were closed at the moment of the visit, and 17 were not accessible due to challenging terrain conditions. The rest were not visited due to reasons such as logistics (cost of reaching the school or failure to geolocate the school) and the local election campaign. The analysis had to consider the sampling implications of excluded schools, adjusting the weights accordingly as described in Annex I. Attrition was analyzed ensuring that there was no impact on the sample composition.

[9] World Bank (2019).

Table 2: Education SDI survey instruments[10]

| Module | Description |
|---|---|
| Module 1: School Information | Administered to the head of the school to collect information about school type, facilities, school governance, student enrollment, and school hours. Includes direct observations of school infrastructure by enumerators. |
| Module 2a: Teacher Absenteeism and Information | Administered to the principal or head teacher and individual teachers to obtain a list of all school teachers, to measure teachers' absenteeism, and to collect information about teacher characteristics. |
| Module 2b: Teacher Absenteeism and Information | Unannounced visit to the school to assess absence rate. This visit is done at least two days after the first (announced) visit to the school. |
| Module 3a: School Finances | Administered to the principal or head teacher to collect information about school finances. |
| Module 3b: Principal Questionnaire | Administered to principals to collect information on principal background, perceptions, and practices. |
| Module 4: Classroom observation | An observation module using *Teach* to assess teaching activities and classroom conditions. Administered to one randomly selected 4th grade teacher per school. |
| Module 5a and b: Student Assessment | A test to students to measure learning in math and Portuguese in 4th grade. Administered to a randomly selected list of 10 students. |
| Module 5c and d: Student Socioemotional Skills | Includes two instruments: *Challenging Situations Task* captures students' self- regulation and emotion knowledge, and the Harter Scale captures students' self-perceived competences. |
| Module 6: Teacher Assessment | A knowledge test to teachers covering math and Portuguese. Administered to all available teachers. |
| Module 7: Parent Questionnaire | A questionnaire to parents and caregivers to inquire about their involvement in the student's education and perception about student's behavior and personality traits. Administered to a randomly selected list of 5 parents of the students selected for Module 5. |

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[10] Adapted from Table 5: Education SDI survey instrument (Molina & Martin 2015)

Table 3: Service Delivery Indicators 2018 - Summary

| Indicator | Total 2014 | Total 2018 | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|---|
| **What providers know (ability)** | | | | | | | |
| Math Score (out of 100) | 30.4 | 43.1 | 50.4 | 46.7 | 33.3 | 46.5 | 42.9 |
| Portuguese Score (out of 100) | 32.3 | 40.9 | 41.7 | 44.5 | 35.4 | 41.5 | 40.8 |
| **What providers do (effort)** | | | | | | | |
| Teacher Absenteeism % | 45.0 | 29.8 | 19.1 | 28.1 | 40.9 | 31.6 | 29.6 |
| **What providers have to work with (availability of inputs)** | | | | | | | |
| Fraction of Students with Textbooks | 68.0 | 70.4 | 76.4 | 75.1 | 59.7 | 78.7 | 69.8 |
| Minimum Equipment Index | 77.0 | 68.0 | 71.7 | 80.3 | 48.6 | 74.5 | 67.6 |
| Minimum Infrastructure Index | 29.0 | 27.6 | 34.9 | 27.8 | 22.4 | 35.3 | 27.0 |
| Observed Student Teacher Ratio | 21.0 | 23.1 | 31.0 | 22.9 | 18.2 | 35.2 | 22.3 |
| **What students know (learning)** | | | | | | | |
| Portuguese Score (out of 100) | 19.0 | 31.2 | 54.8 | 22.6 | 19.9 | 44.8 | 29.8 |
| Math Score (out of 100) | 25.0 | 31.4 | 37.8 | 29.6 | 27.4 | 37.7 | 30.7 |
| Total (out of 100) | 21.0 | 31.3 | 46.3 | 26.1 | 23.7 | 41.3 | 30.3 |

### *Main result: Has learning improved?*

The ultimate goal of analyzing the quality of service delivery at the school level is to understand how students' learning is changing and what are the main factors associated with those changes. SDI evaluates student learning through a one-on-one assessment administered to grade 4 students. Students are randomly selected from a classroom –the same one that is observed under the classroom observation module–, and assessed on their reading, writing and arithmetic skills. The student assessment is conducted in Portuguese or the student's mother tongue if required.[11]

Student learning remains low across the country. On average, students scored 31.3 (out of 100) in the student assessment, and the results in math (31.4 out of 100) and Portuguese language (31.2 out of 100) were very similar. Under half of grade 4 students could correctly identify a word and under 1 in 5 could read a simple paragraph. In math, around 6 out of 10 students were able to perform a basic single-digit addition, and only a third of the students can do a single-digit subtraction (Table 4).

*Student test scores improved from an average of 29 (out of 100) to 31. Despite progress, learning is still critically low, unequal and below other countries in the region.*

Nonetheless, these figures are better than the 2014 results. Student assessment scores improved in both Mathematics and Portuguese over the past 4 years. The student score increased by 6 percentage points in mathematics and over 12 percentage points in Portuguese, as shown in Figure 1. The full distribution of student scores is shown in Figure 1 in Annex IV.

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[11] The exception is the Portuguese language assessment, which is conducted only in Portuguese.

Compared to other countries in the region, in 2018 Mozambique fared better than Niger 2015 (23 out of 100 in language and 12 in math), but still far below what students in Tanzania scored in 2014 in both language (48 out of 100) and mathematics (58 out of 100). It was also below Madagascar 2016 (57 out of 100 in mathematics and 44 out of 100 language).
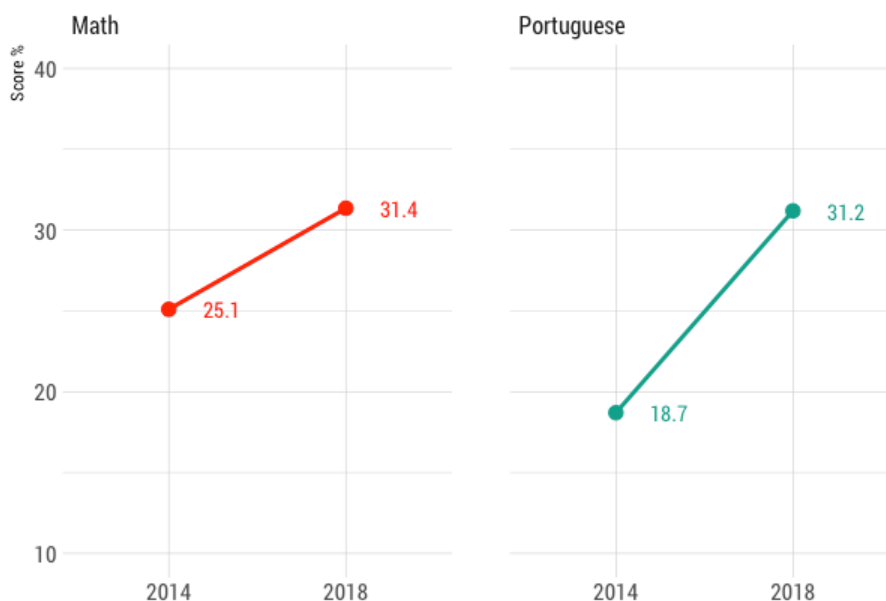
Figure 1: Students' test scores 2014-2018



Table 4: Student learning outcomes

| Category | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| Total Score | 31.3 | 46.3 | 26.1 | 23.7 | 41.3 | 30.3 |
| **Portuguese Language** | | | | | | |
| Portuguese Score | 31.2 | 54.8 | 22.6 | 19.9 | 44.8 | 29.8 |
| Identifying a Letter | 59.2 | 73.7 | 58.0 | 45.2 | 72.2 | 57.8 |
| Identifying a Word | 42.4 | 63.4 | 37.4 | 27.9 | 55.2 | 41.1 |
| Reading a Sentence | 27.1 | 52.5 | 17.7 | 15.2 | 46.2 | 25.1 |
| Reading a Paragraph | 16.5 | 34.9 | 9.8 | 8.0 | 26.5 | 15.5 |
| Reading Comprehension | 13.2 | 23.3 | 12.0 | 4.2 | 30.9 | 11.4 |
| **Mathematics** | | | | | | |
| Math Score | 31.4 | 37.8 | 29.6 | 27.4 | 37.7 | 30.7 |
| Single Digit Addition | 61.6 | 71.9 | 60.4 | 52.2 | 68.5 | 60.9 |
| Double Digit Addition | 34.4 | 44.4 | 30.1 | 30.8 | 44.8 | 33.3 |
| Single Digit Subtraction | 42.8 | 54.8 | 41.6 | 31.6 | 52.0 | 41.9 |
| Double Digit Subtraction | 10.5 | 11.1 | 10.4 | 10.2 | 15.2 | 10.0 |
| Single Digit Multiplication | 19.6 | 20.8 | 21.9 | 14.1 | 28.7 | 18.6 |
| Double Digit Multiplication | 1.9 | 1.9 | 2.6 | 0.8 | 5.8 | 1.5 |
| Single Digit Division | 14.0 | 27.2 | 9.1 | 8.1 | 23.5 | 13.1 |

*Large disparities in student learning*

The improvement in the overall test scores hides important regional differences. Learning has increased, but so has inequality. Most of the improvement in student scores happened in the Southern provinces, with Maputo Province and City leading the table. In the Center and North, both of which have lower human development indices,[12] increases were much more limited. The Center showed the smallest improvements, especially in Portuguese.[13] On average, a student in the South scored around 30 percentage points more in the Portuguese test than a student in the Center and almost 35 percentage points more than a student in the North.

There is also a prominent urban-rural divide. Student learning in urban schools was already higher in 2014, but it increased far more than scores in rural schools over the past 4 years. As a result, the urban-rural gap has almost doubled. Compared to other countries in the region, Mozambique has one of the largest urban-rural gaps in education outcomes.[14]

Gender gaps in student learning also showed no improvement. On average, boys scored higher than girls in both mathematics and Portuguese language. The gap is around 6 percentage points in Portuguese and almost 4 percentage points in math. The size of these differences is similar to those in 2014, when girls scored 4.8 points below boys in Portuguese and 4.5 in math. The size of these gaps, however, vary across the country. In the South there is almost no gender gap in mathematics, and girls actually score over 7 percentage points higher than boys in Portuguese. In the North and Center, however, the disadvantage of girls compared to boys is evident.

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[12]  Smits & Permanyer (2019).

[13] The fieldwork was completed months ahead of cyclones Idai and Kenneth, which devastated some areas in the Central and Northern regions.

[14] World Bank (2018a).

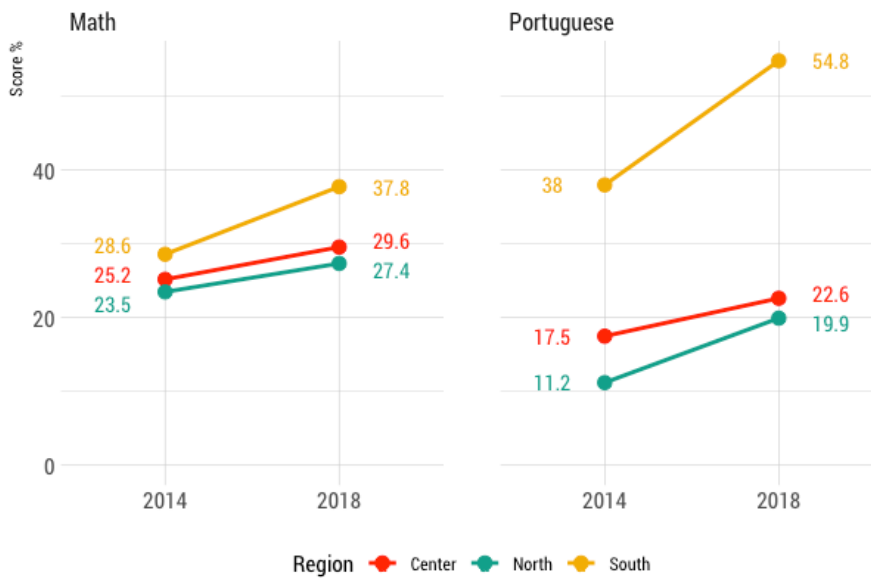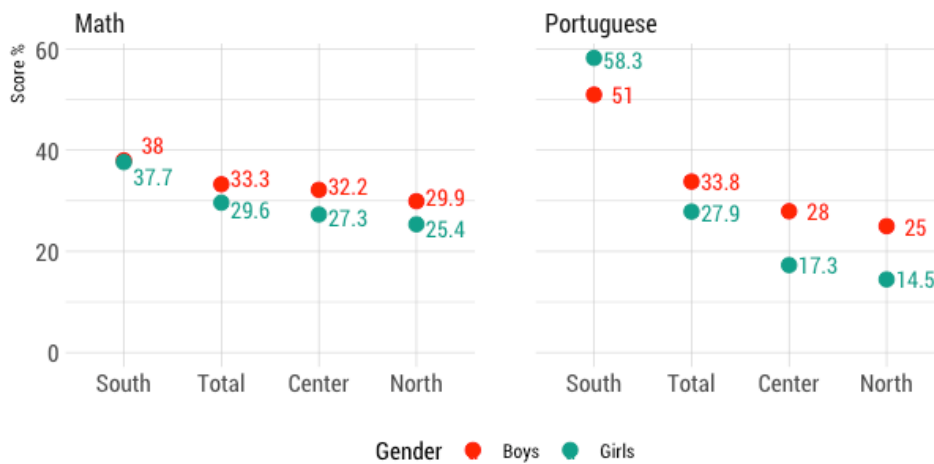Figure 2: Students' test scores by Region 2014-2018



Figure 3: Students' test scores by gender 2014-2018



One possible factor associated to this gender gap is the presence of female teachers, which the literature highlights as having a positive effect on girls' learning.[15] We find that having a female teacher is associated with better scores for both boys and girls, but especially for girls. In fact, having a female teacher almost closes the gender gap in the overall test score

*Results suggest that there has been little progress in closing the gender gap in student learning, especially in the North and Center, where learning is on average lower.*

[15] Eble & Hu (2017).

(shown below). There are more female teachers in the South than in the Center and North, which explains part of the remaining gender gap (See Table 1 in Annex IV for a full breakdown of factors associated with student learning). Of all teachers evaluated under the classroom observation tool, 43% were female. Nonetheless, in the South, female teachers represented 51%, almost 10 percentage points higher than in the rest of the country.

Figure 4: Association between gender of the teacher and student test scores
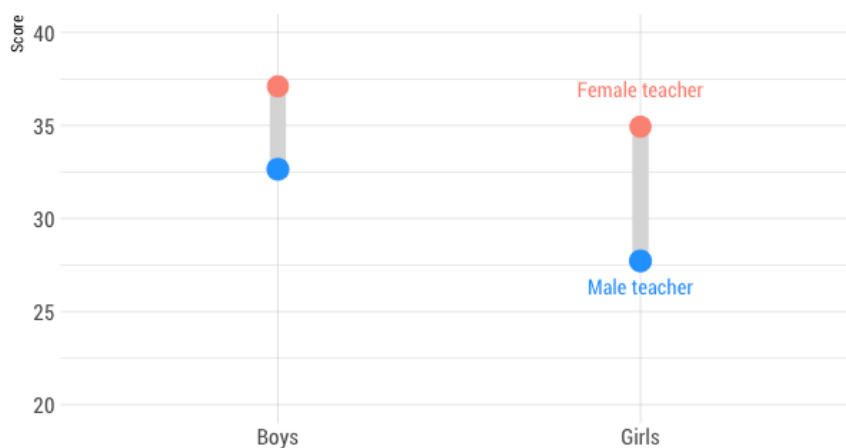


### Students' socioemotional skills

For the first time, the SDI survey included measures of students' socioemotional skills and perceived competences. Recent evidence suggests that some socioemotional skills can play a crucial role in child development and later student learning.[16] One of the instruments used in the survey is the *Challenging Situations Task* (CST), which captures the student's ability to regulate his/her own emotions. CST presents students with several scenarios depicting challenging social situations. Students are then asked what they would feel like and what they would do when facing the hypothetical situation.[17] Research suggests that choosing socially competent options is positively associated (and choosing angry options negatively associated) with executive function, which is a predictor of many crucial life outcomes, including health, educational attainment and employment.[18]

The indicator for each option is the fraction of times the student chose that emotion or response out of the total. We find that students from lower income families (using literacy of parents as a proxy) are more likely to choose angry responses, and less likely to choose socially competent responses. This suggests potential patterns of inequality in emotional self-regulation. Students exposed to higher temperatures at the time of the test were also more likely to choose angry and less socially competent responses than

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[16] See, for example, Heckman & Kautz (2012).
[17] See Denham et al (2014) for more information.
[18] Riggs et al (2006), Diamond (2014).

their peers who took the test in colder weather. Girls were also slightly less likely to choose socially competent options, but otherwise there were no strong gender differences.

The second instrument used is the *Harter Scale of Competence*, which measures students' perceptions of their own competences and self-satisfaction along several dimensions (for example, scholastic, athletic, social and global). The enumerator presents different scenarios to a student (for example, "Some girls are happy, but some are not") and asks him/her to say which one is more like him/her.

Interestingly, we find that girls who had higher overall scores in the student assessment also had higher scores in the Harter Scale. However, there was no association for boys. In other words, self-satisfaction and perceived competences were associated with school performance only for female students. Of course, the causality (if any) could go both ways, but this may suggest differences in the way self-perception and student learning interact. See Annex III for more details on the socioemotional skills results.

## III.    Are schools delivering better services?

Assessing the quality of schools' service delivery requires a good understanding of what teachers are doing. Effective teachers are a basic input for students' learning. However, successful teachers can only result from a system that works well to recruit, train and support teachers in their key role.[19] The SDI collects standardized measures of what teachers know (ability), what teachers do (effort) and what inputs teachers have to work with, to characterize levels and changes of schools' service delivery.

### i.    *What do teachers know?*

To measure the subject content knowledge of primary school teachers, all mathematics and Portuguese language teachers teaching grade 4 during the year of the data collection or grade 3 during the previous year were assessed.[20] Rather than having teachers complete a traditional knowledge exam, the instrument asks teachers to grade mock student tests in language and mathematics. Questions were based on common items taken from the national primary curriculum (Bold et al., 2017). On average, between two and three teachers per school completed the test.

Teachers' content knowledge improved compared to 2014. In mathematics, teachers' test scores increased from 30 (out of 100) to 43 (out of 100), while in Portuguese the increase was more moderate, going from 32 to almost 41 (out of 100). Despite progress, these findings imply that on average teachers master around 40% of the content they are

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[19] Beteille and Evans (2019)

[20] The sample also included teachers teaching other grades. Around 33% of teachers assessed taught grade 4 in the current year, 11% taught grade 3 last year, 56% taught other primary grades (mostly grades above 4th grade).

supposed to teach in Portuguese language and mathematics. Regional disparities are large. For example, in mathematics there is a 17 percentage point difference between an average teacher in the South and an average teacher in the North.
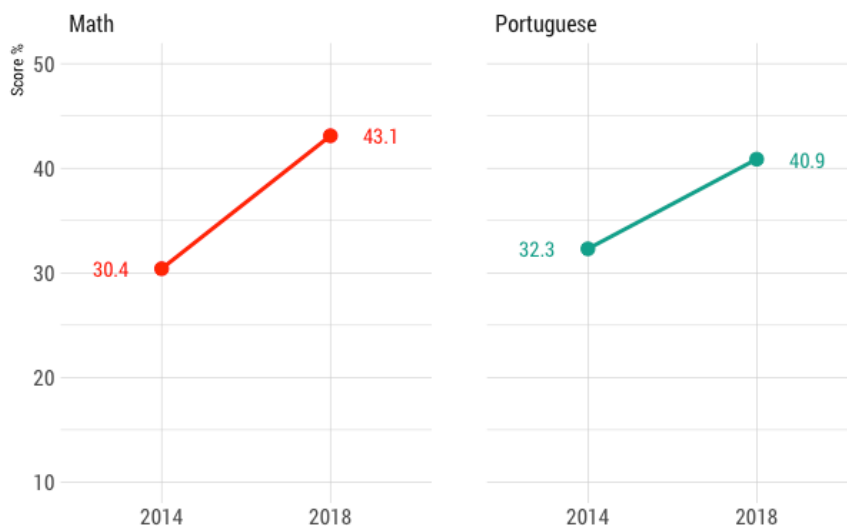
The SDI indicators also include a metric for teachers' "minimum knowledge", defined as marking at least 80% of the items in each subject correctly.[21] Results show that only 3.3% of teachers masters the minimum knowledge in mathematics, and less than 1% do so in Portuguese language (Table 5). This represents only a slight improvement compared to 2014, at alarmingly low levels. If the definition of "minimum knowledge" is adjusted changing the threshold from 80% to 70% or 60%, results improve as expected, but still showing that few teachers manage the content that need to be taught. In general, teachers are able to perform well in tasks such as checking grammar in the language test (81.2% correct) but struggle in tasks such as assessing reading comprehension and vocabulary using Cloze passages (the exercise presents sentences with blank spaces for students to fill in with words) or composition (correcting a simple letter).[22] In math, very few teachers could compare fractions correctly (25% correct) or interpret data on a graph (19.5%). The full results are shown on Tables 2 and 3 in Annex IV.

*Only 3.3% of teachers masters the minimum knowledge in mathematics and 1% in Portuguese language. These gaps can hardly be compensated with teacher training.*

No teacher can teach content s/he does not know. Teacher training can hardly fill these important knowledge gaps. Hence, these findings should guide policies that improve recruitment and minimum requirements that should be considered for students choosing the teaching profession, as will be discussed further in the last section of this document.

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[21] Bold et al. (2017)
[22] Bold et al. (2017)

Table 5 – Teacher Knowledge (SDI 2018)

| Category | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| **Average Scores (%)** | | | | | | |
| Math Score | 43.2 | 50.5 | 46.9 | 33.3 | 46.5 | 43.0 |
| Portuguese Score | 40.9 | 41.7 | 44.5 | 35.4 | 41.5 | 41.0 |
| **Minimum Knowledge (% of Teachers)** | | | | | | |
| Math 60% | 19.5 | 42.8 | 15.6 | 9.2 | 25.4 | 18.8 |
| Math 70% | 10.6 | 29.9 | 6.9 | 2.9 | 12.8 | 10.5 |
| Math 80% | 3.3 | 12.5 | 1.0 | 0.5 | 7.0 | 3.0 |
| Portuguese 60% | 10.7 | 8.0 | 19.6 | 0.0 | 15.0 | 10.8 |
| Portuguese 70% | 2.0 | 1.6 | 3.6 | 0.0 | 6.0 | 1.8 |
| Portuguese 80% | 0.8 | 0.0 | 1.8 | 0.0 | 0.9 | 0.9 |

## ii.    *What do teachers do?*

Although teachers' subject knowledge has a significant effect on students' learning outcomes[23], evidence show that it is not enough. Teacher practices and the quality of teacher-student interactions in the classroom is what best predicts student learning.

The Mozambique SDI 2018 included a new classroom observation tool, *Teach*, recently developed by the World Bank and, to date, implemented in five countries. *Teach* was piloted and adapted to the context in Mozambique. Only trained and certified enumerators administered *Teach* during the SDI data collection. A total of 279 classes were observed, 50 of them by two enumerators.[24] Teachers' actions are scored (in a 1 to 5 scale) according to specific behaviors classified into three areas: classroom culture (the extent to which the teacher creates a supportive learning environment, sets positive behavioral expectations and uses class time effectively), instruction (the extent to which the teacher facilitates the lesson, checks for understanding, provides feedback, and encourages students to think critically), and socioemotional skills (the extent to which the teacher instills autonomy, promotes perseverance, and fosters social and collaborative skills).[25]

Results showed good levels of teachers' practice in classroom culture, but weak in instruction and, particularly, in socioemotional skills. Levels are similar to those found in Punjab (Pakistan) (Figure 3 in Annex IV), with slightly better performance in instruction

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[23] Bold et al (2019)

[24] Intercoder reliability rates were 91% (1-point difference) and 76% (half-point difference), adequate levels compared to similar studies using similar classroom observation tools.

[25] World Bank (2019)

and worse performance in classroom culture. Three findings are worth highlighting. First, *Teach* scores are correlated to students' test scores. Students of teachers with the top 25% *Teach* scores achieved an average of 36 points (out of 100) in students' tests. Students of teachers with the lowest 25% *Teach* scores achieved 26 points. On average, a 1 standard deviation (SD) increase in the overall *Teach* score is associated with a 0.16 SD increase in the total student assessment score. These findings are consistent with previous related literature, which shows that teachers' behaviors and practices in the classroom are associated to students' learning. Second, *Teach* scores vary by teachers' gender. Female teachers got higher *Teach* scores than male teachers in some areas (positive behavioral expectations, autonomy and social & collaborative skills). This could, in part, explain the association of students' test scores with the teacher's gender (especially for girls) described in the previous section. Third, the distribution of *Teach* scores can be helpful to inform continuous professional development programs for teachers that are based on peers' feedback, like the current in-service strategy implemented in Mozambique. In the SDI 2018 sample, for example, 33% of the teachers got a high score in checking students' understanding (instruction), while 31% got the lowest score in the same element; 20% got the highest score in encouraging students to participate in the class (socioemotional skills), while 40% of the teachers got the lowest score in that element (Table 4 in Annex IV). So, despite low averages, there could be a sizable group of teachers that show high level of practices inside the classroom and could be consider to coach or mentor peer teachers to improve specific behaviors in the context of a structured program.

In addition to the quality of teaching practices, *Teach* measures the time spent on learning activities. The time on task component is measured evaluating on a 1-5 scale the fraction of time that the teacher spent on learning activities during the observed segment.[26] Results show that in Mozambique 83% of the time that teacher and students spend in the classroom is used for learning activities. The level of instructional time is relatively high compared to other countries and regions. As a reference (although not strictly comparable), according to a study in a group of Latin-American countries, teachers spend between 52% and 85% of class time on academic activities.

What teachers do in the classroom clearly depends on the teacher being present at school and in the classroom. In 2014, teacher absenteeism in Mozambique was the highest among all SDI countries at that moment. On average, 45% of the teachers were absent from school and an additional 11% were at the school but not in the classroom when they were supposed to be teaching. This resulted in a reduction of effective instructional time from 4 hours and 17 minutes (excluding break time, as reported by schools) to 1 hour and 43 minutes per day.

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[26] The full scale went from 1 (approximately 40 percent or more of the lesson is spent on a non-learning activity) to 5 (approximately less than 10 percent of the lesson is spent on a non-learning activity).

Results in 2018 show a reduction in teacher absenteeism. On average, 28.4% of the teachers were absent from school during the unannounced visit during the fieldwork.[27] An additional 1.3% of the teachers was present at the school but not in the classroom when they were supposed to be teaching. Absenteeism was reduced in all regions, although not closing the gaps significantly. The South has the lowest levels of teachers' absenteeism followed by the Center and the North, respectively. Absenteeism in the North is almost twice as high as in the South. The most cited reason for the teachers not going to school was sickness. Around 20% of the times, absence is not justified. Going to pick up salary was only reported in near 3% of the cases, less than could be expected as common beliefs are that it is a predominant cause of teachers' absenteeism. Absenteeism is, in fact, correlated with the day of the month (beginning and end of the month, absenteeism is higher) and the day of the week (increasing significantly on Fridays)[28.] One possible reason is that justifications are reported by a third person (usually principal or another teacher), which may result in misinformation or misreporting. A note of caution: challenges during the data collection affected the measures of absenteeism, mostly during the second (unannounced) visit. A detailed description of the challenges and how they are being addressed in this report is presented in Annex II. Nonetheless, under all the scenarios that were examined, the findings above remain.

Figure 6: Teacher absenteeism by region (2014-2018)



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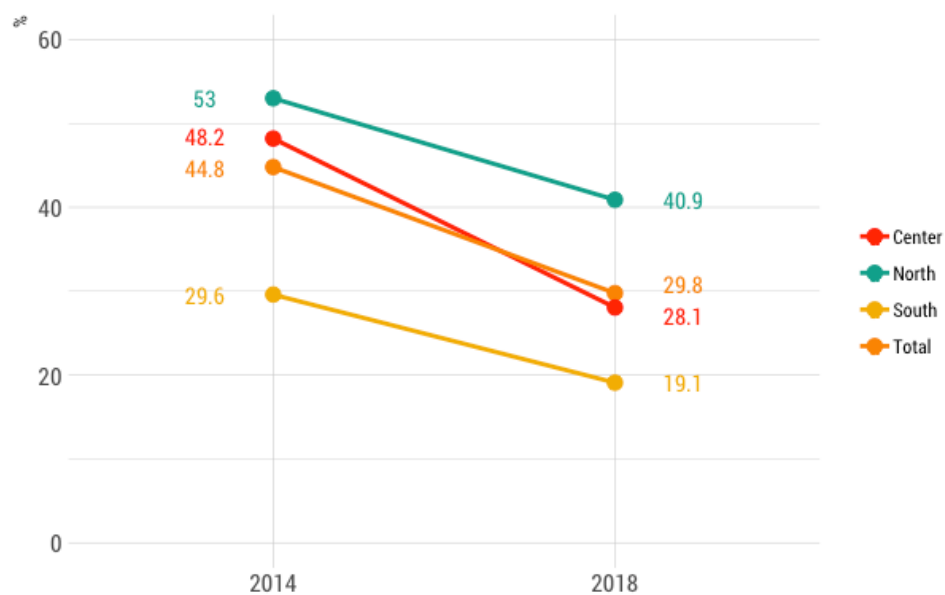
[27] Absenteeism was measured in two visits to each school. During the first visit (announced), up to ten teachers were randomly selected from the teacher roster of the school. At least two days (school days) after the first visit to the school, a second (unannounced) visit was conducted in which the enumerators were asked to check whether the selected teachers were present at the school, and in that case whether they were at the class teaching.
[28] See Figure 4 included in Annex IV.

The reduction in teachers' absenteeism resulted in an increase of instructional time of almost one hour per day, going from 1 hour and 41 minutes to 2 hours and 38 minutes. Still, instructional time is low compared to international standards. In OECD countries, for example, the compulsory instructional time per school day in primary education is about 4.5 hours. The SDI goes from 3 hours and 10 min (Nigeria) to 1 hours 43 in the first SDI round in Mozambique (2014).

Figure 7: Reason reported for teachers' absence
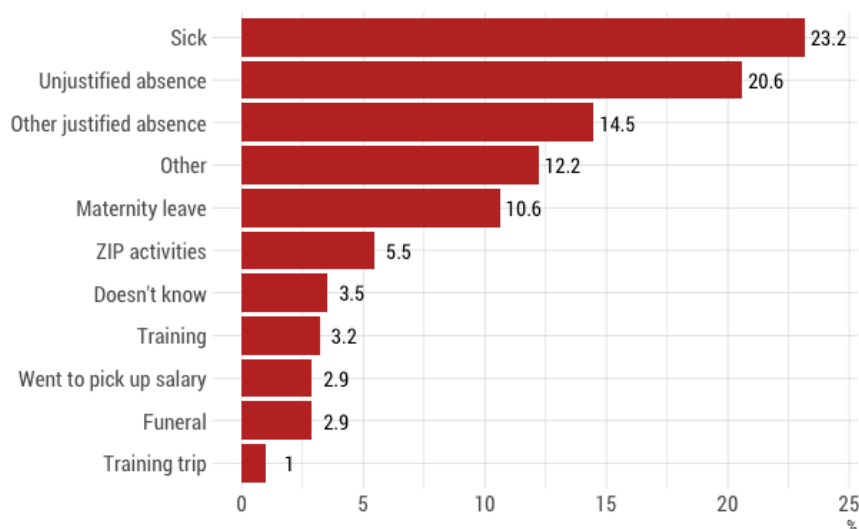


Box 1. What explains teachers' absenteeism?

Are there any variables that explain the level of absenteeism across the country? Table 5 in Annex IV shows the full results of a regression at the individual teacher level. The data suggest that teacher absenteeism is higher in schools with high student absenteeism. Causality, however, could run both ways. Students (or their families) may choose to not attend schools where teachers are often absent. At the same time, empty classrooms may make teachers more likely to skip work.

Absenteeism also varies depending on the day of the week. It is significantly higher on Fridays (around 8 percentage points). Supervisors and enumerators suggested that this could be due to teachers leaving early to travel to their homes or urban areas.

Teachers' education also seems to be associated with absenteeism. Those that hold a higher education degree are less likely to be absent from school than the rest. Interestingly, teacher gender, having a non-permanent contract, or age do not seem to play an important role.

The SDI survey also provides estimates of student absenteeism using data from the classroom observation tool and the official student enrolment. Findings show that

absenteeism remains very high at around 45.8%, down from 55.8% in 2014. This implies that the average Mozambican student misses more than 2 full days of class every week of school.
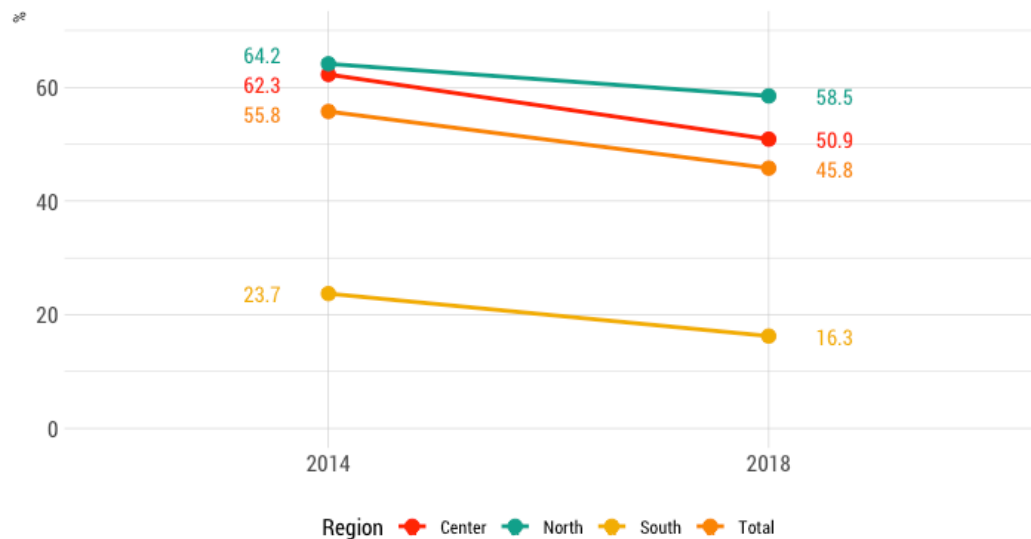
The situation is especially critical in the North and Center, where more than half of the students were not in school when the survey was carried out. The gap between regions hasn't decreased at all. Though the Center saw higher than average reductions in absenteeism, the gap between South and North grew slightly from around 40 percentage points to over 42 percentage points.

*Students absenteeism remains critically high. The average Mozambican student misses more than two full days of class every week of school.*
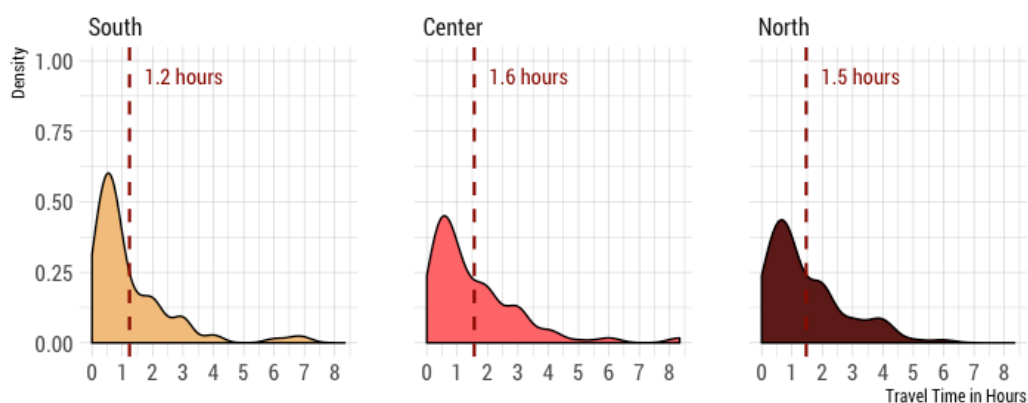
Figure 8: Students' absenteeism by region (2014-2018)

### iii. What do providers have to work with?

The SDI indicators included measures of the availability of basic inputs that service providers (schools) need to operate, including basic equipment, infrastructures and financial resources.

*Equipment and infrastructure*

The first metric of input availability, *minimum equipment* availability, is a binary indicator capturing the availability of: (i) functioning blackboard and chalk and (ii) pens and exercise books in 4th grade classrooms. These elements were observed in a randomly selected 4th grade classroom in every school visited (the same classroom observed administering

*Teach*). Findings show that 68% of classrooms had the minimum equipment to support teaching (Table 6), compared to 77% in 2014. Furthermore, this index shows considerable regional imbalances, with 49% of schools in the North having minimum equipment.

Despite deterioration in the last four years, Mozambique did well on minimum equipment compared to other SDI countries (25% in Niger, 2015; and 61% in Tanzania, 2014). However, more resources are needed at the school level to ensure availability of essential learning materials for all students. In addition to basic inputs, the country needs to gradually increase resources that help improve education quality, such as supplementary reading materials and classroom support materials to improve early literacy and numeracy.

*Minimum equipment (one of the best performing indicators in 2014 compared to other SDI countries) dropped 9 percentages points since 2014*

Table 6. Equipment Availability

| Minimum Equipment | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| Min. Equipment Index | 68.2 | 71.7 | 81.0 | 48.6 | 74.5 | 68.5 |
| Students with pens | 94.2 | 92.1 | 96.9 | 92.1 | 94.2 | 94.3 |
| Students with booklets | 95.0 | 95.0 | 94.7 | 95.3 | 95.2 | 95.3 |
| Blackboard | 96.1 | 100.0 | 98.4 | 90.4 | 95.0 | 96.0 |
| Chalk | 99.6 | 100.0 | 100.0 | 98.7 | 100.0 | 99.5 |

The second metric for providers' inputs is minimum infrastructure, which is constructed as a binary indicator capturing the availability of: (i) functioning toilets and (ii) classroom visibility. Functioning toilets are defined as those functioning, accessible, clean and private (enclosed and with gender separation) as inspected by the enumerators. Classroom visibility is verified by selecting randomly a 4th grade classroom and having the enumerators assessing the readability of a printout placed on the board, from the back of the classroom.

Mozambique did reasonably well in securing basic infrastructure in the large majority of schools. However, over 10% of schools lack toilets, and where available, the level of cleanliness is very poor, and so is the quality of the infrastructure. Lack of functioning toilets affects mainly girls, increasing the risk of school dropout. Results also show that between 10% to 15% of the classrooms are open or under the trees. The Ministry of Education estimated that the classrooms deficit in Mozambique is approximately 31,000 (considering precarious, open air and overcrowded classrooms), huge magnitude considering that school construction capacity in the country has been very low. Over the last 4 years, near 770 classrooms have been built per year in Mozambique. The classroom

gap implies that more than 3.5 million children are deprived from basic infrastructure for learning.[29] Moreover, this gap has been recently aggravated by the massive destruction caused by cyclones Idai (approximately 4,200 classrooms) and Kenneth (approximately 500 classrooms). [30] Fast demographic (and student enrollment) growth expected for the next years also increases the challenge of infrastructure for the education sector throughout the country. Solving the school infrastructure problem will require strong action from the Government and innovative solutions, as the demand grows at pace well above that of the infrastructure provision.

In terms of access to textbooks, the country registered an improvement over the last four years. In 2018, 70% of students had textbooks in core subjects, Portuguese and mathematics, compared to 68% in 2014. However, regional imbalances remain high with schools in the North having only 60% of the students with textbooks, even below the 2014 average.

The observed Pupil to Teachers Ratio (PTR) is 23.2 against 57.5 PTR according to enrolment, and 64 national PTR. This scenario may be reflecting the still high students' absenteeism.

*Overall, access to textbooks improved and is quite high compared to other SDI countries. However, the North is still lagging with only 60% of students with books (compared to the average 70%).*

Table 7. Infrastructure Availability

|  | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| **Minimum Infrastructure** |  |  |  |  |  |  |
| Min. Infrastructure Index | 27.6 | 34.9 | 27.9 | 22.4 | 35.3 | 26.1 |
| **Textbooks** |  |  |  |  |  |  |
| Students with Textbooks | 70.3 | 76.4 | 75.0 | 59.7 | 78.7 | 69.4 |
| **Toilets** |  |  |  |  |  |  |
| Toilets Available | 92.0 | 98.1 | 91.2 | 89.0 | 100.0 | 91.3 |
| Toilet Clean | 58.9 | 48.4 | 63.9 | 60.5 | 60.6 | 58.1 |
| Toilets Private | 68.6 | 82.2 | 64.6 | 63.6 | 76.5 | 67.2 |
| Toilets Accessible | 73.2 | 81.8 | 72.0 | 68.2 | 90.1 | 71.3 |
| **Students-Teacher Ratios** |  |  |  |  |  |  |
| Observed Student Ratio | 23.2 | 31.0 | 23.0 | 18.2 | 35.2 | 22.3 |
| Student Ratio According to Enrollment | 57.5 | 44.1 | 58.6 | 65.0 | 56.4 | 57.9 |

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[29] This estimate assumes that one classroom serves 120 students (two shifts of approximately 60 students).

[30] Sources of these estimates are the Post-Disaster Needs Assessment conducted in Mozambique (Idai affected areas) and preliminary data shared at the Education in Emergency Cluster (as of May 2019, Kenneth affected areas).

Access to water, sanitation and hygiene facilities is low. As shown below, most schools lack drinking water, with greater deficits in the North (almost 70% of schools in the Northern region don't have drinking water). In addition, only around 20% of schools have facilities for students to wash their hands. Lack of WASH facilities represents a major health risk for the entire school community, particularly for students, and requires an integral approach involving other service providers, such as local water supply, sanitation and health.

*Despite available infrastructures, a huge gap remains in basic Water, Sanitation and Hygiene (WASH) at schools in Mozambique*

Figure 10. Basic hygiene at schools

Most schools have toilets, but lack other basic facilities
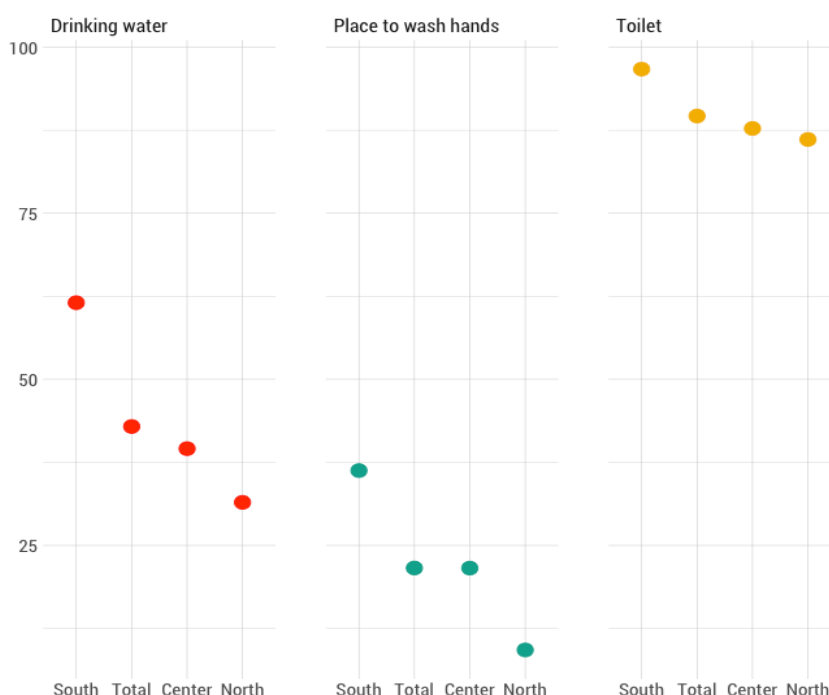


While basic infrastructures tend to be available at school, thanks to Mozambique's massive investment in school construction[31], lack of maintenance seems to hinder their effective usage. Budgeting for maintenance, as well as hiring of non-teaching staff to secure cleaning, is needed to improve the current scenario, where more than 90% toilets are either not clean or reasonably clean (see Figure 6 in Annex IV).

## School Finances

Mozambique adopted free public education policy for primary education in 2004. School fees were abolished, and free textbooks started to be provided for all primary school

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[31] School infrastructure is financed mostly by external funds. Over the last three years, FASE funded construction of an average 650 classrooms (including administrative blocks and toilets) per year.

students. While not mandatory, families tend to contribute with financial resources, mainly to pay for school guards.

Mozambique invest a significant fraction of its public budget to education. Education expenditure represents 22.4 % of the State budget, and 5.2 % of the GDP. At the same time, the share of funds managed at district level have increased from 44% in 2015 to 60% in 2018. [32] However, over 90% of the sector budget is allocated to salaries and related expenses, leaving little margin for larger investment and financing of inputs to improve learning. Basic learning materials (including textbooks) and school functions (excluding salaries) still depend quite heavily on external support.[33]

*ADE is an important source of funding, particularly in the Centre and North regions where it represents 90% of the funding per student, compared to 52% in the South where schools tend to have other sources of funding, including contribution from families.*

ADE represents the largest source of funding per student managed at school level. The provision of internal recurrent budgets to schools is not standardized nor it has a transparent criterion known by all stakeholders including the schools. Improving funding to schools will require the institutionalization of school budgets, in which all available resources can be visible and planned accordingly. In the short run, this budget may still be heavily funded by external sources (like the ADE), but gradual inclusion of internal resources observing a clear criterion could help build a sustainable mechanism of schools' funding, especially considering Government policy of free and mandatory nine years basic education to all children in Mozambique.

*Very large disparities among regions on expenditure per student when considering all the financial resources. The South tend to have to have other source of funding, including contribution from families compared to the other two regions.*

While all primary schools receive ADE, funding per student is slightly higher in the South than in the rest of the regions (Figure 11). This occurs due to the higher percentage of small schools (under 200 students) that receive the ADE minimum, as per the ADE rules. However, when considering other sources of financing (school fees and family contributions, local investment fund spending, and district/other government funding), the gap between the South and the rest increases tremendously, with the schools in the South having double the financing per student. The result is an unintended regressive funding system, whereby schools in wealthier areas have access to more resources.

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[32] UNICEF (2018)
[33] World Bank (2016).

Figure 11. School financing per student by source
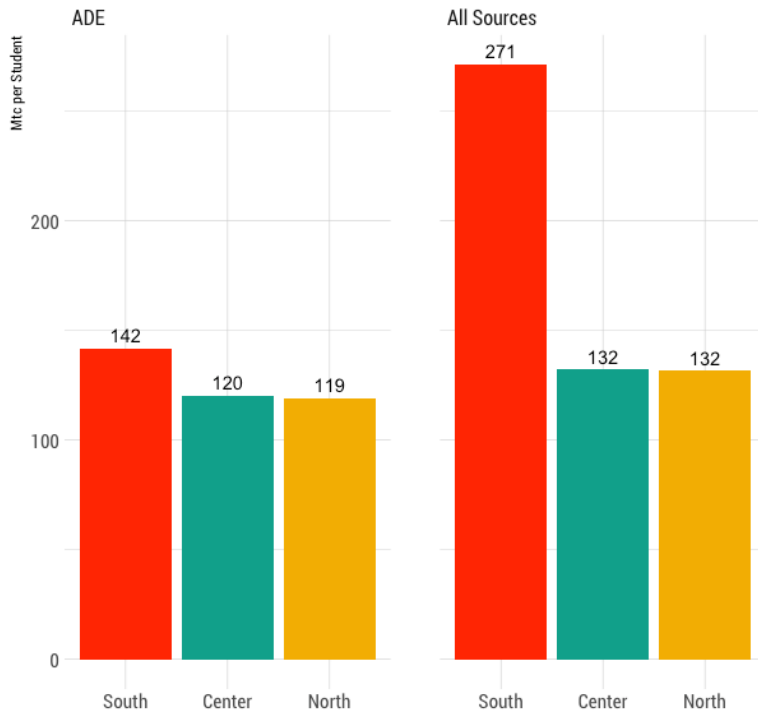


As discussed, minimum inputs at school level are not optimal, and most of them are procured at school level or by the families (in case of students' pencils and exercise books). Resources to help improve minimum equipment and bring quality enhancing inputs need to be deployed at school level and managed jointly with School Councils.

Direct Support to Schools (*Apoio Directo às Escolas-ADE*, in Portuguese) is a school grant program that provides schools with financial resources to improve learning conditions. The program was introduced in 2003 as part of a World Bank project and it covered (at that time) all primary education schools. The program was extended to cover secondary in 2005 and TVET schools in 2008 and incorporated into Ministry of Education's annual plans. It also started being financed by the *Education Sector Support Fund (FASE* in Portuguese), a pooled fund supported by nine development partners (Canada, Global Partnership for Education, Germany, Finland, Ireland, Italy, Portugal, UNICEF and the World Bank).

The grant is channeled directly to schools through the district education authorities (SDEJTs) for the purchase of pedagogical material, services and classroom consumables, according to established guidelines. In addition to school environment improvement, the objective of the ADE program is to reinforce school management by fostering parental and community participation through the School Councils.

The allocation for each school is mainly based on students' enrollment. Since 2011, however, the ADE added a social protection component targeting the most vulnerable students and families to improve school retention of population at risk. Under this component, the school could use the grant to directly finance some of the individual expenses of deprived students, including purchase of school material, hygiene kits, uniforms and shoes, mosquito nets. Furthermore, schools located in areas with a high incidence of HIV/AIDS and/or food insecurity benefit from additional financing.

The annual value of the ADE in 2017 was 120 MZN (around US$2) per student, 200 MZN (US$3.3) per class, with a minimum value of 24,000 MZN (US$ 400) per school. SDEJTs also receive 200 MZN (US$3.3) per school in the district to cover for supervision of the management of the grant.

## IV. From service delivery to outcomes: Determinants of student learning

A crucial question is whether the inputs necessary for service delivery –such as teacher knowledge, teacher effort, or equipment and infrastructure – actually translate into increased student learning. Data shows that the minimum equipment index, the teacher assessment and the fraction of students that have access to textbooks are positively (and significantly) correlated with student learning. Teacher absenteeism, as expected, is negatively correlated with student outcomes.[34] Increasing absenteeism from 0 to 100%

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[34] Two of the SDI indicators are correlated with student learning in ways opposite to what one would expect. The first is the minimum infrastructure index, which is negatively correlated with student learning. This is likely due to one of its components, toilet cleanliness. This variable is prone to variation since it depends on the observer's subjective judgment. The second variable is the observed student-teacher ratio, which is positively correlated with student learning. This seems to be related to high levels of absenteeism.

is linked to a 4 percentage point drop in the overall student score. The full regression is presented in Annex IV.

Students that speak Portuguese at home score higher in both the Portuguese and mathematics assessment. This could be expected, since limited knowledge of Portuguese is often mentioned as a key constraint for student learning. Overall, Portuguese speakers score around 13 percentage points more in the overall student assessment, and the gap between Portuguese and non-Portuguese speakers has increased over the past four years.

The strongest predictor of student learning, however, is student absenteeism. Every 10 percentage point increase in students' absenteeism is associated with a 3.2 percentage point drop in student learning. Absenteeism explains more than 12% of the total variance in student grades (see Table 1 and Figure 2 in Annex IV). This suggests that student absenteeism could be a critical constraint for further improvements in student learning.

Figure 12. Correlation between student absenteeism and test scores
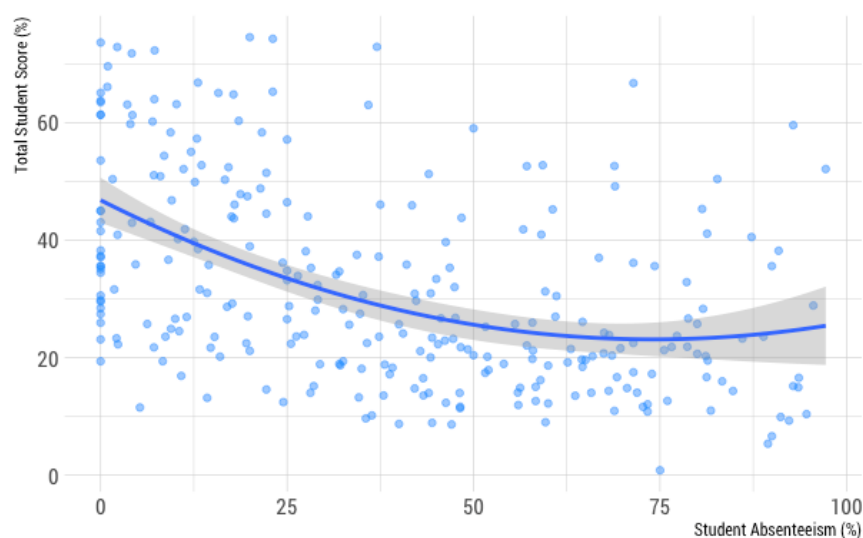


Comparting results in 2018 with results in 2014 also make it possible to examine the determinants of *changes (*rather than *levels)* in student learning over the past 4 years. Results show that the changes in teacher knowledge (measured as the difference in average teacher assessment scores by school between 2014 and 2018) are strongly correlated with changes in student learning. Schools where teacher scores improved more also saw higher improvements in student assessment scores. Overall, changes in teacher knowledge explain around 6% of the change in student learning.

This is not surprising, since teacher knowledge is a key ingredient of successful learning. However, there is a caveat. The effect of changes in teacher knowledge shows to be contingent on the school's level of student absenteeism. In other words, in schools where student absenteeism are high, positive changes in teacher knowledge were *not* associated with improvements in learning. On the other hand, in schools with low student

absenteeism, changes in teacher knowledge explained a 16% of the total change in student learning. Figure 13 below shows the association for low absenteeism schools (below the median) and high absenteeism schools (above the median).

Interestingly, the same results hold for student learning and teacher absenteeism. In schools with low teacher absence, changes in teacher knowledge are strongly correlated with changes in student learning and explain around 16% of the variance. In schools with high absenteeism, the association disappears.

This has important policy implications, since it would suggest that the returns of improving teacher knowledge are much lower in the presence of absenteeism problems. The strong complementarities between teacher skills and attendance (of both teachers and students) suggest that addressing these issues separately may fail to improve service delivery.

Figure 13 – Changes in teacher knowledge are associated with changes in student learning, but only in low student absenteeism schools
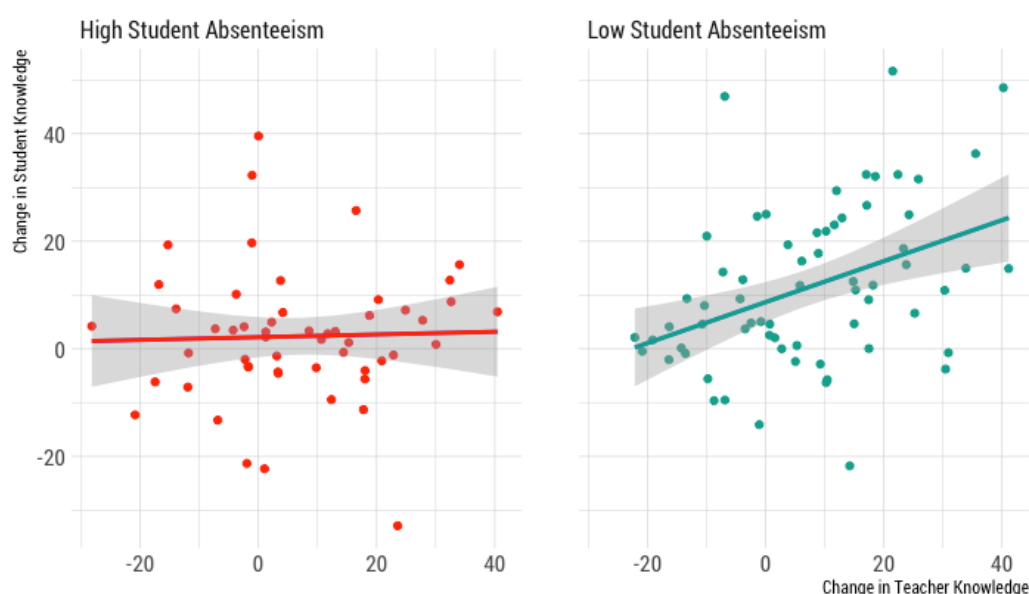


## V.    Conclusions and policy discussion: What could be done?

This report presents the findings of the second round of the SDI in Mozambique. The main purpose is to assess the quality of education in Mozambique by analyzing service delivery in education at the provider's level, the school. Teachers are clearly at the center of this process and, for that reason, the document addresses three main questions about teachers: what teachers know, what teachers do and what inputs are available for teachers to work with.

Results show that student learning in Mozambique improved over the last four years but remains at critical levels. Better learning outcomes are associated with improvement in teachers' content knowledge *combined* with a reduction in teachers' absenteeism. In those schools in which teachers show low level of absenteeism, improvement in knowledge content was strongly associated with better students' test scores, whereas in those schools where teachers were more absent, improvement in teachers' knowledge content made little difference in students' performance, as expected.

Teachers' absenteeism was reduced from alarming levels in 2014 (around 45%) to close to 30%. When trying to understand what the factors associated to teachers' absenteeism, results show that in 20% of the cases, the reported cause is unjustified. Another frequently cited reason is sickness. On the other hand, going to collect their salary - a cause that is usually thought to be an important cause of teachers' absence in school – is only reported in 3% of the cases. Teachers tend to be more absent on Mondays and Fridays, and in the last days of the month. Absenteeism is not associated with gender, and slightly varies with the level of education of teachers (higher educated teachers tend to be less absent in school). All those factors are associated with the *level* of absenteeism in schools. The *changes*, however, only seem to be explained by the number of supervision visits of the district. This is an important finding, as in the last years, Mozambique showed important progress in institutionalizing district supervision to schools, improving planning, increasing the number of visits and developing a structured guide to support the districts in their supervision role.

What could be done to improve education quality in Mozambique? What policies and areas of intervention could directly affect service delivery at the school level? Deep reforms in diverse areas. The starting point, it could be argued, may be on teacher policies but infrastructure, curriculum and language of instruction, governance and accountability are also priorities that could make a difference. Recent World Bank studies include detailed discussion about effective reforms to increase quality of education.[35] Below some policy options are presented, related with education challenges identified by this study and with reforms already being discussed in the country.

*What policies and areas of intervention could directly affect service delivery at the school level? Deep reforms in diverse areas, some of which the Government has initiated, are required.*

Mozambique urgently needs to improve the skills and knowledge of its teacher workforce. This is a basic precondition for sizable progress in student learning. Having well prepared and motivated teachers can only be achieved by implementing a comprehensive package of teacher policy reforms that covers recruitment into the teaching profession, pre-service training, teachers' deployment, continuous professional development, and teachers' management (performance assessment, motivation and

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[35] World Bank (2018), Bashir et al. (2018), Beteille and Evans (2019).

incentives, accountability, meritocratic career progression). These types of reforms usually have long run impact, but short-term measures can also be adopted to strengthen performance of teachers fast.[36]

*Recruitment into teaching.* Attracting the best students to teaching careers is critical to improve the profile of teachers in Mozambique. Big teachers' knowledge gaps indicate that prospective teachers frequently start (and finish) pre-service training at the Teacher Training Institutes with deficient understanding of basic subject content. Pre-service teacher training cannot efficiently make up for large knowledge gaps brought from secondary school. To avoid this, a rigorous selection process can identify candidates with the minimum academic skills to be able to develop well later as a teacher. That would allow prospective teachers and lecturers to concentrate time and effort during pre-service training mostly to developing pedagogic techniques and teaching practices. Over the last two years, Mozambique has implemented an admission exam for candidates applying to the Teacher Training Institutes and is discussing a change in the academic requirements of applicants from having completed 10th grade to being secondary education graduate (12th grade completed). These policies need to be consolidated and enforced, even in a context of strong demand to increase the number of teachers in the system. In addition, alternative pathways for teaching that skip formal pre-service teacher training, such as Teach for America (Teach for All) or community-teacher programs could also be considered.[37] Evidence shows that these types of programs either increased or have not reduced student learning.[38] In parallel, Mozambique may consider actions to attract the best candidates to the teaching profession and improve the social perception of teacher career.[39]

*Pre-service teachers' training.* The best education systems in the world train their teachers well before they enter the classroom.[40] Mozambique changed numerous times in the last few decades its pre-service training model for teachers, trying to adapt to the system's fast-growing needs. Currently most primary school teachers completed 10 years of basic education and were trained one year at a teachers' training institute (TTIs). The Government is about to conduct in 19 out of the 38 TTIs of the country a pilot that will require candidates entering the teaching profession to be secondary education graduates (12th grade completed) and that will train them during three years at the TTIs, including 13 weeks of practical component. Although the practical component increases the cost of pre-service training considerably, it is critical for teachers' preparation. Effective systems such as Finland, Korea or Shanghai include at least six-months of classroom-based practical training for in their pre-service teacher training, replicating what the

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[36] World Bank (2018), Bashir et al. (2018), Beteille and Evans (2019)

[37] World Bank (2018)

[38] World Bank (2018), Alfonso et al (2010).

[39] An example in this area is Elige Educar, a Chilean initiative launched in 2009, to improve the social image of the teaching profession.

[40] Beteille and Evans (2019)

teacher will face at school.[41] Mozambique should assess the effectiveness of the pilot considering increasing the practical component, while considering the sustainability of the model. Also, the new model in Mozambique includes a broad technical training to *all* teachers, including teaching for students with special learning needs and teaching in the bilingual education modality. While Mozambique needs to ensure that the teaching workforce includes teachers well prepared to assist equally all students, there are some areas that require deeper training and specialization so that teachers can indeed be effective. All students need to have access to teachers with these specializations when needed, which does not mean that *all* teachers of the system should receive some superficial training in these key specializations.

*Teachers' deployment*. When discussing effective principles that should guide teachers' deployment, a recent study summarizes three main decisive factors: [42] i) meritocratic selection of teachers yields better learning outcomes; ii) probationary periods are crucial to allow teachers to learn and prove themselves; and iii) education systems must be able to dismiss ineffective teachers who do not improve. Although it is provenly difficult to predict teachers' effectiveness, meritocratic methods end selecting a better pool of teachers than other criteria based on characteristics that are not related with the teachers' ability to teach. Successful education systems select, retain and promote their teachers *and* principals based on merit and not patronage. Other considerations might also be relevant. For example, this SDI 2018's findings show that students of female teachers got higher test scores that students of male teachers. This was especially notorious for girls, but also present for boys. Either through becoming role model or because of different practices in the classroom, encouraging more talented women to the teaching profession can contribute to better learning outcomes (while presumably also result in further positive effects due to greater women's empowerment in the family and community). Finally, an apprenticeship system for recently graduated teachers can help identify teachers with good (and bad) performance. This probationary period, however, should be supported by mechanisms to dismiss teachers that show weak performance and do not improve despite receiving all needed support.

*Teachers' continuous professional development.* The current teachers' workforce also needs training and support. Mozambique recently approved a strategy of continuous professional development of teachers, which main principles are aligned with best international practices. In particular, the new strategy emphasizes the need to bring training to the classroom, rather than long theoretic lecture-type trainings. It also involves classroom observation and peer feedback as central elements. The Bank is working with the Ministry in a pilot project to strengthen the implementation of this strategy. The pilot, *Aprender +*, will include more frequent follow up visits, and support and guidance to teachers from coaches, specifically selected and trained for this role and based at the main school of the education cluster (ZIP – *Zona de Influencia Pedagogica*).

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[41] Beteille and Evans (2019)
[42] Beteille and Evans (2019)

*Aprender +* will also use scripted lessons plans that guide the teachers with concrete steps and actions for each class. Finally, *Aprender +* will focus on a specific area (early reading) rather than having a general approach, since there is evidence that this is one of the key features of effective teacher training programs.

*Teachers' management.* The broader context of teacher career in Mozambique needs discussion and review. A mechanism for the assessment of teachers' skills, not necessarily linked to salary, helps improve training, deployment and support to the teacher workforce. Teachers are the main ingredient for students to learn and the main item in country's education budgets. In view of that, a good education system needs to provide incentives and support for teachers to teach with motivation, effort and skills.

*Beyond teachers' reforms.* In addition to teacher policies reforms, the SDI results indicate the need to review the mechanisms to allocate resources to schools. A decentralized planning and budgeting system that allocate annual grants to all schools helps schools address their specific problems as identified by the school community, including school maintenance, procurement of learning materials to support early literacy and numeracy. The ADE has worked well over the years, but adjustments could be considered to tackle regional growing disparities. The devastating impact of tropical cyclones Idai (in the Center) and Kenneth (in the North) will increase the needs of two regions that were already in disadvantage over the next years. Also, result-based finacing could be added to the allocation of resources to schools. For example, a results-based component could be included in the on-going ADE program to target problems such as teachers' absenteeism and students (mostly girls) retention. Mozambique has tried an experience recently at a small scale, so lessons learned should be analyzed to improve the design and monitoring mechanism of such program. There are several successful international experiences to look at, including countries with similar challenges to Mozambique's of low local capacity and difficult access to schools.

With the implementation of the new education law in Mozambique, the preparation of the next 10-year education plan, and the international attention after the recent natural disasters, the country has an invaluable opportunity to implement reforms. Based on diagnosis and rigorous evidence, actions can be adopted to accelerate the change and provide better education to all Mozambicans.

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# Annex I – Sampling and weights

The 2017 sampling for 2018 service delivery fieldwork is meant to build upon the 2014 SDI data collection. A crucial question is whether indicators have changed over time. At least two approaches to this question are reasonable: follow the same schools as in 2014 or make a fresh national sample. There are reasons that both are desirable, as described below.

As in 2014, the goal in the 2017 sampling for 2018 service delivery fieldwork was to produce a nationally representative sample for Mozambique. As in 2014, the sample was stratified. Consistent with the 2014 approach, the strata were constructed according to two binary distinctions: urban/rural population; and above/below-median number of students enrolled on the 4th grade by province and urbanization. In this regard, nothing has changed in 2017.

However, in 2014, for a variety of reasons, the original sample of 300 schools was reduced, in practice, to only 203 schools. Among other limitations, ongoing conflict had made some regions out of bounds even before the sampling. Thus, the 2014 sample might not resemble a new national sample, for which no region is deemed conflict-affected and unsafe for field work. We nonetheless desire both a simple approach to producing a nationally representative statistic, and a simple approach to producing a statistic comparable to the 2014 sample for comparison's sake.

Thus, the 2017 sample is drawn as follows:
- The target sample size is 400 schools.
- Every school fall in a 2014-defined stratum, was either in a conflict-affected or non-conflict-affected area at that time, and if non-conflict-affected, was either visited by SDI 2014 or not.
- This last category, the 203 schools included in the 2014 SDI data, including 3 then-closed schools, are included in the 2017 sample.
- Among non-SDI 2014 schools, areas that had been conflict-affected in 2014, which were roughly 5% of the sample frame last time, are no longer out of bounds. 5% of 400 is 20, so we now sample roughly this number (18, in practice) of schools from the then-conflict-affected area.
- Across all remaining strata defined in 2014, excluding the 203 schools visited by SDI 2014, and excluding the conflict-affected areas, we sample 200-18=182 schools following an approach identical to that used in 2014: we sample a number of facilities proportional to the total number of facilities in the stratum. To give a sense for this, there are 11,433 facilities remaining, excluding then-conflict-affected and SDI 2014 facilities. To sample 182 of these is to sample roughly one in every 63 facilities. So of the 307 facilities in the "Manica Rural Small" stratum, we sample 4; of the 1,397 facilities in the

"Zambezia Rural Small" stratum, we sample 22. The full table by stratum is provided below.

- We sample roughly an additional 20 percent as replacement facilities for each stratum (in case the sampled facility does not exist, is not functional, or is, for perhaps a security reason, completely unreachable), sampling at least two facilities in each stratum even if that exceeds 20 percent of the total for a stratum.

Figure I.1 - SDI 2017: Initial School Sample by Stratum

| Stratum designation 2018 | Sampled schools | | Totals | |
|---|---|---|---|---|
| Cabo Delgado Rural Large | 6 | | | |
| Cabo Delgado Rural Small | 7 | | | |
| Cabo Delgado Urban Large | 1 | | | |
| Cabo Delgado Urban Small | 1 | | | |
| Cidade de Maputo Urban Large | 1 | | | |
| Cidade de Maputo Urban Small | 1 | | | |
| Gaza Rural Large | 5 | | | |
| Gaza Rural Small | 5 | | | |
| Gaza Urban Large | 1 | | | |
| Gaza Urban Small | 1 | | | |
| Inhambane Rural Large | 6 | | | |
| Inhambane Rural Small | 6 | | | |
| Inhambane Urban Large | 1 | | | |
| Inhambane Urban Small | 1 | | | |
| Manica Rural Large | 4 | | | |
| Manica Rural Small | 4 | | | |
| Manica Urban Large | 1 | | | |
| Manica Urban Small | 1 | | | |
| Maputo Rural Large | 3 | | | |
| Maputo Rural Small | 3 | | | |
| Nampula Rural Large | 15 | | | |
| Nampula Rural Small | 16 | | | |
| Nampula Urban Large | 1 | | | |
| Nampula Urban Small | 1 | | | |
| Niassa Rural Large | 8 | | | |
| Niassa Rural Small | 8 | | | |
| Sofala Rural Large | 3 | | | |
| Sofala Rural Small | 4 | | | |
| Tete Rural Large | 8 | | | |
| Tete Rural Small | 9 | | | |
| Tete Urban Large | 1 | | | |
| Tete Urban Small | 1 | | | |
| Zambézia Rural Large | 21 | | | |
| Zambézia Rural Small | 22 | | | |
| Zambézia Urban Large | 2 | | | |
| Zambézia Urban Small | 3 | | | |
| Sub-subtotal | | 182 | | |
| | | | | |
| Conflict 2014 | 18 | | | |
| Subtotal | | | 200 | |
| | | | | |
| SDI2014 | 203 | | | |
| TOTAL | | | | 403 |

Table I.2 - Final Sample of Visited Schools

| Province | Initial Sample | Visited Sample |
|---|---|---|
| Cabo Delgado | 26 | 25 |
| Gaza | 31 | 30 |
| Inhambane | 37 | 37 |
| Manica | 24 | 24 |
| Maputo (Provincia) | 18 | 18 |
| Maputo (Cidade) | 6 | 6 |
| Nampula | 75 | 60 |
| Niassa | 27 | 22 |
| Sofala | 26 | 26 |
| Tete | 47 | 38 |
| Zambezia | 87 | 51 |

### School weights

SDI is representative at the national level, and at a number of strata. As mentioned above, these include the urban/rural areas and school size. To calculate the indicators, weights are needed. There are different weights depending on what is being aggregated. Teacher absenteeism, teacher assessment, student assessment, and the school-level indicators all use different weights. These are explained below.

### Student knowledge weights

The student assessment weights used factor in the number of students that were assessed out of the total number of students present in that class (observed from module 4). Since 10 is the maximum number of students that can be assessed, using no weights would over-represent schools with few students (and small classes) and under-represent larger schools (where maybe up to 50 students are present in a class). The weight is equal to the inverse of the probability that a student is picked for assessment (1 / (Students Assessed / Total Number of Students Present in the Class)).

### Teacher knowledge weights

The teacher assessment uses a different kind of weights. Teacher assessment scores are calculated by aggregating the results at the individual (not the school) level. However, a few issues need to be considered. First, not all eligible teachers take the exam for several reasons. Some are absent, some work in a different shift, some have to leave early. As such, schools with many teachers but where few of them take the exam will be under-represented, and small schools where all teachers take it will be over-represented. The weight used in the analysis is the inverse of the probability that an eligible teacher is assessed (1/(Teachers Assessed / Eligible Teachers)). This is then multiplied by the regular school weights.

### Teacher absenteeism weights

The final set of weights are those for absenteeism. These are meant to correct by the number of teachers randomly sampled to undergo the absenteeism check. Once the teacher roster in Module 2 is filled out, a maximum of 10 eligible teachers are randomly

selected. The enumerators then check whether these teachers are present in the school and classroom (if appropriate). However, many schools have a much higher number of teachers. This weight is the inverse of the probability that an eligible teacher is randomly chosen (1/(Teachers Randomly Sampled / Eligible Teachers )).

# Annex II –Reliability checks

An intensive work was done to adapt instruments to the local context and national curriculum.[43] Nonetheless, as part of the data quality control process for the Mozambique SDI 2018, quality checks were conducted to confirm reliability of the findings on student test scores. The checks (described below) include inter-item correlations, Cronbach's alpha and MacDonald's omega. Item response theory (IRT) is also included to analyze the results for student assessment (Module 5), providing the same metrics for the SDI 2014 data for comparison.

## *Student Learning –Inter-Item Correlations*

Inter-item correlations are a useful indicator of how different questions within a test relate both to each other and to the domain they intend to measure.[44] Very high correlations suggest some degree of redundancy, while very low correlations may imply that the items are measuring different domains. In the case of the student assessment (the Portuguese results are shown below), inter-item correlations showed an appropriate range overall. The "Image" item (students were read a word and they had to point to the image that represented that word) had the lowest inter-item correlation overall, but still above 0.20, a commonly-used heuristic.[45] Additionally, inter-item correlations were similar across both rounds of SDI, which suggests that the structure of the responses has not changed substantially. In other words, the test is still measuring the same domain as five years ago.

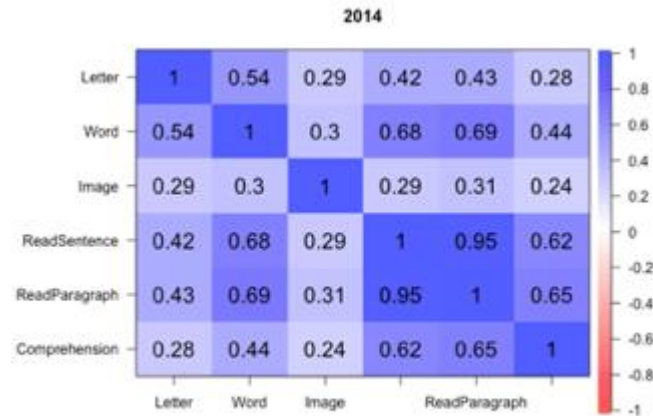### Figure II.1 - Student Learning Inter-Item Correlations



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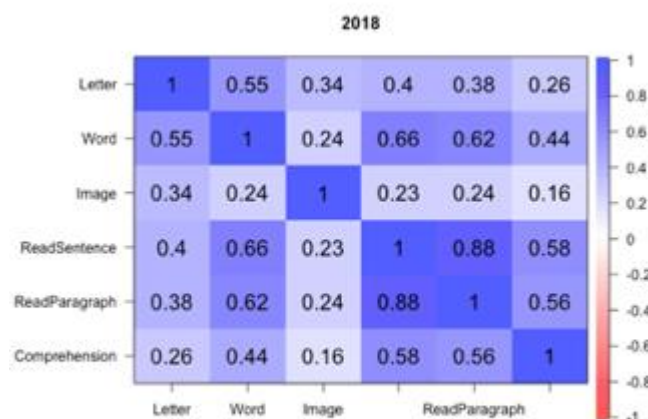
[43] Johnson et al (2012).
[44] Piedmont (2014).
[45] An *average* inter-item correlation values of 0.20-0.40 is a frequently-used rule of thumb, according to the literature (Piedmont 2014).

2014

| | Letter | Word | Image | ReadSentence | ReadParagraph | Comprehension |
|---|---|---|---|---|---|---|
| Letter | 1 | 0.54 | 0.29 | 0.42 | 0.43 | 0.28 |
| Word | 0.54 | 1 | 0.3 | 0.68 | 0.69 | 0.44 |
| Image | 0.29 | 0.3 | 1 | 0.29 | 0.31 | 0.24 |
| ReadSentence | 0.42 | 0.68 | 0.29 | 1 | 0.95 | 0.62 |
| ReadParagraph | 0.43 | 0.69 | 0.31 | 0.95 | 1 | 0.65 |
| Comprehension | 0.28 | 0.44 | 0.24 | 0.62 | 0.65 | 1 |

### Students' Cronbach's Alpha and McDonald's Omega

As part of the reliability analysis, we also assessed Cronbach's alpha and McDonald´s omega, two commonly-used reliability and internal consistency indicators. Though Cronbach's alpha is perhaps the most popular indicator for this purpose, it has several issues that limit its use.[46] For example, it is unrelated to the internal structure of a test, and therefore has little to say about internal consistency. It is also one of many lower bounds for reliability, and therefore should probably be reported alongside other indicators.

Here we report both Cronbach's alpha and McDonald's omega. McDonald's omega has been reported to be a better indicator under a wider set of scenarios, whereas alpha may vary significantly depending on the underlying psychometric properties of the scale.[47] 0.7 is a common lower bound for both alpha and omega. The values for both the Portuguese and the math assessment were above these thresholds for the 2014 and 2018 rounds of SDI in Mozambique. There were small changes across years, but the values remained similar, as shown below.

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[46] See, for instance, Sijtsma (2009).
[47] Zinbarg et al (2005).

Figure II.2 - Key Reliability Indicators for Student Learning
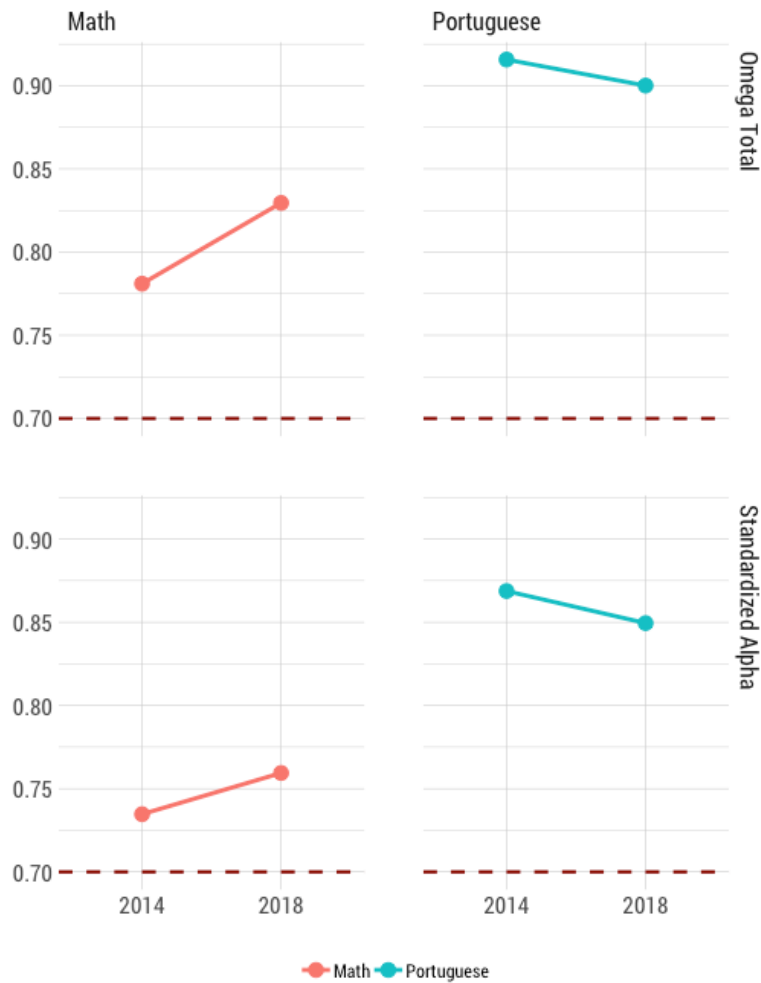
## Student Learning: Item Response Theory

We use Item Response Theory (IRT)[48] to evaluate whether the student assessment can successfully discriminate between students of different ability. An assessment can do this if it can reliably capture information throughout the entire ability distribution. The figures below show how well the different items in the Portuguese and math tests discriminate among students of different abilities. The graphs on the left show the distribution of item information (y-axis) plotted against standardized student ability (x-axis) for each of the items in the assessment ("sentence" or "word", for example). The graphs on the right show the *total* amount of information captured by the assessment at each level of ability. Ideally, each item of the assessment should capture information in different areas to optimize the total item information captured by the assessment.

The assessment of Portuguese language has higher total information and is better at capturing it across a wider range of abilities. However, the mathematics assessment's items also have a good spread and a good total information score. The figures suggest

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[48] See Embretson and Reise (2013) for a full introduction to IRT.

that the assessment is more effective at discriminating students at higher levels of ability, since total information at +2 is much higher than total information at −2. This may be because the SDI assessment was designed for a large number of countries in mind, and Mozambique is one of the lowest-scoring in the sample.

Figure II.3 - Student Learning: Item and Test Information for the Portuguese (top) and Math (bottom)
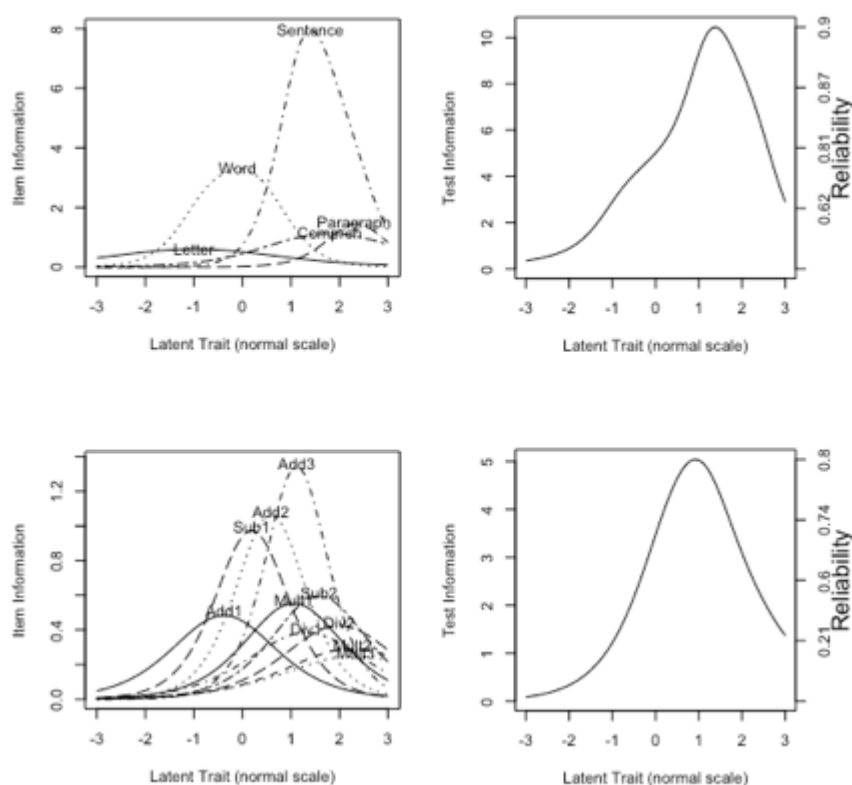


### Challenges and reliability of teachers' absenteeism measures

The fieldwork for the survey lasted from July to October 2018 and was divided into two phases. The first phase covered July and the beginning of August and was interrupted by the school winter break. The second phase began at the end of August and ended in the 2nd week of October. This had the following consequences:

- **Timing**: fieldwork for SDI 2014 started Spring (in Mozambique, April-June), around three months before the 2018 fieldwork. This means that data was collected at a different moment of the school year, which could affect: i) student learning, had three more months of school in 2014, ii) absence indicators, since both teachers and students may be more likely to be absent from school as the school year draws to a close.
- **Logistics and schools not visited:** the fieldwork faced several logistical constraints that prevented enumerators to reach all 403 schools included the original sample (as described in Annex I), and to carry out the 2nd visits in many others. As a result,

the response rate of each module was different, and inverse probability weights were adjusted to take this into account.[49] The teacher absenteeism indicators (Module 2) were particularly affected by these problems, because they require data collection in both the 1st and 2nd visits. As a result, our sample for teacher absenteeism during the announced visit is larger than the sample for the unannounced visit. This makes estimates for absenteeism during the 2nd visit less reliable and vulnerable to different specifications. The sensitivity of the indicator is explored in the following section.

### Teacher Absenteeism: Sensitivity to different scenarios

Teacher absenteeism is checked during both the announced and the unannounced visit. The absenteeism during the unannounced visit is supposed to better capture absenteeism on a regular school day, since it prevents teachers and principals from engaging in strategic behavior –such as being present during the announced visit in case their absence has any negative consequences.

Collecting data for this second visit means returning to the school at least two days after the announced visit. The logistical constraints resulted in that many second visits were not carried out, and several other schools were visited but found closed. The main reasons provided for failing to visit schools was lack of road access to the schools, which prevented enumerator teams from reaching them.

Another consequence of missing schools is that we lack the information to generate absenteeism weights for those schools. As mentioned in Annex I, absenteeism indicators are calculated using school weights (from the sampling design) and absenteeism weights (to correct for the proportion of eligible teachers randomly selected to undergo the absenteeism check).

Given these limitations, we carried out sensitivity checks to evaluate how the absenteeism estimates changed under different scenarios. Three of these scenarios are shown below. The first two include only those schools where we have full data for the 2nd visit. Scenario 1 includes both sets of weights (school weights and absenteeism weights), whereas Scenario 2 only includes school weights. Finally, Scenario 3 includes all schools included in Scenarios 1 + 2 plus all the schools that were reported as closed by the field team, imputing a 100% absence rate to the latter.

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[49] These are described in more detail in Annex II.

Table II.3 - Teacher Absenteeism Sensitivity Analysis – Unannounced Visit

| Scenarios | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| 1. Schools with full data + all weights | 29.8 | 19.1 | 28.1 | 40.9 | 31.6 | 29.6 |
| 2. Schools with full data + school weights only | 30.4 | 25.7 | 26.7 | 38.7 | 33.2 | 30.3 |
| 1. Including schools that were reported as closed by field team + school weights only | 40.0 | 25.7 | 39.1 | 50.2 | 47.0 | 39.5 |

Estimates are very similar under Scenarios 1 and 2, except for the estimate for the South, which is lower under Scenario 2. As expected, Scenario 3 substantially increases absenteeism estimates, both overall and for the Central and Northern regions. All Southern schools were visited, which explains why the estimate for this region does not change. Even under the most conservative scenario, teacher absenteeism was reduced. The estimates of absenteeism for the SDI 2014 did not include closed schools.

# Annex III: Students' socioemotional skills

## Challenging Situations Task (CST)

As previously mentioned, the *Challenging Situations Task* (CST) captures the student's ability to regulate his or her emotions. CST presents students with several scenarios depicting challenging social situations. Students are then asked: i) what they would feel like, and ii) what they would do when facing the hypothetical situation. For the first part, students are given four emotion responses: "sad", "angry", "just ok", or "happy". For the second part of the procedure, students can choose between four different reactions: "crying", "hitting" the other student, "walking away", and "asking" why the other student had behaved that way.

There is no hierarchy of responses in the sense that one is coded as better than the rest, and there is no overall score. For example, "angry" and "hitting" emotions/reactions are added up and standardized to generate the "anger" indicator, and "asking" reactions are used to generate the "socially competent" indicator. As mentioned previously, these two student responses have been shown to correlate with constructs such as executive control. Specifically, executive control is positively correlated with socially competent responses and negatively correlated with angry choices.

We find that students are about as likely to choose an angry and a competent emotion or response. However, there are some regional differences. Students in the North are generally less likely to choose both the angry and the socially competent response, whereas the opposite is true for students in the Center.



**CST: Emotional Responses**
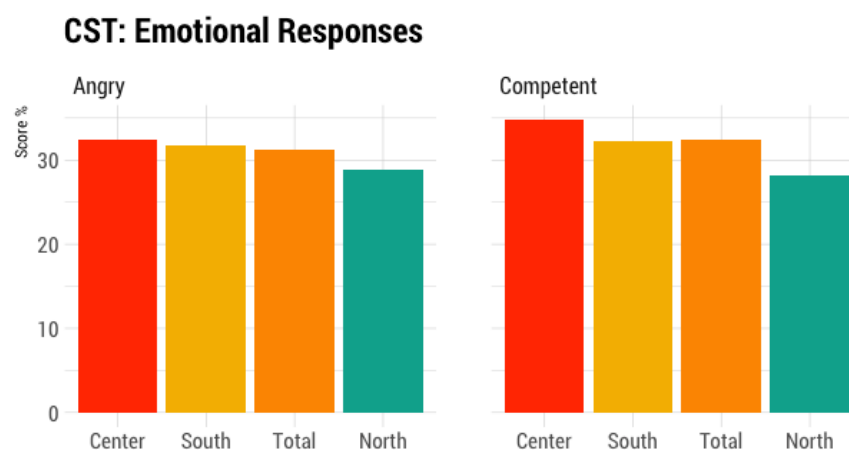
These responses are also correlated with proxies for socioeconomic status. Students who have at least one literate parent are significantly less likely to choose angry responses and significantly more likely to choose socially competent responses in the CST instrument (see below). There is also a positive and significant correlation between student learning and socially competent responses in our student sample.

**CST: Emotional Responses by Parent Literacy**
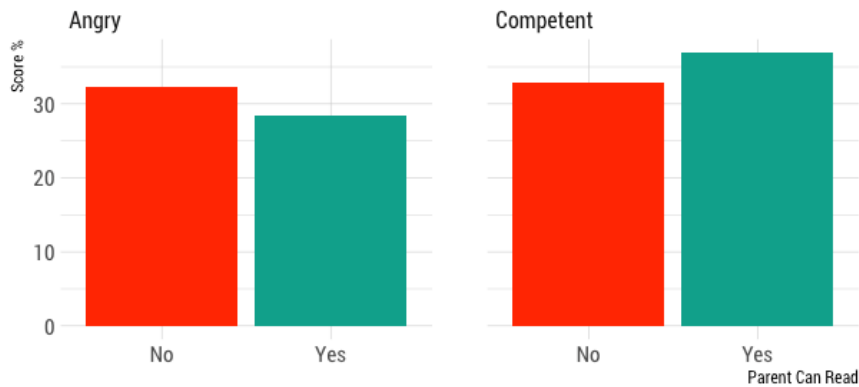


There is an emerging literature that suggests heat can have negative effects on student wellbeing and performance. Students in hot environments can feel more tired,[50] and recent evidence from the United States suggests high temperatures can decrease student learning and increase inequality.[51] Interestingly, we found that room temperature at the time of the assessment was the best predictor of angry responses (and negative predictor of socially competent responses). This suggests students exposed to higher temperatures may be at a disadvantage compared to their peers.

**CST: Reponses and Temperature**



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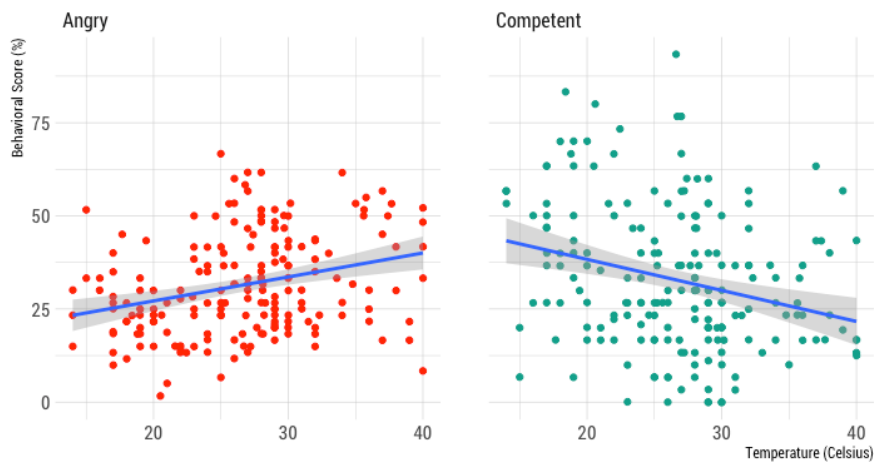
[50] Bidassey-Manilal et al (2016).
[51] Goodman et al (2018).

# Annex IV: SDI 2018 - Additional results

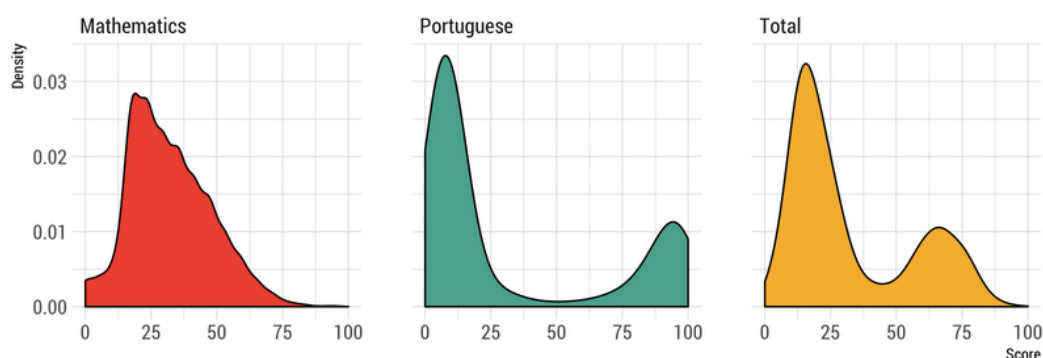## Figure IV.1 – Student Assessment: Distributions



## Table IV.1 – Student Assessment: Determinants

|  | *Dependent variable:* **Total Student Score** | | |
|---|---|---|---|
|  | SDI Indicators | Student-Level Indicators | All Indicators |
|  | (1) | (2) | (3) |
| Minimum equipment index | 2.182** | | 4.471*** |
|  | (1.108) | | (1.176) |
| Minimum infrastructure index | -4.654*** | | -4.245*** |
|  | (1.082) | | (1.113) |
| Teacher absenteeism | -4.411** | | 5.337** |
|  | (2.230) | | (2.494) |
| Teacher assessment (Portuguese) | 0.015 | | -0.038 |
|  | (0.048) | | (0.050) |
| Teacher assessment (Math) | 0.088*** | | -0.021 |
|  | (0.032) | | (0.035) |
| Observed student/teacher ratio | 0.333*** | | -0.056 |
|  | (0.033) | | (0.044) |
| Student absenteeism | | | -32.468*** |
|  | | | (2.772) |
| % of students with textbooks | 10.586*** | | 6.619*** |
|  | (1.914) | | (2.034) |
| Classroom observation score (Teach) | | | 0.385*** |
|  | | | (0.092) |
| Teacher is female | | | 2.278** |
|  | | | (1.088) |
| Student is girl | | -3.951*** | -2.726*** |
|  | | (0.975) | (1.055) |

| | | | |
|---|---|---|---|
| Age of student | | -0.995*** | -0.166 |
| | | (0.255) | (0.289) |
| Student had breakfast | | 1.043 | 1.229 |
| | | (0.967) | (1.066) |
| Student speaks Portuguese at home | | 13.664*** | 12.673*** |
| | | (1.692) | (1.734) |
| Constant | 12.390*** | 44.865*** | 30.367*** |
| | (2.352) | (3.135) | (5.426) |
| | | | |
| Observations | 2,085 | 2,330 | 1,768 |
| $R^2$ | 0.085 | 0.046 | 0.202 |
| Adjusted $R^2$ | 0.082 | 0.044 | 0.196 |
| Residual Std. Error | 22.891 (df = 2077) | 23.132 (df = 2325) | 21.641 (df = 1753) |
| F Statistic | 27.425*** (df = 7; 2077) | 27.867*** (df = 4; 2325) | 31.730*** (df = 14; 1753) |

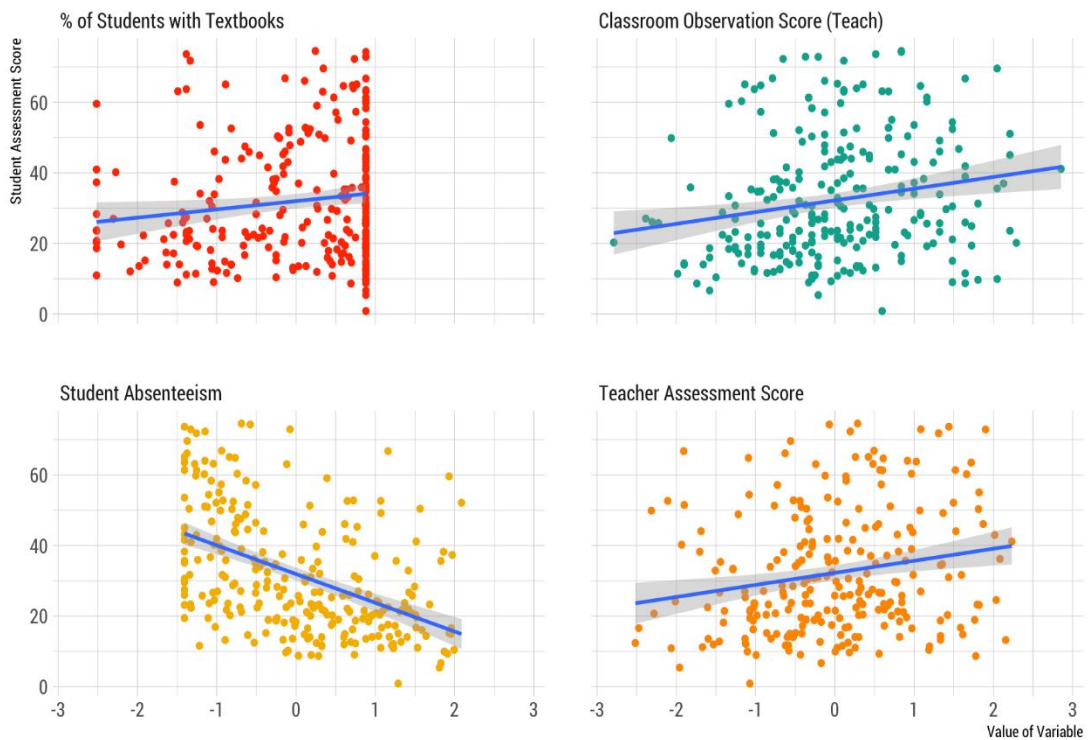## Figure IV.2 – Student Assessment: Correlations

## Table IV.2 – Portuguese Teacher Assessment

| Category | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| Portuguese Score | 40.9 | 41.7 | 44.5 | 35.4 | 41.5 | 41.0 |
| Cloze task (% correct) | 45.3 | 49.6 | 54.2 | 30.6 | 46.7 | 45.0 |
| Composition task (% correct) | 16.5 | 17.2 | 18.4 | 13.5 | 19.5 | 16.5 |
| Grammar task (% correct) | 81.6 | 87.1 | 79.7 | 80.4 | 82.4 | 81.6 |

## Table IV.3 – Math Teacher Assessment

| Category | Total | South | Center | North | Urban | Rural |
|---|---|---|---|---|---|---|
| Math Score | 43.2 | 50.5 | 46.9 | 33.3 | 46.5 | 43.0 |
| Fraction correct on upper primary | 28.6 | 41.5 | 30.1 | 18.1 | 31.3 | 28.4 |
| Fraction correct on lower primary | 49.5 | 57.3 | 53.9 | 38.5 | 53.0 | 49.4 |
| Comparing fractions | 25.5 | 14.5 | 41.1 | 12.0 | 36.0 | 24.9 |
| Interpreting data on a Graph | 19.5 | 28.0 | 24.6 | 7.0 | 24.5 | 19.4 |
| Interpreting data on a Venn Diagram | 34.2 | 50.8 | 35.2 | 21.9 | 39.0 | 33.7 |

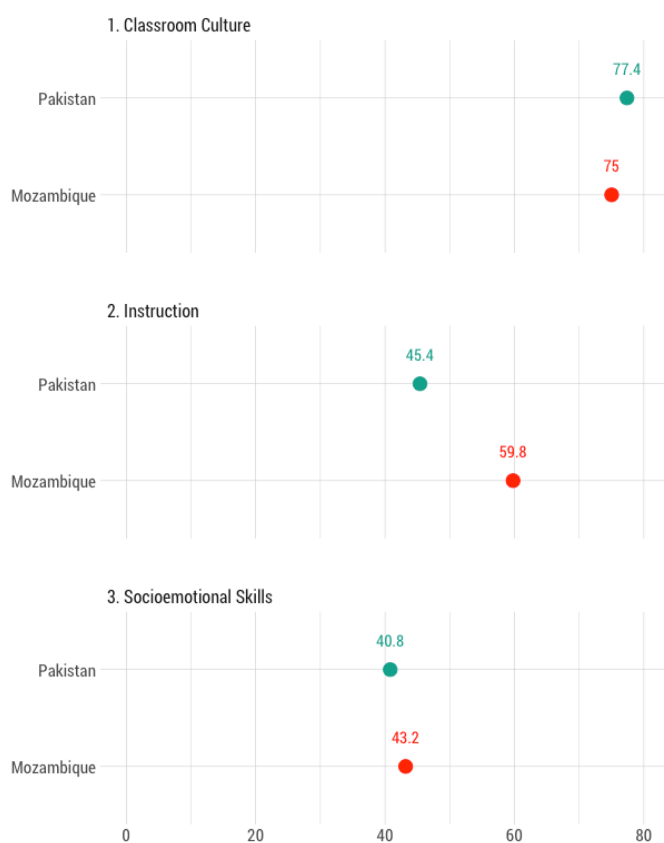Figure IV.3: *TEACH* – Classroom Observation Scores (Mozambique and Pakistan)



Table IV.4 – Distribution of *Teach* Scores by Element

| | Teach score | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| *Classroom Culture* | | | | | |
| 1. Supportive Learning Environment | 2.7 | 9.4 | 25.1 | 49.3 | 13.5 |
| 2. Positive Behavioral Expectations | 4.8 | 19.2 | 34.7 | 31.5 | 9.9 |
| 3. Opportunities to Learn | 2.2 | 4.0 | 13.7 | 19.9 | 60.3 |
| | | | | | |
| *Instruction* | | | | | |
| 4. Lesson Facilitation | 6.5 | 20.9 | 30.3 | 34.2 | 8.1 |
| 5. Check for Understanding | 7.6 | 19.8 | 33.1 | 28.1 | 11.4 |
| 6. Feedback | 14.7 | 11.5 | 37.7 | 16.5 | 19.6 |
| 7. Critical Thinking | 32.6 | 22.3 | 23.3 | 13.8 | 8.1 |
| | | | | | |
| *Socioemotional Skills* | | | | | |
| 8. Autonomy | 25.9 | 22.6 | 26.6 | 15.3 | 9.5 |
| 9. Perseverance | 37.0 | 29.1 | 18.7 | 11.7 | 3.5 |
| 10. Social and Collaborative Skills | 67.5 | 13.0 | 11.4 | 5.2 | 2.9 |

## Table IV.5 – Teacher Absenteeism: Determinants

| | Absenteeism announced visit (1) | Absenteeism unannounced visit (2) |
|---|---|---|
| University education | -0.017 | -0.116[*] |
| | (0.042) | (0.061) |
| Upper secondary education | 0.071[**] | -0.025 |
| | (0.030) | (0.040) |
| Age | 0.001 | 0.002 |
| | (0.001) | (0.002) |
| Teacher is female | 0.033 | 0.013 |
| | (0.022) | (0.030) |
| Temporary teacher | 0.047 | -0.007 |
| | (0.049) | (0.068) |
| Principal absent | 0.035 | |
| | (0.029) | |
| Student absenteeism | 0.094[**] | -0.034 |
| | (0.041) | (0.058) |
| Day is Friday | 0.080[**] | |
| | (0.031) | |
| Number of district visits | -0.001 | -0.004 |
| | (0.004) | (0.005) |
| Constant | 0.025 | 0.153[**] |
| | (0.038) | (0.073) |
| | | |
| Observations | 887 | 726 |
| $R^2$ | 0.025 | 0.008 |
| Adjusted $R^2$ | 0.015 | -0.002 |
| Residual Std. Error | 0.317 (df = 877) | 0.390 (df = 718) |
| F Statistic | 2.489[***] (df = 9; 877) | 0.795 (df = 7; 718) |

Figure IV.4 Teacher Absenteeism by Day

A. Teachers absenteeism by day of the month

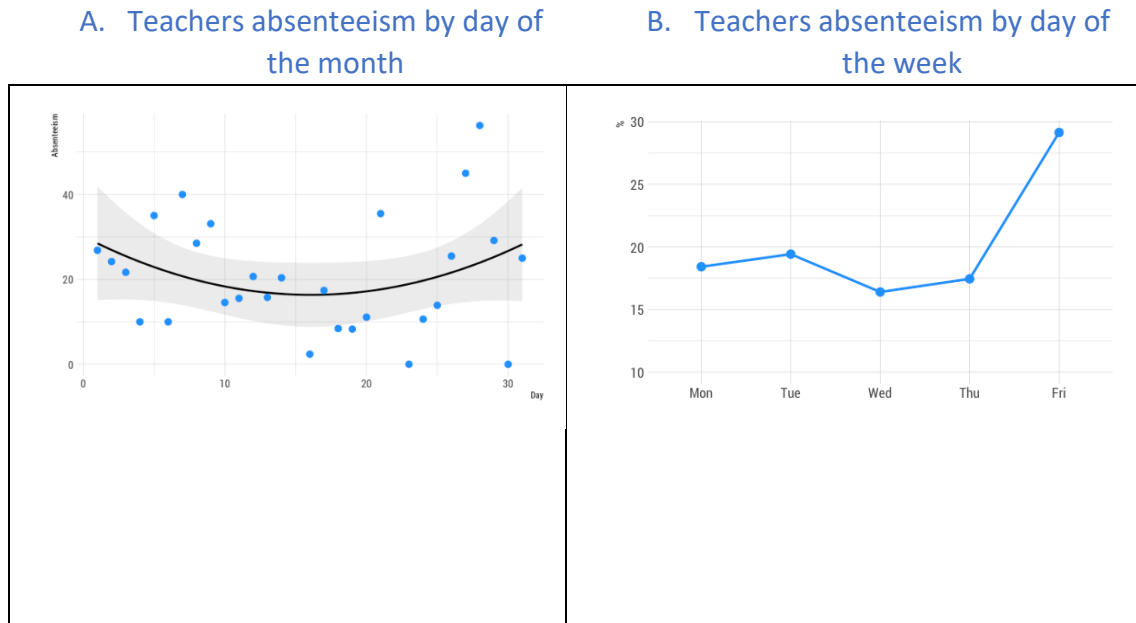B. Teachers absenteeism by day of the week



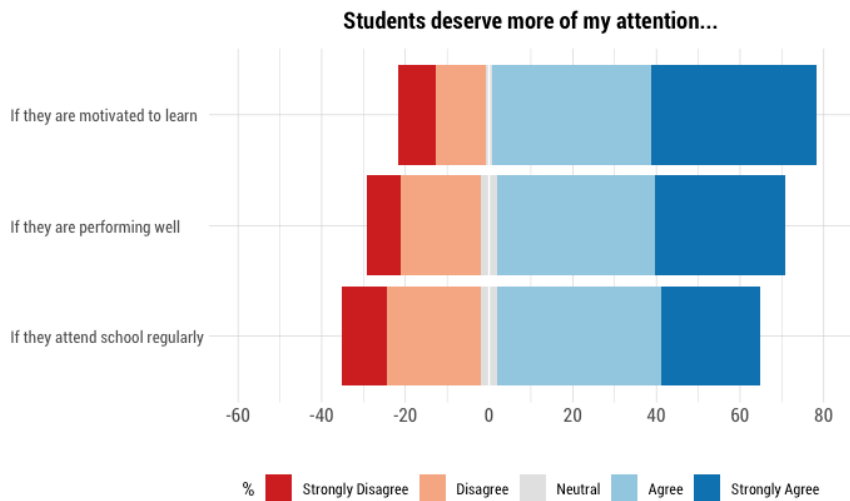Figure IV.5 – Teacher Motivation – Which Students Deserve More of the Teacher's Attention?

Figure IV.6: Toilet Cleanliness by Region



Figure IV.6: Toilet Cleanliness by Region