

Funda Wande Western Cape Evaluation

BASELINE REPORT

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INTRODUCTION

Funda Wandé is a not-for-profit organization that aims to ensure that all learners in South Africa can read for meaning and calculate with confidence, in their home language by the age of 10. They develop video and print materials to equip teachers on how to teach literacy and numeracy in the Foundation Phase. Partnering with the Eastern Cape, Limpopo and Western Cape Departments of Education, Funda Wandé is implementing a series of interventions with accompanying evaluations.

The interventions are all built around a common set of Learner and Teacher Support Materials (LTSM) with different modalities of support. The evaluations of the first year of the Funda Wandé and Bala Wandé workbooks intervention in Limpopo and the Eastern Cape found the programme to be effective in improving foundational literacy and numeracy outcomes. In the Eastern Cape, teachers are supported by ongoing on-site expert coaching while teachers in Limpopo receive a full-time teaching assistant for the year. The intervention in the Western Cape is an opportunity to test programme scalability through using existing government systems with teachers supported by Subject Advisors.

SALDRU at the University of Cape is tasked with conducting an external impact evaluation of the Funda Wandé and Bala Wandé workbooks intervention in the Western Cape.

This report focuses on the baseline findings of this evaluation.

THE INTERVENTION

Early results from the Eastern Cape and Limpopo evaluations have shown that the combination of Funda Wandé LTSM and support from coaches or teaching assistants is effective in improving early grade literacy and numeracy outcomes. However, the coaching and teacher assistant models are relatively resource intensive and challenging to scale. An important consideration is whether provincial education departments in South Africa can successfully implement the Funda Wandé and Bala Wandé programmes, given their budgetary and capacity constraints. The Western Cape intervention is a partnership between Funda Wandé and the Western Cape Education Department (WCED) that aims to develop and assess a province-wide rollout of Funda Wandé LTSM supported by Subject Advisors.

The Funda Wandé intervention is being incrementally rolled-out to all Afrikaans Language of Learning and Teaching (LOLT) schools in the province over a period of four years (2021-2024). During this period Funda Wandé is supporting the provincial education department in their implementation of the programme using a gradual release model of support with the aim of strengthening the internal capacity of the system. The first year (2021) involved a pilot in 50 Afrikaans schools with Funda Wandé leading the training of teachers. Over this year the LTSM were iteratively developed in collaboration with the WCED. The second year (2022) introduced the programme to 50 additional Afrikaans LOLT schools with the WCED leading the training with support from Funda Wandé. These 50 schools form the treatment group for this evaluation. In the third and fourth year, the programme will be rolled-out to all remaining Afrikaans schools in the province.

The 2022 intervention comprises three components 1) LTSM, 2) Teacher training and 3) ongoing support by Subject Advisors. Each component is described below.

The LTSM were developed by Funda Wandé and comprise of (1) activity workbooks for each learner, (2) teacher guides aligned to the learner workbooks that explain to the teacher what they need to teach and how and (3) classroom materials including readers, posters, phonics flashcards for literacy and manipulatives such as Base-Ten-Kits, Dienes' Blocks, models of shapes and measuring instruments for numeracy. The activity workbooks and teacher guides are closely aligned to the DBE Curriculum and Assessment Policy Statement (CAPS). There are two workbook series, one for numeracy (Bala Wandé) with the aim of "Calculating with confidence" and another for literacy (Funda Wandé), with the aim of "Reading for Meaning". There are four learner workbooks per grade and competency, one for each term. All three components complement each other, enabling teachers to vary their materials usage whilst still teaching the same concept. Further, Funda Wandé has made a series of open-access videos (available on YouTube) that go hand-in-hand with the teacher guides. The use of videos provides a visual teaching experience to enhance understanding and demonstrate the use of techniques in an authentic classroom environment.

The Afrikaans materials were developed over 2021 by Funda Wandé in collaboration with the WCED Directorate of Chief Education Specialists (DCES). Meetings were held both virtually and in person on a quarterly basis. Subject Advisors¹ were also given the opportunity to review and edit the Funda Wandé workbooks. Moving forward both stakeholders will continue with amendments and improvements based on feedback from the grassroots level.

¹ Subject advisors fall under the professional support service at the district level and are responsible for providing guidance and mentorship to in-service teachers within their fields of specialisation. Their main function is to "facilitate curriculum implementation and improve the environment and process of learning and teaching by visiting schools, consulting with and advising school principals and teachers on curriculum matters" (Department of Basic Education, 2013).

The training model utilises a cascade approach with the gradual reduction of Funda Wandé support. At the first level the Mathematics, Life Skills and Afrikaans DCEs train the District Coordinators and Foundation Phase Subject Advisors on the Funda Wandé programme content, curriculum structure and pedagogical strategies. This training evolved from being delivered entirely by Funda Wandé at the beginning of 2021 to a collaborative effort led by both partners. At the second level of the cascade, Subject Advisors train teachers within their respective circuits. In line with the gradual release support model, the initial teacher trainings were supported by the DCEs and Funda Wandé.

Subject Advisor training took place online over two days at the beginning of the first term of 2022 and was attended by 60 subject advisors. A second in-person session was held over two days in the second term and was attended by 57 Subject Advisors. For term three there will be a one day in-person training and term four will be a virtual training.

In term one of 2022, teacher training was conducted over three different days and led by the DCEs. Attendance at the first day was high (90 percent of intervention schools) but low on the other two days (40 percent and 6 percent of schools respectively). In term two there were two days of teacher training with DCEs and Subject Advisors co-training. Attendance was 72 percent of schools on the first day and 62 percent of schools on the second day. All teacher training was held virtually. For those unable to attend training due to connectivity issues, recordings of the training sessions were sent to the schools. Going forward there is a recognition of the need for more face-to-face training. However, planned trainings for terms three and four are virtual.

SUBJECT ADVISOR SUPPORT

Subject advisors are expected to provide teachers with ongoing technical and pedagogical support in their implementation of the Funda Wandé programme. This support function should be incorporated into their regular duties when they visit intervention schools. On average, each subject advisor will provide support to two intervention schools, visiting each school twice per term. However, this is slightly higher in the Metro East and Overberg districts where Subject Advisors typically look after 3 to 4 intervention schools.

2. Reasearch Aims and Design

RESEARCH AIMS AND DESIGN

RESEARCH AIMS

The primary aim of this evaluation is to assess the causal impact of the Funda Wandé and Bala Wandé materials – supported by governmental Subject Advisors – on learners’ literacy and numeracy outcomes. The results from this study will be compared to those in other provinces, namely the Eastern Cape and Limpopo. Therefore, the secondary aim of these evaluations is to provide an understanding of which modalities of support are effective. It will also feed into the comparative efficacy and cost-effectiveness of using in-house governmental personnel versus external individuals to support teacher professional development efforts.

In addition this research will feed into broader efforts to measure early learning outcomes in South Africa. The longitudinal learner level data collected during this study will provide the first opportunity to establish the predictive validity of the Early Learning Outcomes Measure (ELOM) 6 & 7 tool.

RESEARCH DESIGN

To identify the causal effect of the Funda Wandé intervention, we would ideally randomize schools into treatment and control groups as with the ongoing evaluations in the Eastern Cape and Limpopo. However, this was not possible as the 50 treatment schools selected for inclusion in the study were chosen by the Western Cape, Department of Education (WCED). We therefore use matching techniques to create an appropriate control group. In order to construct as credible a counterfactual as possible, we rely on a two stage process of matching. Firstly, we select 50 control schools matched on available administrative data including previous results on the Western Cape annual systemic tests. Then when we estimate the effects of the intervention, we will take advantage of the longitudinal data collected in this study to match on learner level baseline performance thereby further reducing any selection bias.

Table 1 summarizes the waves of data collection. Within each school, we will randomly select 10 learners who will be followed in a longitudinal panel for the duration of the study. We will administer literacy and numeracy assessments to these same individual learners at baseline in term 1 of 2022 and again in term 3 of 2023. Data from the grade 3 Western Cape systemic tests will provide the final learner outcome measure.

Table 1: Fieldwork waves

| Fieldwork wave | Term and year | Learner grade |
|------------------------|---------------|---------------|
| Baseline | Term 1 2022 | Grade 1 |
| Midline | Term 3 2023 | Grade 2 |
| Western Cape Systemics | Term 4 2024 | Grade 3 |

We provide more detail on the selection of both treatment and control schedules below

Selection of treatment schools

The treatment schools selected for inclusion in the study were chosen by the Western Cape, Department of Education (WCED). Subject Advisors asked schools within their district to complete an application form and then schools were chosen based on their responses. Table 2 summarises the main selection criteria as provided by the Subject Advisors for each district. The main concern for subject advisors was whether they thought that the school could benefit from the programme and whether the school was willing to be part of the intervention. Six out of seven subject advisors included the willingness to participate in the program in their decision, with the exception of the West Coast (WC). The next influencing factors were:

1. whether the school had effective management (Cape Winelands, Eden and Central Karoo, Metro East, West Coast),
2. whether the school needed to improve its performance (Cape Winelands, Eden and Central Karoo, Metro-North, Overberg),
3. whether the school could benefit from the professional development activities (Eden and Central Karoo, Metro East, Metro-North, and Metro South).

Some subject advisors also considered socioeconomic factors (Cape Winelands, Eden and Central Karoo, Metro South), the structured approach of the Funda Wande programme (Metro-North, Metro South, Overberg), the HL instruction focus of the programme (Eden and Central Karoo, Metro South), or whether the school was newly developed or not (West Coast).

Table 2: Selection of schools based on Subject Advisor discretion

| | Cape Winelands | Eden and Central Karoo | Metro East | Metro North | Metro South | Overberg | West Coast | Total |
|--|----------------|----------------------------|------------|-------------|-------------|----------|------------|-------|
| School displays a high willingness to implement programme | | | | | | | | 6 |
| School has effective management | | | | | | | | 4 |
| School is underperforming | | | | | | | | 4 |
| School will benefit from professional development activities | | | | | | | | 4 |
| Low socioeconomic status of students | | | | | | | | 3 |
| School responds well to FW's structured approach | | | | | | | | 3 |
| School responds well to CAPS alignment of the programmer | | | | | | | | 2 |
| School would benefit from the HL focus of the programme | | To Benefit Non-HL Learners | | | | | | 2 |
| School maintains high standards | | | | | | | | 1 |
| School is newly developed | | | | | | | | 1 |

Selection of matching schools

The selection of control schools utilised the following administrative data from the Department of the Western Cape.

1. Systemic Test data: The WCED conducts annual Systemic Tests in Language and Mathematics for Grades 3 and 6 and 9 learners. School systemic scores for Grade 3 were used in the selection of matching schools.
2. Administrative data from the WCED which documents school characteristics such as fee status, medium of instruction, quintile and geographical region (district, urban/rural).

The list of potential matches was restricted to primary schools with Afrikaans as the Language of Learning and Teaching (LOLT) who had not been selected for treatment nor were part of the 2021 Funda Wande pilot. We also included parallel medium schools that were confirmed to have Afrikaans classes by the Chief Education Specialist of Foundation Phase.

Schools were stratified into two strata: 1) district (whereby the Metro East, South, and Central districts were merged) and 2) whether the school was no-fee. All treatment schools in the Eden and Central Karoo districts were urban-based schools. For this reason, control schools were restricted to urban schools for the Eden and Central Karoo district. Overberg and the West Coast were further stratified into urban or rural rather than no fee. In total, this resulted in 11 groups to match on, with a combined total of 406 schools to choose from. See Table 3 below.

Table 3: Strata and schools available to match

| Strata | Available to match | Treatment schools | Total |
|-------------------------------------|--------------------|-------------------|------------|
| Cape Winelands fee | 45 | 3 | 48 |
| Cape Winelands no-fee | 116 | 6 | 122 |
| Eden and Central Karoo urban fee | 24 | 2 | 26 |
| Eden and Central Karoo urban no-fee | 18 | 7 | 25 |
| Metro North fee | 73 | 3 | 76 |
| Metro North no-fee | 8 | 3 | 11 |
| Metro (Central, East, South) | 13 | 12 | 25 |
| Overberg rural | 18 | 3 | 21 |
| Overberg urban | 14 | 6 | 20 |
| West Coast rural | 49 | 1 | 50 |
| West Coast urban | 28 | 4 | 32 |
| Total | 406 | 50 | 456 |

Within each stratum, schools were matched based on their average grade 3 systemic performance for literacy and mathematics from 2017 to 2019². This process aims to match each school in the treatment arm to the school with the closest average systemic score in the counterfactual (control arm). However, as fieldwork began we were instructed by the WCED to replace one of the treatment schools. We also discovered that one control school had closed down and 2 control schools refused to participate. Another control school was removed from the sample as it only had Grade R to 3 learners. These four control schools were all replaced, where possible with the next closest match³. Fieldwork was completed at two control schools where there were only grade R to 3 learners. To ensure that we had sufficient schools for the benchmarking exercise with Grades 4 and 7, one new control school was added to the sample. Of the 101 schools, 50 were in the treatment arm and 51 were in control. To match across districts, a control school from Overberg was dropped from the analytic sample resulting in a final sample of 100 schools evenly split between treatment and control⁴. The results of this process are shown in Figure 1 below.

2 An aggregate average score was determined using a Principal Components Analysis (PCA) across all schools in the administrative data set (all schools in the Western Cape province). A PCA reduces the data to a single component. This single component explained 87% of the variation.

3 For example, we had exhausted the sample in Metro (East, South, Central) after one replacement and needed to make the second replacement from Metro-North.

4 This was an under-performing school (comparative to other schools in the district) from the first quintile.

Figure 1: Geographical distribution of treatment and control schools across districts

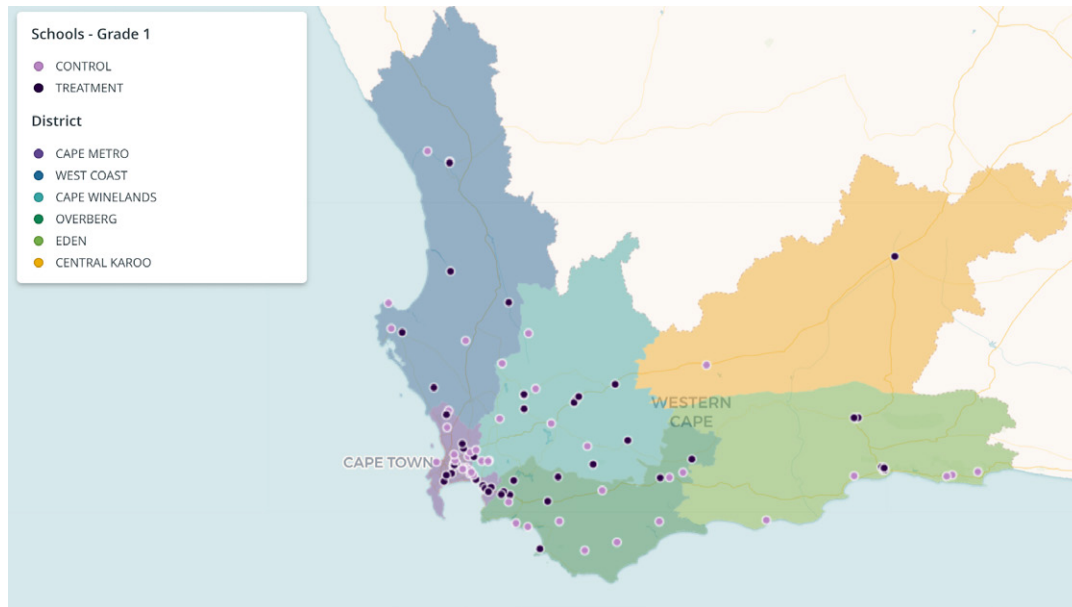


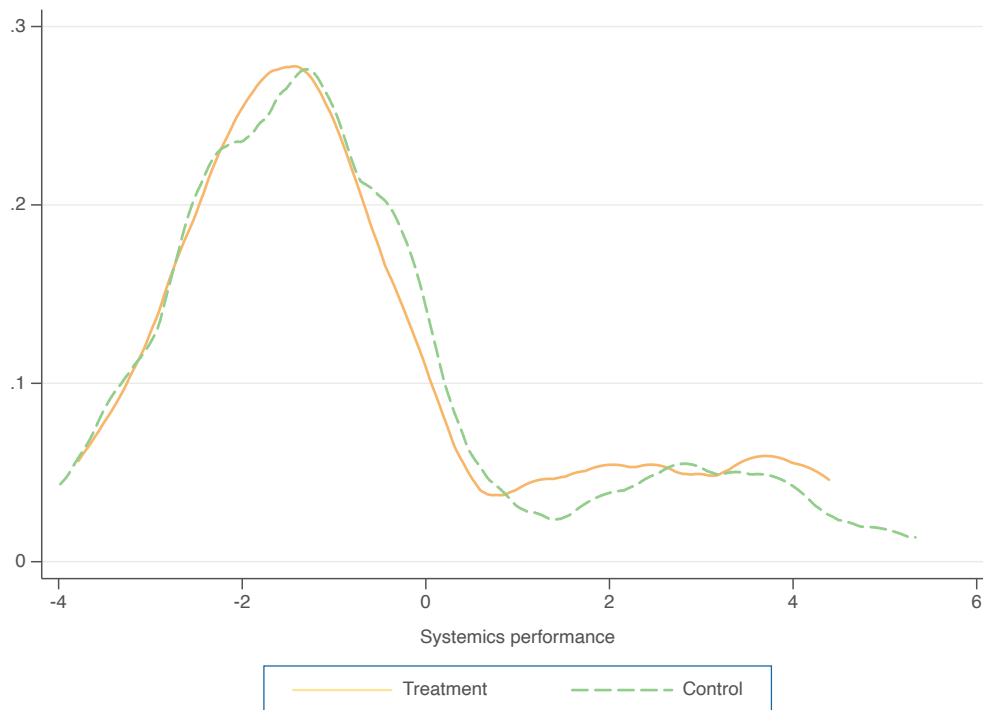
Table 4 summarises the characteristics of schools by treatment arm. Schools are exactly-matched across districts. However, there are substantially more quintile 1 schools in the control group than in the treatment group. A more detailed description of schools by their quintile is discussed in section 3. The average systemic scores are similar across districts, except in Overberg. In Overberg, treatment schools tend to perform better than control schools on average. When ranking the schools based on their score within the sample (from 1 – 100), the West Coast and Metro districts rank in the lower half of the distribution on average. On average, ECK and Overberg tend to rank in the upper half, and Cape Winelands at the median. There is a fairly even split of urban-rural across treatment status. By district, there are 7 rural schools in the Cape Winelands, 3 in Metro, 6 in Overberg and 3 in the West Coast. Lastly, according to administrative data, there are slightly more fee-paying schools in the control arm.

Table 4: Characteristics of schools by treatment arm

| | Control | Treatment | Total |
|--|---------|-----------|-------|
| District | | | |
| Cape Winelands (CW) | 9 | 9 | 18 |
| Eden And Central Karoo (ECK) | 9 | 9 | 18 |
| Metro | 18 | 18 | 36 |
| Overberg | 9 | 9 | 18 |
| West Coast (WC) | 5 | 5 | 10 |
| Quintile | | | |
| 1 | 10 | 6 | 17 |
| 2 | 6 | 7 | 13 |
| 3 | 12 | 13 | 25 |
| 4 | 11 | 12 | 23 |
| 5 | 11 | 12 | 23 |
| Average PCA Score Of Systemic Results | | | |
| Cape Winelands | -.87 | -.87 | -.87 |
| Eden And Central Karoo | -.26 | -.27 | -.27 |
| Metro | -.97 | -1.05 | -1.01 |
| Overberg | -0.24 | .35 | 0.058 |
| West Coast | -1.94 | -2.14 | -2.04 |
| Average PCA Score Ranking Of Systemic Results By District (1-100) | | | |
| Cape Winelands | 52 | 52 | 52 |
| Eden And Central Karoo | 55 | 54 | 55 |
| Metro | 45 | 48 | 46 |
| Overberg | 65 | 64 | 64 |
| West Coast | 33 | 28 | 30 |
| Urban Rural Split | | | |
| Rural | 10 | 9 | 19 |
| Urban | 40 | 41 | 81 |
| Fee Paying | | | |
| Yes | 28 | 24 | 46 |
| No | 22 | 26 | 54 |

The following figure (Figure 2) shows the kernel density plot of systemic performance scores by treatment arm. Scores match each other closely by arm.

Figure 2: Kernel density plot of systemic scores by treatment arm



BASELINE INSTRUMENTS

Five instruments were used to collect data 1) the Early Learning Outcomes Measure 6 & 7 learner assessment, 2) a brief learner household questionnaire 3) a teacher questionnaire, 4) a school observation tool, and 5) a principal questionnaire. Each instrument is described below. Additionally, we use Grade 4 and 7 data from the Afrikaans Reading Benchmarks study which was conducted at the same time as the current study.

Early Learning Outcomes Measure (ELOM) 6 & 7 Years Assessment

The ELOM 6&7 Years Assessment is a South African tool that was developed by Innovation Edge⁵ in 2018-2019 to address the growing need for measuring Early Childhood Development outcomes for children aged 69 - 89 months. The project team consisted of South African leaders in Early Childhood Development, developmental psychologists and specialists as well as specialist consultants in foundational phase numeracy and literacy. The main aim of the tool is to enable the DBE to report on their indicator: *The percentage of Grade R children ready for Grade 1*. While the development of the ELOM was informed by the Grade R Curriculum and Assessment Policy Statement (CAPS), due to time restrictions it references key predictors of Foundation performance and does not cover all areas. The ELOM 6&7 assess the language and literacy, numeracy and mathematical skills and underlying cognitive and executive functioning skills which correlate with both language and mathematical abilities. It is a population-level instrument that measures differences in levels of the key predictors to provide diagnostic feedback to the education system. A Pilot study was conducted in 2019 to 1) inform the finalisation and refinement of a new test and 2) conduct analyses to examine how children from different socio-economic backgrounds (based on school quintiles) and languages responded to each item. A nationally representative sample is needed in order to conduct final psychometry analyses and standardisation. The longitudinal data collected in this study will contribute to establishing the predictive validity of the tool.

For this baseline, we required an instrument that would both be correlated with later literacy and numeracy outcomes and provide good discrimination between learners at baseline. Given time constraints and the focus of our study, we used selected items from the literacy and numeracy domains. Tables 5 and 6 below outline the items selected at baseline for each competency – literacy, and numeracy, respectively.

⁵ <https://innovationedge.org.za/>

Table 5: Subtasks included in the literacy assessment:

| Literacy | |
|--|---|
| Task | Sub-task & Measurement |
| Item 2: Nonword Repetition | Learner is asked to repeat a non-word. |
| Item 3: Productive vocabulary (3 sets of 12) | Learner is asked to name the picture shown on the tablet. |
| Item 4: Phonemic Awareness | Identify and manipulate phonemes (starting and ending sounds of words, segmenting words) |
| Item 5: Letter Sounds | Number of letters sounds identified. |
| Item 9: Listening comprehension | Number of questions answered correctly about a passage listened to on the tablet. |
| Item 10: Concepts about print | Learner is asked questions relating to book concept, orientation, print direction and word concept. |

Table 6: Subtasks included in the numeracy assessment

| Numeracy | | |
|-----------------------------|-----------------------------|---|
| Content area | Topic | Task |
| Number sense and operations | | |
| | Number concept | Item 1: Counting forwards (to 20) |
| | Number concept | Item 2: Counting backwards |
| | Number concept | Item 3: Counting on from a given number |
| | Number concept | Item 4: Skip counting in twos |
| | Number concept | Item 5: Counting with one-one correspondence |
| | Number concept | Item 6: Number order |
| | Number concept | Item 7: Number recognition |
| | Number sense | Item 8: Subitising to 5 |
| | Number sense | Item 9: Knowledge of ordinal numbers |
| | Number sense | Item 10: Comparing two collections (grouping) |
| | Solve problems | Item 12: Addition and subtraction problems |
| | Solve problems | Item 13: Solving sharing and grouping problems |
| Space and shape | | |
| | 2-D shapes | Item 15: Shape identification and understanding |
| Data Handling | | |
| | Sorts collection of objects | Item 16: Sorting and classification |
| Patterning | | |
| | Patterns | Item 17: Pattern completion |
| | Patterns | Item 18: Pattern extension |

Learner interview

At the end of the ELOM 6&7 assessment, learners were asked a few demographic and home background questions. These questions identified the child's language experience, birth date, socioeconomic status (including an asset list of items such as a radio, computer or washing machine and home environment, such as access to electricity), and access to books at home and school.

Teacher questionnaire

A randomly selected Grade 1 teacher was interviewed at each school. Teachers were asked about their experience and expertise, learner attendance (including COVID-19 rotational timetabling), demographics, their general teaching practices, and a range of questions seeking to understand their attitudes and beliefs, as well as their motivation, job satisfaction, and burnout. Teachers in the treatment schools also received questions about their experience with Funda Wandé, and whether they had received the materials or not.

Principal/HOD questionnaire

A very short interview was conducted with the principal, deputy principal or Foundation Phase Head of Department. Most questions related to the proportion of children who attended Grade R, school fees for Grade 1, number of classes and teachers in Grade 1. Questions about rotational timetabling, and library and internet access were also included.

School observation

A school observation was also conducted by the assessor. This observation form recorded library, water and electricity access on the day of the observation and recorded the number of enrolments per grade from Grade R to Grade 7. The number of toilets available for boys and girls was also recorded.

Afrikaans Reading Benchmarks

The Department of Basic Education has been collecting data on early grade reading in all official languages in South Africa for the purposes of establishing oral reading fluency benchmarks. To date, benchmarks have been set for Nguni languages. In collaboration with Funda Wandé, benchmarks are being developed for Afrikaans oral reading fluency and comprehension. During the data collection for Grade 1 learners, benchmarking data were collected for grades 4 and 7 (in 97 schools for Grade 4, and 96 for Grade 7) in the same schools as those of Grade 1. This is the first time large-scale Afrikaans early grade reading assessments have been completed in South Africa. Learners were assessed using the Early Grade Reading Assessment (EGRA) containing various subtasks. Table 7 below shows the tasks conducted within each grade.

Table 7: Grade 4 and 7 benchmarking sub-tasks from EGRA assessment

| Skill/Task | Grade 4 | Grade 7 |
|--|---------|---------|
| Phonemic awareness | X | |
| Rapid Object Naming | X | |
| Letter-sound Knowledge | X | |
| Complex Consonants/Diacritic | X | |
| Word Reading | X | |
| Oral Reading Fluency + Comprehension Questions | X | X |
| Written Comprehension | X | X |
| Written vocabulary task | | X |

BASELINE FIELDWORK

The baseline fieldwork was conducted by iKapadata, the same company that has conducted the fieldwork for prior Funda Wande evaluations. Fieldworker training took place in Cape Town from 31 January to 5 February 2022 and was conducted by the Principal Investigator together with a research team from iKapadata. The training covered all of the instruments and fieldworkers were observed over the five days. Fieldworkers also performed interrater reliability (IRR) tests which together with observations from training, were used to select the final team members. Additional training topics included research ethics, the basics of survey research, the use of tablets and SurveyCTO software, research protocols for working with children, and COVID-19 protocols. On the fourth day of training, fieldworkers visited a pilot school not included in the evaluation sample in order to gain familiarity with the assessments, device, and fieldwork setting.

A fieldwork schedule with dates for each school in the Grade 1 and benchmarking sample visit was prepared in January 2022 based on the initial sample of schools. This schedule was included in a letter which also explained the study and asked the schools to prepare an adequate space for the assessments. The letter was signed by the Director of General Education and Training at WCED and emailed to the schools by their respective district offices. Following this, ikapadata fieldwork team leaders contacted schools via telephone at least one week in advance reintroducing the study to the principal and relevant teachers and gaining permission to conduct the study at the school.

Data collection was conducted between the 7th of February and the 23rd of March 2022. At each school, learners were randomly sampled using a digital form. Two Grade 1 classes were randomly selected and then 10 learners were randomly selected within each class for a total of 20 learners per school. In the event the school had only one Grade 1 class, all 20 learners were selected from that class. Learners were considered ineligible to participate if they refused to participate. No other exclusion criteria were used in-field.

Post assessment, learners were considered ineligible if their caregiver did not consent to their inclusion in the study. Consent forms were given after each learner was assessed. These were to be returned should parents/guardians not want their child to participate. When consent forms were returned, any data for these children were deleted, and only their study ID and school ID were kept. Learners were later excluded from the study if they had any cognitive impairments⁶.

BALANCE BETWEEN TREATMENT AND CONTROL

Tables 8-10 show the differences between treatment and control schools at the school, teacher and Grade 1 learner level on a range of characteristics. On average, we find that control and treatment groups are very similar across almost all characteristics. With the exception of a few teacher level variables, none of the differences are statistically significant.

Table 8: School level characteristics by treatment status

| | Mean | |
|--|-----------|-----------|
| | Control | Treatment |
| % of schools with no fees | 70% | 74% |
| Average school fees per annum (R) | 2323 | 1961 |
| Access to internet | 100% | 98% |
| Electricity | 100% | 98% |
| Running water | 96% | 98% |
| Fencing | 100% | 98% |
| Library | 60% | 60% |
| Toilet to learner ratio: <=30 | 56% | 42% |
| Toilet to learner ratio: >30-60 | 34% | 40% |
| Toilet to learner ratio: >60 | 10% | 18% |
| Average school performance | | |
| Grade 4 composite score* | 0.02 | -0.02 |
| Grade 4 ORF (correct words per minute)* | 42.6 | 39.4 |
| Grade 7 composite score* | -0.00 | 0.00 |
| Grade 7 ORF (correct words per minute) * | 95.8 | 93.7 |
| Grade 1 composite score | .05 | -.05 |
| Total number of observations | 50 | 50 |

Notes: *Not all schools in the sample have grade 4 and 7 scores available.

⁶ We follow the protocols applied to ELOM 4 & 5 (Dawes et al., 2020), and removed these learners based on enumerator comments post data collection.

Table 9: Teacher level characteristics by treatment status

| | Mean | |
|--|-----------|-----------|
| | Control | Treatment |
| Female | 98% | 100% |
| Age in years [†] | 48 | 41 |
| Experience in years teaching Foundation Phase [†] | 21 | 15 |
| Has a degree | 96% | 100% |
| Intends to stay in the teaching profession | 76% | 82% |
| Learners enrolled [†] | 31 | 35 |
| Learners present on the day of observation [†] | 28 | 32 |
| Grouping of learners: | | |
| No grouping | 4% | 4% |
| Ability grouping | 78% | 76% |
| Mixed ability grouping | 18% | 20% |
| Total number of observations | 49 | 50 |

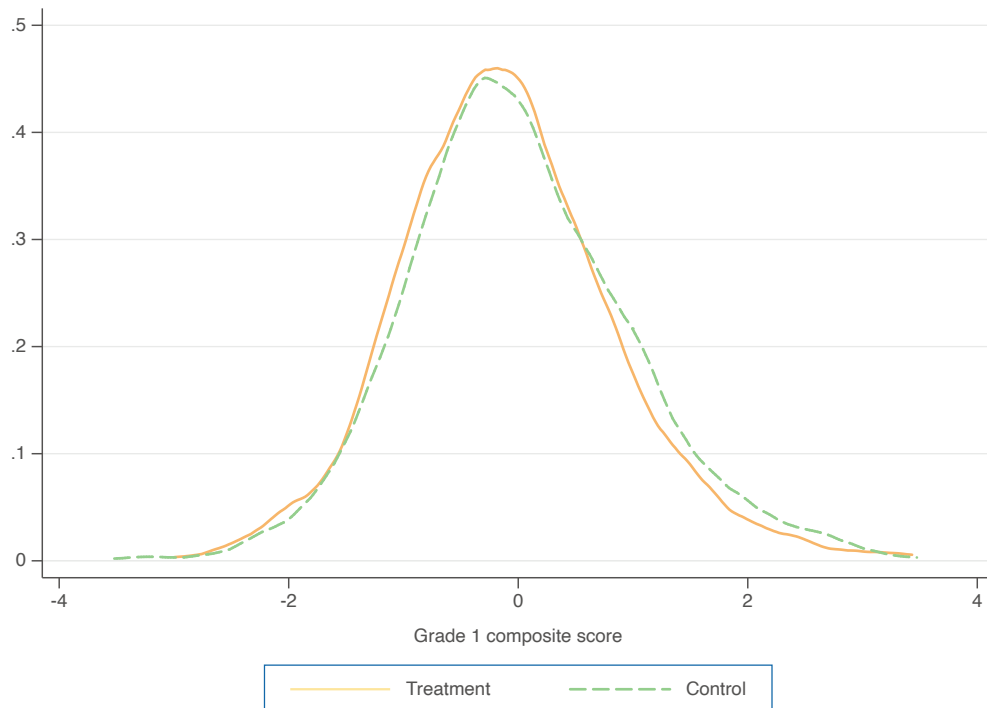
Notes: One control school teacher did not consent to the interview. [†]These differences are significant at the 5 percent level.

Table 10: Learner level characteristics by treatment status

| | Mean | |
|----------------------------------|------------|------------|
| | Control | Treatment |
| Lives with mother | 91% | 93% |
| Has less than five books at home | 81% | 76% |
| Has a radio at home | 53% | 55% |
| Has a mobile at home | 87% | 87% |
| Has a television at home | 90% | 91% |
| Has a computer at home | 45% | 45% |
| Has a washing machine at home | 88% | 89% |
| Has a refrigerator at home | 93% | 93% |
| Has a bicycle at home | 66% | 66% |
| Has a vehicle at home | 62% | 62% |
| Has electricity at home | 95% | 96% |
| Has running water at home | 94% | 94% |
| Has hot running water at home | 68% | 75% |
| Mostly speaks Afrikaans at home | 84% | 80% |
| Observations | 981 | 994 |

Figures 3-5 show the distribution of the Grade 1, 4 and 7 composite scores. The Grade 1 composite score was calculated by using item response theory (IRT)⁷. The Grade 4 and 7 aggregate scores were calculated by using a PCA⁸ score constructed on the EGRA tasks shown in Table 7. The solid line represents the treatment group and the dashed line represents the control group. These figures show that baseline composite scores are similarly distributed by treatment status, especially for Foundation Phase learners in grades 1 and 4.

Figure 3: Distribution of Grade 1 composite score



⁷ We use a two-parameter IRT model. This model specifies two parameters affecting a learner's response to a particular item: (1) the difficulty level of the item and (2) the item discriminability. The composite score is weighted using the discrimination parameter. For this analysis, we restrict weights to the control group.

⁸ The first component explained 70% of the variation for grade 4 and 75% of the variation in grade 7 tasks.

Figure 4: Distribution of Grade 4 composite score

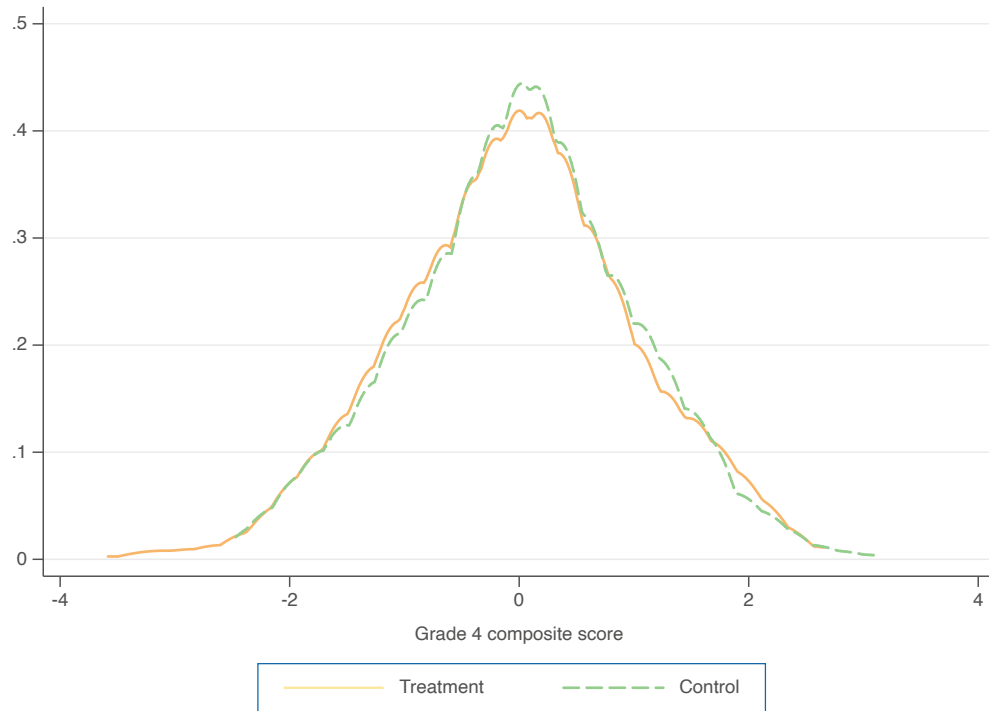
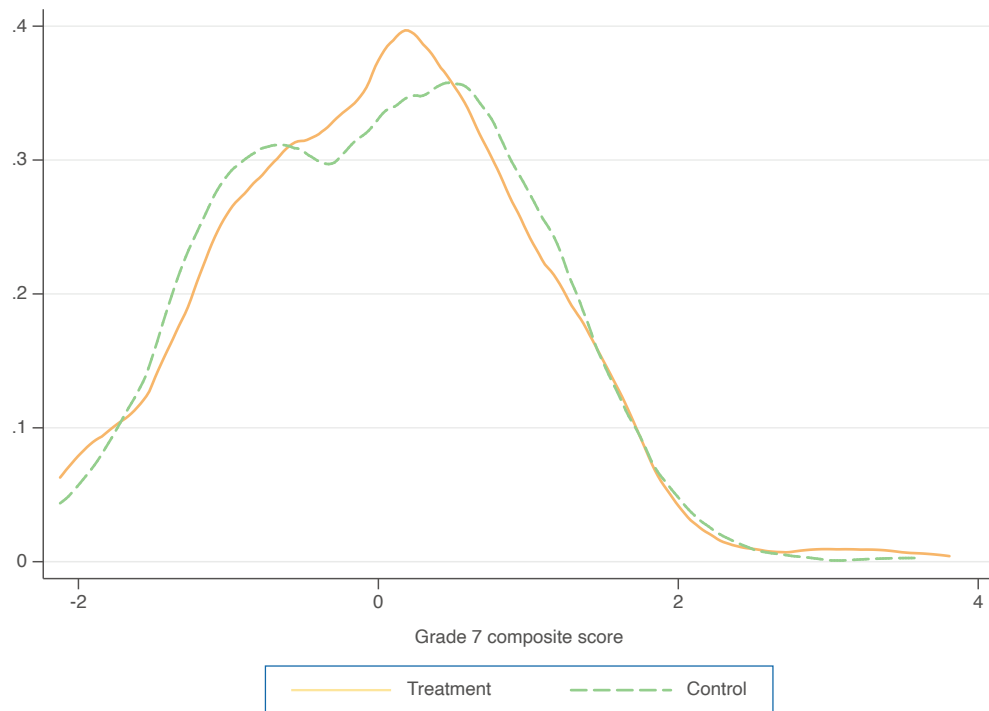


Figure 5: Distribution of Grade 7 composite score

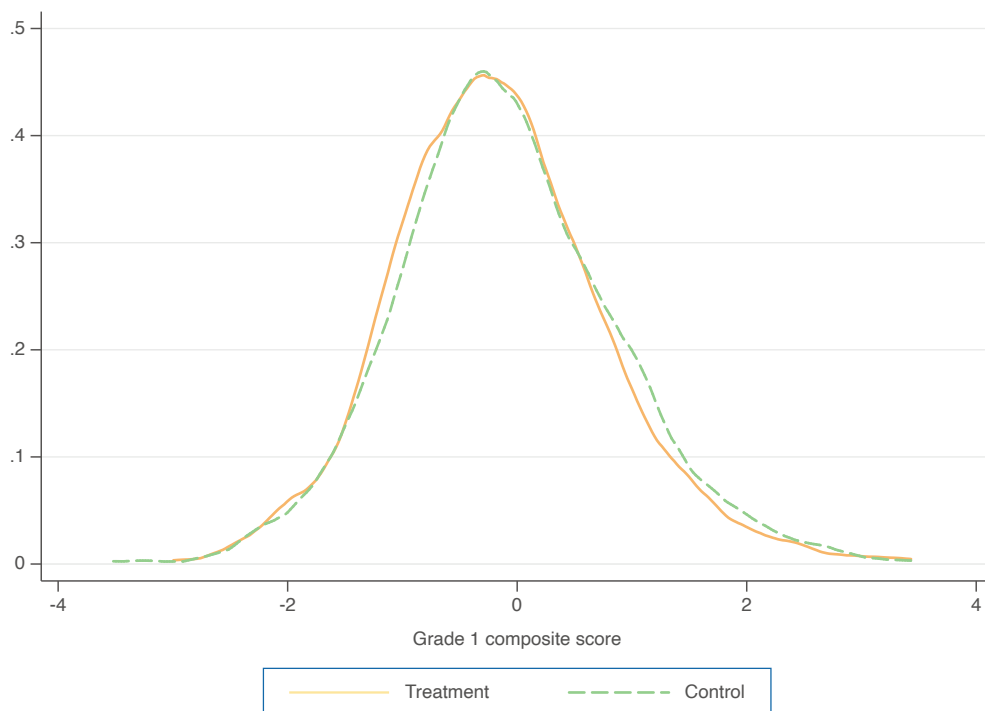


Matching at the individual level

While the treatment and control schools are well balanced on observable school-level characteristics, we can further strengthen the plausibility of our counterfactual by using longitudinal data to match on baseline performance at the individual learner level. Propensity score matching methods provide a natural weighting scheme and allow one to match learners across a range of dimensions. The propensity score is the estimated probability of receiving treatment conditional on covariates. These scores are then used to create analytic weights which will be applied to regressions when determining the treatment effect at the next round of data collection.

We use the grade 1 composite score, fee group (*Fees less than R1000; Fees greater than R1000*), school fees and whether the learner has less than five books at home or not as covariates in our propensity score model. Figure 6 shows the weighted distribution of learner composite scores by treatment. The distribution of scores by treatment arm are more closely aligned, particularly at the mean (zero) in comparison to Figure 3.

Figure 6: Distribution of weighted composite scores at the learner level – post matching



RESULTS

SCHOOL CHARACTERISTICS

Previous Funda Wande evaluations in the Eastern Cape and Limpopo have focused exclusively on no-fee schools in quintiles 1 to 3. In contrast, the Western Cape sample includes schools across the full range of DBE quintiles. Funda Wande materials and training are designed to address the challenges in a typical no-fee classroom and it is unclear what impact should be expected in classrooms that were already highly resourced prior to the intervention. That said, Funda Wande works with an eye to scale and in the context of a provincial roll-out it is important to examine the uptake and acceptability of the Funda Wande materials in better resourced schools.

Evidence from data focusing on the Western Cape has cautioned the use of school wealth quintiles as predictors of individual learner and school outcomes (Zoch, 2017). Quintiles are assigned by the DBE and are based on the relative poverty levels of the community living within 3km of the school. However, Zoch (2017) found that less than half of students go to schools in the same wealth quintile as the area they reside in and that learners from quintile 3 and 4 schools are actually less likely to reach and pass matric than learners from quintile 1 and 2 schools. In view of this evidence, we pay close attention to the characteristics of schools within quintiles.

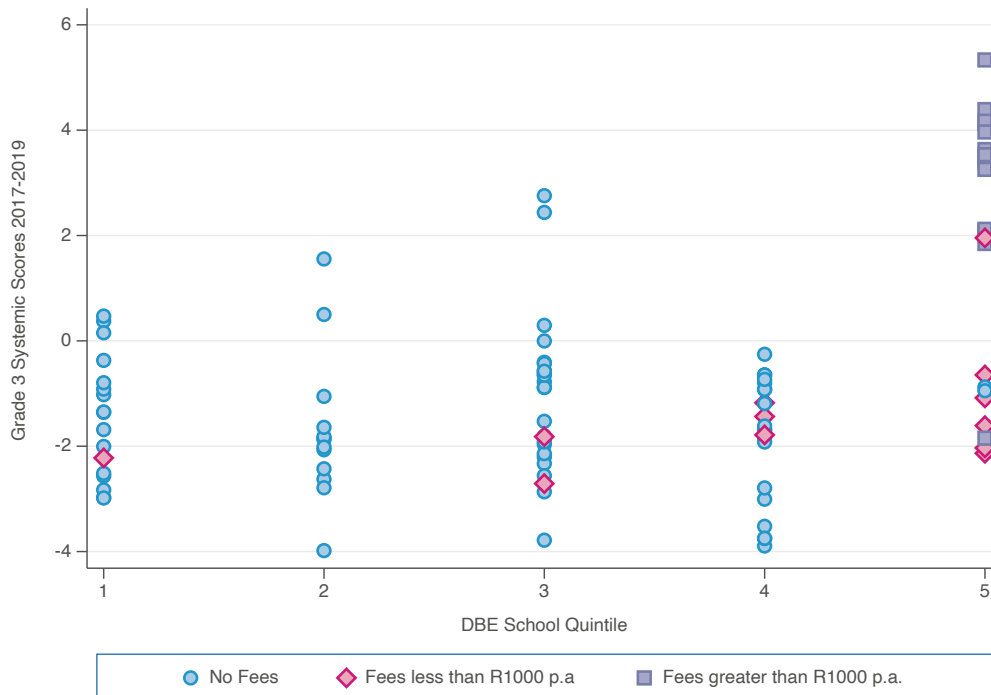
Data collected from interviews with principals on school fees reveal some misalignment with administrative data on whether a school is fee-paying. For example, 22 schools in our sample were classified as fee-paying in the administrative data but were no-fee schools according to principals, and three schools recorded as non-fee in the administrative data were reported as fee-paying in the principal interview. Table 11 shows the breakdown of fees charged by quintiles for the 100 schools in the sample. There are a handful of quintile 1 and 3 schools that do pay a small fee of up to R250 per annum in the Cape Winelands, Eden and Central Karoo and Metro districts. All quintile 2 schools are no-fee. Three quintile 4 schools pay up to R500 per annum. There are also two no-fee quintile 5 schools in the treatment arm (Cape Winelands and the West Coast). Within the fee-paying quintile 5 schools there is large variation in fees with 5 schools charging fees less than R1000 and 16 charging fees ranging between R1030 and R32000.

Table 11: Fees charged and school quintiles

| | No-fee | Fees up to R1000 | Fees >R1000 | Total |
|------------|--------|------------------|-------------|-------|
| Quintile 1 | 15 | 1 | | 16 |
| Quintile 2 | 13 | | | 13 |
| Quintile 3 | 23 | 2 | | 25 |
| Quintile 4 | 20 | 3 | | 23 |
| Quintile 5 | 2 | 5 | 16 | 23 |

The alignment between fees charged and school performance is evident in Figure 7 which plots the Western Cape systemic scores by quintile with the colour of the points indicating whether a school is no-fee, low-fee (<R1000) or relatively higher fee (R1000). There is a distinct group of quintile 5 schools that are charging fees in excess in R1000 and have better systemic scores. In terms of fees and prior performance, quintile four schools are not distinguishable from schools in the lower three quintiles.

Figure 7: Western Cape systemic scores by quintile



Given the misalignment between fees and DBE quintiles, we use Latent Class Analysis (LCA) to categorise schools into two classes⁹. LCA helps one identify unobserved groups, by quantifying who is likely to be in a group and how that group's characteristics differ from other groups. We modelled the LCA across a range of variables including Grade 4 and 7 EGRA scores, school systemic scores and the proportion of Grade 1 learners who have certain home characteristics at each school (a mobile, computer, bicycle, vehicle, microwave, hot running water and books), DBE quintile, and fees. The optimal model revealed that 16 schools were categorised as a separate group. These are all quintile five and relatively high paying (>R1000 per annum) schools in the sample. The lowest paying fee in this group is R1030. Throughout this report, we refer to this group as “*Fees greater than R1000 p.a.*” and its counter as “*Fees less than R1000 p.a.*”, where the highest fee was R850.

Table 12 shows school characteristics by fee group. While the sample still includes higher fee schools, the majority of schools are no-fee schools (87% percent in the *Fees < R100* group). The average fees charged per annum are much higher in the *Fees > R1000* group (an average of R13121 p.a. compared to R51 in the *Fees < R1000* group). Almost all schools have access to the internet, electricity, running water and fencing, with exceptions coming from the *Fees < R1000* group. The majority of schools (75 percent) in the *Fees > R1000* group have a library, while under two-thirds of schools (57 percent) in the *Fees < R1000* group have a library. On average, the majority of schools in the *Fees > R1000* group have a toilet to learner ratio of less than 30 (82 percent) compared to only 43 percent of schools in the *Fees < R1000*. Less than 30 is the average recommendation by the World Health organisation.

When comparing the average school performance of Grade 4 and 7, schools in the *Fees > R1000* group outperform the *Fees < R1000* significantly. For the composite scores, average performance in schools in the *Fees < R1000* are consistently below the mean (<0.00) and performance in the *Fees > R1000* is consistently well above the mean. Similarly, the average Grade 4 and 7 learner can read between 30 to 40 additional correct words per minute in the *Fees > R1000* group in comparison to the *Fees < R1000* group.

⁹ The choice of two classes were determined by post-estimation of the model. Modeling on more than two classes did not result in clear differences across groups.

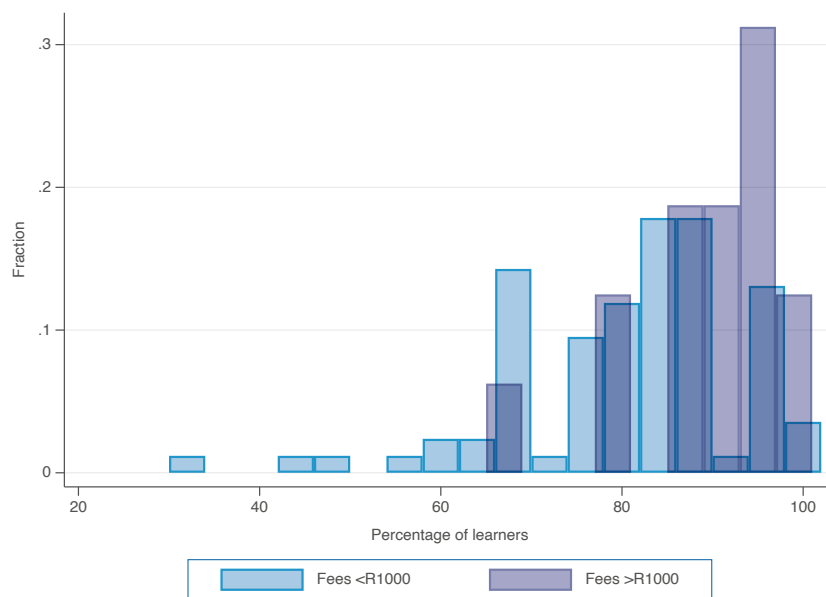
Table 12: School characteristics by fee group

| Total | Mean | |
|---|-------------|-------------|
| | Fees <R1000 | Fees >R1000 |
| % of schools with no fees | 87% | 0% |
| Average school fees per annum (ZAR) | 51 | 13121 |
| Access to internet | 99% | 100% |
| Electricity | 99% | 100% |
| Running water | 96% | 100% |
| Fencing | 99% | 100% |
| Library | 57% | 75% |
| Toilet to learner ratio: <=30 | 43% | 82% |
| Toilet to learner ratio: >30-60 | 43% | 6% |
| Toilet to learner ratio: >60 | 14% | 12% |
| Average school performance | | |
| Grade 4 composite score* | -0.11 | 0.58 |
| Grade 4 ORF (correct words per minute)* | 34.9 | 74.3 |
| Grade 7 composite score* | -0.14 | 0.73 |
| Grade 7 ORF (correct words per minute)* | 89.8 | 121.06 |
| Total number of observations | 50 | 50 |

Notes: *Not all schools in the sample have grade 4 and 7 scores available.

We calculated the percentage of grade 1 learners assessed in each school that reported Afrikaans as the most common language spoken at home. Figure 8 shows the distribution of the percentage of learners in each school who speak Afrikaans at home. There is considerable variation between schools – ranging from 30 to 100 percent of learners. Schools with a lower percentage of Afrikaans learners tend to be in the no-fee or low-fee group.

Figure 8: Distribution of the percentage of learners who speak Afrikaans



LEARNER CHARACTERISTICS

The final sample consists of 1975¹⁰ Grade 1 learners. Table 13 presents basic sample characteristics of all learners. The first column presents averages across the full sample, while the second and third column show differences between the two groups (Fees < R1000 and Fees > R1000). Overall, there are slightly more boys (53 percent) than girls (47 percent). The vast majority of learners live with their mother (92 percent) and roughly three-quarters live with their father. More than half of the learners do not have books at home (52 percent). Almost no children (3 percent) have “many” books at home, but few do have “lots” (14 percent). To answer this question, learners were shown a showcard displaying various piles of books in different quantities. While almost all learners have a television at home (91 percent), around half have a radio (54 percent) or a computer (45 percent) in their home. The majority of learners report having running water inside their home (94 percent), and just under three quarters (72 percent) report that this includes hot water. The vast majority of learners also report having a toilet inside their home (91 percent).

By fee group, we see differences across a range of variables. While gender and age are similar on average, a slightly higher percentage of learners in the *Fees > R1000* group live with their mother (7 percentage points more); live with their father (11 p.p. more), are likely to have at least one book (28 p.p. more) or lots of books (23 p.p. more). These learners are also highly more likely to have a computer, bicycle, car/truck or hot running water in their home¹¹.

¹⁰ Of the 2039 learners sampled, 6 learners were absent, 4 had to leave school early and 1 learner was new to the school and Afrikaans was not her home language. A further, 17 did not consent to participate, 5 revoked their consent during the assessment and 15 caregivers refused. Additionally, in accordance with ELOM guidelines informed by the World Health Organization Ten Point Disability Screen (Durkin et al., 1995), learners with disabilities were excluded. This included 2 learners with a hearing impairment, 1 with a learning disability, 2 learners with a speech impairment, 1 special needs learner who is in the process of a school transfer and 1 learner with a physical disability. Finally, in schools where more than 20 learners were assessed (7 schools), the first 20 learners with non-missing tasks were kept.

¹¹ See Appendix Table A2 for marginal means.

Table 13: Grade 1 learner sample characteristics by fee group

| Characteristic | Mean | | |
|--|-------------|-------------|-------------|
| | Overall | Fees <R1000 | Fees >R1000 |
| Female | 47% | 47% | 48% |
| Age | 82 months | 82 months | 80 months |
| Lives with mother | 92% | 91% | 98% |
| Lives with father | 77% | 75% | 86% |
| No books at home | 52% | 56% | 28% |
| Few books at home | 27% | 27% | 23% |
| Some books at home | 5% | 4% | 9% |
| Many books at home | 3% | 2% | 7% |
| Lots of books at home | 14% | 10% | 33% |
| Is there a radio at your home? | 54% | 52% | 61% |
| Is there a television at your home? | 91% | 89% | 97% |
| Is there a computer at your home? | 45% | 38% | 80% |
| Is there a refrigerator at your home? | 93% | 92% | 100% |
| Does anyone at your home have a bicycle? | 66% | 62% | 89% |
| Does anyone at your home have a car, or a truck? | 62% | 55% | 95% |
| Is there a washing machine at your home? | 88% | 86% | 99% |
| Is there a microwave at your home? | 82% | 79% | 97% |
| Do you have electricity at your home? | 95% | 95% | 99% |
| Is there running water inside your home? | 94% | 93% | 97% |
| Is there hot running water inside your home? | 72% | 68% | 91% |
| Is there a toilet inside your home? | 91% | 90% | 99% |
| Mostly speaks Afrikaans at home | 82% | 81% | 89% |
| Mostly speaks Afrikaans with friends | 90% | 90% | 92% |
| Observations (N) | 1975 | 1661 | 314 |

TEACHER CHARACTERISTICS AND PEDAGOGY

Teacher characteristics are summarised separately by fee group in Table 14. Almost all teachers are female and are on average 44 years old across both groups. Teachers in the higher fees group have slightly more experience in teaching foundation phase (21 years in comparison to 18). The vast majority of teachers hold a bachelor's degree or higher. A higher proportion of teachers in higher fee schools report intending to stay in the teaching profession than those in no-fee or low-fee schools (88 percent versus 75 percent). On average, classes have around 6 to 7 more learners in no-fee and low-fee schools compared to higher fee schools.

Table 14: Teacher characteristics by fee group

| | Mean | | |
|--|---------|-------------|-------------|
| | Overall | Fees <R1000 | Fees >R1000 |
| Female | 99% | 99% | 100% |
| Age in years [†] | 44 | 44 | 44 |
| Experience in years teaching Foundation Phase [†] | 18 | 17.7 | 20.6 |
| Has a degree | 98% | 99% | 94% |
| Intends to stay in the teaching profession | 79% | 77% | 88% |
| Learners enrolled [†] | 33 | 34 | 27 |
| Learners present on the day of observation [†] | 30 | 31 | 25 |
| Total number of observations | | 49 | 50 |

Notes: One control school teacher did not consent to the interview. [†]These differences are significant at the 5 percent level.

During teacher interviews, the most frequently reported challenge was that there is not enough support at home (Table 15). Teachers also reported that class sizes are too large (22 percent). These were fairly similar across fee groups, with a slightly higher percentage of teachers in the *Fees >R1000* group stating that there is not enough support at home (63 versus 54 percent). Teacher responses in the “Other” category mentioned responses such as all options being applicable, learners not attending an accredited Grade R program, and learners struggling to keep attention/phonics.

Table 15: Teacher reported challenges

| Challenge | Mean (%) | | |
|--|----------|--------------|-------------|
| | Overall | Fees < R1000 | Fees >R1000 |
| Class sizes are too large | 22% | 23% | 19% |
| Learners are behind / cannot keep pace | 13% | 18% | 13% |
| There are not enough books | 2% | 2% | 0% |
| There is not enough support at home | 56% | 54% | 63% |
| Other | 7% | 2% | 6% |

Pedagogy

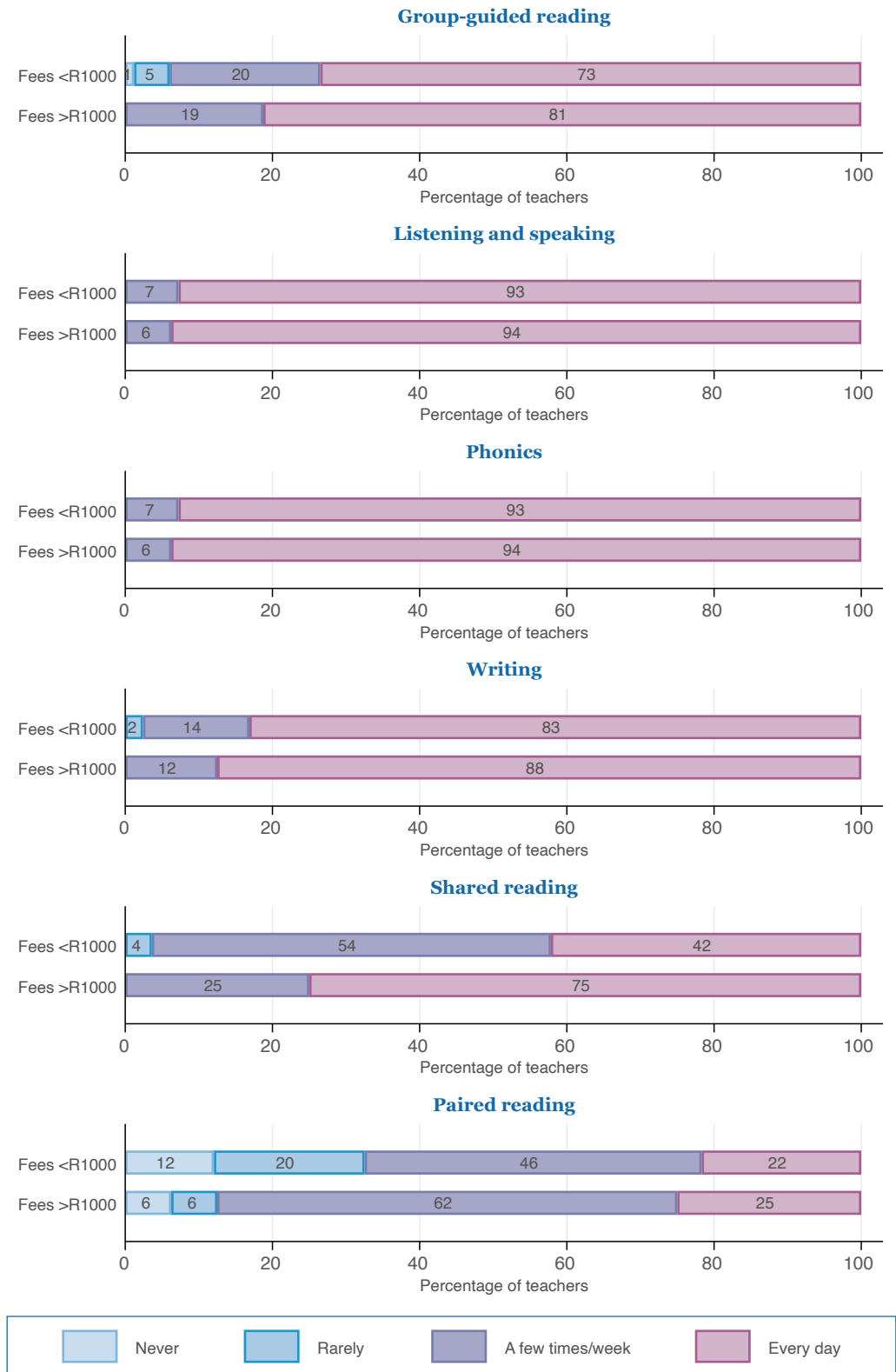
Across the two fee groups, the majority of teachers report sometimes grouping their learners for home language teaching (Table 16). Teachers in higher fee schools are more likely to group learners by ability.

Table 16: Grouping of learners

| | Mean | | |
|-------------------------------------|---------|-------------|-------------|
| | Overall | Fees <R1000 | Fees >R1000 |
| Grouping of learners: | | | |
| No grouping | 4% | 5% | 0% |
| Ability grouping | 77% | 75% | 88% |
| Mixed ability grouping | 19% | 20% | 12% |
| Total number of observations | | 49 | 50 |

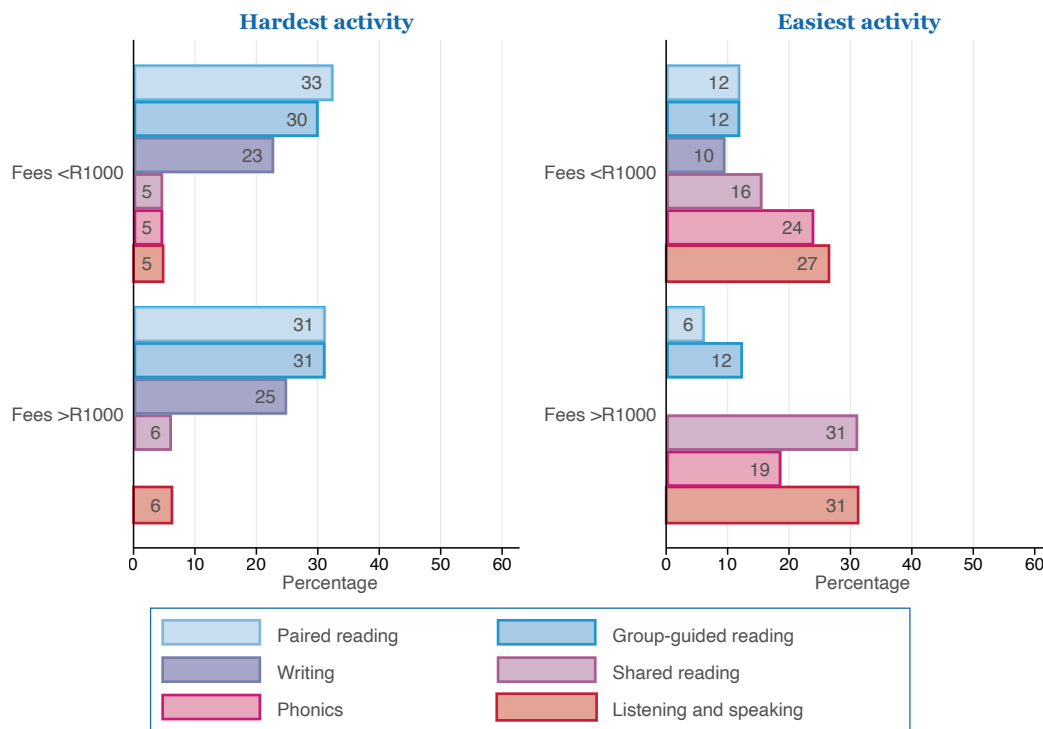
Teachers report doing various home-language activities at similar frequencies across the fee groups (Figure 9). Most teachers report doing a group-guided reading, listening and speaking, phonics and writing activity every day (more than 80 percent of teachers). However, teachers in the *Fees greater than R1000* group report doing paired and shared reading more frequently. For example, 75 percent of teachers in this group report doing shared reading every day, versus 42 percent in the *Fees less than R1000* group.

Figure 9: Self-reported frequency of activities



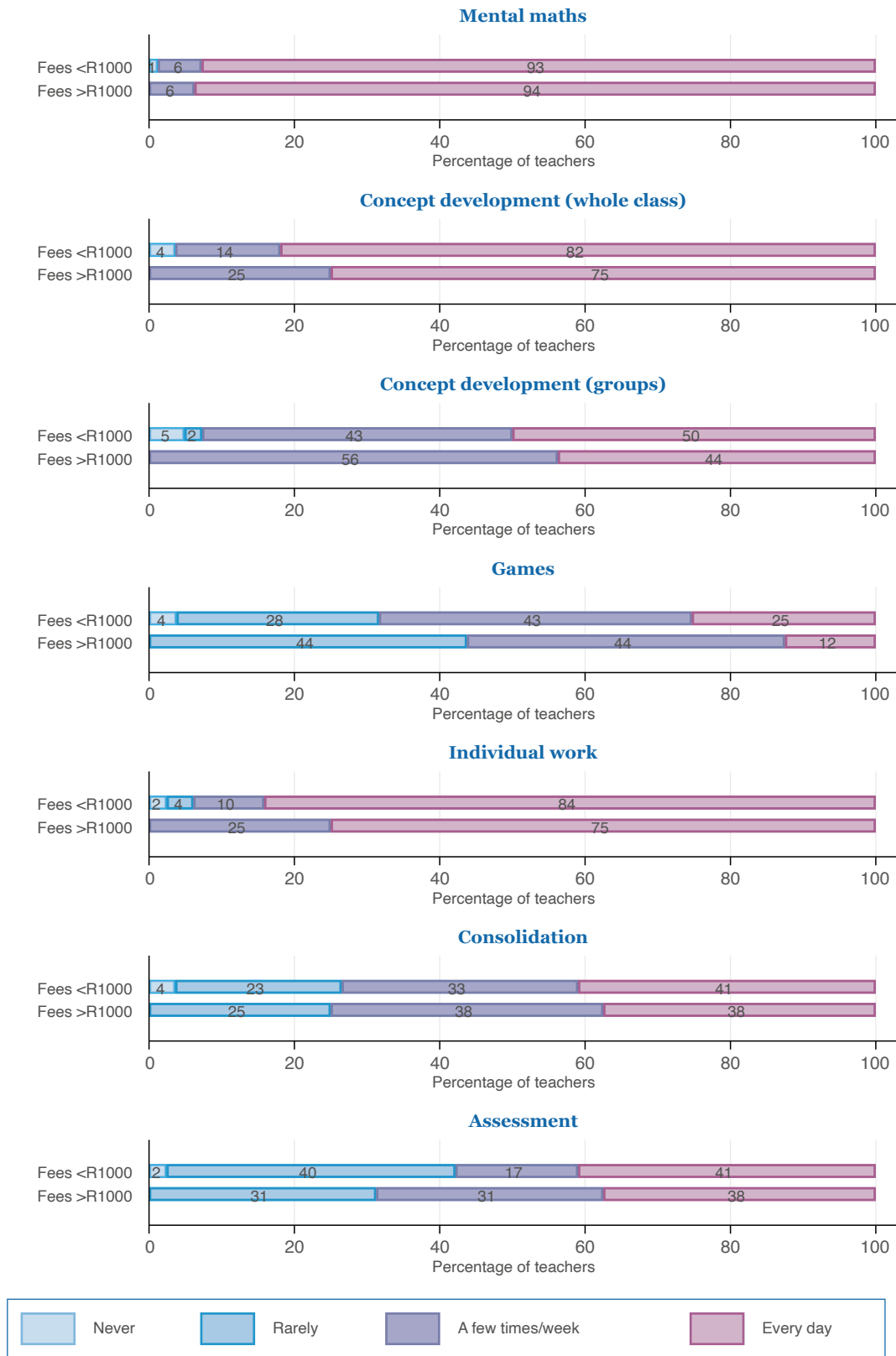
Around a third of teachers in both groups (30-33 percent) report that either group-guided or paired reading is the most difficult home language activity. There is a lot more variation in what teachers consider the easiest home-language activity, but 26 percent and 31 percent of teachers in the *Fees less than R1000* and *Fees greater than R1000* group respectively, report listening and speaking as the easiest (Figure 10).

Figure 10: Most difficult and easiest home language activity



For the frequency of mathematics activities, teachers in both groups report similarly (Figure 11). Teachers in the *Fees greater than R1000* group, report doing whole class or group concept development slightly less frequently than teachers in the *Fees less than R1000* group. The amount of time that teachers report spending on mathematics activities is similar (see Appendix A1 which displays the average amount of time teachers spend on each activity).

Figure 11: Frequency of mathematics activities



Motivation, job satisfaction, beliefs and attitudes

Teachers were asked a series of questions relating to burnout, and job satisfaction. Figures 12 and 13 below summarize the results for negatively and positively worded statements respectively. Red indicates that teachers strongly disagree with the statement, orange that teachers disagree, grey that teachers are neutral, light green that teachers agree and dark green that teachers strongly agree with the statement. Teachers tended to either disagree or strongly disagree with negatively worded statements and agree or strongly agree with positively worded statements. There was more variation among teachers regarding feelings like they are working too hard and feeling burnt out or drained. The majority of teachers felt neutral toward statements relating to feeling like they have accomplished worthwhile things as a teacher (55 percent), having clear personal goals (61 percent) and feeling like they are positively influencing the lives of others (57 percent).

Figure 12: Negatively worded statements

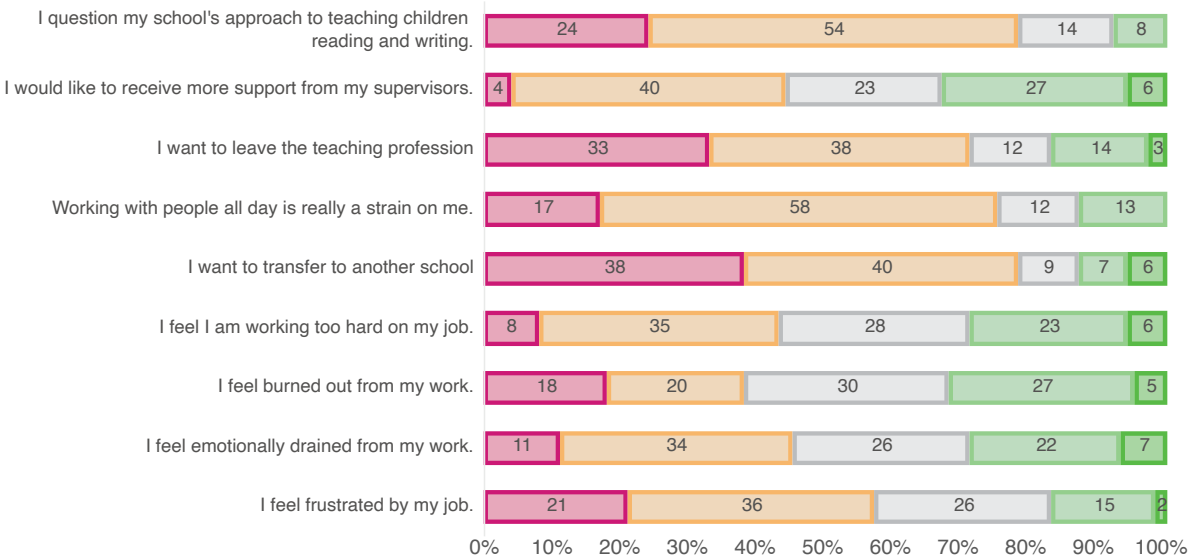
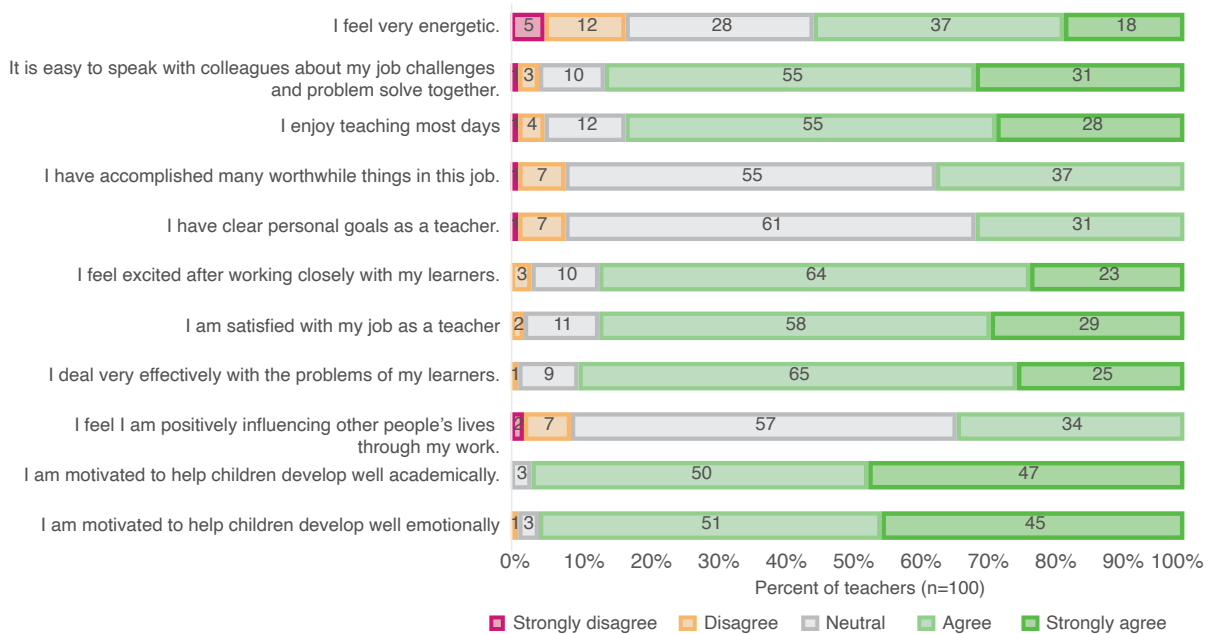


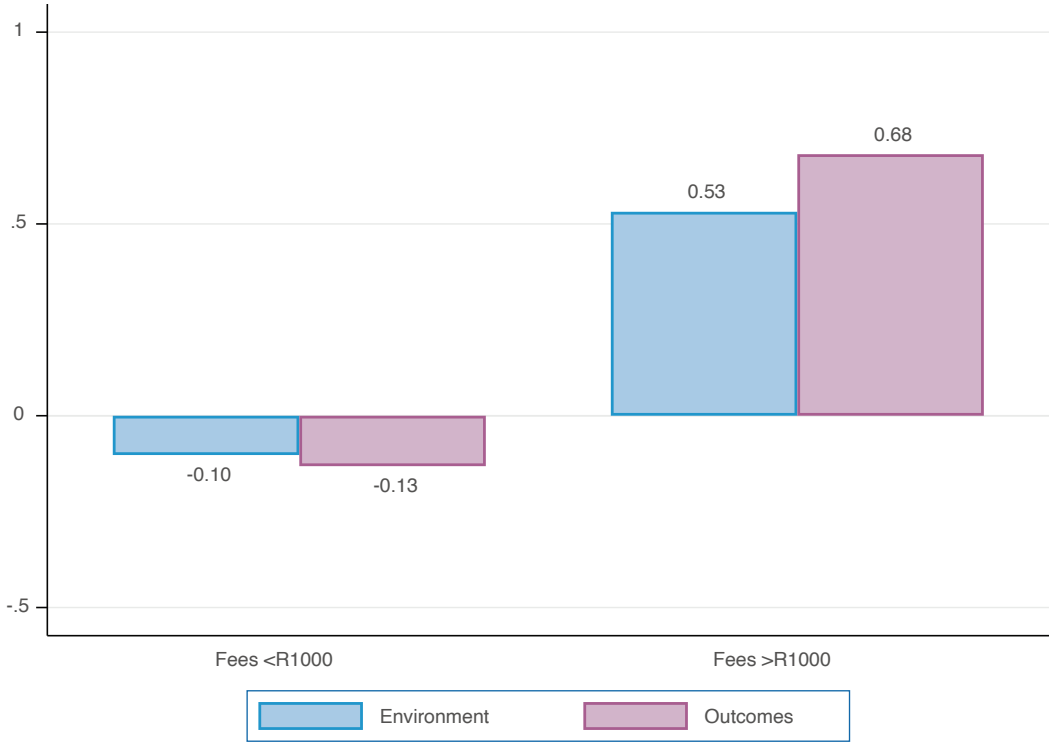
Figure 13: Positively worded statements



Using an exploratory factor analysis¹², these questions were grouped into two latent factors: 1) Motivation relating to a teacher’s environment and 2) Motivation relating to outcomes. Items, where stronger agreement is associated with less motivation, were reverse coded. Table A3 in the appendix shows how each item was grouped according to the prevalence of their loading on the factor. Figure 14 shows the average motivation score for each factor by fee category. Teachers in higher fee schools exhibit higher average motivation, particularly on learner outcomes. Not only are those schools better resourced with smaller classes, but learner performance is substantially higher (see section 4.4).

¹² Oblique rotation is used on the assumption that aspects of motivation are correlated, and therefore factors will be correlated (Yong & Pearce, 2013). The correlation between factors was moderate (0.48).

Figure 14: Average motivation scores by fee category

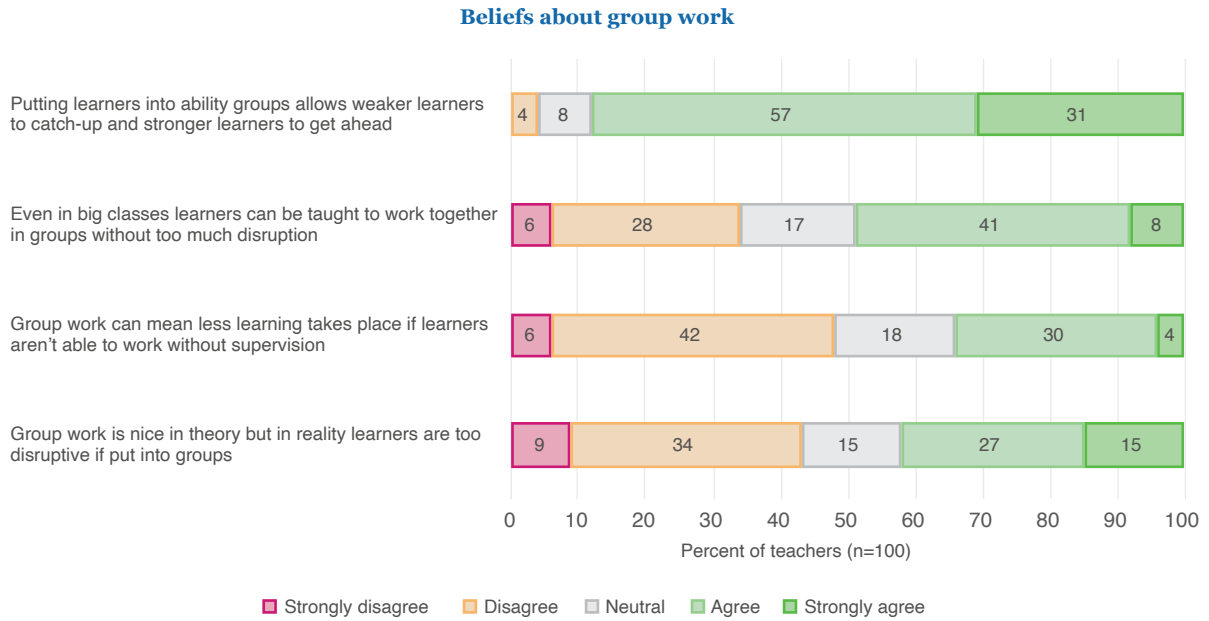


Teachers were also asked a series of questions pertaining to their attitudes and beliefs. Across most questions, teachers tended to agree. These questions were grouped into four categories:

1. Beliefs around group work (Figure 15);
2. Beliefs around self-correction (Figure 16);
3. Beliefs around lesson plans and creativity (Figure 17), and
4. Beliefs around teacher preparedness (Figure 18)

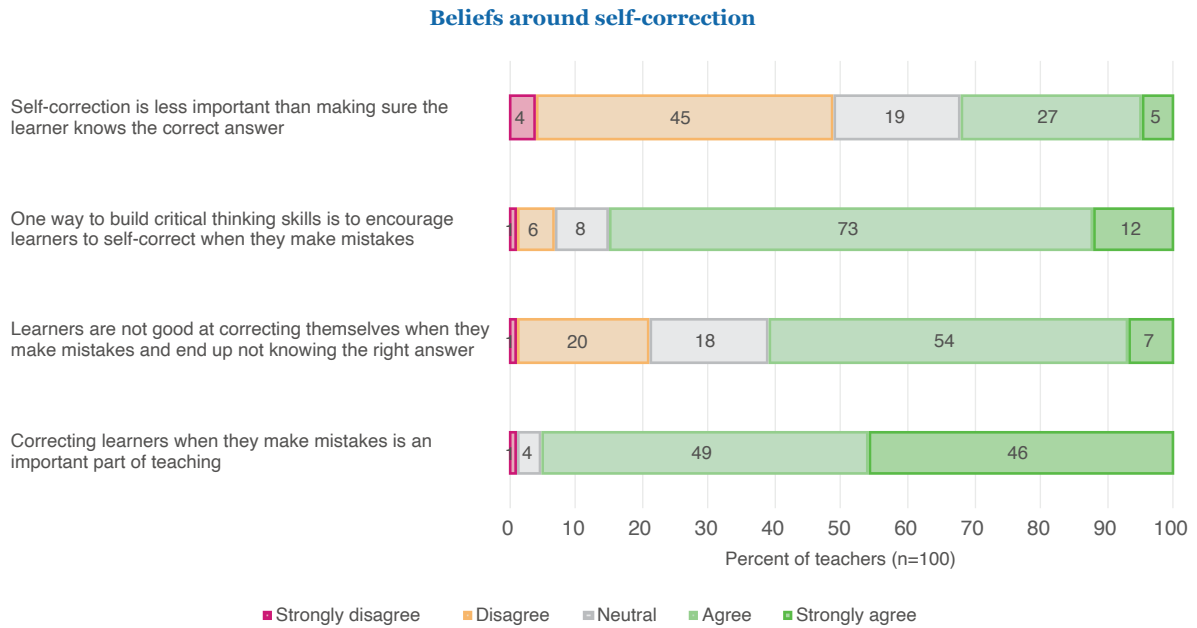
The most variation in teacher beliefs was toward group work. For example, 42 percent of teachers agreed that group work is nice in theory but disruptive in reality, while 43 percent disagreed. A third of teachers agreed that group work can mean less learning takes place if there is no supervision, but 48 percent disagreed.

Figure 15: Beliefs around group work



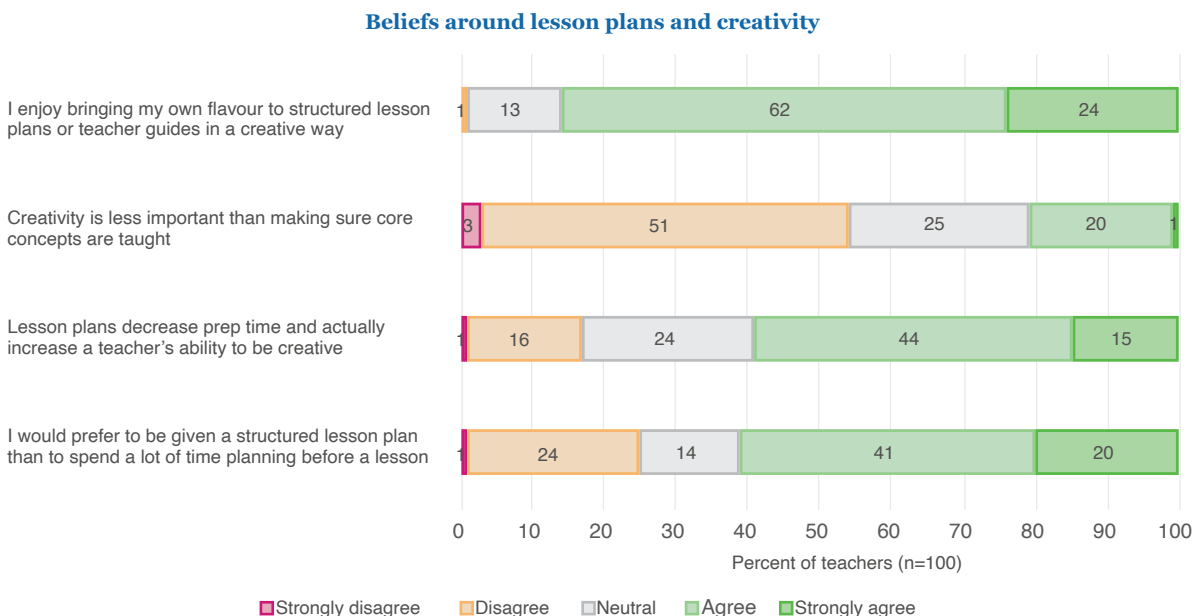
In general, only a handful of teachers strongly disagreed with self-correcting statements. Teachers tend to largely agree on statements regarding the importance of self-correction in the learning process. Teachers especially agreed that self-correction is one way to facilitate critical thinking skills (73 percent agree; 12 percent strongly agree). Almost all teachers also strongly agreed (46 percent) and agreed (49 percent) that correcting learners is an important part of teaching. The contrast between the two statements show that teachers agree correction is important, but infer that self-correction may be the less dominant strategy. Around two-thirds of teachers agreed that learners are not good at correcting themselves (54 percent agree; 7 percent strongly agree). Discerning the choice between when to allow learners to self-correct and when to correct learners directly may be an important part of the learning process.

Figure 16: Beliefs around self-correction



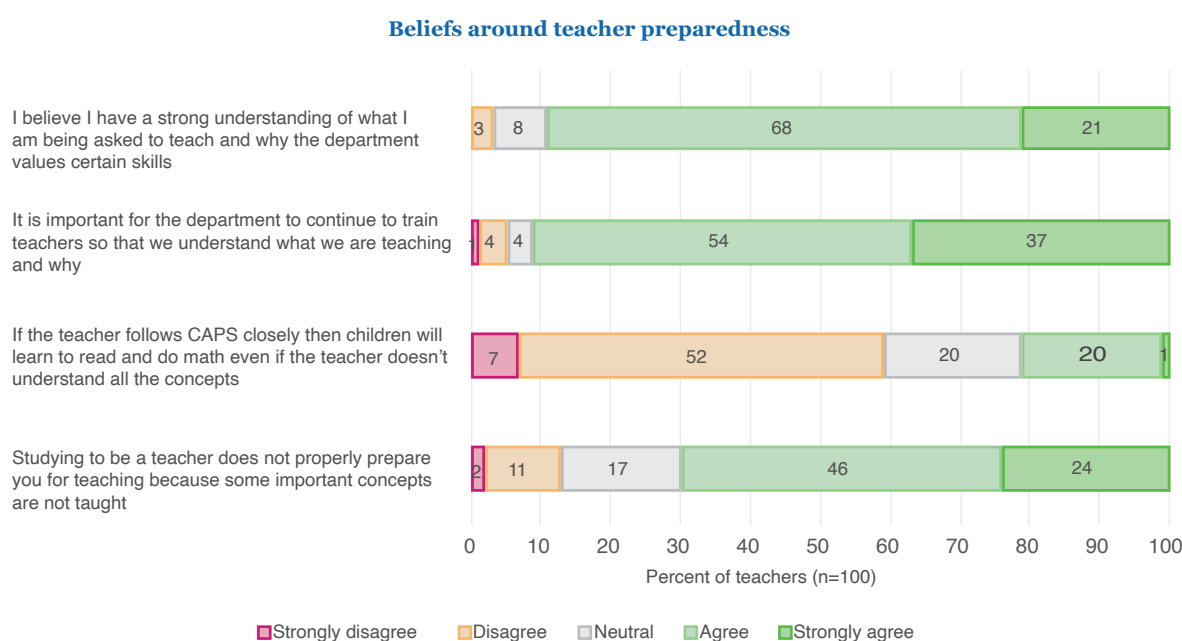
For the most part, teachers agreed that having structured lesson plans are both preferred (61 percent) and decrease prep time allowing teachers to be more creative (59 percent). The majority of teachers agree that they enjoy bringing their own “flavour” to structured lesson plans or guides in a creative way (62 percent agree; 24 percent strongly agree). Teacher answers were more varied however, regarding the importance of creativity over ensuring that core concepts are taught. Only 21 percent agreed that creativity is less important, while 54 percent disagreed. The remaining teachers were neutral (25 percent). Teachers prefer and enjoy structured lesson plans, which can leave room for increased creativity, but balancing whether creativity should be prioritised over core concepts is not as clear.

Figure 17: Beliefs around lesson plans and creativity



Teachers mostly agreed with the statements around teacher preparedness. The majority of teachers agreed that they have a strong understanding of what they are being asked to teach and why (68 percent agreed; 21 percent strongly agreed). Teachers also agreed on the importance of continuous professional development, where more than a third of teachers strongly agreed (37 percent) and 54 percent agreed. The majority of teachers believe that there needs to be a complementarity between their understanding of concepts as well as following CAPS in order for children to learn to read and do mathematics, however, there was more variation in this answer and at least 20 percent of teachers agreed that following CAPS closely without an understanding of the concepts will still allow learners to learn how to read and do maths.

Figure 18: Beliefs around teacher preparedness



LEARNER OUTCOMES

Literacy

The aggregate results of the six literacy tasks are presented in Table 17. The first column shows the percentage of learners scoring zero for the task. The second column provides the average score out of the maximum possible score (column three). The average score as a percentage is provided in the final column. Figure 19 summarises the average percentage score for each task by the two fee groups. Each task is discussed separately below.

Table 17: Grade 1 literacy scores

| | (1) % scoring zero | (2) Average score | (3) Maximum | (4) % correct |
|-------------------------|-----------------------|----------------------|----------------|------------------|
| Non-word repetition | 6 | 9,5 | 15 | 64 |
| Productive vocabulary | 0 | 24,6 | 36 | 68 |
| Phonemic awareness | 17 | 4,7 | 8 | 59 |
| Letter sounds | 8 | 6,4 | 12 | 53 |
| Listening comprehension | 1 | 7,7 | 10 | 77 |
| Concepts about print | 1 | 4,8 | 9 | 53 |

Non-word repetition

Most learners were able to repeat at least one non-word, and could correctly repeat an average of 9.5 of the 15 non-words. The average percentage score was 64 percent . When disaggregating the average percentage score by fee-group (Figure 22), we see that learners in the *Fees greater than R1000* group scored 14 percent higher on average than learners in the *Fees less than R1000* group.

Productive vocabulary

All learners were able to name the object or identify the action of at least one image shown on the tablet. On average learners could correctly answer 24.6 out of the 36 questions, scoring an average of 68 percent. The IRT modelled good variation in difficulty across these items and the most difficult item in the overall assessment was the last vocabulary item. By group, learners in the *Fees greater than R1000* score an average of 15 percent higher.

Phonemic awareness

The highest percentage of learners scoring zero was on the phonemic awareness task. Roughly 17 percent of Grade 1 learners could not identify and manipulate any phonemes. In the IRT model, 6 of these items had the highest discrimination value of all the items in both the numeracy and literacy assessment. This means that overall, phonemic awareness items have a high ability to differentiate learners. On average, learners scored 4.7 out of 8 resulting in an average percentage score of 59 percent. The average percentage score difference by fee group is stark, where learners in the *Fees less than R1000 group* score an average of 54 percent, which is 33 percentage points lower than the average percentage score in the *Fees greater than R1000* group .

Letter-sounds

For identifying letter-sounds, learners were able to correctly identify a little over half of the letters, (6.4 letters out of 12). Similarly to phonemic awareness, the differences by groups are stark. Learners in the *Fees less than R1000 group* score 33 percentage points lower than the average percentage score of learners in the *Fees greater than R1000 group* (48 percent versus 81 percent on average). Learners particularly struggled with the letters “u” and “b”, where roughly a third of learners correctly identified the sound.

Listening comprehension

Only a handful of learners scored zero on the listening comprehension task (1 percent). The average percentage score was 77 percent (7.7 out of 10 on average). Learners found the question that required them to integrate and interpret ideas from the story the most challenging, with 58 percent of learners correctly answering this question. The listening comprehension shows the lowest disparity by fee group—of 9 percent. Learners in the *Fees less than R1000 group* score 75 percent on average and learners in the *Fees greater than R1000 group* score 84 percent on average.

Concepts about print

Finally, although a small percentage of learners scored zero when asked questions relating to book concept and orientation (1 percent), learners scored the lowest average percentage score for this task (53 percent). Learners found turning the page and pointing to the next word (20 percent got this correct) and pointing to the last page (22 percent correct) the most difficult. Learners in the *Fees greater than R1000 group* scored 17 percentage points higher on average than learners in the *Fees less than R1000 group*. Similarly to all other tasks, learners in the *Fees less than R1000 group* score below the overall average.

Figure 19: Literacy percentage scores by task and class

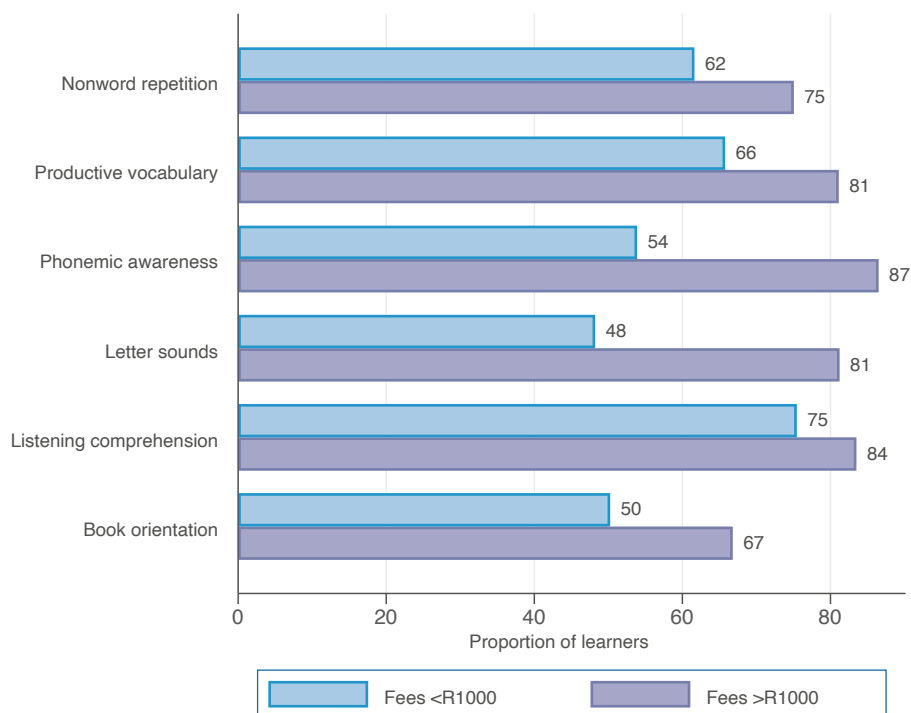


Figure 20 presents the average distribution of scores by fee group. The green distribution shows the *Fees less than R1000 group*, and the gold distribution shows the *Fees greater than R1000 group*. We see that the average distribution of

learners in the *Fees greater than R1000* group is shifted to the right of the *Fees less than R1000* group. When disaggregating by gender (Figure 21), we do not observe an as obvious shifted distribution, however, girls tend to perform better than boys.

Figure 20: Distribution of composite scores by class

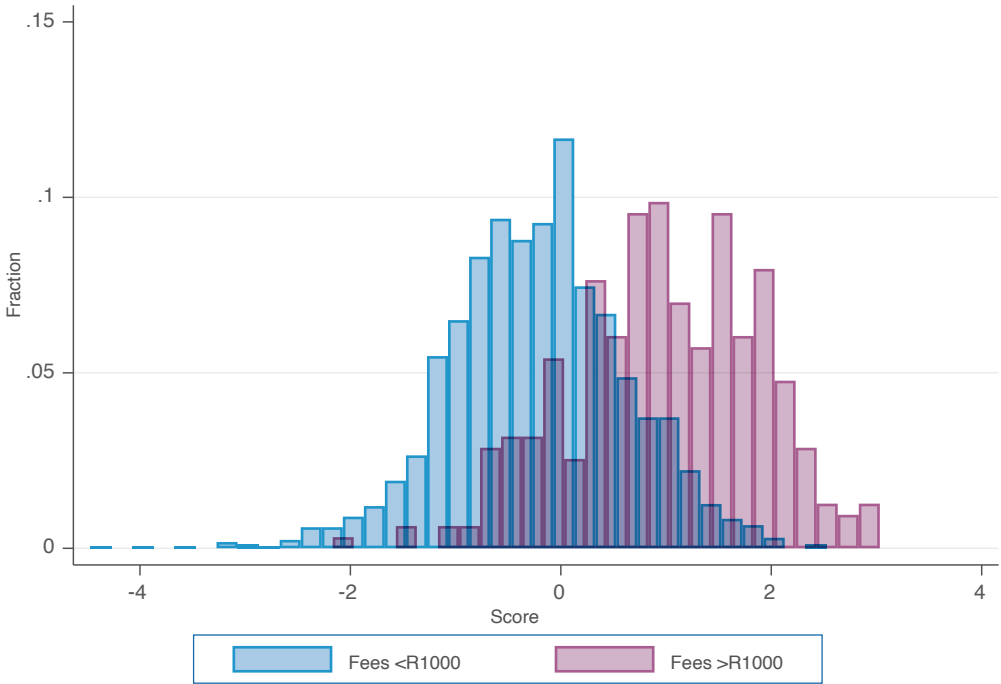
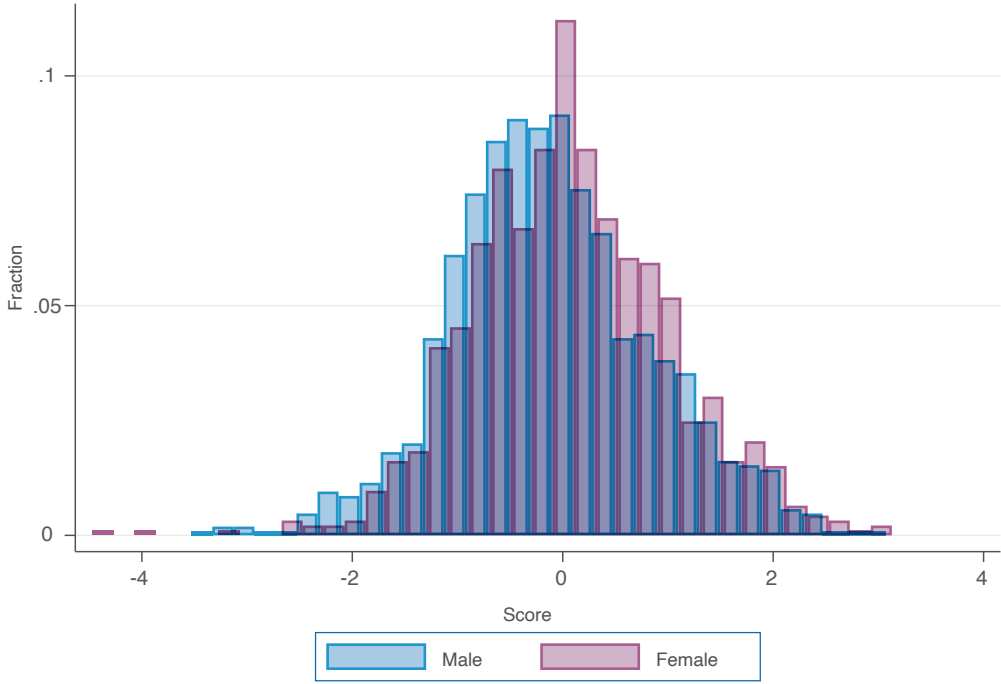


Figure 21: Distribution of composite scores by gender



Numeracy

The results of the 16 numeracy tasks are presented in Table 18. The first column shows the percentage of learners scoring zero and the second column shows the average percentage score.

Number sense and operations:

For the counting tasks, a quarter of Grade 1 learners were unable to count from 1 to 20. However, the average learner could count to 17. Results are similar for counting objects with one-one correspondence. Just over half (52 percent) of Grade 1 learners were unable to count backwards from 10 and 45 percent of learners could not count on from a given number. The most difficult counting task required learners to count in twos. Less than a third of learners were able to count in twos (29 percent).

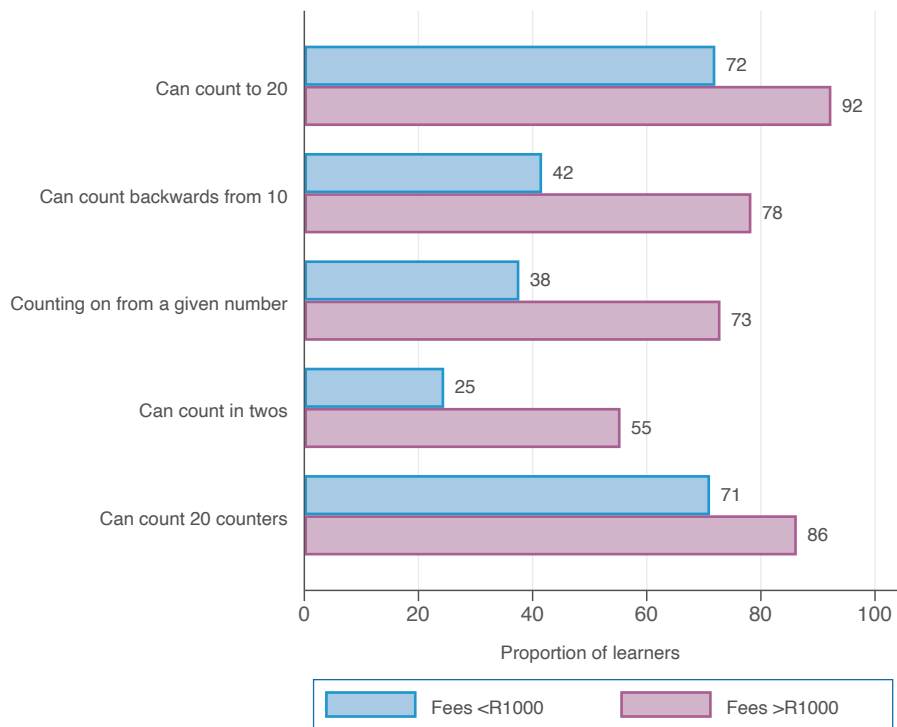
Table 18: Grade 1 numeracy scores

| | (1) % scoring zero | (2) % correct |
|--|-----------------------|------------------|
| Can count forward from 1 -20 (indicator variable) | 25 | 75 |
| Counting with one-one correspondence* (indicator variable) | 26 | 74 |
| Can count backwards from 10 (indicator variable) | 52 | 48 |
| Counting on from a given number | 45 | 43 |
| Can count in twos (indicator variable) | 71 | 29 |
| Number identification | 8 | 72 |
| Number order (indicator variable) | 36 | 64 |
| Knowledge of ordinal numbers | 2 | 73 |
| Subitising to five** | 12 | 51 |
| Comparing two collections | 5 | 55 |
| Addition and subtraction | 49 | 24 |
| Sharing and grouping problems | 81 | 12 |
| Shape identification and understanding | 2 | 59 |
| Sorting and classification | 25 | 36 |
| Pattern completion | 38 | 35 |
| Pattern extension | 21 | 42 |

Notes: *Total N=1813 **Total N=1952

Figure 22 presents the average percentage scores for each of the counting tasks by fee group. Learners in the *Fees greater than R1000 group* score substantially higher on average than those in the *Fees less than R1000 group* with the gap increasing at higher levels of understanding. For example, the differential increases from 20 percentage points for counting to 20 to 30 percentage point for counting in twos.

Figure 22: Average percentage score by class for counting tasks



Learners performed well on number identification (average percentage score is 72 percent). However, more than a third (36 percent) of learners were unable to put numbers in order from 0 -10. Learners displayed a good knowledge of ordinal numbers (average score of 73 percent. Learners found subitising numbers difficult, and scored an average of 51 percent. Learners however, did increasingly better as the task progressed. Learners scored an average of 26 percent for the first and 67 percent for the last task despite these tasks requiring the same subitisation of five dots. Learners were asked a series of addition and subtraction questions, and scored an average of 24 percent. For the simplest question, only 31 percent of learners were able to add 3 and 5. For subtraction however, more than half (54 percent) of learners were able to subtract 3 from 7. Lastly, learners were asked a few sharing and grouping word problems. The majority of learners scored zero (81 percent) however, almost a quarter (24 percent) of children could divide 10 by 5. By fee group (Figure 23), we see that the scores of the *Fees greater than R1000 group* learners are much higher on average, particularly on the number ordering task.

Space and shape

Learners were asked to identify shapes and tell the enumerator something about the shapes. Learners scored 59 percent on average. Almost all learners (94 percent) were able to identify a circle, and 81 percent were able to identify a rectangle. However, when asked about the shape, only one-fifth of learners were able to provide a difference between a square and a rectangle.

Data handling

For sorting and classifying shapes in colours and sizes, the average learner scored 36 percent. In order of prevalence, learners were able to group at least once according to colour (51 percent), shape (41 percent) and size (17 percent). Almost half (48 percent) of learners were able to sort on one attribute, 19 percent on two and only 8 percent of learners were able to sort on all three attributes.

Pattern completion

More learners scored zero on completing a digital pattern (38 percent) than extending a pattern (21 percent) using 2-D objects. For pattern extension, learners scored an average of 30-44 percent for each shape. For pattern completion, learners averaged between 35 and 47 percent for each icon.

Figure 23: Average percentage score

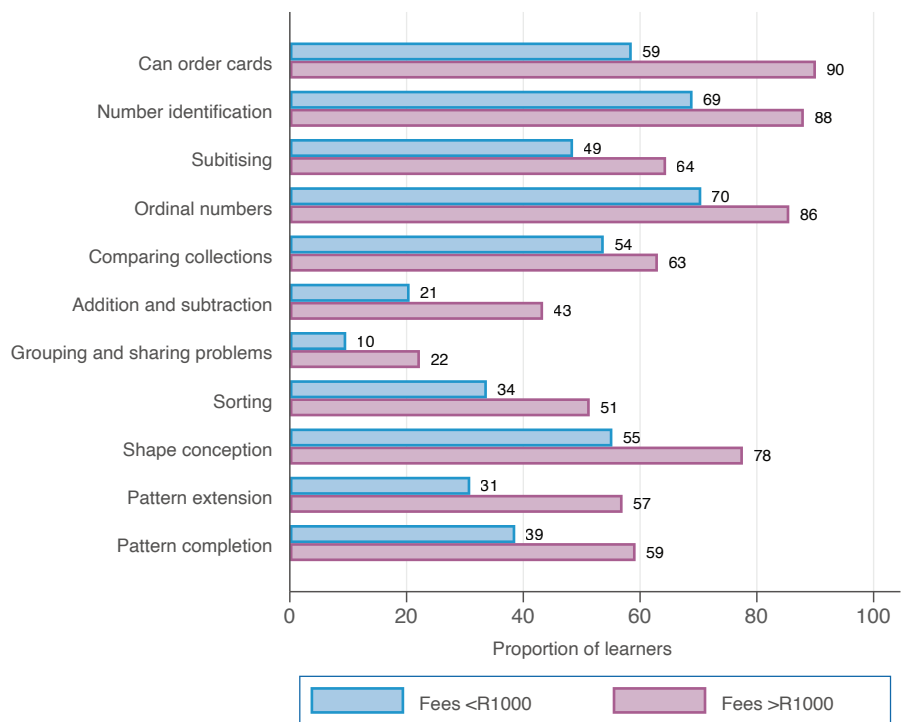


Figure 24 presents the average distribution of scores by fee group. The green distribution shows the *Fees less than R1000* group, and the gold distribution shows the *Fees greater than R1000* group. Similarly to literacy, we see that the average distribution of learners in the *Fees greater than R1000* group is shifted to the right of the *Fees less than R1000* group. When disaggregating by gender (Figure 25), we do not observe an as obvious shifted distribution and girls and boys perform similarly.

Figure 24: Distribution of composite numeracy score by class

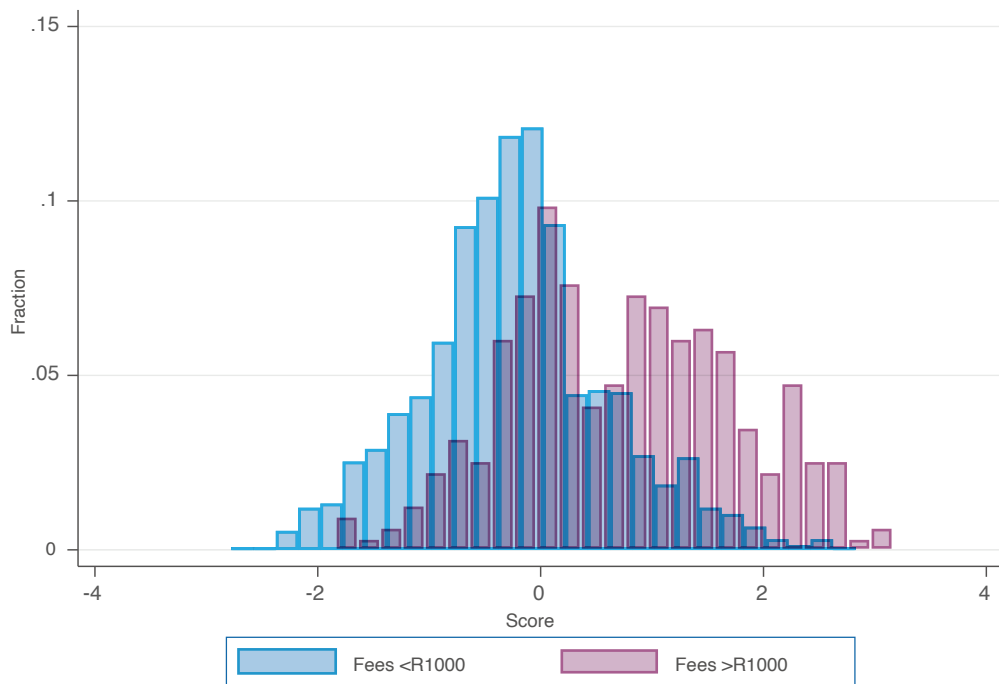
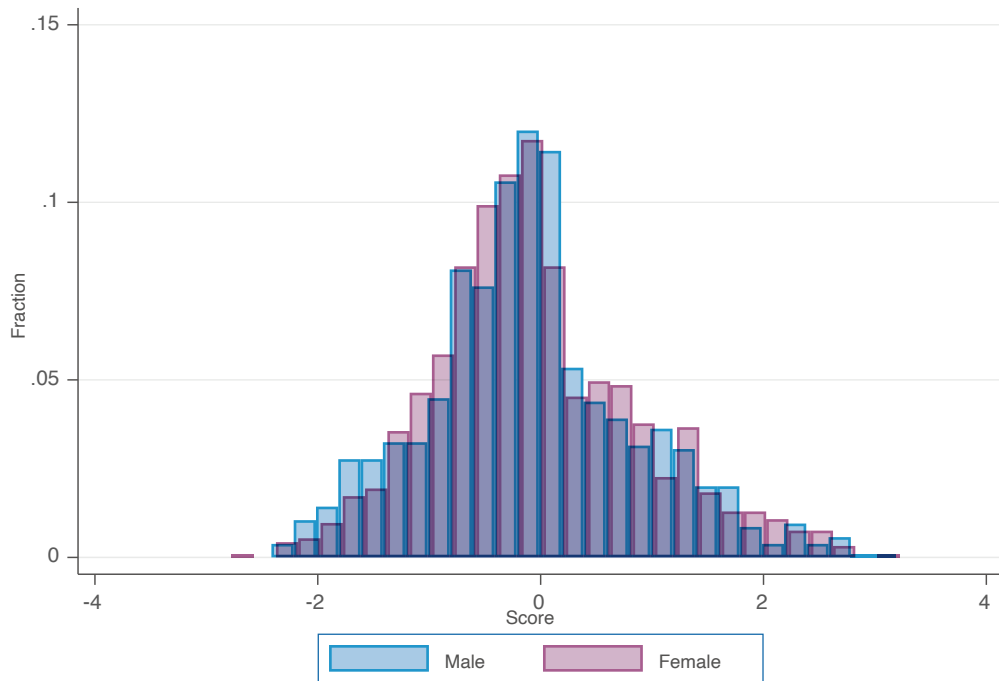
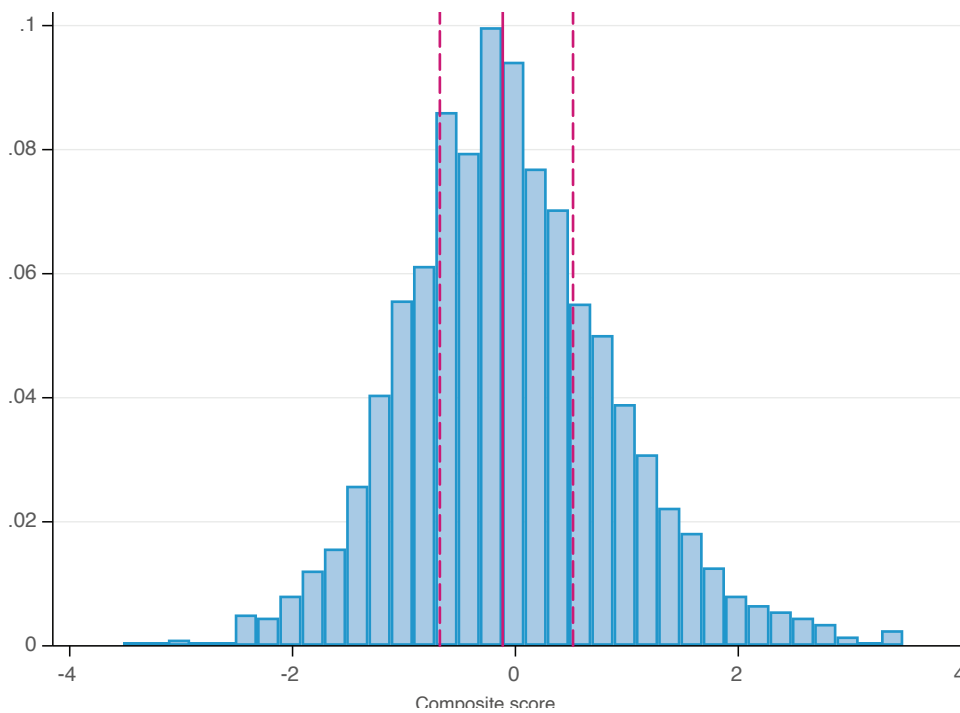


Figure 25: Distribution of composite numeracy score by gender



Good discrimination requires that there is not a large proportion of learners scoring zero (floor effects) or full marks (ceiling effects). While there are a few tasks that learners find particularly challenging (counting in twos, addition and subtraction word problems, grouping and sharing word problems) or easy (counting to 20, counting with one-one correspondence and the listening comprehension), the overall composite score displays good variation between learners, providing no evidence of floor or ceiling effects on the overall measure. Figure 26 shows the distribution of the composite score expressed in standard deviations. The median is represented by the solid red line and the inter-quartile range (25th to 75th percentile) lies between the two dashed red lines.

Figure 26: Distribution of overall composite score



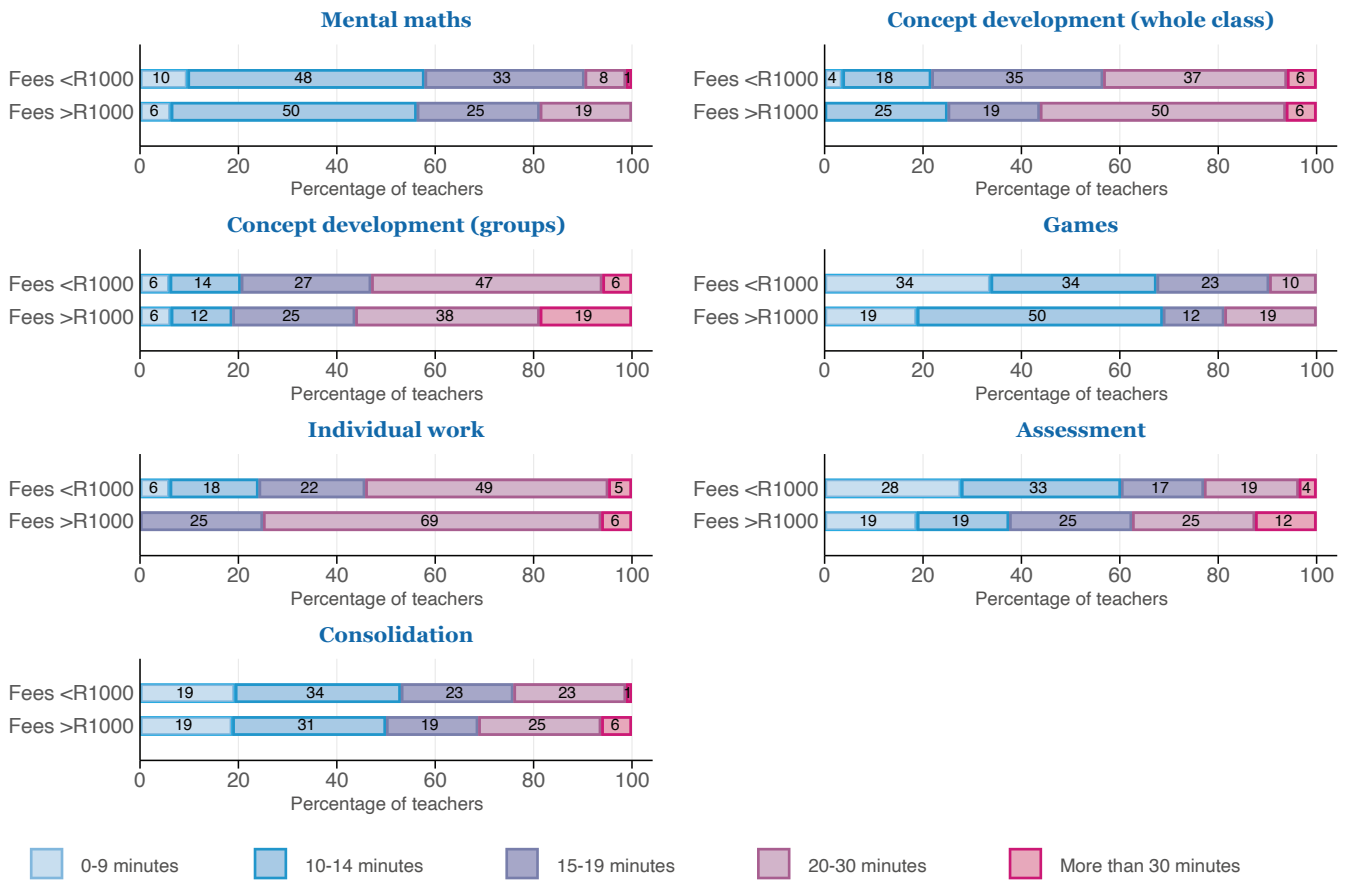
CONCLUSION

This report presents findings from the baseline data collection for the evaluation of Funda Wandé and Bala Wandé workbooks intervention in the Western Cape. From a technical and statistical perspective, the baseline data collection encountered no serious challenges. The treatment and control groups of schools are well-balanced according to both administrative data (district, rural-urban, quintile and 2017-2019 systemic scores) and baseline data collected at the school, teacher and learner level. The plausibility of our counterfactual will be further enhanced by matching on baseline individual level literacy and numeracy performance when we estimate treatment effects with the next round of data collection.

Unlike prior Funda Wandé evaluations, this study includes schools across the full range of socio-economic quintiles. Careful analysis reveals substantial mismatch between the DBE quintiles and reports from principals about school fees. We therefore classify schools into a no-fee or very low fee group (84 schools) and another group with fees in excess of R1000 (16 schools). The baseline data reveal stark differences in school facilities, class size and learner outcomes across these two groups. Across all the schools in the sample, average performance indicates that there are many learners who do not yet have the skills to effectively engage with the Grade 1 curriculum. The average percentage score ranged from 53 to 77 percent across literacy tasks and 12 to 75 percent for the numeracy tasks. The average was below 50 percent for eight of the 16 numeracy tasks. These averages mask considerable variation with learners from higher fee schools substantially outperforming their peers from no-fee and low fee schools.

This evaluation provides an opportunity to assess a scalable support model for the Funda Wandé and Bala Wandé LTSM and to examine uptake beyond the no-fee sector of public schools.

Appendix A1: Teacher reported time spent on mathematics activities



Appendix A2: Latent class marginal means

| Variable | The Fees less than R1000 group | | | The Fees greater than R1000 group | | |
|--|--------------------------------|------|---------|-----------------------------------|------|---------|
| | Margin | S.E | P-value | Margin | S.E | P-value |
| Grade 7 EGRA PCA rank out of 100 | 41.3 | 2.5 | 0.0 | 83.7 | 5.8 | 0.0 |
| Grade 4 EGRA PCA rank out of 100 | 42.7 | 2.6 | 0.0 | 83.13 | 6.0 | 0.0 |
| School systemic rank out of 100 | 43.2 | 2.6 | 0.0 | 88.6 | 5.9 | 0.0 |
| Percentage of learners at school with a mobile phone | 0.85 | 0.00 | 0.0 | 0.98 | 0.02 | 0.0 |
| Percentage of learners at school with a computer | 0.40 | 0.01 | 0.0 | 0.8 | 0.03 | 0.0 |
| Percentage of learners at school with a bicycle | 0.61 | 0.01 | 0.0 | 0.9 | 0.03 | 0.0 |
| Percentage of learners at school with a vehicle | 0.55 | 0.01 | 0.0 | 0.95 | 0.03 | 0.0 |
| Percentage of learners at school with a microwave | 0.8 | 0.01 | 0.0 | 0.96 | 0.02 | 0.0 |
| Percentage of learners at school with hot water | 0.68 | 0.02 | 0.0 | 0.91 | 0.04 | 0.0 |
| Percentage of learners at school without any books | 0.56 | 0.2 | 0.0 | 0.17 | 0.04 | 0.0 |
| Quintile (administrative data) | 2.9 | 0.12 | 0.0 | 5.0 | 0.28 | 0.0 |
| Fee category (1=R0; 2=<=R1050; 3=(>R1050) | 0.13 | 0.4 | 0.0 | 1.9 | 0.08 | 0.0 |

Appendix A3: Factor loadings on motivation

| Environmental | Factor loading |
|---|----------------|
| I feel frustrated by my job. | 0.79 |
| I feel emotionally drained from my work. | 0.77 |
| I feel burned out from my work. | 0.76 |
| I feel I am working too hard on my job. | 0.67 |
| I want to transfer to another school | 0.57 |
| I enjoy teaching most days | 0.56 |
| It is easy to speak with colleagues about my job challenges and problem solve together. | 0.54 |
| I feel very energetic. | 0.49 |
| Working with people all day is really a strain on me. | 0.48 |
| I want to leave the teaching profession | 0.46 |
| I would like to receive more support from my supervisors. | 0.32 |
| I question my school's approach to teaching children reading and writing. | 0.32 |
| Outcomes | |
| I am motivated to help children develop well emotionally (i.e., feel good about themselves, not be too sad or fearful, feel good about the future). | 0.77 |
| I am motivated to help children develop well academically. | 0.75 |
| I feel I am positively influencing other people's lives through my work. | 0.73 |
| I deal very effectively with the problems of my learners. | 0.69 |
| I am satisfied with my job as a teacher | 0.65 |
| I feel excited after working closely with my learners. | 0.63 |
| I have clear personal goals as a teacher. | 0.57 |
| I have accomplished many worthwhile things in this job. | 0.55 |

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