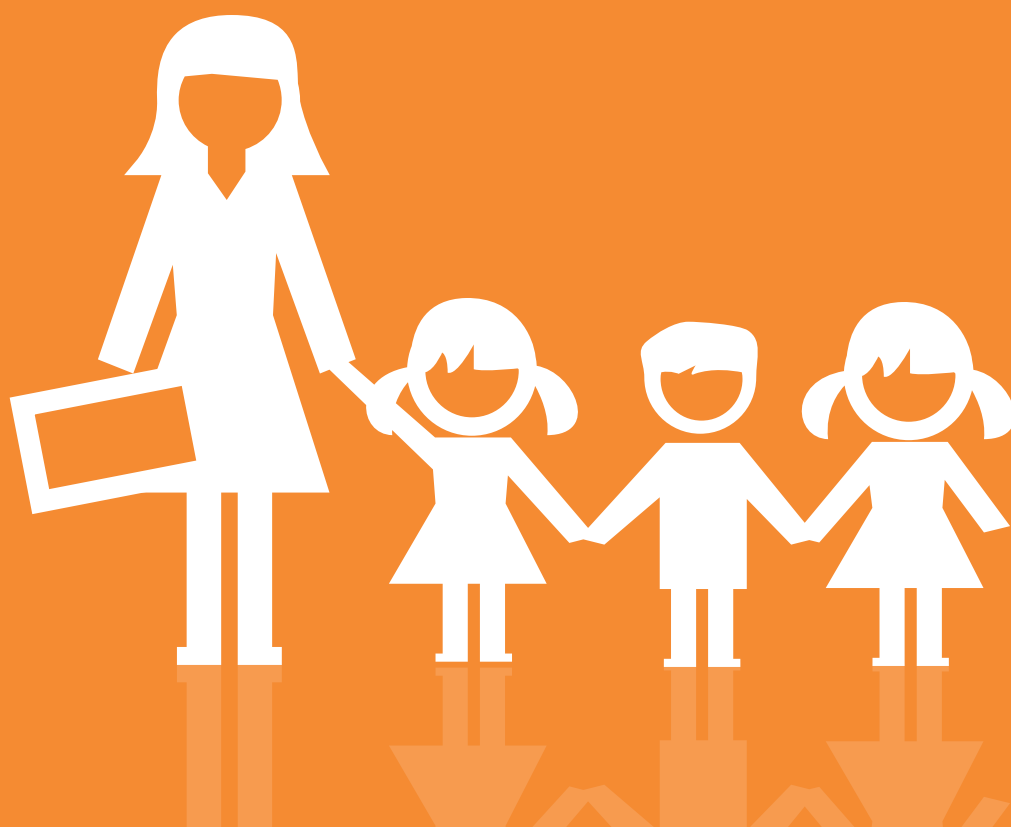


LAYING FIRM FOUNDATIONS

GETTING READING RIGHT

Nicholas Spaul, Servaas van der Berg, Gabrielle
Wills, Martin Gustafsson & Janeli Kotzé



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**Final Report to the ZENEX Foundation on poor
student performance in Foundation Phase
literacy and numeracy**

24 May 2016

**Nicholas Spaul, Servaas van der Berg, Gabrielle Wills,
Martin Gustafsson & Janeli Kotzé**

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This report is available online at resep.sun.ac.za

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Further information regarding the Zenex foundation can be found at www.zenexfoundation.org.za



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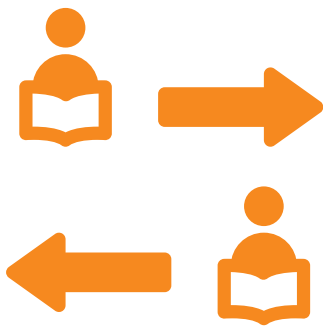
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Executive summary

Project Overview

Background and context

The central focus of this research project has been the investigation of causes of weak South African student performance in literacy and numeracy in the Foundation Phase (Grades 1–3). Many South African children complete these grades without being able to read properly in their home-language, with little understanding of the language in which they will be taught from Grade 4 (English), and with an inability to move from basic counting to true calculation using the four operations. **Less than half of all students learn to read for meaning in this critical period.** These weak foundations provided in Grades 1–3 constitute one of the major factors leading to poor learning outcomes in later grades.



Weak student performance in literacy and numeracy in the Foundation Phase (Grades 1–3), constitute one of the major factors leading to poor learning outcomes in later grades

This research project has taken a system view to analyse how these problems interact to create the low level equilibrium South African education finds itself in. This research has been undertaken through the lens of the ‘**instructional core**’, evaluating what happens in Foundation Phase classrooms and how this influences learning. The departure point is the view that any attempt to raise the quality of education in South Africa must focus on the ‘instructional core’ in Foundation Phase classrooms, i.e. “actual interactions between teachers, students, and content in the classroom” (City et al., 2009). All other factors are important only to the extent that they impact on these three components.

In a parallel research project, the research team has undertaken work on identifying the binding constraints in school education in South Africa more broadly, for the Presidency and the European Union (via the Programme to Support Pro-poor Policy Development, PSPPD). This work has a wider focus in two ways: evaluating learning outcomes at *all* levels of the schooling system and identifying a broader set of limiting factors, including within the administrative core of the education system. Nonetheless, a great deal of synergy exists between these two research projects (intentionally so), allowing for the delivery of consistent, reinforcing recommendations.

Methodology

The project comprised the following components:

- A literature review that summarises the research literature currently available about learning deficits and instruction in Foundation Phase classrooms;
- A thorough investigation of the evidence that can be extracted from the Annual National Assessment (ANA) data about the Foundation Phase;
- Investigation of all other large scale survey and administrative data that may yield useful information on learning in Foundation Phase classrooms;
- Interviews with policy makers, teachers and SGB members to add qualitative information to the quantitative information referred to above.

Project deliverables

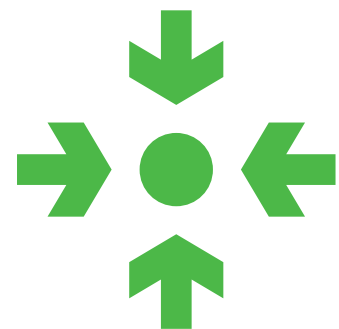
The research team produced 4 journal articles, 5 working papers, one monograph, 6 policy briefs, and 2 policy engagement workshops. In addition, some further outputs were jointly produced as a product of this project and the linked Binding Constraints project. With PSPPD support the team hosted a large conference highlighting 'Quantitative Applications in Education Research', in August 2015 in Stellenbosch, and three DBE officials spent short stints at ReSEP in Stellenbosch, providing invaluable contextual inputs on current policy and government priorities.

ReSEP also commissioned three additional pieces of work for the Zenex project: (1) an updated literature review on teaching and learning in the Foundation Phase in South Africa, (2) a new research article analysing the Grade 3 DBE workbooks as curriculum tools, and (3) a concept note detailing the structure and content of a proposed course on "*Teaching Reading (& Writing) in the Foundation Phase*", produced at a workshop convened by Prof Elizabeth Pretorius (UNISA) on ReSEP's request.

Project Report

Centrality of learning to read for meaning

The main message emerging from the research is the centrality of **learning to read for meaning** during the Foundation Phase. Given the hierarchical nature of skills acquisition, the ability to successfully progress through the education system to tertiary levels, where returns to education are highest, is determined much



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during the first three years of school

earlier in a student's schooling career. The critical window for acquiring basic learning skills at school, and specifically reading skills, is Grades 1–3, the so-called Foundation Phase. This is heavily influenced by classroom practices: the so-called instructional core.

Early learning determines matric results

For this project, Van der Berg (2015) analysed data from the Annual National Assessments (ANAs). He found that Grade 4 outcome patterns mirror those in Grade 12 (matric) remarkably closely, reflecting the long lasting disadvantage suffered by students who have fallen behind early in their school careers. Importantly, already by Grade 2 more than half of students in Quintiles 1–4 are not on track (defined as performing above the low international benchmark in mathematics). The likelihood of being on track is also heavily determined by which school quintile a student falls into.

Instructional core as a critical framework for looking at learning

Any attempt to raise the quality of South African education must focus on what is happening inside 'Instructional Core': "In its simplest terms, the instructional core is composed of the teacher and the student in the presence of content... a focus on the instructional core grounds school improvement in the actual interactions between teachers, students, and content in the classroom" (Elmore, 2008).

Evidence on learning activity in South African classrooms

For this project, Hoadley (2016) provides an overview of the literature studying existing classroom activity, with a focus on poorer schools. Students in most classrooms have very little opportunity to practice reading or engage with texts in meaningful ways. Teachers and student groups often read aloud together, with little attention drawn to understanding texts or provision of individual feedback to students. In consequence, students in poor schools can often mechanically decode text but have little comprehension of the content of what they are reading. Similar findings apply with respect to maths. Teachers also fail to provide students with meaningful feedback, particularly when they made errors. Of great concern is the weak pacing and low conceptual content of maths teaching. Teachers default to everyday knowledge instead of teaching the principles of maths, with classroom strategies focusing predominantly on overly-concrete problem solving. Teachers often lack knowledge of how students learn to work with numbers.

The national reading crisis

Spaull (2016a) analysed the prePIRLS assessment of 2011. He found that 58% of the Grade 4 sample could not read for meaning, while 29% were reading illiterate. Draper and Spaull (2015) undertook the first analysis of large-scale oral reading fluency (ORF) in English in South Africa using data for 1 772 rural students in Grade 5 gathered by NEEDU in 2013. They found that the English oral reading fluency of Grade 5 rural students was very low: 41% of the sample were considered to be non-readers in English, reading at less than 40 words correct per minute (WCMP), i.e. so slowly that they could not understand what they were reading. 11% could not read a single English word from the passage. In aggregate, the South African Grade 5 rural English Second Language students' ORF scores rank on the same level as the lowest category of Grade 2 English Second Language students in Broward County in Florida, USA, students who cannot communicate meaning orally in English and demonstrate very little understanding of the language. They are thus functionally illiterate in English.

The following section of the report focuses on factors underlying the weak reading results.

Cause 1: Insufficient policy focus on early childhood development and primary schooling

Over the past decade, the introduction of a compulsory Grade R year has been the strongest policy lever used to promote early learning. Enrolment in pre-school has steadily increased, with 64% of four year olds and 81% of five year olds attending educational institutions in 2013 (Kotzé 2015). However, education quality is highly variable. A quarter of ECD facilities lack necessary basic infrastructure such as water, electricity and ablutions, particularly in poorer provinces. The ECD Audit of 2013 shows that the average ECD practitioner earned R1 400 to R2 000 per month, only 10% of the DBE salary scale of R21 100 per month for an entry level Foundation Phase teacher (Kotzé 2015). Linked to the poor pay on offer, ECD practitioners are poorly qualified. Only 10% have a tertiary qualification, just a quarter have some training in ECD and more than 70% of ECD practitioners and assistant practitioners have no qualification whatsoever.

Wills (2016) analysed the School Monitoring Survey data of 2011 and found that district resources are being disproportionately targeted towards secondary schools relative to primary schools. While 61% of FET teachers reported at least one visit by a curriculum adviser, only 45% of Foundation Phase teachers did so. The proportion of Foundation Phase teachers reporting that they had been visited by a curriculum/subject-adviser in the Western Cape (84%) was more than twice as high as in KwaZulu-Natal (34%) and the Eastern Cape (33%), and four times as high as in Limpopo (22%). In particular, primary schools are less likely to be visited by district managers, circuit managers, ICT or e-learning officials and subject or curriculum advisers. In interviews in the Eastern Cape, district officials expressed views that the Foundation Phase was far less important than the FET phase, and that matric was the most important year. This is unsurprising given the strong emphasis on matric results as *the* barometer of success.

Von Fintel (2015) uses the NSES panel to study how attending a better quality school impacts on the learning trajectories of black South Africans. She demonstrates that the learning gains of attending a higher quality school are substantial but diminish with each grade. To raise the average performance of the system over time and address gross inequalities in learning, prioritisation should therefore be given to improving the quality of foundation phase teaching and learning.

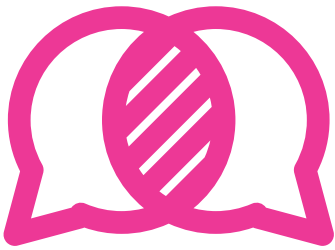
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The disadvantage of learning in another language

was much reduced if that language was a related language, i.e. part of the same language group (Nguni languages or Sotho languages)

Cause 2: Language issues

Van Staden (2016) and Bergbauer (2016) found very large differences in performance in prePirls between schools testing in English or Afrikaans and those testing in an African language, even after controlling for socioeconomic status and home background. The disadvantage of learning in another language was much reduced if that language was a related language, i.e. part of the same language group (Nguni languages or Sotho languages). The implication is that where it is impractical for Foundation Phase children to attend a school that teaches in their home language, it appears preferable that they then at least attend a school of the same language group.

Cause 3: Weaknesses in the instructional core

Teacher content knowledge and pedagogical skill

Existing literature has shown a positive link between teacher content knowledge and student learning. Hoadley (2016) provides a comprehensive overview of the relevant literature. A number of South African studies have identified weak teacher content knowledge as a fundamental constraint. The SACMEQ study of 2007 showed that only 32% of Grade 6 mathematics teachers in South Africa had desirable levels of subject knowledge in mathematics (Hungu et al., 2011, p. 52), compared with considerably higher proportions in Kenya (90%), Zimbabwe (76%) and Swaziland (55%). Mpumalanga had almost no mathematics teachers with desirable content knowledge (4%), while in the Western Cape this proportion was considerably higher (64%). Almost four out of five (79%) Grade 6 mathematics teachers have a content knowledge level below the level they are currently teaching (Venkat & Spaul, 2015). These teachers are highly concentrated in the poorest four quintiles of schools.

Low opportunity to learn and learning application

A number of South African studies have frequently found that less than half of the official curriculum is being covered in the year and fewer than half of the officially scheduled lessons are actually taught. The report provides an overview of the main findings delivered by large-scale studies that have measured OTL, including information from the NSES, SMS and NEEDU about the lack of practical exercises. A 2010 study by the Human Sciences Research Council found that “a conservative, optimistic leave rate of educators in South Africa is between 10% and 12%” (Reddy et al., 2010, p. 84), which amounts to 20 to 24 days per year for the average teacher. Furthermore, “Just over three quarters of all leave instances recorded on the Persal system are for one or two days in duration, that is, discretionary leave not requiring a medical certificate. Mondays and Fridays are the most popular discretionary leave days” (Reddy et al., 2010, p. x).

Low levels of OTL could have their roots in both a lack of capacity (teachers lack the content knowledge and pedagogical skill to teach some content areas) and a lack of accountability (no monitoring by the principal or district officials). A number of local education researchers have for some years now proposed that the DBE Workbooks be used to measure curriculum coverage at a very basic level. The DBE Workbooks were introduced in 2011 and are now available in mathematics and language to all students in Grades 1 to 9. They reach approximately 9 million students and structure the curriculum week-by-week, providing a practice tool for teachers to use. For the present study two curriculum experts were commissioned to conduct both a comprehensive review of the Grade 3 DBE workbooks for mathematics and language, and an assessment of the purpose to which the workbooks were best suited. They concluded that “The overall high level of curriculum compliance of the workbooks suggests they could be effective as a monitoring tool at a systemic level. It would be possible to gain a crude measure of coverage in key content areas” (Hoadley & Galant, 2016, p. 20). In their analysis they go further and comment on the potential complementarity of textbook and workbook:

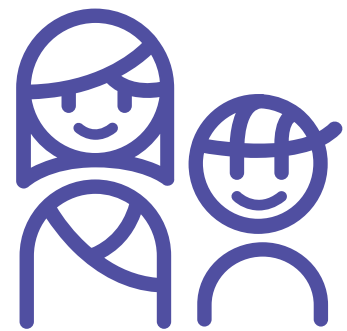
“With the recent proposal to produce a single textbook per subject per grade, this textbook could usefully be aligned with the workbooks. The textbook could then function as a primary transmission text, with clear conceptual signalling as well as relevant tasks, and the workbook could function as a practice tool, either for use in class or as a homework resource” (Hoadley & Galant, 2016, p. 21).

Language of learning and teaching

About 90% of students receive general instruction in English from Grade 4 onwards. Applying an innovative school fixed-effects approach – which controls for school-level characteristics –, Taylor and Von Fintel (2016) show that receiving mother tongue instruction in the Foundation Phase significantly improves the acquisition of English language skills later on.

Cause 4: Home background

Differences in home and family background have an important influence on patterns of learning. Upon entering school, considerable gaps are likely to exist on the basis of socio-economic status – what Lee and Burkham (2002) characterise as “inequality at the starting gate.” Inequalities in school readiness are in turn augmented by differences in access to quality ECD (Van der Berg et al, 2013).



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Home support is strongly influenced by parents' education and their involvement with a child – a factor that cannot be assumed as present in a country with extremely high levels of orphanhood. Family structure is a very strong determinant of educational outcomes such as enrolment rates, number of grades completed and student achievement (Anderson, Case and Lam, 2001). Reading development in particular is strongly dependent on whether someone in the home can help a child with their reading and support them with comprehension.

Although socio-economic status strongly determines the educational outcomes of children across the country and explains much of the inequalities in educational outcomes, for every level of socio-economic status apart from the very top levels, primary school children in South Africa fare worse in reading and numeracy than equally poor children in SACMEQ countries such as Kenya, Tanzania and Swaziland (Kotzé and Van der Berg, 2015). Thus the quality of primary schooling to which most South African students have access is sub-optimal when compared to some poorer African states. But there is convincing quantitative evidence from research conducted by ReSEP colleagues that school quality can overcome a large portion of socio-economic disadvantage, particularly when quality education is accessed by children in early grades (Von Fintel, 2015; Shepherd, 2016).

In multivariate analysis of prePIRLS data, Bergbauer (2016) found that after controlling for socioeconomic background, three factors not usually included in regression analysis seemed to be strongly associated with better performance in schools that tested in African languages. These factors were how regularly parents checked their children's homework; how supportive parents are of children reading at home; and whether teachers self-reported that they closely followed the curriculum. The difference in performance between students scoring very low on these factors and those scoring very high was 81% of a standard deviation, i.e. equivalent to about 2 years of learning. Of great interest is that these factors did not appear to be of similar importance in those schools testing in English. The first two of these factors relate to home background and parental support.

Cause 5: Extreme class sizes in the Foundation Phase

Teaching young children to read is difficult in an over-crowded classroom. Studies that have tried to estimate the impact of reducing class sizes have mainly been conducted in developed countries, where



Emphasise reading as a unifying goal for early primary schooling

classes are typically not 'large' in any developing-country sense. It is quite reasonable to expect that class size reductions from 60 to 40 may have a different impact than those from 40 to 20, particularly in the early grades. There is not a large amount of rigorous research on this issue in developing countries. In a recent review Ganimian & Murnane (2016: 17) summarise this as follows: "The best available evidence is that class size reductions in developing countries are effective only when initial class sizes are very large, the reductions radically change the number of students in the classroom, and students are tracked by their initial achievement." Snow et al. (1998) add that "best instructional practices are not guaranteed by small class size. Class size reduction efforts must be accompanied by professional development and planning that supports the desired changes in curriculum, instruction, and assessment."

In South Africa there has been little attention paid to class sizes, especially in the Foundation Phase. The post-provisioning norms of 2002 indicate that the maximum class size for Grades R–4 is 35, for Grades 5–6 is 40 and Grades 7–9 is 37. An analysis of the Annual Survey of School data for 2013 to determine the prevalence of different Foundation Phase class-sizes shows significant provincial differences in the extent to which Grades 1–3 students are exposed to large classes. The majority of Foundation Phase students are in classes that exceed the government’s own post-provisioning norms of 35 students in Grades R–4. While 38% of Grade 1–3 students in the Western Cape are in classes that do not exceed the norm, the comparable figure in Gauteng is only 21%. If one considers extreme class sizes, the true extent of the problem emerges. Among Grade 1–3 students in Limpopo and the Eastern Cape more than one in four (27%) are in very large Foundation Phase classes (more than 50 students). What is of greatest concern is that in the Eastern Cape and Limpopo between 10 and 15% of Grade 1–3 students are in extremely large classes with more than 60 children.

The fact that large classes are often overlooked in the policy debates could have contributed to a situation where education expenditure discussions tend to focus on the ability to pay existing teachers more, as opposed to employing more teachers, or even teacher assistants.

Policy recommendations

To improve learning outcomes, policy should focus on the universal acquisition of foundational reading skills. This must become the central objective for teaching in early primary school, with aligned research funding, teacher training – specifically with regards to teaching reading – and the establishment of reading norms. Interventions for wider implementation across the system should be selected on the basis of sound evidence and receive sustained support.

There are 12 main policy recommendations emerging from this research.

These are listed below:

- 1. Emphasise reading as a unifying goal for early primary schooling.** The single most important goal for the first half of primary school should be the solid acquisition of reading skills such that every child can read fluently and with comprehension in their home language by the end of Grade 3. An important secondary goal is that every child should also be able to read First Additional Language texts in English fluently and with comprehension by the end of Grade 3. This goal is easily communicated to and understood by parents, teachers and principals and is relatively easy to measure and monitor.
- 2. Teach primary school teachers how to teach reading in African languages and in English.** That many primary school teachers do not know how to teach reading is evidenced by the crippling low oral reading fluency scores in Grade 5. Students with such extremely low oral reading fluency cannot engage with the curriculum (which is usually in English in Grade 5) and hence fall further and further behind as the reading material and cognitive demands become more and more complex. There is a clear need to convene a group of literacy experts to develop a course to teach Foundation Phase teachers how to teach reading. This course should be piloted and evaluated and if it is of sufficient quality should become compulsory for all Foundation Phase teachers in schools where more than half of all students do not learn to read fluently in the language of learning and teaching (LOLT) by the end of Grade 3. As part of this project we have begun this process with an initial document – see point 10 below.
- 3. Develop evidence-based interventions and evaluations and provide sustained support.** Much of the policy energy that has been expended in the last 10 years has been sporadic and haphazard.

Promising programmes (such as the Systematic Method for Reading Success) are not pursued, while new initiatives are funded (but not evaluated) without a clear understanding of how they improve on or learn from previous initiatives. Any new national literacy drive needs to be piloted, independently evaluated and taken to scale when it is proven to be effective.

- 4. Declare early literacy research (particularly in African languages) a National Research Foundation (NRF) Research Priority Area.** Given the magnitude of the reading crisis and the lack of research on African languages at South African universities (particularly on early literacy), the NRF should declare this a national priority. It should dedicate the necessary resources to those researchers and departments who have the skills and expertise to investigate how children learn to read in African languages and which interventions are the most promising.
- 5. Establish oral reading fluency norms for South Africa's African languages.** Although there are oral reading fluency norms for English, there are none for African languages. It is also not possible to translate English norms into African language norms since the language structure is different. Without these norms it is not possible to reliably measure and benchmark children's oral reading fluency in African languages.
- 6. Use DBE workbooks to measure curriculum coverage at regular intervals.** Our research shows that at least the Grade 3 Home Language series is relatively well aligned with the curriculum. Monitoring and support should be commensurate with the level of underperformance. In underperforming schools, curriculum coverage using the workbooks should take place once per term. Schools that have consistently low ANA results should be instructed to use the DBE Workbooks as a primary practice tool in language and mathematics. Given that the majority of Quintile 1–3 schools fall into this category, principals and teachers should be made aware that Departmental officials will be measuring curriculum coverage on a quarterly basis using the Workbooks. If district officials know how much of the curriculum different schools are covering, they can more effectively target additional monitoring and support. With the introduction of the one-textbook policy there is also scope to better align the Department textbooks, workbooks and assessments to teach, practice and monitor the acquisition of core skills.
- 7. Eliminate gender inequality in the appointment of principals:** Our research on the principal labour-market in South Africa (Wills, 2015) found that while 79% of primary school teachers were female, only 43% of primary principals were. Clearly the selection process favours the appointment of male principals over female principals in primary schools. This implies that a large pool of talent is often ignored in the appointment process of principals. These gross inequities should be cause for concern.
- 8. Continue to test students regularly through the Annual National Assessments (ANAs).** Prior to 2011, the only standardised national exams were the matric exams at school exit. This is too late to identify a systemic need for remedial action within schools where large numbers of students are not learning effectively. Since this research shows that most students are acquiring learning deficits early on (Grades 1–3), accurate indications of learning outcomes at this early stage are required in order to take timeous and directed corrective action.
- 9. Review the allocation of district-level resources and personnel.** The School Monitoring Survey of 2011 clearly shows that primary schools are at a disadvantage in terms of district-level monitoring and support. Provincial and district level officials should be made aware of why this is problematic and about the importance of ensuring that all children learn to read in the Foundation Phase, which lays the basis for all future learning.
- 10. Develop a course to teach Foundation Phase teachers how to teach reading:** Through discussions with literacy and reading experts at South African universities it became clear that almost all of them believed that Foundation Phase teachers do not know how children learn to read, and even prospective teachers do not spend much time on this at university. As part of this project we convened a group of literacy experts under the leadership of Professor Elizabeth Pretorius to create a detailed concept note outlining the structure and content of a course to teach existing and prospective Foundation Phase teachers how to teach reading. This 27 page document is now available, with the provisional title "Teaching Reading (& Writing) in the Foundation Phase."
- 11. Investigate the extent of and reasons for extreme class sizes in some Foundation Phase classrooms and pilot strategies to reduce these:** Extreme class-sizes vary across provinces and districts. Causes

could include unresponsive post-provisioning systems, a lack of physical classrooms, teacher absenteeism, or inefficient timetabling (use of existing resources). Given budgetary constraints, alternative strategies for reducing class sizes should be considered. This could include multiple school 'shifts' where one set of students start and finish their school day later than the other group, to allow some hours of smaller classes for more individualised support to students. Special classes in the afternoon for students struggling most could also be considered. The international literature also points to the recruitment of contract teaching staff or teaching assistants as a policy option. These individuals are usually drawn from the local community, offered a short course of training and are remunerated at lower levels because they have lower qualifications. This could improve working conditions

of existing teachers, create a channel to influence the teaching of reading in the Foundation Phase (through short-course curricula) and increase local employment.

- 12. Prioritise the elimination of extreme class sizes in the Foundation Phase:** Although the Action Plan to 2019 does identify "Teacher availability and class sizes" as an explicit goal (Goal 15), there is no special mention of the Foundation Phase, yet this is where the foundation is laid for further learning. When referring to large class-sizes in the Foundation Phase, it is important to distinguish between marginally overcrowded classes (40 students per class) and extremely overcrowded classes (60 per class). Attempts to reduce excessive class sizes should give highest priority to first eliminating *very* large classes (i.e. those with 50+ students per class).

Conclusion

The idea that the primary focus in schools should be on the Foundation Phase, and on reading for that matter, is not new. In fact, there have been many attempts to give early reading a central role in our school system. Reading deserves this role not only in its own right (learning to read and write is central to the notion of education as a universal right), but also to provide the foundation for further learning, whether that be in literature, mathematics, history or science – reading is central to almost all further formal learning. The horizons that functional literacy opens is testament to the importance of this first foundation in the school career.

In the companion research report for the PSPPD ("Identifying binding constraints in education"), more background is provided on some of these earlier attempts to make reading central. We should take an important message from that part of our education history: that attempts like these do not always convert into sustained and long run action that improves learning outcomes.

Yet we are hopeful that this time the message may land on more fertile ground. The first reason for this optimism is that the accumulated research of countless researchers provides ample evidence about the importance of early learning, and that getting reading right in the Foundation Phase is crucially important. The second reason for our optimism is that there is growing urgency amongst policymakers, parents and many teachers, to improve educational outcomes for the poor. There has never been a better time to tackle this problem than now.



Learning to
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Project Overview

Background and context

The central focus of this research project has been the investigation of causes of weak South African student performance in literacy and numeracy in Foundation Phase (i.e. Grades 1–3). Many South African children complete Grades 1–3 without being able to read properly in their home-language, with little understanding of the language in which they will be taught from Grade 4 (English), and with an inability to move from basic counting to true calculation using the four operations. These learning deficits in language and mathematics reinforce each other, creating cognitive backlogs that progressively inhibit the acquisition of more complex competencies (Schollar, 2008). There is a broad consensus that the weak foundations provided in Grades 1–3 constitute one of the major factors leading to poor learning outcomes in later grades¹. The primary mechanism is **that less than half of all students learn to read for meaning in this critical period.**



Less than half
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for meaning
in any language in
Grades 1–3

A variety of explanations have been provided in the literature, but most of these focus on only one specific element of the problem (for example teacher content knowledge) while often neglecting interactions between that element and other factors (for example curriculum coverage, school functionality or excessive class-sizes). The research undertaken for the purposes of this project has taken a system view to analyse how these problems relate to create the low level equilibrium South African education finds itself in.

This research has been undertaken through the lens of the ‘**instructional core**’, evaluating what happens in Foundation Phase classrooms and specifically how these activities influence learning. The departure point is the view that any attempt to raise the quality of education in South Africa must focus on the ‘instructional core’ in Foundation Phase classrooms, i.e. “actual interactions between teachers, students, and content in the classroom” (City et al., 2009). All other factors are important only to the extent that they impact on one or more of these three components.

¹ See for example Fleisch (2008), Schollar (2008), Spaull (2013) and Taylor, Muller & Vinjevold (2003)

In a parallel research project, the present research team has undertaken work on identifying the binding constraints in school education in South Africa more broadly, for the Presidency and the European Union (via the Programme to Support Pro-poor Policy Development, PSPPD). This work also focuses on constraints on learning in literacy and numeracy in South African schools, but has a wider focus in two ways: evaluating learning outcomes at *all* levels of the schooling system and identifying a broader set of limiting factors including within the administrative core of the education system. Nonetheless, a great deal of synergy exists between the two research projects (intentionally so), allowing for the delivery of consistent, reinforcing recommendations to policymakers and other key stakeholders.

Key objectives and research questions

The main intended outcomes of this project were as follows:

- a) to investigate learning deficits in the Foundation Phase,
- b) to synthesise and interpret existing research from an ‘instructional core’ perspective, and
- c) to use existing information (survey data, supplemented through discussions and interviews) to contribute to understanding the main factors preventing the acquisition of foundational numeracy and literacy skills.

With a focus on understanding the causes of the development of learning deficits, the two research questions that animated this study were as follows:

1. How large are the learning deficits that accumulate over the Foundation Phase and how are they distributed across socioeconomic groups?
2. Why do most South African children learn so little during the Foundation Phase of primary school?

Research on Annual National Assessment (ANA) data evaluates the performance of students from various schools and home backgrounds (defined as socioeconomic status, driven predominantly by household income) to provide an indication of the relative efficiency of schools in converting education ‘inputs’ into ‘outputs’ such as acquired literacy and numeracy.

The second question separates out the influences of the teacher, classroom and school environment on student learning. The teaching environment captures factors such as teacher content knowledge, quality, availability as well as the use of learning materials (i.e. textbooks and workbooks). Data from SACMEQ III and the DBE rainbow workbooks provided insights with regards to this element of the instructional core. Factors specific to the classroom environment include class size, the quality of school management and the relative efficiency with which schools are able to influence learning outcomes. The ANA data is particularly useful for analysis of these issues. Finally, the school environment is evaluated by assessing factors such as the demand and supply of teachers, and the impact of standardised testing (i.e. the ANAs) on activities in Foundation Phase classrooms. HEMIS and PERSAL data provided evidence in respect of this element.

Methodology

The project comprised the following components:

- A literature review that summarises the research literature currently available about learning deficits and instruction in Foundation Phase classrooms;
- A thorough investigation of the evidence that can be extracted from the Annual National Assessment (ANA) data about the Foundation Phase;
- Investigation of all the other large scale survey and administrative data that may yield information that could usefully inform an understanding of the learning situation in Foundation Phase classrooms, using the lens of the instructional core;
- Interviews with policy makers, teachers and SGB members to add qualitative information to the quantitative information referred to above.

The project centred on quantitative analysis of various datasets, linking data wherever possible to develop enhanced insight regarding learning during the Foundation Phase and its relationship to later learning outcomes:

- The **Annual National Assessments (ANA)**: These data capture the test results at the individual level for children undertaking the ANA tests in language and mathematics for 2011 (data for this year captured only for some schools), 2012, 2013 and 2014;
- The **Annual Survey of Schools 2013**: These data record enrolments by school and class allowing for an analysis of the distribution of excessive class sizes in different provinces.
- The **School Monitoring Surveys of 2011** contain a wealth of information on the situation in schools, including availability of textbooks and issues related to management, for both primary and secondary schools;
- The **National School Effectiveness Study of 2007 to 2009 (NSES)** tested the same children in a nationally representative sample of schools (excluding Gauteng) in Grades 3 to 5 in three consecutive years;
- **SACMEQ data** (currently available for 2007, but a 2013 wave may soon be available) provides information for a representative sample of Grade 6 students in South Africa;
- **PrePIRLS** is part of an international testing programme and relates to 2011 Grade 4 performance of a sample of South African Grade 4 children in literacy;
- The **PERSAL** data from the public sector salary system is used to determine the qualifications and experience of teachers teaching in the Foundation Phase.

However, the complex relationships between education variables made it essential to use both simple descriptive statistics and multivariate models. The aim in each case was to estimate the degree of association or, where possible, the causality (where this exists and can be determined) between the different variables. The use of regression analysis made it possible to control for certain variables that are also likely to affect performance, such as socio-economic status, while simultaneously establishing the association between the outcome variable (say test score) and an input variable (say teacher subject knowledge).

In addition to the quantitative analysis needed to answer these questions, the team conducted a number of qualitative interviews with members of School Governing Bodies, principals, teachers and policy-makers as part of the research process to supplement and enrich the data analysis.

Project deliverables

The research team has produced a number of deliverables, including 4 journal articles, 5 working papers, one monograph, 6 policy briefs, and 2 policy engagement workshops. In addition, some further outputs were jointly produced as a product of this project and the linked “Binding Constraints” project earlier referred to.

Publications and working papers

The research work has been given a visible academic platform through comprehensive inclusion in a special edition of the *South African Journal of Childhood Education* that profiles the work of the Zenex and PSPPD projects. This is an open-access journal and does not require institutional access to read the articles with the page fees paid from the Zenex grant. The issue is titled “Priorities and Policy Making in South African Education” and is edited by Dr Nick Taylor (JET) and Dr Thabo Mabogoane (Office of the Presidency). Three research papers written under the auspices of the Zenex project were accepted for publication in this journal, namely:

1. Kim Draper & Nic Spaul: *Examining oral reading fluency among rural Grade 5 English Second Language students in South Africa: An analysis of NEEDU 2013*
2. Servaas van der Berg: *What the Annual National Assessments can tell us about learning deficits over the education system and the school career*
3. Janeli Kotzé: *Can Pre-Grade R be the equalising stepping stone to social equality in South Africa?*

These articles were first published as Working Papers on our website², the most widely read series of its kind in South Africa. The Monograph by Hendrik van Broekhuizen is also available for download as a Working Paper:

4. Van Broekhuizen, H. 2015. *Teacher Supply in South Africa: A Focus on Initial Teacher Education Graduate Production*. Stellenbosch Economic Working Paper Series 07/2015: Stellenbosch University.

In addition, five further Working Papers were produced that are also available for download from ReSEP’s website for non-economic Working Papers:

5. Hoadley, U. (2016). *A review of the research literature on teaching and learning in the foundation phase in South Africa*. ReSEP Working Paper Series 01/2016: Stellenbosch University.
6. Hoadley, U. & Galant, J. (2016). *An analysis of the Grade 3 Department of Basic Education workbooks as curriculum tools*. ReSEP Working Paper Series 02/2016: Stellenbosch University.

² <http://resep.sun.ac.za/index.php/research-outputs/stellenbosch-working-papers/>



The research project generated

- 4 journal articles,
- 5 working papers,
- 1 monograph,
- 6 policy briefs, and
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7. Van Staden, S. (2016). Language and *Grade 4 reading literacy achievement in prePIRLS 2011*. ReSEP Working Paper Series 03/2016: Stellenbosch University.
8. Graaff, J. (2016). *Governance in the poorer public schools in South Africa from the perspective of the parent governor*. ReSEP Working Paper Series 04/2016: Stellenbosch University.
9. Bergbauer, A. (2016). *The role of non-conventional inputs in South African education: An analysis of prePIRLS 2011*. ReSEP Working Paper Series 05/2016: Stellenbosch University.

Finally, a related article was produced in an international journal:

10. Pretorius, E. & Spaul, N. (2016). Exploring relationships between oral reading fluency and reading comprehension amongst English second language readers in South Africa. *Reading and Writing* April DOI: 1-23 10.1007/s11145-016-9645-9

Policy briefs and engagements with policymakers

In addition to academic publications, we have ensured that our findings are available to policy-makers in an accessible format and communicated through appropriate channels. There have been two substantial engagements.

The first was a large conference hosted by ReSEP and PSPPD highlighting ‘Quantitative Applications in Education Research’, held on the 17–18th of August 2015 in Stellenbosch. (The programme can be found in the Appendix, while papers can be downloaded from our website³.) We were fortunate to host Minister Angie Motshekga as the keynote speaker at this conference.

Secondly, we have hosted Ms Carol Nuga Deliwe (Chief Director), Ms Nompumelelo Mohohlwane and Mr Ntsizwa Vilakazi for short week-long stints at ReSEP in Stellenbosch under the umbrella of a learning exchange facilitated by the PSPPD project. The inputs by these three DBE personnel were invaluable, providing contextual information on the current policy environment and the existing priorities of government.

In order to engage policy makers with accessible and succinct overviews of our research, we have published 5 policy briefs: (1) ‘Learning to read and reading to learn’ (Spaul, 2016a), (2) ‘What the ANAs tell us about socioeconomic learning gaps in South Africa’ (Van der Berg, 2016), (3) ‘Excessive class sizes in the Foundation Phase’ (Spaul, 2016a), (4) ‘Rethinking pre-grade R’ (Kotzé, 2015), (5) ‘Increasing the supply of teacher graduates’ (Van Broekhuizen, 2015), (6) ‘The DBE’s workbooks as a curriculum tool’ (Hoadley & Galant, 2016). These are available in print and on our website at resep.sun.ac.za.

Commissioned work and collaborations

In addition to the research undertaken by the ReSEP team, we have commissioned three additional pieces of work that speak directly to the Zenex project and the Foundation Phase.

Two of these were authored or co-authored by Professor Ursula Hoadley (UCT), namely the updated (2016) literature review “*A Review of the Research Literature on Teaching and Learning in the Foundation Phase in South Africa*” as well as a new research article entitled “*An Analysis of the Grade 3 Department of Basic Education workbooks as curriculum tools*” (2016, with Jaamia Galant). This was an important addition since there exists so little research on the DBE workbooks, despite their ubiquitous presence in almost all schools in the country.

The final piece of commissioned research relates to a workshop on Foundation Phase reading with leading experts in South Africa. After realising that reading would become a key focus of the Zenex

³ <http://resep.sun.ac.za/index.php/events/conferences-2>

Foundation project as well as the PSPPD project, we asked Prof Elizabeth Pretorius (UNISA) to convene a panel of literacy experts for a workshop with the intention of producing a concept note detailing the structure and content of a proposed course on “*Teaching Reading (& Writing) in the Foundation Phase*”. The abstract is included as an Appendix.

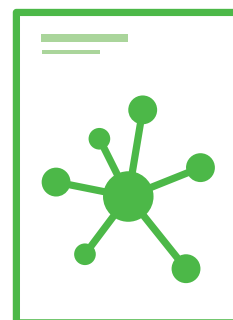
Impact

Arguably the most important endorsement of this work has come directly from the Minister of Basic Education, Angie Motshekga. Subsequent to the August 2015 conference she sent us an email conveying her intent to consolidate the strategic relationship between the DBE and ReSEP. At this conference we presented new research on the two major topics of the Zenex grant: reading in primary schools and learning deficits. This conference was a great success, and the email correspondence from the Minister is an important measure of the value the DBE attaches to this work. Since the DBE represents the primary stakeholder in this research, being the organisation with the greatest ability to change the way public school education is delivered, the research conducted for the Zenex Foundation is likely to deliver significant impact in improving educational outcomes in years to come.

While the Zenex Foundation project is somewhat smaller than the PSPPD project and has a narrower remit, the over-arching focus of both of these projects has subsequently become reading in the Foundation Phase. This was largely due to the startling results emerging from the Zenex research and the tightly focused aim on the Foundation Phase.

A critical area of impact from our perspective is closing existing knowledge gaps through pioneering academic research that informs better decision making, both within and beyond the sphere of government. Three examples are worth highlighting, (1) The work by Draper and Spaul on oral reading fluency is the first large scale analysis of its kind in South Africa; (2) Prior to Janeli Kotzé’s analysis of the ECD Audit of 2013 there existed no publicly available information on this critical dataset; (3) Analysis of the ANA datasets for the first time allowed us to determine at what stage of the schooling process the large learning deficits of many South African students become apparent.

This concludes the overview of the project. The next major section reports on the project itself, before the concluding major section presents recommendations.



A critical area of impact from our perspective is

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Project Report

Introduction

The headline message emerging from the research performed for this project is the centrality of **learning to read for meaning** during the Foundation Phase. Without being properly equipped with this skill at the start of their school careers, students progressing to later grades are unable to derive sufficiently substantial learning benefit from schooling to successfully cross critical hurdles, notably the school-leaving matriculation examination or, more ambitiously, a Bachelor's pass or university exemption (as a prerequisite for university entrance). Poor reading also influences the ability of students to engage with Mathematics. Unfortunately the opportunity of learning to read with fluency, accuracy, prosody and comprehension is not afforded to the majority of South African children, meaning that they never get a firm hold on this first rung of the academic ladder. They are perpetually stumbling forward into new grades even as they fall further behind the curriculum. Whether children are tested in their home language or in English, the conclusions are the same; the majority of South African children cannot read for meaning by the end of Grade 4 – even in their home language – and the results in English are no better. This implies that the current DBE policy and budget focus on interventions during later school years is rather poorly targeted, given the core policy objective of improving outcomes at matric level. In our view, preventing and remediating core learning deficits in early primary school – specifically in reading – should become the main policy priority of the Department of Basic Education. All future learning hinges on this critical skill.

This section of the report synthesises the main findings of the research performed for the Zenex Foundation, supplemented with complementary findings from the parallel work done for the PSPPD project. It starts with laying out the theoretical foundations for the empirical analysis before it proceeds to explore the results of analysis. Policy recommendations are presented in the final section.

Centrality of learning to read for meaning

A child's prospects in life are heavily influenced by the quantity and quality of education that he or she receives. Given the hierarchical nature of skills acquisition, the ability to successfully progress

Unfortunately the opportunity of learning to read with fluency, accuracy, prosody and comprehension is not afforded to the majority of South African children, meaning that they never get a firm hold on this first rung of the academic ladder.

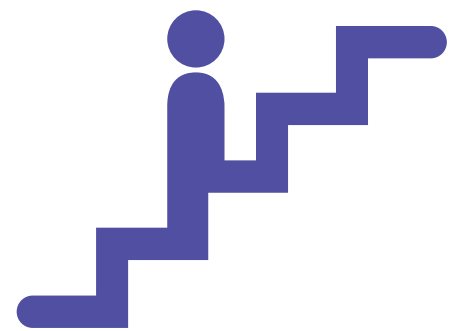
through the education system to tertiary levels, where returns to education are highest, is determined much earlier in a student's schooling career. Research shows that the critical window for acquiring basic learning skills at school, and specifically reading skills, is Grades 1–3, the so-called Foundation Phase. Little learning can take place later if a child has not yet acquired the ability to read for meaning in the language of learning and teaching by Grade 4. The development of this skill is heavily influenced by classroom practices: the so-called instructional core. It is also influenced by a child's familiarity with the language of learning and teaching, which is typically English from Grade 4 onwards.

Early learning determines matric results

For this project, Van der Berg (2015) analysed data from the Annual National Assessments (ANAs), comprising national data for 2012 and 2013, to track student cohort performance from Grades 1 to 12 using a methodology similar to panel data analysis. He found that Grade 4 outcome patterns mirror those in Grade 12 (matric) remarkably closely, reflecting the long lasting disadvantage suffered by students who have fallen behind early in their school careers (Figure 1). Importantly, already by Grade 2 more than half of students in Quintiles 1–4 are not on track, highlighting how few students are acquiring basic skills in Foundation Phase. Whether a child is still 'on track' is determined by whether his or her performance is at or above the benchmark in mathematics, defined as being one standard deviation below the reference group⁴. Students at this level have a basic knowledge of whole numbers, decimals, operations and basic graphs by Grade 9; clearly this is not a very burdensome requirement.

It is also clear from the figure that a student's likelihood of being on track is heavily determined by which school quintile he or she falls into. Quintile 5 students, representing the most advantaged from a socioeconomic perspective, are far more likely to be on track than their peers in Quintiles 1 to 4. This is likely due to a variety of factors, including both the quality of Foundation Phase schooling received and parental support for learning. It appears that the flat learning trajectories experienced by children attending poorer schools seriously undermine their chances of success in matric (particularly at the Bachelor's level, the requirement for university studies) and therefore also reduce their prospects for higher education, success in the labour market and upward social mobility.

⁴ The reference group comprises white and Indian children, in the appropriate grade for their age. This group performs at the same level as the TIMSS international average in mathematics, comparably with United Kingdom, Australia, Denmark and New Zealand.



Already by

Grade 2

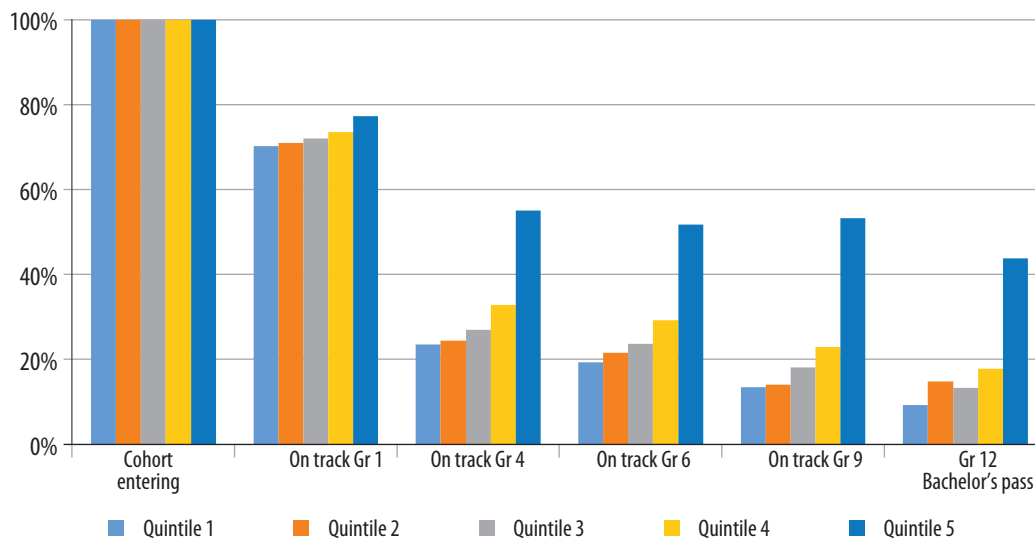
more than half of
students in

Quintiles

1–4

are not on track

Figure 1: Proportion of entering cohort on track in various grades in ANA 2012, and Bachelor's passes in Grade 12, by school quintile



Source: Van der Berg (2015)

Instructional core as a critical framework for looking at learning

The notion of the instructional core has been a central component influencing the way we look at learning in the Foundation Phase. Throughout this project we have started with an *a priori* view that any attempt to raise the quality of education in South Africa must focus on what is (or is not) happening inside Foundation Phase classrooms. City et al. (2009) refer to this concept as the 'Instructional Core': "In its simplest terms, the instructional core is composed of the teacher and the student in the

presence of content... a focus on the instructional core grounds school improvement in the actual interactions between teachers, students, and content in the classroom" (Elmore, 2008). Both in our analysis and in our recommendations we emphasise those interventions and policies that directly affect the learning reality in the classroom.



Students in poor schools can usually mechanically decode text but have little comprehension of the content of what they are reading

Evidence on learning activity in South African classrooms

As part of the present project, Hoadley (2016) provides an overview of the literature studying existing classroom activity, with a focus on poorer schools to identify where possible gaps in instruction and learning might lie. She focuses separately on literacy and numeracy.

From this review it is clear that students in most classrooms have very little opportunity to practice reading or engage with texts in meaningful ways. Teachers and student groups often read aloud together, with little attention drawn to understanding texts or

provision of individual feedback to students regarding their ability to read. In consequence, students in poor schools can usually mechanically decode text but have little comprehension of the content of what they are reading. This becomes a significant disadvantage in later grades when students are required to read different types of text and apply their skills by writing in workbooks.

Descriptive features of Foundation Phase literacy classrooms

- Students have limited opportunities to handle books and bound material
- Students mainly read isolated words rather than extended texts
- Students mainly write single words and single sentences. There is very little writing of extended text.
- Focus is on decoding texts rather than comprehension and reading for meaning
- There is little or no elaboration on student responses
- Learning is largely communalised
- There is virtually no vocabulary and spelling development
- There is little systematic teaching of phonics and decoding skills
- Oral discourse predominates
- There is a lack of (good) print material in classrooms
- There is a shortage of sufficient texts at a range of reading levels, both 'big books' and graded readers

Source: Hoadley (2016)

By contrast, to prevent children from falling behind, a comprehensive approach to teaching literacy is required (Pretorius referred to in Hoadley, 2016):

1. *Phonics needs to be taught;*
2. *Children need to be constantly motivated to read;*
3. *Children need easy access to books;*
4. *Children need plenty of opportunities to read in and outside the classroom; and*
5. *Classrooms need knowledgeable teachers.*

With respect to maths, Hoadley's (2016) literature review reflects similar findings. Teachers also fail to provide students with meaningful feedback, particularly when they made errors. Of great concern is the weak pacing and low conceptual content of maths teaching. Teachers default to everyday knowledge instead of teaching the principles of maths, with classroom strategies focusing predominantly on overly-concrete problem solving instead of abstract ways of working with numbers. It became apparent that teachers often lack knowledge of how students learn to work with numbers.

Descriptive features of Foundation Phase mathematics classrooms

- Teachers do not demonstrate a clear theory of how children learn number
- The use of apparatus and concrete methods for solving problems dominates classrooms
- Everyday knowledge in many instances obscures the learning of mathematics
- Learning occurs at an extremely slow pace
- There is a very low conceptual level of instruction
- There is an 'a-historicity' in the ways in which knowledge is introduced in classrooms, and in the understanding of the development of mathematical understanding
- There is a lack of feedback – very often Initiation and Response, with no Feedback

Source: Hoadley (2016)

58%

of the Grade 4
sample children

could not read
for meaning

while **29%**

were reading illiterate



student's home language). It tested 15 744 Grade 4 students in a nationally representative sample of 341 primary schools in all 11 languages⁵. Spauld found that 58% of the Grade 4 sample could not

The national reading crisis

Insufficient numbers of South African children are acquiring basic literacy skills, undermining their subsequent attempts to learn to read for meaning. This is driven by insufficient attention to and standardisation in ECD, weaknesses in the instructional core during the Foundation Phase of primary school, and little parental capacity for support.

The magnitude of the problem

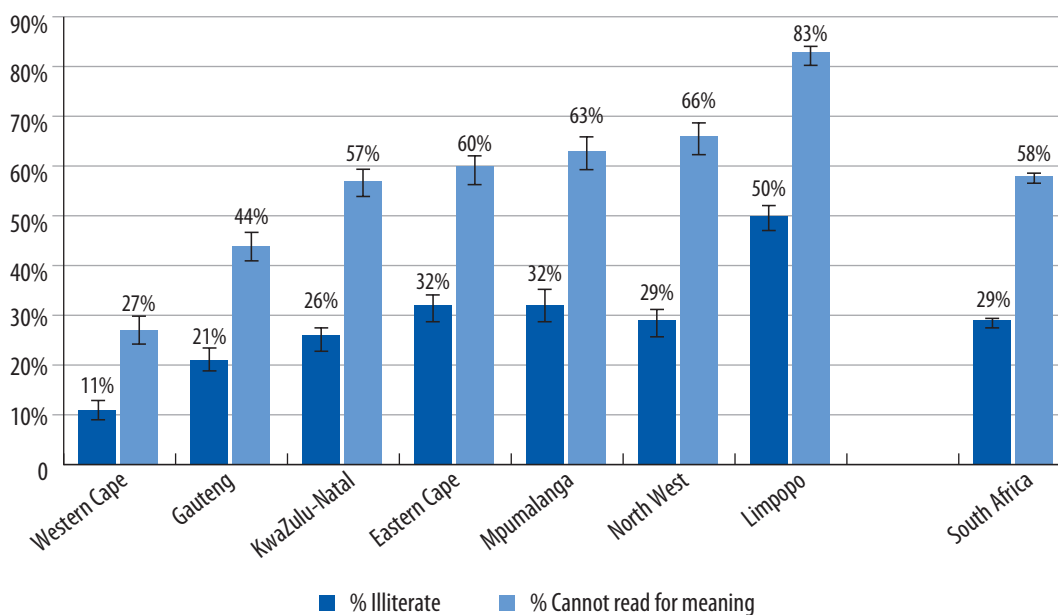
According to the 2013 Annual National Assessments (ANAs), approximately 70% of all students in Grades 1–3 were learning in an African language. In Grade 4 most of these students switched to English as the language of learning and teaching, thus about 90% of students learn in English from Grade 4 onwards. The logic behind this approach is that children find it easier to transition into literacy in a second language if they are first literate in their home language. The practical difficulty with this is that most children do not learn to read for meaning in an African language (or any language) by the end of Grade 3. Consequently, they are switching into a second language when they have not in fact become literate in a first (home) language.

Spauld (2016a) analysed the prePIRLS assessment of 2011, which deliberately aimed to assess reading literacy in whatever language the school used in Grades 1–3 (and thus in most instances the

⁵ **Note:** the prePIRLS test is considerably easier than the PIRLS assessment with roughly 400 words per text in prePIRLS rather than 800 words per text in PIRLS.

read for meaning (i.e. the intermediate test benchmark on prePIRLS) while 29% were reading illiterate (i.e. were unable to reach the lowest benchmark). These proportions differ dramatically by province (Figure 2). By way of example, in the Western Cape only 11% of students were illiterate and 27% could not read for meaning. In Limpopo 50% were illiterate and 83% could not read for meaning at the end of Grade 4.

Figure 2: Grade 4 students who are illiterate and cannot read for meaning, 2011



Note: Using prePIRLS 2011, 'illiterate' = cannot reach low international benchmark; 'cannot read for meaning' = cannot reach intermediate international benchmark. PrePIRLS is not stratified by province and therefore the Free State and the Northern Cape were excluded since they had fewer than 1000 students.

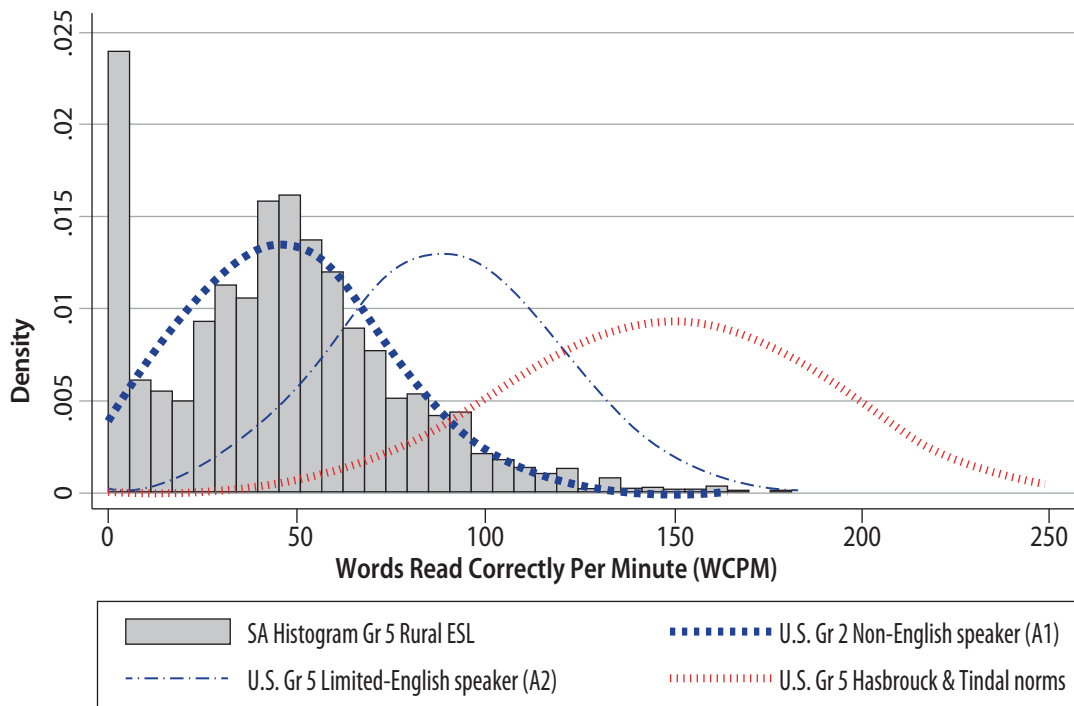
Source: Spaul (2016a)

It is worth reiterating that at the Grade 4 level in South Africa the entire curriculum is being taught in English for 90% of the student population. If these students cannot read for meaning in English then they cannot engage with the curriculum and are 'silently excluded' for the remainder of their educational career. This leads to a cycle of confusion, weak performance, a lack of motivation and disengagement, teacher frustration, undermining of teacher agency and so on.

To measure an integral component of learning to read for meaning, Draper and Spaul (2015) undertook the first analysis of large-scale oral reading fluency (ORF) in English in South Africa using ORF and comprehension data for 1 772 rural students in Grade 5 gathered by NEEDU in 2013. ORF is defined as the ability to read text quickly, accurately and with meaningful expression. They found that the English oral reading fluency of Grade 5 rural students is very low: 41% of the sample were considered to be non-readers in English, reading at less than 40 words correct per minute (WCPM), i.e. reading so slowly that they could not understand what they were reading. 11% of the sample could not read a single English word from the passage (Figure 3). In aggregate, the South African Grade 5 rural English Second Language students' ORF scores rank on the same level as the lowest category of Grade 2 English Second Language students in Broward County in Florida, USA. These students cannot

communicate meaning orally in English and demonstrate very little understanding of the language. They are thus functionally illiterate in English. The rationale for the comparison is that Broward County classifications and materials were created specifically for English Second Language students.

Figure 3: Distribution of oral reading frequency scores for Grade 5 rural South African English Second Language students relative to Broward County Grade 2 English Second Language students (words correct per minute)



Source: Draper & Spaul (2015)

Using the same data, Pretorius and Spaul (2016) model the relationship between English reading fluency and comprehension for this group of rural English Second Language students. In the light of evidence that ORF scores reliably predict reading comprehension and reading ability in general in both first and second language, they state that “it is important to set up ORF benchmarks for ESL reading in the local context. Even if these norms are later adapted in the light of new L2 reading research evidence, benchmarks serve an important purpose in making teachers aware of fluency developmental trends, of what is possible in reading development, and of raising expectations of what children can achieve...” (Pretorius and Spaul, 2016). They conclude that an appropriate threshold could be 70 words-read-correct-per-minute for Second Language readers, “lower than the typically used threshold of 90 words-read-correct-per-minute of English first language readers.”

The following section of the report will focus on the factors underlying the weak reading results, as highlighted in this research for Zenex Foundation.

Cause 1: Insufficient policy focus on early childhood development and primary schooling

This report makes a case for targeted interventions early on in a child's schooling career, ensuring a solid foundation for secondary and tertiary education and thereby proactively reducing inequality in labour market opportunities and improving social mobility.

Over the past decade, the introduction of a compulsory Grade R year has been the strongest policy lever used by the DBE to promote early learning. The National Development Plan sets the objective of universal access to two years of education prior to Grade 1, implying that access to education needs to be expanded for children at younger ages. Enrolment in pre-school has steadily increased, according to Kotzé (2015), with 64% of four year olds and 81% of five year olds attending educational institutions in 2013.

Whilst enrolment in preschool is becoming more common, the quality of education is highly variable, due to a lack of resourcing, standardisation of teacher qualifications and administrative focus. Kotzé (2015) finds that approximately a quarter of ECD facilities lack necessary basic infrastructure such as water, electricity and ablutions, and that these under-resourced centres are concentrated in poorer provinces. ECD centres receive only a basic subsidy of R15 per day per means-tested child to cover all salaries, infrastructure expenses, equipment acquisitions and two meals, which is supplemented by fees paid by parents to ECD providers. In contrast, ordinary no-fee schools receive a subsidy of one third of this amount for non-personnel spending alone, apart from the salaries of teachers that are paid by the state. Thus it is not surprising that ECD practitioners are paid very little. The ECD Audit of 2013 shows that the average ECD practitioner earned R1 400 to R2 000 per month, only 10% of the DBE salary scale of R21 100 per month for an entry level Foundation Phase teacher⁶. It is worth noting that this remuneration level is below the minimum wage of a household domestic worker. This makes it highly unlikely that ECD would draw in good quality practitioners; currently it is in many instances a job of last resort. Further, there is little pay differentiation based on level of qualification.

Linked to the poor pay on offer, ECD practitioners are seldom well qualified. Only 10% have a tertiary qualification, while just a quarter have some training in ECD (Figure 4). According to our analysis of the ECD Audit data, more than 70% of ECD practitioners

More than

70%

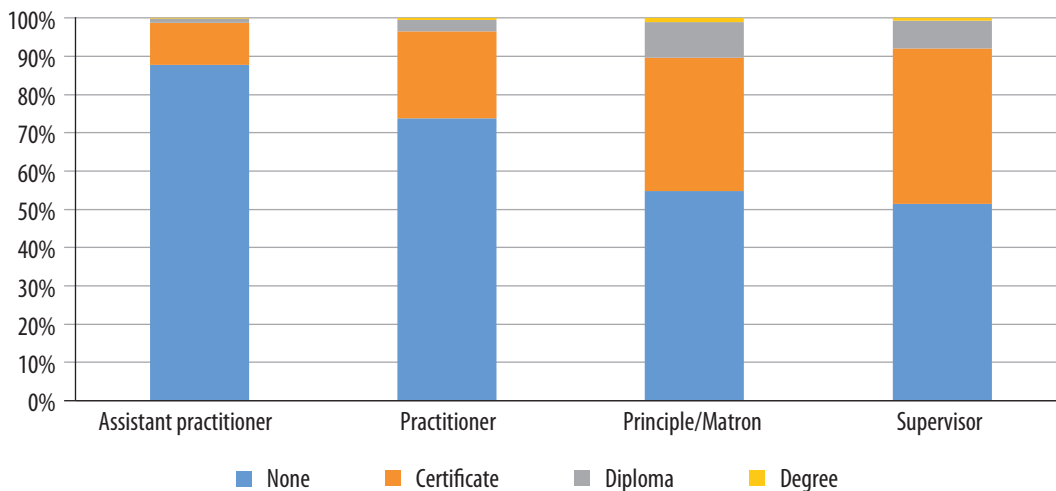
of ECD practitioners and assistant practitioners have no qualification whatsoever



⁶ This refers to total cost of employment of a REQV Foundation Phase teacher including benefits such as pension, medical aid and housing.

and assistant practitioners have no qualification whatsoever. Clearly the majority of ECD centres are not implementing the ECD norms and standards set by government, with the result that it is very easy to become an ECD practitioner, potentially to the detriment of the physical, social, emotional and cognitive development of young children.

Figure 4: Educational qualifications of ECD personnel

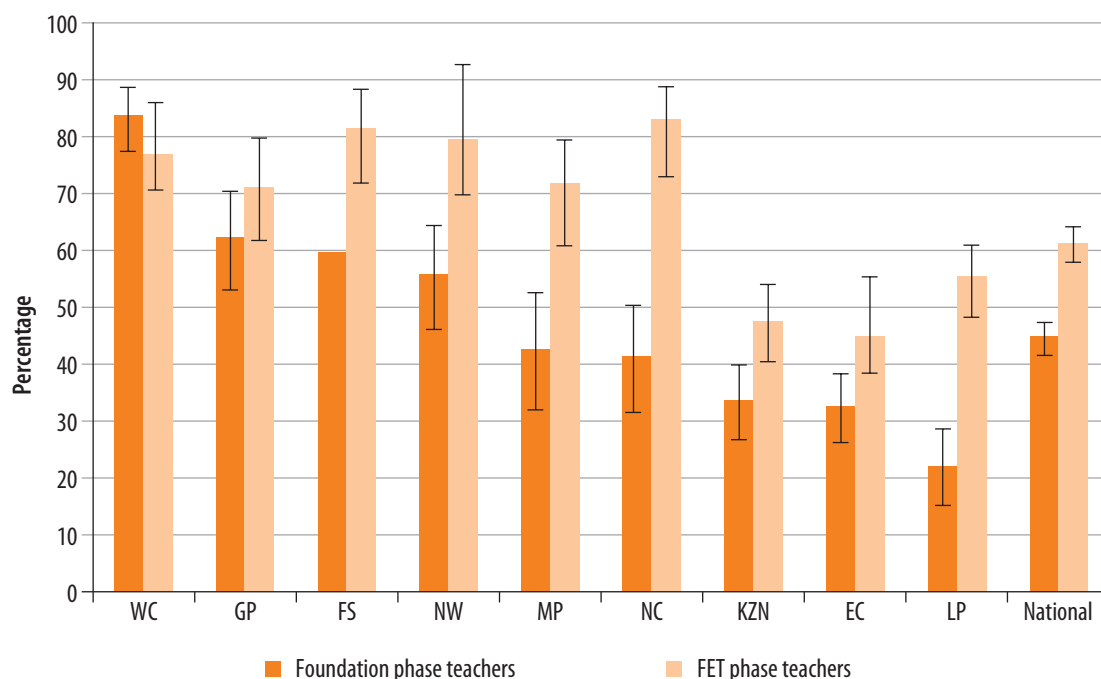


Administrative support for early education, encompassing both ECD and primary school, is also lacking. For this research project, Wills (2016) analysed the School Monitoring Survey data of 2011 which surveyed a nationally representative sample of 2 005 schools. This clearly showed that district resources are being disproportionately targeted towards secondary schools relative to primary schools. This is reflected in principal reports of the intensity of district visits to their schools, which types of district officials visit their schools and what types of activities are carried out during these visits. Principal reports were also triangulated with more than 15 000 teacher responses⁷ on their personal experience of subject adviser visits. Figure 5 below shows that FET-phase teachers (Grades 10–12) were considerably more likely to have been visited by a subject/curriculum adviser in 2011 (the year of the survey) as compared to Foundation Phase teachers (Grades 1–3). While 61% of FET teachers reported at least one visit by a curriculum adviser, only 45% of Foundation Phase teachers did so, a large and statistically significant difference.

Figure 5 also shows the uneven nature of district level support. The proportion of Foundation Phase teachers reporting that they had been visited by a curriculum/subject-adviser in the Western Cape (84%) was more than twice as high as in KwaZulu-Natal (34%) and the Eastern Cape (33%), and four times as high as in Limpopo (22%). Apart from in Gauteng and the Western Cape, in all other provinces FET-phase teachers were significantly more likely to be visited by a subject specialist than were Foundation Phase teachers, demonstrating the bias against the Foundation Phase.

⁷ As part of the School Monitoring Survey of 2011, ten teachers per school were selected randomly within the school, or in the case of there being ten or fewer teachers all teachers were selected. Each teacher was asked to complete a five-page questionnaire dealing with professional development and support provided by districts. In total 15,252 teachers were surveyed, of whom 15,004 reported information on subject advisor visits.

Figure 5: Percentage of Foundation Phase and FET phase teachers sampled in the School Monitoring Survey that report they were visited by a subject/curriculum adviser during 2011



In schools with primary school students, principals were less likely to report 12 or more visits by district officials for monitoring or support purposes during 2011: 27% of students were in primary schools received at least 12 visits, versus 39% of students in secondary schools.⁸ In particular, primary schools are less likely to be visited by district managers, circuit managers, ICT or e-learning officials and importantly subject or curriculum advisers. In some of our interviews in the Eastern Cape, district officials expressed views that the Foundation Phase was far less important than the FET phase, and that matric was the most important year. This is unsurprising given that provincial educational officials, funders, the media and non-governmental organizations all emphasise the matric results as *the* barometer of success or failure.

There is clearly a signalling problem where district resources are disproportionately allocated to the FET phase, leaving fewer human and financial resources for the critical Foundation Phase. This is partly because matric is the only examination that is verified by an independent body (Umalusi) and is relatively trusted as a reliable measure of school performance. The Annual National Assessments introduced in 2011 were an important step in the right direction and went some way to remedy this situation by providing some metric (albeit flawed) of learning in the early grades. Unfortunately these were not implemented in 2015 due to union objections and their future status is uncertain.

The crucial importance of receiving high quality early education cannot be overestimated. In another ReSEP study, Von Fintel (2015) uses the National Systemic Evaluation panel study to identify how attending a better quality school (proxied by former-Model-C status) impacts on the learning trajectories of black South Africans. Analysis demonstrates that the learning gains of attending a higher quality

⁸ Student weighted school estimates are shown to weight schools correctly by their size. If primary schools are typically smaller in size in terms of enrolment than secondary schools this will distort estimations by phase level.



The disadvantage of learning in another language

was much reduced if that language was a related language,

i.e. part of the same language group, either Nguni languages or Sotho languages

school are substantial but diminish with each grade⁹. To raise the average performance of the system over time and address gross inequalities in learning prioritisation must therefore be given to improving the quality of foundation phase teaching and learning.

Cause 2: Language issues

Using prePirls data, Van Staden (2016) and Bergbauer (2016) found very large differences in performance between schools testing in English or Afrikaans¹⁰ and those schools testing in one of the African languages, even after controlling for socioeconomic status and home background. Schools could choose whether children were tested in Grade 4 in English or in the Language of Learning and Teaching (LOLT) of Grades 1 to 3. A startlingly important new finding by Van Staden (2016) was that the disadvantage of learning in another language was much reduced if that language was a related language, i.e. part of the same language group (either Nguni languages or Sotho languages among the African languages)¹¹. Those students who attended schools that were of the same language grouping as their own, performed somewhat better than if they had attended a school of a different language grouping. In other words, a child who speaks one of the Nguni languages at home was less disadvantaged if the school language was not his own language but another Nguni language rather than an unrelated language, and similarly a child who has a Sotho home language was less disadvantaged if tested in another Sotho language than in an unrelated language.

The implication of this is that the placing of children in contexts in which there are many languages, such as in parts of Gauteng, for instance, needs to be carefully considered. Where it is impractical for Foundation Phase children to attend a school that teaches in their home language, it appears preferable that they then at least attend a school of the same language group.

9 She considers the impact of a non-white student attending a former white school using only the grade 4 data and then only the grade 5 data. Results indicate that the former white school impact becomes less important over time, as the lagged test score from the previous year (a measure of inherent ability and past inputs) becomes more important.

10 Excluding Afrikaans schools, which are ignored for current purposes

11 For this analysis, Nguni languages were considered to be isiNdebele, isiXhosa, isiZulu, SiSwati and Xitsonga (the last is not always considered part of this grouping). Sothi languages were Sepedi, Sesotho and Setswana. Tshivenda, like English and Afrikaans, were not considered to be part of any language grouping for purposes of this analysis.

Cause 3: Weaknesses in the instructional core

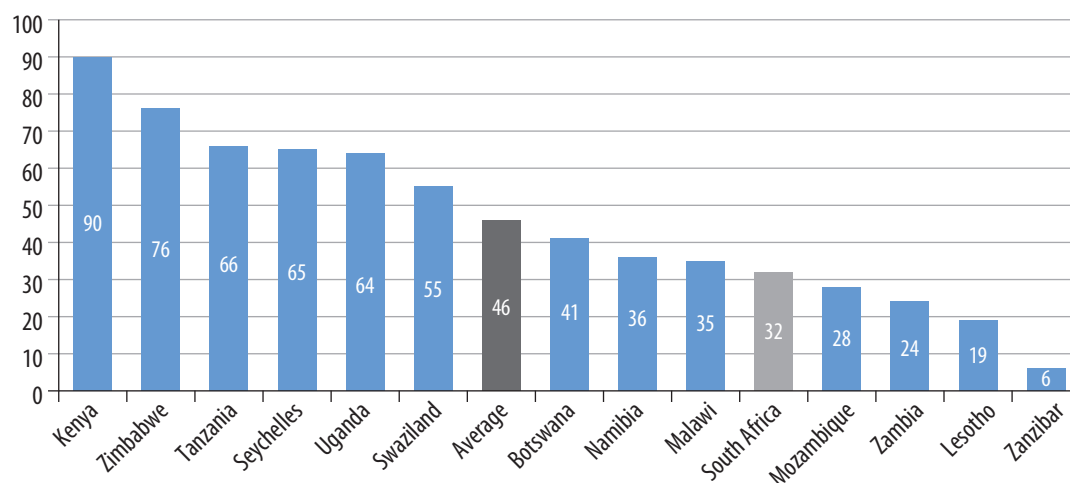
At the core of the problem is a weak instructional core, undermined by at least four compounding factors: (1) inadequate teacher content knowledge and pedagogical skill, (2) insufficient student opportunity to learn and practice, (3) learning and teaching in a second language (from Grade 4 on), and (4) excessive class sizes in some schools.

Teacher content knowledge and pedagogical skill

It is widely accepted that teachers cannot effectively teach what they do not know themselves. A number of South African studies have identified weak teacher content knowledge as a fundamental constraint to improvement in the South African education system. Until teachers are better equipped with content knowledge themselves, student learning gains through other interventions will be marginal.

The SACMEQ study of 2007 is currently the only nationally representative assessment of teacher content knowledge in South Africa. This survey showed that only 32% of Grade 6 mathematics teachers in South Africa had desirable levels of subject knowledge in mathematics (Hungu et al., 2011, p. 52), compared with considerably higher proportions in other countries such as Kenya (90%), Zimbabwe (76%) and Swaziland (55%) (Figure 6). There were also considerable differences between provinces within South Africa; Mpumalanga, for example, had almost no mathematics teachers with desirable content knowledge (4%), while in the Western Cape the proportion of teachers that were adequately equipped was considerably higher (64%) but still below levels for some other SACMEQ countries.

Figure 6: Percentage of grade 6 students with teachers with desirable levels of mathematics subject knowledge, 2007 (SACMEQ)



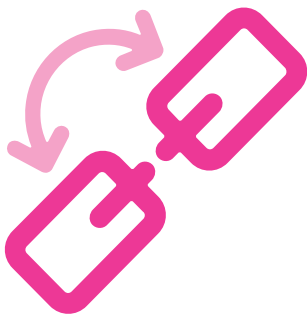
Source: Own analysis using Hungu et al. (2011)

Teacher content knowledge and student socioeconomic status

The research team's recent work on the 2007 SACMEQ data shows that almost four out of five (79%) Grade 6 mathematics teachers have a content knowledge level below the level they are currently teaching (Venkat & Spaul, 2015). That is to say that they cannot score 60% correct on Grade 6 or 7 level questions. These teachers are highly concentrated in the poorest four quintiles of schools, suggesting that inadequate teacher content knowledge in poor schools perpetuates a cycle of poor educational

79%

of grade 6
mathematics
teachers have a
content knowledge
level below
Grade 6/7 level



outcomes for students, further entrenching their poverty and weak labour-market status. This finding is borne out by examining South Africa in regional context; it is the only country in the SACMEQ group where the difference in mathematics teacher content knowledge between the poorest and richest school quintiles is large enough to be statistically significant.

Links between teacher content knowledge and learning outcomes

Existing literature from medium and large scale studies has shown a positive link between teacher content knowledge and student learning. Hoadley (2016) provides a comprehensive overview of the relevant literature, some of which is highlighted here. A novel and influential study by Carnoy, Chisholm and Chilisa (2012) compared the contributions of classroom and teaching factors to student mathematics achievement in schools in the North West Province and Botswana. Teacher knowledge was strongly linked to ratings of teacher quality and opportunity to learn in schools in the North West. Similarly, utilising the NSES panel data, Taylor (2014) found student learning improved substantially when teacher knowledge was combined with time on task. A smaller scale study by Reeves (2005) found that the most critical feature of teaching practice related to knowledge and its transmission. The teaching practices with the highest impact involved teachers making explicit the criteria of knowledge evaluation, and engaging students at challenging levels of cognitive demand.

Finally, a large body of local education research attributes these deficiencies in teacher content knowledge to inadequate apartheid-era training and ineffective post-apartheid in-service teacher training. Currently there is no rigorous evaluation of any large-scale in-service teacher training programmes: a critical gap. One of the key insights of the New Accountability movement in the United States is that one cannot effectively hold people accountable for things that they cannot do, i.e. where they lack capacity. Trying to do so leads to a situation where teachers subvert the aims of the accountability system to the detriment of students. Given the tight interplay between accountability and capacity, and the exceedingly low levels of content knowledge among South African teachers, it is difficult to see how there can be any sustained or substantial improvement in student outcomes without an improvement in teacher content knowledge and pedagogical skill.

Low opportunity to learn and learning application

A number of South African studies have aimed to measure opportunity to learn (OTL) and have frequently found that less than

half of the official curriculum is being covered in the year and fewer than half of the officially scheduled lessons are actually taught. It is useful to provide an overview of the main findings delivered by large-scale studies that have measured OTL.

Inadequate teaching time

In a comprehensive year-long comparative study evaluating 58 schools in the North West province and 58 schools across the border in Botswana, researchers found that of the 130 mathematics lessons scheduled for the year, Grade 6 teachers in the North West had only taught 50 lessons by the beginning of November, i.e. only 40% of scheduled lessons for the year (Carnoy et al, 2012, p. xvi). By contrast, in Botswana Grade 6 teachers had taught 78 lessons by the beginning of November (60% of scheduled lessons). The researchers note that frequently the problem was not teacher absenteeism but rather a lack of teaching activity despite teacher presence. As the authors note “One of [the reasons] brought up by many North West teachers, is the ‘lack of confidence’ teachers feel in teaching the required elements of the Grade 6 mathematics curriculum. In discussions, teachers attributed this lack of confidence to lacking the knowledge needed to teach the subject” (p. xvi), reflecting the interaction between support and accountability.

Teacher absenteeism

A 2010 study by the Human Sciences Research Council found that “a conservative, optimistic leave rate of educators in South Africa is between 10% and 12%” (Reddy et al., 2010, p. 84), which amounts to 20 to 24 days per year for the average teacher. They furthermore explain that, “Just over three quarters of all leave instances recorded on the Persal¹² system are for one or two days in duration, that is, discretionary leave not requiring a medical certificate. Mondays and Fridays are the most popular discretionary leave days” (Reddy et al., 2010, p. x). Spull (2011), using the SACMEQ¹³ 2007 data, finds that the average Grade 6 Mathematics teacher in South Africa reported being absent from school for 19 days. This was much higher in the poorest 20% of South African schools, at 23 days, compared to 11 days in the wealthiest 20% of schools. While it is true that severe teacher strikes in 2007 inflated absenteeism figures, these are also self-reported rates of absenteeism and so almost certainly under-reported.

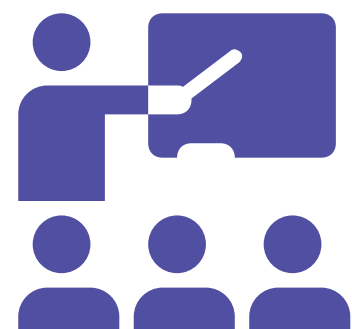
In a comprehensive year-long comparative study evaluating

58

schools in the North West, Grade 6 teachers had only taught

40%

of scheduled lessons for the year



¹² PERSAL is the Personal and Salary System of the Department of Basic Education.

¹³ Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ).

They found that only

53%

of students nationally had covered the bare minimum number of exercises required for curriculum coverage



Practical exercise and application lacking

- *National School Effectiveness Study (NSES): Mathematics.* The NSES study of 2007/8/9 is arguably the most comprehensive survey of primary schooling in the post-apartheid period. A multitude of researchers were involved in the project which surveyed and assessed approximately 15 000 students from 268 schools in Grade 3 (2007), Grade 4 (2008) and Grade 5 (2009) from eight of the nine provinces in South Africa (Gauteng was excluded due to other testing). Observing the student's workbooks, the researchers could only find written exercises for 22 of the 89 topics required to be taught in Grade 5. This implies that students covered less than one quarter (24%) of the prescribed mathematics topics for the year. The figures are the same for Grade 4. In fact, only 12% of teachers had covered more than 35 of the 89 topics by about the end of the third term.
- *National School Effectiveness Study (NSES): Language.* The NSES data on opportunity to learn language and to write text is also deeply concerning. The study showed that most Grade 5 children write in their books only once per week or less. Only 3% of Grade 5 students across South Africa wrote in their books every day. In Grade 4 and Grade 5 exercise books, about half of all exercises in the year were single word exercises. As one of the researchers notes "Of greatest concern is how little extended writing there is in the books..., students write one paragraph every month and a half of school!" (Dechaisemartin, 2013, p.170) It is also significant that the majority of exercises (78%) in the grade 4 books were half a page or less. A shocking 44% of Grade 4 students had not written any paragraphs during the entire school year. The researcher further notes: "In the North West and the Northern Cape, close to two thirds of all Grade 4 classrooms in the sample (62% and 63% respectively) had not written any paragraphs throughout the year" (Dechaisemartin, 2013, p. 172).
- *School Monitoring Survey: Use of exercise books.* In 2011 the Department of Basic Education surveyed a nationally-representative sample of approximately 2 000 schools from across the country (both primary schools and high schools). This survey included an analysis of exercise books at the Grade 6 and Grade 9 levels. They found that only 53% of students nationally had covered the bare minimum number of exercises required for curriculum coverage¹⁴. However this figure differs substantially by province. While 85% of students in Gauteng and 76% of Western Cape students had completed this (low) number of exercises per month, only 27% of students in the Eastern Cape and 24% of students in the North West had done so (DBE, 2015, p. 68).

¹⁴ For instance, the Department used a threshold of seven mathematics exercises a month at the Grade 9 level or six language exercises a month in Grade 6.

- *National Education Evaluation and Development Unit (NEEDU): Writing activities.* The 2013 round of the NEEDU evaluation surveyed 218 rural primary schools from across South Africa and conducted an in-depth study in four schools per province (36 schools in total). While not nationally representative, the results of the 36-school analysis confirm other studies of a similar nature. The investigators found that “Not only are the frequency and volume of writing generally far too low, but they are highly variable across the sample. Students in some schools write, on average, one or two pages a day over the entire year, while the majority write a page twice a week or less frequently. These disparities reflect vastly different opportunities to learn offered to children in more or less effective schools...Only 23.7% of the set of writing activities prescribed by CAPS was completed in a subsample of 36 schools studied in detail. In five schools no extended writing was done at all and in another five schools only one or two pieces of writing were in evidence” (NEEDU, 2013, p. 43). It is also worth noting that the NEEDU researchers also looked at the DBE Workbooks and found that in the full sample of 218 schools, more than 80% of children had completed less than one page per day in their mathematics and language workbooks.

The centrality of opportunity to learn

In the early stages of the present project, it became clear that opportunity to learn would be a major focus of the overall findings, given that it features prominently throughout the academic literature and in SA policy documents. It is likely that the low levels of OTL could have their roots in both a lack of capacity (teachers lack the content knowledge and pedagogical skill to teach some content areas) and a lack of accountability (no monitoring by the principal or district officials).

However, irrespective of cause, it is necessary to first measure OTL to understand how much of the curriculum teachers are covering in different grades in every school across the country. Without this information it is not possible to determine (a) which schools need additional monitoring and support, and (b) if OTL is improving or deteriorating over time in these schools. Although various sample-based surveys have found ways of measuring OTL, there is currently no consensus on how to measure OTL on a system-wide level.

Workbooks as a measure of opportunity to learn

In light of the above, a number of local education researchers have for some years now proposed that the DBE Workbooks be used to measure curriculum coverage at a very basic level. The DBE Workbooks that were introduced in 2011 are now available



In the sample of 218 rural schools, more than

80%

of children had completed less than one page per day in their mathematics and language workbooks

in mathematics and language to all students from Grades 1–9. They reach approximately 9 million students and structure the curriculum week-by-week, providing a practice tool for teachers to use.

For the purposes of the present study two curriculum experts were commissioned to conduct both a comprehensive review of the Grade 3 DBE workbooks for mathematics and language, and an assessment of the purpose to which the workbooks were best suited. The full working paper associated with that review is available online (Hoadley & Galant, 2016). They explored three possibilities for workbook use, namely as a practice tool, an assessment tool, and a monitoring tool. In this respect, the authors conclude that:

“The overall high level of curriculum compliance of the workbooks suggests they could be effective as a monitoring tool at a systemic level. It would be possible to gain a crude measure of coverage in key content areas” (Hoadley & Galant, 2016, p. 20).

In their analysis they go further and comment on the potential complementarity of textbook and workbook:

“With the recent proposal to produce a single textbook per subject per grade, this textbook could usefully be aligned with the workbooks. The textbook could then function as a primary transmission text, with clear conceptual signalling as well as relevant tasks, and the workbook could function as a practice tool, either for use in class or as a homework resource” (Hoadley & Galant, 2016, p. 21).

Both of the recommendation agree with the conclusions of earlier studies, notably those of Carnoy et al. (2012) who concluded that:

“... emphasising opportunity to learn through time spent overall on mathematics work, content coverage, spread of topics across each grade year and cognitive and curricular pacing within and across grades, could be an effective strategy to increase learning, especially in poorly performing schools, such as most of those in our sample. To accomplish this, teachers need to acquire more content knowledge and should be held accountable for teaching their classes. *Were such a strategy added to the current effort to provide and use efficiently a well-structured and carefully designed textbook and workbook series, as well as other material, it could greatly improve student learning with almost no increase in per student spending...* This is provided that teachers actually use the books purposefully” (Carnoy et al., 2012, p. xviii emphasis added).

In an extensive review of large, medium and small scale studies relating to classroom practices and learning outcomes in primary schools, Hoadley (2016) concludes that learning conditions are far from optimal across most of the system.

Dominant descriptive features of primary school classrooms from medium and large-scale studies

- Low levels of teacher knowledge
- A lack of print material in classrooms, especially textbooks
- A lack of opportunities for reading and writing (oral discourse dominates)
- Classroom interaction patterns that privilege the collective (chorusing)
- Low levels of cognitive demand
- Weak forms of assessment and lack of feedback on students' responses
- Slow pacing

Source: Hoadley (2016)

Descriptive features of primary school classrooms derived from small-scale studies

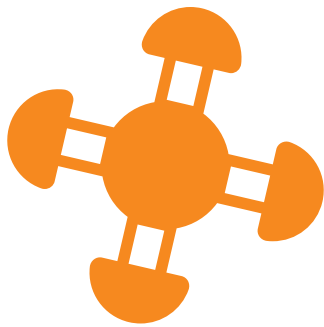
- Low levels of cognitive demand
- Everyday, context-dependent knowledge
- Teaching practices which often undermine explicit, direct instruction
- Lack of opportunities for reading and writing (oral discourse dominates)
- Slow pacing
- Collectivised as opposed to individualised learning
- The erosion of instructional time
- Multiple issues related to language, especially second language teaching and learning
- Lack of differentiated teaching, especially in multigrade classrooms

Source: Hoadley (2016)

Classroom factors associated with learning gains in medium and large-scale studies

- Teachers adjusting pace to pupil ability
- Greater curriculum coverage, including teacher knowledge and planning for and coverage of curriculum standards
- Teacher commitment and planning
- Teacher knowledge
- Greater opportunity to learn (content coverage by cognitive demand, content exposure as well as curriculum coherence and pacing)
- More appropriate assessment and providing feedback to students
- A focus on reading and writing text

Source: Hoadley (2016)



Disadvantage arises more from

lack of cognitive and non-cognitive stimulation

given to young children than simply from the lack of financial resources

Language of learning and teaching

Despite there being 11 official languages in South Africa, the matric exams are only currently written in Afrikaans or English. Similarly, 90% of students receive general instruction in English from Grade 4 onwards, yet, only a fifth of students have English or Afrikaans as a home language (Taylor & Von Fintel, 2016).

Applying an innovative school fixed-effects approach – which controls for school-level characteristics – to data from the Annual Survey of Schools and ANAs, Taylor and Von Fintel (2016) show that receiving mother tongue instruction in the Foundation Phase significantly improves the acquisition of English language skills later on.

Given the fact that South Africa is a multilingual country and that most children will typically have to be fluent in at least two languages – their home language as well as English or Afrikaans – it is important to specify which language one is referring to when setting goals for reading. All children should be able to read home-language grade-appropriate texts fluently and with comprehension by the end of Grade 3. They must also be able to read First Additional Language (FAL) texts in English by the end of Grade 3. Given that most children will be learning through the medium of English from Grade 4 onwards, it is imperative that they can read English texts fluently and with comprehension. While literacy in the first language certainly helps facilitate the acquisition of literacy in a second language, English must be taught explicitly from Grade 1, as is prescribed in CAPS.

Cause 4: Home background

Differences in home and family background have an important influence on patterns of learning. For example, differences in the proportion of children across provinces and school quintile who are on track or who are illiterate and cannot read for meaning in grade 4 (in Figures 1 and 2) may be partly explained by divergent student backgrounds. The very high income inequality in South Africa has significant implications for inequalities in learning even before children access formal schooling. Upon entering school, considerable skills gaps are likely to exist on the basis of socio-economic status – what Lee and Burkham (2002) characterise as “inequality at the starting gate.” Inequalities in school readiness are in turn likely to be augmented by differences in access to quality ECD education (Van der Berg et al, 2013). The extent to which these gaps widen or narrow during institutional education will depend on the effectiveness of the school system and on-going support from the home environment (Spaull and Kotzé, 2015).

There are numerous channels through which home-background can influence learning. The first is having access to material resources at home necessary for stimulation and learning in early years. The second is through the availability and quality of educational support in the home or living in an environment conducive to learning; although James Heckman (2006: 1900) argues that “disadvantage arises more from lack of cognitive and non-cognitive stimulation given to young children than simply from the lack of financial resources”. Home support is strongly influenced by parents’ education and their involvement with a child – a factor that cannot be assumed as present in a country with extremely high levels of orphanhood.¹⁵ Family structure is found to be a very strong determinant of educational outcomes such as enrolment rates, number of grades completed and student achievement (Anderson, Case and Lam, 2001). Reading development in particular is strongly dependent on whether someone in the home can help a child with their reading and support them with comprehension. It follows that school efforts to drive reading improvements must be accompanied by significant campaigns to create parent and community awareness of the importance of reading, as identified in the DBE’s 2008 National Reading Strategy.

A third home background factor influencing educational achievement is the ability of parents to ensure that their children are placed in good quality schools. Although schools are no longer officially segregated, the residential patterns established under apartheid have to a large degree persisted, thus effectively limiting school choice. Indeed a very important part of how a child’s socio-economic status (SES) affects educational outcomes in South Africa is through the channel of school choice (Taylor and Yu, 2009). A number of quantitative studies in South Africa confirm that the effects of SES appear to be intensified through schools where the combined SES of students in a school may be more important than a child’s own family background once school choice decisions are made. In other words, the impact of the school environment and the quality of tuition received become very important for explaining school outcomes once school attendance occurs.

Although socio-economic status strongly determines the educational outcomes of children across the country and specifically explains much of the inequalities in educational (and reading) outcomes observed, for every level of socio-economic



The impact of the school environment and the quality of tuition

received become very important for explaining school outcomes once school attendance occurs

¹⁵ Using General Household Survey data, Hall and Meintjies (2015) identify that in 2013 there were 765,000 double orphans, 1,9 million paternal orphans and 604,000 maternal orphans in South Africa. In other words, orphanhood affects a significant proportion of the population of school-going children.



What is of greatest concern is that in the Eastern Cape and Limpopo between 10 and 15% of Grade 1–3 students are in extremely large classes with more than 60 children

status apart from the very top levels, primary school children in South Africa fare worse in reading and numeracy than equally poor children in other developing and African countries, including Kenya, Tanzania and Swaziland (Kotzé and Van der Berg, 2015). The conclusion one draws is that the quality of schooling, particularly primary schooling, to which the majority of South African students have access is sub-optimal when compared to some poorer African states. The focus must be given to addressing quality issues in the education system, rather than only dwelling on socio-economic disadvantage. There is convincing quantitative evidence from research conducted by ReSEP colleagues that school quality can overcome a large portion of socio-economic disadvantage, particularly when quality education is accessed by children in early grades (Von Fintel, 2015; Shepherd, 2016).

In multivariate analysis of the prePIRLS data, Bergbauer (2016) found that after controlling for other factors such as the socioeconomic background of children three factors not usually included in regression analysis seemed to be strongly associated with better performance in schools that tested in African languages. These factors were how regularly parents checked their children's homework; how supportive parents are of children reading at home; and whether teachers self-reported that they closely followed the curriculum. The difference in performance between students scoring very low on these factors and those scoring very high was 81% of a standard deviation, i.e. equivalent to about 2 years of learning. Of great interest is that these factors did not appear to be of similar importance in those schools testing in English. It is of course not obvious that these effects are causal, i.e. that these factors cause better performance rather than that they are only associated with better performance.¹⁶ Nevertheless, this opens up new areas of enquiry for further research and creates the possibility of incorporating such questions in future surveys to improve understanding of the role of such factors in performance of students from disadvantaged backgrounds.

Cause 5: Extreme class sizes in the Foundation Phase

Teaching young children to read is notoriously difficult in an overcrowded classroom. As Snow et al. (1998) explain: "The abilities and opportunities of teachers to closely observe and facilitate the

¹⁶ For instance, those parents who regularly check homework may also be those more interested and motivated parents who are more involved in their children's education generally, not only in checking homework, and that the checking of homework reflects such greater interest and involvement by parents rather than that checking homework causes better performance.

literacy learning of diverse groups of children are certainly influenced by the numbers of children they deal with.”

Studies that have tried to estimate the impact of reducing class sizes have mainly been conducted in developed countries, where classes are typically not ‘large’ in any developing-country sense. The classic Tennessee Project STAR research looked at a reduction from 22 children per class to 15 children per class. Similarly Angrist & Lavy (1999) looked at a reduction in class size from 41 to 21 in Israel. It is quite reasonable to expect that class size reductions from 60 to 40 may have a different impact than those from 40 to 20, particularly in the early grades.

There is not a large amount of rigorous research on this issue that has been conducted in developing countries. In a recent review Ganimian & Murnane (2016: 17) summarise this as follows: “The best available evidence is that class size reductions in developing countries are effective only when initial class sizes are very large, the reductions radically change the number of students in the classroom, and students are tracked by their initial achievement.” In one of the studies in Kenya which they refer to, class sizes were reduced from about 90 students to about 43 students by using a contract teacher. Where students were also tracked on prior achievement there were modest but statistically significant gains. In a similar study in Andhra Pradesh (India), Muralidharan & Sundaraman (2013) find that reducing the pupil-teacher ratio of 36 by 10% using either a contract teacher or a regular civil-service teacher led to an increase in test scores of 0.03 and 0.02 standard deviations respectively, a quite small gain. They stress the cost-effectiveness of hiring contract teachers over regular civil service teachers, given that the latter earn 5 times as much and the impact was very similar for both groups.

Moving from the quantitative literature to the educational literature, Snow et al. (1998), in their book “Preventing reading difficulties in young children”, discuss class sizes but note the following:

“Although both the quantity and quality of teacher-student interactions are necessarily limited by large class size, best instructional practices are not guaranteed by small class size. Class size reduction efforts must be accompanied by professional development and planning that supports the desired changes in curriculum, instruction, and assessment.”

(It is worth bearing in mind that ‘small’ here refers to about 21 students in a class.)

In the South African context there has been little attention paid to class sizes, especially class sizes in the Foundation Phase. There is a strong case to be made that class sizes in the early grades should be smaller than those in the higher grades. The post-provisioning norms of 2002 (Government Gazette 24077) indicate that the maximum class size for Grades R–4 is 35, for Grades 5–6 is 40 and Grades 7–9 is 37.

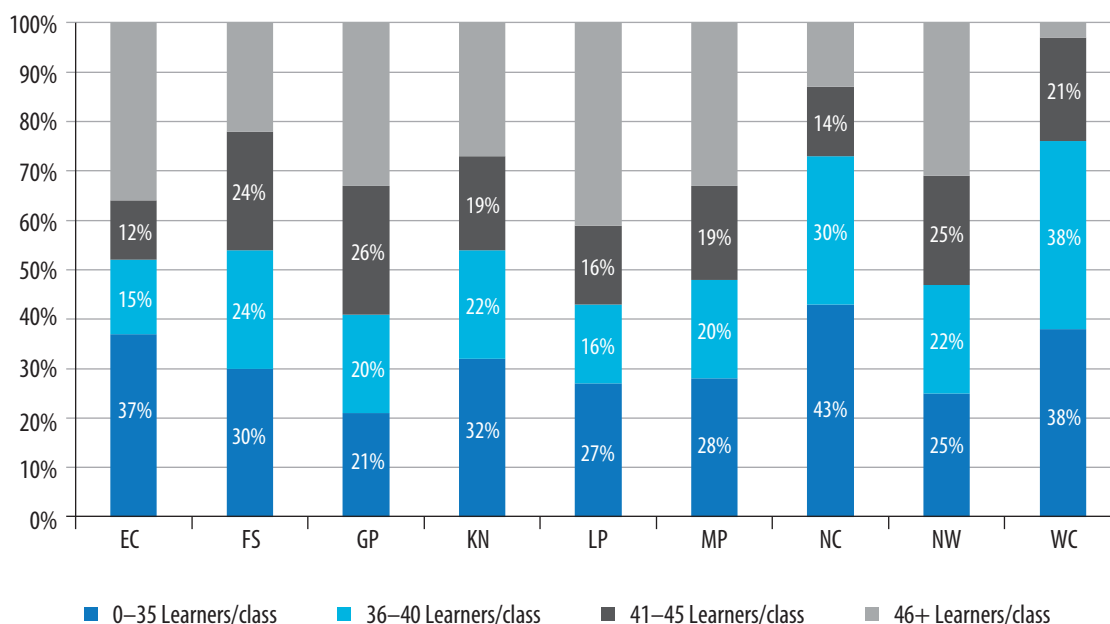
An analysis of the Annual Survey of School (ASS) data for 2013 was done to determine the prevalence of different Foundation Phase (Gr 1–3) class-sizes in each province. Table 1 below, together with Figures 7 and 8, show the proportion of students that can be found in different class sizes in each province.

Table 1: Percentage of Grades 1–3 students in Foundation Phase classes of a particular size in each province

	0–35 Students/ class	36–40 Students/ class	41–45 Students/ class	46–50 Students/ class	51+ Students/ class
EC	37%	15%	12%	9%	27%
FS	30%	24%	24%	16%	6%
GP	21%	20%	26%	19%	14%
KN	32%	22%	19%	12%	15%
LP	27%	16%	16%	14%	27%
MP	28%	20%	19%	15%	18%
NC	43%	30%	14%	7%	6%
NW	25%	22%	22%	15%	16%
WC	38%	38%	21%	3%	0%

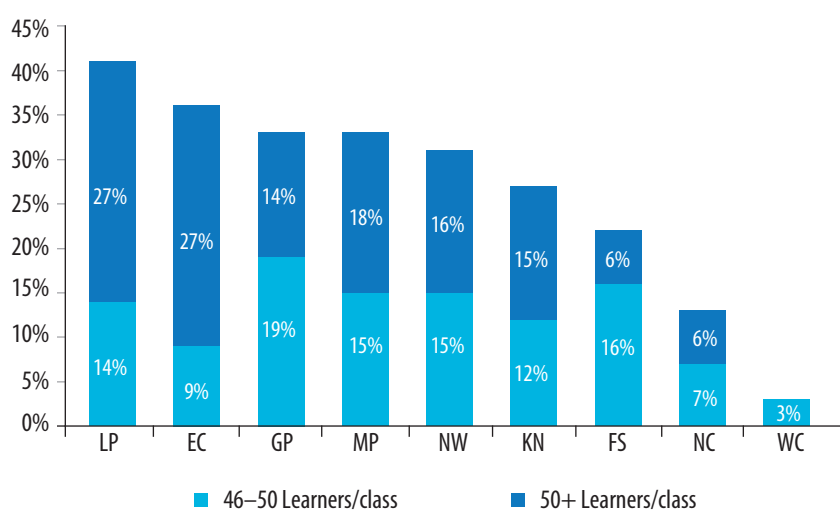
From the table and figures it quickly becomes clear that there are significant provincial differences in the extent to which Grades 1–3 students are exposed to large classes. If one uses the government’s own post-provisioning norms, which prescribe a maximum class size of 35 students in Grades R-4, then we can say that the majority of Foundation Phase students are in classes that exceed these norms, in some instances by a significant margin. While 38% of Grade 1–3 students in the Western Cape are in classes that do not exceed the norms, the comparable figure in Gauteng is only 21%. If one takes a slightly larger class-size threshold of 40 students per class or less, then three quarters (76%) of Grades 1–3 students in the Western Cape are in norm-compliant classes, compared to only 41% in Gauteng, 43% in Limpopo and 52% in the Eastern Cape. It is interesting that Gauteng, the richest province, also appears to be the province where these low class size norms in the Foundation Phase are most often exceeded.

Figure 7: The percentage of Grades 1–3 students that are in Foundation Phase classes of a particular size in each province.



If one turns to the issue of very large and extreme class sizes, the true extent of the problem emerges. Among Grade 1–3 students in Limpopo and the Eastern Cape more than one in four (27%) are in very large Foundation Phase classes (more than 50 students). In five provinces more than 30% of Grade 1–3 students are in large classes (more than 45 students). What is of greatest concern is that in the Eastern Cape and Limpopo between 10 and 15% of Grade 1–3 students are in extremely large classes with more than 60 children.

Figure 8: *The percentage of Grades 1–3 students that are in very large classes*



The fact that large classes are often overlooked in the policy debates has arguably contributed to a situation where education expenditure discussions tend to focus on the ability to pay existing teachers more, as opposed to employing more teachers, or even teacher assistants.

Policy recommendations

To improve learning outcomes, policy should focus on the universal acquisition of foundational reading skills. This must become the central objective for teaching in early primary school, with aligned research funding, teacher training – specifically with regards to teaching reading – and the establishment of reading norms. Interventions for wider implementation across the system should be selected on the basis of sound evidence and receive sustained support.

There are 12 main policy recommendations emerging from this research.

These are listed below:

- 1. Emphasise reading as a unifying goal for early primary schooling.** The single most important goal for the first half of primary school should be the solid acquisition of reading skills such that every child can read fluently and with comprehension in their home language by the end of Grade 3. An important secondary goal is that every child should also be able to read First Additional Language texts in English fluently and with comprehension by the end of Grade 3. This goal is easily communicated to and understood by parents, teachers and principals and is relatively easy to measure and monitor. The benefit of having a single unifying goal to focus attention, energy and resources should not be underestimated.
- 2. Teach primary school teachers how to teach reading in African languages and in English.** That many primary school teachers do not know how to teach reading is evidenced by the cripplingly low oral reading fluency scores in Grade 5. Students with such extremely low oral reading fluency cannot engage with the curriculum (which is usually in English in Grade 5) and hence fall further and further behind as the reading material and cognitive demands become more and more complex. There is a clear need to convene a group of literacy experts to develop a course to teach Foundation Phase teachers how to teach reading. This course should be piloted and evaluated and if it is of sufficient quality should become compulsory for all Foundation Phase teachers in schools where more than half of all students do not learn to read fluently in the language of learning and teaching (LOLT) by the end of Grade 3. As part of this project we have begun this process with an initial document “Teaching reading (& writing) in the Foundation Phase” now available – see point 10 below.
- 3. Develop evidence-based interventions and evaluations and provide sustained support.** Much of the policy energy that has been expended in the last 10 years has been sporadic and haphazard. Promising programmes (such as the Systematic Method for Reading Success) are not pursued, while new initiatives are funded (but not evaluated) without a clear understanding of how they improve on or learn from previous initiatives. Any new national literacy drive needs to be piloted, independently evaluated and taken to scale when it is proven to be effective. This should be seen as a medium-to-long term rather than short-term goal.
- 4. Declare early literacy research (particularly in African languages) a National Research Foundation (NRF) Research Priority Area.** Given the magnitude of the reading crisis and the lack of research on African languages at South African universities (particularly on early literacy in African languages), the NRF should declare this a national priority. It should dedicate the necessary resources to those researchers and departments who have the skills and expertise to investigate how children learn to read in African languages and which interventions are the most promising.
- 5. Establish oral reading fluency norms for South Africa’s African languages.** Although there are already oral reading fluency norms for English, there are none for the African languages. It is also not possible to translate English norms into African language norms since the language structure (morphology) is different, with English being an analytic language and African languages being agglutinating languages. Without these norms it is not possible to reliably measure and benchmark children’s oral reading fluency in African languages.
- 6. Use DBE workbooks to measure curriculum coverage at regular intervals.** Our research shows that at least the Grade 3 Home Language series is relatively well aligned with the curriculum. Monitoring and support should be commensurate with the level of underperformance¹⁷. In underperforming schools, curriculum coverage using the workbooks should take place once per term. Schools that have consistently low ANA results should be instructed to use the DBE Workbooks as a primary practice tool in language and mathematics. Given that the majority of Quintile 1–3 schools fall into this category, principals and teachers should be made aware that Departmental officials

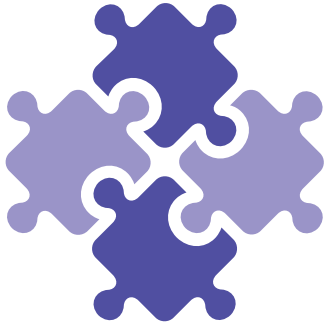
¹⁷ It should be emphasised that crude measures of opportunity to learn (such as counting pages with written text on them) are vulnerable to suboptimal strategic behaviour or “gaming.” If students are instructed to simply transcribe text from a board into their workbooks, such ‘work’ would count as OTL, when in fact this has practically no educational value. Thus, before workbooks could be used as a tool to monitor OTL, the Department should create a rubric whereby principals and district officials can assess a sample of student’s workbooks and do so in an educationally meaningful way. This may include assessing only a random sample of 10 students per class, only analysing certain pages (unannounced to the teacher), and comparing results across students.

will be measuring curriculum coverage on a quarterly basis using the Workbooks in these schools. If district officials are aware how much of the curriculum different schools are covering, they can more effectively target additional monitoring and support. With the introduction of the one-textbook policy there is also scope to better align the Department textbooks, workbooks and assessments to teach, practice and monitor the acquisition of core skills.

7. **Eliminate gender inequality in the appointment of principals:** Our research on the principal labour-market in South Africa (Wills, 2015) found that while 79% of primary school teachers were female, only 43% of primary principals were female. Clearly there is a selection process which favours the appointment of male principals over female principals in primary schools. Whether these effects are driven by cultural or political factors, the effect is that a large pool of talent is often ignored in the appointment process of principals. There is no evidence to suggest that male teachers are better than their female counterparts, either as teachers or principals. These gross inequities should be cause for concern.
8. **Continue to test students regularly through the Annual National Assessments (ANAs).** Prior to 2011, the only standardised national exams were the matric exams at school exit. This is too late to identify a systemic need for remedial action within schools where large numbers of students are not learning effectively. Since this research shows that most students are acquiring learning deficits early on (Grades 1–3), accurate indications of learning outcomes at this early stage are required in order to take timeous and directed corrective action.
9. **Review the allocation of district-level resources and personnel.** The School Monitoring Survey of 2011 clearly shows that primary schools are at a disadvantage in terms of district-level monitoring and support. Provincial and district level officials should be made aware of why this is problematic and about the importance of ensuring that all children learn to read in the Foundation Phase, which lays the basis for all future learning.
10. **Develop a course to teach Foundation Phase teachers how to teach reading:** Through our discussions with literacy experts and reading researchers at a number of South African universities, it soon became clear that almost all of them believed that South African Foundation Phase teachers do not know how children learn how to read, and even prospective teachers do not spend much time on this at university. As part of this project we convened a group

of literacy experts under the leadership of Professor Elizabeth Pretorius to create a detailed concept note outlining the structure and content of a course to teach existing and prospective Foundation Phase teachers how to teach reading. This 27 page document is now available, with the provisional title "Teaching Reading (& Writing) in the Foundation Phase."

11. **Investigate the extent of and reasons for extreme class sizes in some Foundation Phase classrooms and pilot strategies to reduce these:** Extreme class-sizes vary across provinces and districts. Identifying the characteristics of schools experiencing this problem can aid in creating context-appropriate solutions. Causes could include unresponsive post-provisioning systems, a lack of physical classrooms, teacher absenteeism, or inefficient timetabling (use of existing resources). Given budgetary constraints, alternative strategies for reducing class sizes should be considered. This could include multiple school 'shifts' where one set of students start and finish their school day later than the other group, to allow some hours of smaller classes for more individualised support to students. Special classes in the afternoon for those students struggling most could also be considered. The international literature also points to the recruitment of contract teaching staff or teaching assistants as a policy option. These individuals are usually drawn from the local community, offered a short course of training and are remunerated at lower levels because they have lower qualifications. This could improve working conditions of existing teachers (by providing additional personnel support), create a channel to influence the teaching of reading in the Foundation Phase (through short-course curricula) and increase local employment.
12. **Prioritise the elimination of extreme class sizes in the Foundation Phase:** Although the Action Plan to 2019 does identify "Teacher availability and class sizes" as an explicit goal (Goal 15), there is no special mention of the Foundation Phase, yet this is where the foundation is laid for further learning. When referring to large class-sizes in the Foundation Phase, it is important to distinguish between marginally overcrowded classes (40 students per class) and extremely overcrowded classes (60 students per class). Attempts to reduce excessive class sizes should give highest priority to first eliminating *very* large classes (i.e. those with 50+ students per class).



With widespread agreement that **reading is the foundational skill** upon which all other learning builds, there has never been a better time to tackle this problem than now

Conclusion

The idea that the primary focus in schools should be on the Foundation Phase, and on reading for that matter, is not new. In fact, there have been many attempts to give early reading the central role in our school system that we believe it deserves. Reading deserves this role not only in its own right (learning to read and write is central to the notion of education as a universal right), but also to provide the foundation for further learning, whether that be in literature, mathematics, history or science – reading is central to almost all further formal learning. The horizons that functional literacy opens is testament to the importance of this first foundation in the school career.

In the companion research report for the PSPPD (“Identifying binding constraints in education”), more background is provided on some of these earlier attempts to make reading central. We shall not attempt here to repeat that, but rather take an important message from that part of our education history. That message is that attempts like these do not always convert into sustained and long run action that improves learning outcomes.

Yet we are hopeful that this time the message may land on more fertile ground. The first reason for this optimism is that the accumulated research of countless researchers in this country and internationally provides ample evidence about the importance of early learning, and that getting reading right in the Foundation Phase is crucially important. Our new research has added to that, particularly in demonstrating how bad the situation is in terms of reading fluency in many of our schools. The second reason for our optimism is that there is growing urgency amongst policymakers, parents and many teachers, to improve educational outcomes for the poor. There has never been a better time to tackle this problem than now.

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Appendices

Appendix 1: Agenda, Education Conference 17–18 August 2015, Stellenbosch

DAY 1

- Dr Nicholas Spaul (Stellenbosch University): Exploring the relationship between oral reading fluency and comprehension among rural English-Second-Language students in South Africa
- Prof Doug Willms (University of New Brunswick, Director of The Learning Bar): Educational prosperity: A life-course approach to monitoring childhood outcomes
- Prof Ursula Hoadley (UCT) & Jaamia Galant (UCT): Pedagogy and performance: The challenges of measurement
- Pheladi Fakude (North West University) / Dr Leketi Makalela (Wits): Barking at text: A study of Sepedi oral reading fluency: Implications for edumetric interventions in African languages
- Ntsizwa Vilakazi (DBE): Research inside the DBE: Analysing matric results and Annual National Assessments across schools and districts
- Dr Stephen Taylor (DBE): Measuring the impact of educational interventions
- Prof Peliwe Lolwana (Wits): Youth, skills development and employment
- Prof Hamsa Venkatakrishnan (Wits): Assessing early number learning: How useful is the Annual National Assessment in Numeracy?
- Prof Servaas van der Berg (Stellenbosch University): How much learning is taking place in primary grades? What we can infer from ANA

DAY 2

- Prof Brahm Fleisch (WITS): What Works in Classrooms? Building an evidence base using randomised control trials – recent efforts
- Prof Wilima Wadhwa (ASER Centre/Univ. of California, Irvine/Indian Statistical Inst. Delhi): Impact of early childhood education on early grade learning: The role of public vs private ECE participation – Evidence from India
- Debra Shepherd (Stellenbosch University): Balancing act: A semi-parametric method for estimating the local treatment effect of school type
- Dr Martin Gustafsson (DBE / Stellenbosch University): Moving beyond choropleth maps: Using geo-coordinates of schools to answer difficult education policy questions and understand internal migration better
- Gabrielle Wills (Stellenbosch University): A profile of the labour market for school principals in South Africa: Evidence to inform policy

Appendix 2: Abstract, *Teaching Reading (& Writing) in the Foundation Phase* by Elizabeth Pretorius et al. (2015)

This concept note was developed by five South African academics under the leadership of Professor Elizabeth Pretorius (UNISA). The other four authors are Prof Veronica McKay (UNISA), Sarah Murray (Rhodes University), Mary-Jane Jackson (University Fort Hare), and Dr Nicholas Spuull (Stellenbosch University). The concept note starts with the premise that too many South African Foundation Phase (Grades 1–3) teachers do not know how to teach reading and are currently teaching reading in an ad-hoc, unsystematic way. Consequently the Note aims to provide a detailed outline of a potential online teacher training course which could be used to teach Foundation Phase teachers (and subject advisers) how to teach reading in the Foundation Phase in South Africa. After providing some information on the state of reading in South Africa and the need for the proposed course, the Concept Note outlines (1) what such a course should entail as far as content is concerned, (2) how the course should be structured, delivered (modality) and assessed, (3) how it could be accredited, and (4) how it should be evaluated. While we have tried to provide sufficient detail on the proposed course, the aim was not to provide an exhaustive or comprehensive document of such a course, but rather a solid outline of an ‘ideal’ course; in essence a detailed concept note. Towards the end of the concept note we provide provisional estimates of the costs associated with developing, evaluating and implementing the course.

Table 2: Overview of course on “Teaching Reading (& Writing) in the Foundation Phase”

	Module	Description	Cross-cutting themes			
1	How children learn to read	Introduction to course; processes of learning to read, emergent literacy; formal reading instruction; enabling conditions; the role of exposure; poverty and reading	Big Picture: How does this fit into the overall course structure?	Where is this in CAPS?	How and when do I teach this in Home Language and in English First Additional Language?	How does this progress across Grades R-4? (developmental trajectories)
2	Decoding in reading (and writing)	Phonological awareness; letter-sound relationships; phonics (& using workbooks); word recognition; fluency; developmental trajectories				
3	Comprehension in reading	Types of comprehension (literal, inferential, etc); text types; comprehension strategies; developmental trajectory				
4	Vocabulary in reading	Levels of vocabulary; strategies for developing vocabulary; vocabulary and fluency; developmental trajectories				
5	Children’s literature and the role of response in reading	Children’s books; affect, engagement & motivation; Read Alouds; reading corners, print-rich classrooms				
6	CAPS reading activities	Group-guided, paired, shared, independent reading; ability groups; selecting graded readers for groups; designing activities and managing the groups; how to use DBE workbooks effectively				
7	Reading assessment and remediation	Formative & summative reading assessment; identifying reading difficulties; developing remedial strategies; special education				
8	Planning and consolidation	How everything fits together; macro and micro planning (year, term, 2-week cycle; lesson); managing learning				