Measuring enrolment and support for children with disabilities at the school level

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Declaration

By submitting this dissertation electronically, I declare that all work contained herein is my own, original work and that I am the sole author thereof (save to the extent explicitly otherwise stated). Reproduction and publication hereof by Stellenbosch University will not infringe any third-party rights. I have not previously submitted this work, in its entirety, or in part, for obtaining any qualification.

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Abstract

The overall purpose of this dissertation was to critically assess how disability inclusion in schools is and should be measured in South Africa and to develop and report on new measures of disability inclusion. Measurement of school-reported enrolment of learners with disabilities and inputs, processes and enablers of disability-inclusion in mainstream (ordinary) schools is considered.

Despite the development of inclusive education policy in post-apartheid South Africa, implementation of disability inclusion in mainstream schools has been poorly documented and disability-related educational inequalities have persisted. Very few quantitative studies have addressed teacher training for inclusion, physical accessibility of schools, accessibility of learning materials or availability of disability support structures in mainstream schools in low- and middle-income countries (LMICs). This study develops new indicators of these aspects of disability inclusion and employs them in a nationally-representative school survey.

A comprehensive analysis of school-reported enrolment of learners with disabilities was conducted to determine the reliability of disability-disaggregated enrolment data. The analysis demonstrates that school-level data on enrolment of learners with disabilities collected in annual surveys was inconsistent over time and incomplete and produce estimates that are much lower than rates of disability prevalence among learners estimated from household surveys. School reporting has, however, become more complete following the introduction of a learner-level Education Management Information System (EMIS). This study demonstrates that ordinary schools in South Africa have no financial incentive to enrol or report the presence of learners with disabilities.

The importance of question wording when eliciting data on disability status has been demonstrated by previous research. This study demonstrates that the disability questions used in the EMIS in South Africa are not aligned with current education policy nor with the biopsychosocial model of disability. It recommends that the questions on disability status in EMIS are aligned with those used in the screening and identification processes used in schools since 2014.

Multivariate analysis was used to show that schools in wealthier areas of South Africa are more likely to report enrolment of learners with disabilities than schools in more deprived areas. This suggests that schools in less wealthy areas experience greater difficulty identifying or reporting learner' disability status. This has resulted in skewed reporting of disability-disaggregated enrolment by school wealth quintile.

New (or improved) indicators of disability inclusion were developed and added to the School Monitoring Survey (SMS) 2017 (a nationally-representative sample of approximately 2,000 schools). The analysis was supplemented by a qualitative follow-up study examining ease of use of the teacher questionnaire. The improved indicators provide more comprehensive evidence on the proportion of schools that are physically accessible, have disability support structures in place, and where teachers have received training in inclusive education. These factors are critical in enabling ordinary schools to provide reasonable accommodation of learners' individual needs. This study uses multivariate analysis to show that prior training is associated with improved teacher confidence in addressing learning barriers. This is the first study to use multivariate analysis of the SMS in relation to disability-inclusion. This study provides the first set of comparable nationally-representative data on disability inclusion at two time points. It shows that some progress has been made over time but that substantial provincial inequality across several indicators of disability inclusion remains.

The performance of full-service schools is compared to that of ordinary schools in SMS 2017. A large, fairly-representative sample of full-service schools is shown to perform better than ordinary schools in various aspects of disability inclusion, but still fall short of the expectations in current guidelines.

This study results in a much more comprehensive depiction of disability inclusion in ordinary schools than has been achieved by previous studies. It adds substantially to the body of evidence on operationalising the biopsychosocial model of disability in school indicators in middle-income countries.

Opsomming

Die oorkoepelende doel van hierdie proefskrif was om vas te stel hoe inklusiwiteit rakende gestremdheid in skole in Suid-Afrika gemeet word en gemeet behoort te word en om nuwe maatstawwe van inklusiwiteit daar te stel en daaroor verslag te doen. Aandag word gegee aan die meting van inskrywings van leerders met gestremdhede soos deur skole gerapporteer en insette, prosesse en faktore wat inklusiwiteit vir gestremdes in hoofstroom (gewone) skole versterk.

Ten spyte van die ontwikkeling van ’n inklusiewe onderwysbeleid in Suid-Afrika sedert 2001, is die vordering met gestremdheidsinklusiwiteit swak gedokumenteer en duur ongelykheid rakende onderwys vir gestremdes voort. Min kwantitatiewe studies in lae- en middel-inkomste-lande het tot dusver aandag gegee aan die opleiding van onderwysers vir inklusiwiteit, fisiese toeganklikheid van skole, toegang tot leermateriaal of die bestaan van strukture ter steun van gestremde leerders. Hierdie studie ontwikkel nuwe indikatore van hierdie aspekte van gestremdheidsinklusiwiteit en pas dit dan toe op ’n nasionaal-verteenwoordigende skool-opname.

’n Omvattende analise van inskrywing van leerders met gestremdhede soos deur skole gerapporteer is uitgevoer om vas te stel hoe betroubaar sulke inskrywingsdata volgens gestremdheid is. Die analise toon dat skoolvlak data oor inskrywings van leerders met gestremdhede in jaarlikse skoolopnames onvolledig is en inkonsekwent is oor jare heen. Dit lewer ramings wat baie laer is as die voorkoms van gestremdheid aangedui in huishoudingsopnames. Skole se verslagdoening het egter meer volledig geraak sedert die Onderwys-Bestuur- en Inligtingstelsel (EMIS) leerdervlak-data begin gebruik het. Die studie demonstreer dat gewone skole in Suid-Afrika min finansiële aansporings het om leerders met gestremdhede in te skryf of oor hulle verslag te doen.

Vorige navorsing het reeds aangetoon hoe belangrik die bewoording van vrae is wanneer data oor gestremdheidstatus ingesamel word. Hierdie studie wys dat die vrae oor gestremdheid wat in die Onderwys-Bestuur- en Inligtingstelsel (EMIS) gebruik word nie in lyn is met huidige onderwysbeleid of met die bio-psigo-sosiale-model van gestremdheid nie. Die studie beveel aan dat vrae oor gestremdheidstatus in EMIS in lyn gebring word met die siftings- en identifikasieprosesse wat sedert 2014 in skole gebruik word.

Meervoudige analise word gebruik om te toon dat meer welvarende skole in Suid-Afrika meer geneig is om inskrywings van leerders met gestremdhede te rapporteer. Dit mag daarop dui dat skole in minder welvarende gebiede groter probleme het met die identifisering van of die rapportering van leerders met gestremdhede. Dit lei tot skewe rapportering oor die verskillende skoolkwintiele van inskrywingsdata volgens gestremdheidskategorie.

Nuwe (of verbeterde) indikatore van gestremdheidsinklusiwiteit is ontwikkel en ingesluit by die Skool-moniteringsopname ("School Monitoring Survey (SMS)"), 'n landwyd-verteenwoordigende steekproef van 2 000 skole. Dit is aangevul met 'n kwalitatiewe opvolgstudie om te toets hoe geredelik onderwysers die skoolvraelys gebruik. Ontleding van hierdie indikatore verskaf nuwe getuienis oor die persentasie van skole wat fisies toeganklik is, wat ondersteuningsmaatreëls vir gestremdheid in plek het en wie se onderwysers opleiding in inklusiewe onderwys ondergaan het. Hierdie faktore is uiters belangrik om gewone skole in staat te stel om redelike akkommodering van leerders se individuele behoeftes te verskaf. Die studie gebruik verder meervoudige regressie om te toon dat vroeëre opleiding van onderwysers hulle vertroue verhoog om leer-hindernisse van gestremdes aan te spreek. Hierdie studie is die eerste meervoudige veranderlike-analise van die SMS-data rakende inklusiwiteit van gestremdes en ook die eerste wat nasionaal-verteenwoordigende data oor gestremdheidsinklusiwiteit vir twee verskillende jare vergelyk. Die vergelyking toon beperkte vordering, maar dat beduidende provinsiale ongelykheid steeds bestaan rakende verskeie indikatore van gestremdheidsinklusiwiteit.

Die vertoning van voldiens-skole word vergelyk met dié van gewone skole in die 2017 SMS-opname. Daar word getoon dat 'n nie-ewekansige maar tog beduidend groot en redelik verteenwoordigende steekproef van voldiens-skole beter as gewone skole vaar rakende verskeie aspekte van gestremdheidsinklusiwiteit, maar tog heelwat benede die verwagtinge vervat in die huidige riglyne.

Die studie bied 'n meer volledige beeld van inklusiwiteit van gestremdes in gewone skole as wat tot dusver beskikbaar was. Daardeur dra dit by tot getuienis om skool-indikatore te operasionaliseer vir die bio-psigo-sosiale-model van gestremdheid in middel-inkomste lande.

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Finally, I would like to thank my husband, Seth, and children, Daniel and Cara, for their patience. Now we can finally do the things we put off until “Mom has finished her PhD”.

Dedication

This dissertation is dedicated to Elspeth de Villiers and Dr Andri Barnes.

Of all the teachers we have encountered on my son's journey through the school system, Elspeth best "got" the essence of inclusion. Andri demonstrated the important role a principal can play in driving change towards inclusion. She demonstrated this leadership by being willing to enrol my son, who is a wheelchair user, in Glenwood High School. She also demonstrated flexibility and willingness to adjust school processes, timetables, and venues to accommodate Daniel's needs.

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List of abbreviations

CAPS	Curriculum and Assessment Policy Statement
CRPD	Convention on the Rights of Persons with Disabilities
DHIS	District Health Information System
EMIS	Educational Management Information System
IEP	Individual education plan
ICF	International Classification of Disability, Functioning and Health
GHS	General Household Survey
LMICs	Low- and middle-income countries
LSEN	Learners with Special Education Needs
LTSM	Learning and teaching support materials
MICS	Multiple Indicator Cluster Surveys
NPNC	non-personnel non-capital
OLS	ordinary least squares
OPD	Organisation of People with Disabilities
PES	Provincial Equitable Share
PIRLS	Progress in International Reading Literacy Study
RESEP	Research on Socioeconomic Policy
SBST	School-based Support Team
SDG	Sustainable Development Goals
SIAS	Screening, Identification, Assessment and Support
SMS	School Monitoring Survey
TALIS	Teaching and Learning in Schools
TIMSS	Trends in International Maths and Science Study
UD	Universal Design
UDL	Universal Design for Learning
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

1. Introduction

Rapid expansion of primary and secondary school enrolment has been achieved in sub-Saharan Africa since the year 2000 (United Nations, 2015). However, it has been widely acknowledged that children with disabilities are among the groups that have been left behind (Hanass-Hancock & McKenzie, 2017; UNESCO, 2020b).

Multiple studies in South Africa using household survey data have demonstrated that school enrolment is lower for children with disabilities than for those without disabilities. These studies include analysis of the General Household Survey (GHS) 2013-2015 (Statistics South Africa & Department of Basic Education, 2017), GHS 2014 (Nuga-Deliwe, 2016), GHS 2011 (Budlender, 2015; Department of Social Development, 2015), Census 2011 (Department of Social Development, 2015; Mizunoya et al., 2018; Statistics South Africa, 2014c) and the Community Survey 2007 (Fleisch et al., 2010). For example, in the GHS 2017, caregivers of 28% of children aged 7 to 15 who were out-of-school cited the child's disability as the reason for non-attendance (Department of Basic Education, 2018a). Mizunoya, Mitra and Yamasaki (2018) found consistent evidence[1] of substantial gaps in primary and secondary school attendance between children with and without disabilities in 14 developing countries. In South Africa, they found that roughly half of all 7 to 13-year-old children with disabilities who were out-of-school in 2011 had never attended school, while the other half had dropped out (Mizunoya et al., 2018, p. 397). This suggests that South Africa faces the challenge of improving initial access to school for children with disabilities as well as preventing early drop-out of children with disabilities. The authors suggest that children with disabilities are at increased risk of dropping out of school when teachers are inadequately trained to teach a diverse range of learners in one class, or where accessible learning materials are not available (Mizunoya et al., 2018, p. 394). The disability gap in school attendance rates in South Africa is not explained by differences in gender, age, socio-economic status, geographic location or unobservable household characteristics (Mizunoya et al., 2018).

In South Africa disability-related educational inequalities have persisted despite the development of an inclusive education policy framework (in the form of Education White Paper 6 in 2001)[2]. This framework aimed to ensure equitable access to schooling for children with disabilities, in preference to the expansion of a parallel special school system. Progress in implementation of the proposed reforms towards inclusive education has been poorly documented. Very little is currently known about education provision for learners with disabilities, once enrolled in schools, and there is little

[1] In 14 out of 15 low- and middle-income countries (LMICs) that used the Washington Group Short Set of questions to collect data on disability status in nationally representative surveys from 2005 to 2013.
[2] See section 1.3 for more details of subsequent policy development.

data to track these learners (Nuga-Deliwe, 2016). Not much large-survey data is available on disability accessibility in ordinary[3] schools, the availability of disability support structures[4] and provision of support services to learners. Despite limited monitoring and evaluation, the general consensus is that progress in disability inclusion in schools has been slow (J. McKenzie et al., 2020; Watermeyer et al., 2016).

In South Africa, data on enrolment of learners with disabilities is collected by schools, and total enrolment of learners with disabilities in ordinary schools is frequently used as a key indicator of progress in disability inclusion. Despite the prominence of this data in reporting on progress (Department of Basic Education, 2017), the available data on enrolment of learners with disabilities has received little attention from researchers. This dissertation will thoroughly assess the quality and completeness of this data and how well it is aligned with inclusive education policy. It will also assess what the current data tells us about disability inclusion in different parts of South Africa.

This chapter outlines the study's purpose, the research questions, and the relevance of the topic to the field of education economics, as well as economics more broadly. Before doing so, key concepts and definitions are discussed in section 1.1. The evolving definition of disability status is introduced in section 1.2 and inclusive education policy development since 2001 and policy implementation in South Africa are briefly described in section 1.3 to provide a broader context to the research. The chapter also broadly outlines the data sources used in this study as well as other available data sources.

1.1 Definitions and key disability concepts

The term inclusive education was first coined by the disability movement to refer to the inclusion of learners with disabilities in mainstream schools. Booth (1999) defines inclusion as a process of increasing participation of learners with disabilities in mainstream schools by adapting the mainstream schooling environment to be more accommodating of a range of impairments, addressing curricula barriers, making learning materials more disability-accessible, and improving teachers' attitudes towards learners with disabilities and their skills in adjusting teaching methods to accommodate the needs of learners with disabilities, when necessary.

More recently, the term *inclusive education* has been adopted more generally and has become synonymous with the concept of *education for all* (increasing educational enrolment for all vulnerable

[3] In South Africa the term 'ordinary schools' is used to denote schools that are not special schools. In most other settings, the term 'mainstream schools' is used. These terms are equivalent. The term 'ordinary schools' is used throughout this dissertation as it enables full-service schools to be easily differentiated from ordinary schools.

[4] School-based support teams, district-based support teams, special schools acting as resource centres and assistive device resource centres.

groups of children, including children with disabilities). For example, the European Agency for Development in Special Needs Education (2011) defines inclusive education as the presence (enrolment), participation, and achievement of *all learners* in mainstream classes.

In this research, *disability-inclusive education* is defined as the enrolment, participation, and achievement of *learners with disabilities* in mainstream (ordinary) schools. The term *disability-inclusive education* is used throughout the dissertation to differentiate it from the broader conceptualisation of *inclusive education*, which addresses issues such as gender equity which are not addressed in this research. In South Africa, the available data does not allow one to determine whether learners are in special or mainstream classes within ordinary schools. Thus, disability inclusion must be operationalised as enrolment and participation[5] in ordinary schools.

A central premise in this research is that increased enrolment of learners with disabilities in ordinary schools must be accompanied by universal design (UD) of physical environments, and the provision of reasonable accommodations, where these are needed. UD refers to the design of physical environments, programmes, products, and services so that they are usable by all people, including those with disabilities. When applied to physical spaces, it entails designing spaces that are accessible, and include adequate space for approach and use by a wide range of people including those with different disabilities, rather than designing spaces that provide barriers for some people (Dalton et al., 2019). Both the United Nations CRPD and South African policy (the Minimum Norms and Standards for School Infrastructure[6]) demand that all new school buildings are built following the principles of UD to ensure all school buildings are physically accessible.

Where UD has not been adopted from the outset (or where UD alone is not sufficient to accommodate a specific learner's additional needs), reasonable accommodation is required to enable effective learning. Reasonable accommodation is defined as all necessary and appropriate modifications and adjustments that do not impose a disproportionate or undue burden, where needed in a particular case to ensure that children with disabilities are able to enjoy or exercise their rights (to education) on an equal basis with others (in the communities in which they live) (United Nations, 2007). The nature of these adjustments will differ according to the domain of disability and by the specific needs of individual learners. That is, learners with hearing difficulties require quite different accommodations (adjustments) from learners with mobility difficulties. Learners with low vision may require enlarged print, while learners who are blind may require learning materials in audio or Braille. Where UD was not followed initially there will be a greater need for reasonable accommodation and retro-fitting. For example, where a building has not been built following UD, classes might need to be moved to the ground floor to accommodate a learner with a physical

[5] As will be explained in Section 2.2.1, data is not yet available on achievement disaggregated by disability status.
[6] See Table 1

disability, or the learner may need to leave lessons early to move safely between classes, or ramps may need to be built.

Universal Design for Learning (UDL) is another key concept in inclusive education. UDL was originally informed by neuroscience (which showed that different people learn in different ways) and applies some of the principles of UD to learning and teaching (Dalton et al., 2019). UDL is a strategy for implementing inclusive education that requires flexibility (J. McKenzie et al., 2021) according to three principles: teaching should include multiple forms of representation when content is presented to learners, assessment practices should allow learners to express their knowledge in multiple means and there should be multiple means of engagement with learners (Tim Loreman et al., 2014, p. 173). Practically, this means teaching requires the use of pictorial, visual, auditory and tactile learning materials interchangeably (instead of special accommodations) and provides examples with varying level of complexity (J. McKenzie et al., 2021). Curricula and tasks should be designed such that instruction can be easily scaffolded, to engage and maintain interest of learners with differing levels of ability. Following UDL, curricula and teaching approaches should be designed (at the outset) with a diverse range of learners in mind. Adopting UDL should minimise the adaptation required in the classroom when there is a learner with a disability in a class.

The definition of disability has evolved over time. This research adopts the definition set out in the United Nations Convention on the Rights of Persons with Disabilities (CRPD). Disability is defined as a phenomenon that arises when people with impairments face attitudinal and environmental barriers that hinder their full and effective participation in society (United Nations, 2007). Disability and impairment are distinct concepts. Impairments (often caused by a health condition or injury) do not necessarily lead to disability. However, they can be exacerbated where the environment or system is unaccommodating and prevents participation, leading to disability. In this dissertation, *learners with disabilities* means learners whose participation in learning is limited by an underlying (long-term) health condition or impairment and an unaccommodating learning environment. This will be further explained in Section 1.2.

Due to data availability, some sections of the dissertation (see Chapters 6 and 7) focus on inclusion of 'learners who are experiencing learning barriers' rather than *learners with disabilities*. In South Africa the term 'barriers to learning' is used rather than the term 'special needs'. While the two terms are roughly equivalent (M. Nel et al., 2014), a subtle difference is that 'special needs' focuses on the child's impairment, while 'barriers to learning' emphasises that the problem may lie within the learning environment. The Screening, Identification, Assessment and Support (SIAS) Policy (2014) defines 'barriers to learning' as "difficulties that arise within the education system as a whole, the learning site and/or within the learner him/herself which prevent access to learning and development'". Such barriers can arise from "social, emotional, cognitive, linguistic factors, disability,

or family … circumstances. For instance, additional support may be required for a child or young person who has learning difficulties; is being bullied; has behavioural difficulties; is a parent; has a sensory or mobility impairment; is at risk of school drop-out or has been bereaved" (Department of Basic Education, 2014a).

This research examined inputs, processes, and enablers that are identified as key for effective disability inclusion, and which allow schools to provide reasonable accommodation to learners with disabilities. Inputs, processes, and enablers are defined in section 2.2.1 when the evaluation framework is introduced.

1.2 The evolution of the disability model and its measurement

Before 1980, the medical model of disability was the dominant approach. It conceptualises disability as an impairment that results from the long-term presence of a health condition (B. M. Altman, 2001). In the medical model, disability is thus seen as an individual problem which should be corrected through rehabilitation, specialised education, and other individual-level interventions rather than through changes within the broader education system (Engelbrecht et al., 2016). The long-term health condition (or the medical diagnosis) is a key aspect of disability under the medical model. Surveys informed by the medical model tend to measure the presence or absence of health conditions (for example, epilepsy, cerebral palsy).

The publication of the International Classification of Impairments, Disabilities and Handicaps (World Health Organisation, 1980) marked a major shift in classification of disability as, for the first time, impairments and disabilities were classified according to their consequences rather than medical diagnosis. Thereafter, the social model of disability emerged in the United Kingdom. The social model of disability conceptualises disability as the limitation or loss of opportunities to participate in community life due to physical or social barriers (B. M. Altman, 2001). Although pathology and disease are seen as causal precedents of disability, they play no part in the social model. Rather, disability is seen as being caused by social oppression (Abberley, 1987; B. M. Altman, 2001) and disability and impairment are regarded as discrete. Surveys and data collection tools which operationalise the social model of disability focus on participation (or participation limitations). There is no measurement of health conditions (B. M. Altman, 2001).

The International Classification of Disability, Functioning and Health (ICF) was released in 2001. This classification system conceives of disability as the result of a "dynamic interaction between health conditions and contextual (personal and environmental) factors" (World Health Organisation, 2007). Environmental factors are grouped into physical, social, and attitudinal factors. Disability is seen as encompassing impairments, activity limitations and restrictions on participation. This is different from the social model which sees disability as arising solely from participation restrictions.

The ICF recognises that health conditions and the environment interact to determine an individual's participation levels. The approach embodied in the ICF is often termed the biopsychosocial model of disability.

The ICF-Child and Youth version was developed by the World Health Organisation (WHO) in 2007. It recognises that the physical and psychological environment has a stronger effect on children's functioning than on adults. It introduces the notion of a delay in the development of functionality and yields a profile of a child's functioning in the current environment (performance) and the capacity to participate, given a standard environment.

Both versions of the ICF were developed to provide a detailed characterisation of an individual's functioning. They are not suitable for use in large-scale surveys as they are very detailed tools (the four-level classification is hundreds of pages long). Concise disability measures have been developed to enable disability inclusion in large-scale surveys. Some of these are consistent with the biopsychosocial model of disability as they focus on measuring participation. Two examples are the Washington Group Short Set of questions, and the United Nations Children's Fund (UNICEF) Child Functioning Module (which are discussed in more detail in section 2.4.2).

This dissertation adopts the biopsychosocial model of disability by defining *learners with disabilities* as learners whose participation in learning is limited by an underlying (long-term) health condition or impairment and an unaccommodating learning environment (see page 5). This definition acknowledges that disability is the product of health conditions and environmental factors.

1.3 Background: disability-inclusive education policy development in South Africa

The basic education system in South Africa is characterised by deep disparities in quality and learning outcomes between schools in the wealthiest and poorest areas (Spaull & Kotze, 2015). In part, these inequalities reflect the legacy of racial segregation. While the public school system includes a small number of highly functional schools in wealthier areas, most schools demonstrate weak institutional functionality. There are weak systems of accountability in the schooling system. On average, teachers have weak pedagogical skills and too much of the school year is wasted on non-teaching activities (van der Berg et al., 2016). Nevertheless, sustained improvements in learning outcomes in maths, science and reading have been observed among learners without disabilities (from a low base) over time (Gustafsson, 2020; Zuze et al., 2017).

Despite the weakness of the general education system, the post-apartheid policy vision for South Africa's basic education system, is that of "an integrated system which ensures the availability of

support on a continuum that includes special schools, full-service[7] schools and ordinary public schools coupled with support from the district-based support teams" (Department of Basic Education, 2018b). This vision aligns with the international literature which emphasises that, in an inclusive system, special education refers not to a location, but to the availability of specialised support services in the learner's local school. In 2001, Education White Paper 6 was released. The White Paper states that learners with disabilities should be gradually integrated into designated full-service schools and ordinary schools over a 20-year implementation period, ending in 2021 (National Department of Education, 2001). The vision was that learners with disabilities should ultimately be accommodated at schools in their neighbourhood, where they should have access to all programmes of support, as laid out in the SIAS strategy (2008) and policy (2014). Policy developments since 2001 are summarised in Table 1.

The White Paper and SIAS policy recognise that learners may require assistance from one or several support programmes, with varying frequency. Learners are categorised into those with low-level additional support needs (who need infrequent additional support), moderate-level and high-level support needs (those who need frequent intensive additional support) (Department of Basic Education, 2014a; Department of Education, 2008). These three levels of support provision are to become the main basis for funding and post-provisioning for inclusive education (Department of Basic Education, 2014a). Chapter 2 evaluates the extent to which funding reforms have been enacted to bring this policy change to fruition.

The Minimum Norms and Standards for School Infrastructure require that all new ordinary schools must adhere to the principles of UD (as they pertain to buildings, access points, indoor and outdoor facilities, signage, communication, and other services). Existing schools must follow UD when additions, alterations, or improvements are made (Department of Basic Education, 2013b, pp. 10-11). No penalties are introduced for schools that do not follow UD and there is no requirement for retro-fitting of existing, inaccessible, schools. UDL is not addressed in the norms and does not play a prominent role in any of the policy documents.

In line with the recent literature in other settings, inclusive education policy in South Africa asserts there is a continued role for special schools for learners whose need for frequent, high-level support cannot be met in ordinary schools (Florian, 2019).

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[7] Full-service schools refer to a small group of specially designated ordinary schools which are meant to be flagship schools of inclusion (Government of the Republic of South Africa, 2013). They were designed as an interim measure to provide examples of best practice of disability-inclusion.

Table 1: Policy documents relating to disability-inclusive education since 2001.

Policy document	Year	Aspects of reasonable accommodation, UD or UDL addressed	Restructuring of the school system
Education White Paper 6: Special Needs Education, Building an Inclusive Education and Training System	2001	The policy does not refer to UD, UDL or reasonable accommodation in specific terms but makes extensive mention of the need for adaptation of curricula, teaching methods physical school environments to remove barriers to learning. Identifies an inflexible curriculum as a key barrier to learning. Referrals to special schools should only be made where learners have high-level additional support needs which could not be accommodated in an ordinary school environment or where parents feel special school attendance is in the child's best interests.	Admission policies of all schools should be adapted so that "learners who can be accommodated outside of special schools and specialised settings can be accommodated within full-service or other schools and settings". Proposes school-based support teams (SBSTs), district-based support teams, special schools as resource centres.
Conceptual and Operational Guidelines: Special schools as resource centres	2005	Proposes that support services should be organised based on a learner's level of support need rather than category of disability. Proposes curriculum adaptation as a substitute for pull-out remedial lessons for individual learners.	Outlines how special schools are to serve on site learners and support identified learners and teachers in other schools. Every ordinary school to be associated with one resource centre. Proposes ways in which special schools are to be strengthened and integrated with district-based support teams. All proposals in this document were to be field-tested.
Guidelines for district-based support teams	2005	Not directly addressed.	Proposes composition, functions, and role of district-based support teams.
Strategy on Screening, Identification, Assessment and Support (SIAS)	**2008**	**Details four structured support programmes that will be made available to learners in all schools: 1) provision of specialist staff, 2) implementation of curriculum differentiation, 3) provision of specialised learner and teaching support material and assistive technology, and 4) training of personnel.**	**Learners are to be categorised into those with low-level additional support needs, moderate-level and high-level support needs (those who need intensive additional support frequently). Provides more detail on the role and structure of SBSTs, district-based support teams, special schools as resource centres.**
Guidelines for Inclusive Teaching and Learning	2010	Brief coverage of differentiation of learning programmes, work schedules, lesson plans for Grades 7 to 9, within the national curriculum. Presents multi-level teaching, cooperative learning and grouping of learners as strategies to reach diverse learners.	-
Conceptual and Operating Guidelines for Full-service schools	2010	State that full-service schools should have the capacity to provide reasonable accommodation of learners' individual needs, following the general curriculum with individualised support, with support from district-based support team.	Provides additional details on the role and expectations of full-service schools within the inclusive education system. Incorporates principles of the CRPD.

Policy document	Year	Aspects of reasonable accommodation, UD or UDL addressed	Restructuring of the school system
		Teaching strategies should be responsive to learners' needs and the curriculum should be differentiated.	
Guidelines on Responding to Learner Diversity in the Classroom through the Curriculum and Assessment Policy Statement (CAPS)	2011	Approaches to accommodate diverse learning needs and capabilities through curriculum differentiation of the CAPS curriculum. Does not address UDL in specific terms. Proposes one curriculum for all learners.	-
Integrated School Health Policy	**2012**	**Screening and identifying health barriers to learning among learners.**	**Establishes a school health screening programme, which will cover vision, speech, basic hearing screening, screening for chronic health conditions and basic mental health and psychological risk assessments at specified intervals (for example, Grade 1 and 8).**
Minimum Norms and Standards for School Infrastructure	**2013**	**UD must be followed in the building of all new schools and all alterations of existing schools. Every school must have at least one wheelchair-accessible toilet by 2030 (Department of Basic Education, 2013b, p. 28).**	**All special schools are to be universally accessible.**
Guidelines to Ensure Quality Education and Support in Special Schools and Special School Resource Centre	2014	Learners should only be admitted to special schools where reasonable accommodation cannot be provided in an ordinary school.	Provides more detail on the expanded role of special schools as resource centres. Provides guidelines (rather than a minimum standard) for an adequately functioning special school and resource centre. Begins to address some of the quality concerns in existing special schools.
Policy on SIAS	**2014**	**Slightly amended the strategy on SIAS and upgraded the strategy to an education policy.** **Was designed with specific reference to the aims of Article 24, 2(b) (Department of Basic Education, 2018b).** **Discusses reasonable accommodation extensively and introduces the need for assistive technology and assistive devices.** **Extensive coverage of curriculum differentiation and modifications to physical environment. Does not mention UD. Does not address UDL specifically, nor**	**Low-level support packages should be provided from school-level budgets and no additional allocation of funding will be made to schools for these. A moderate-level support package should be made available at full-service schools, funded by an additional *inclusive education* allocation to cover non-capital non-personnel items.** **Special school resource centres will provide disability-equipment and/or additional teaching and therapy support for learners in all schools in that district.** [8]

[8] Where there is no special school in a district, a full-service school may be converted into a resource centre.

Policy document	Year	Aspects of reasonable accommodation, UD or UDL addressed	Restructuring of the school system
		the need for flexibility in curricula or teaching methods (more generally).	
White Paper on the Rights of Persons with Disabilities	2015	Covers some aspects of schooling, in very broad terms. Does not discuss UDL in the short space devoted to basic education. Defines and applies UD and reasonable accommodation as key concepts throughout the document.	No new policy content.
National Learner transport policy	**2015**	**"All vehicles transporting learners must adhere to the requirements and principle of UD, especially those that are transporting learners with disabilities". No detail is provided.**	**Proposes a system of school transport of learners with disabilities to all types of public schools. Previously this was only provided to special schools. Outlines roles of provincial departments of transport and education and proposes qualifying criteria for provision of accessible transport by provincial department of education.**
Draft policy for provision of quality education and support to children with severe to profound intellectual disability	2017	Accessible and safe school transport.	Extends White Paper 6 to learners with severe to profound intellectual disability as they were initially excluded from ordinary schools and only supported in special care centres. Proposes an integrated approach and collaboration between the departments of education, health, social development, transport and public works for implementation. Outlines responsibilities at national, provincial, district and institutional level.
(Draft) Curriculum for severe intellectual disability	2017	Provides a differentiated curriculum specifically for learners with severe to profound intellectual disabilities.	-
Guidelines on Resourcing an Inclusive Education System	2018	Guidelines on amended school funding norms for special, full-service, and ordinary schools, out of which reasonable accommodation would be funded.	Proposes new post-provisioning norms based on school type (ordinary, full-service, special school) to replace disability weightings in the post-provisioning norms (previously applied in special schools only).
Amended national norms and standards for District staffing	**2018**	-	**Specifies minimum staffing norms for district teams. No timeframes are included.**
Basic Education Laws Amendment Bill	2021	South African Sign Language is given the status of an official language for the purposes of learning.	

Those items shown in bold are binding and mandatory.

South Africa's domestic policies establish three key disability support structures in the schooling system: **SBSTs, district-based support teams** and **resource centres**. Class teachers are responsible for identifying learners who may require additional support. If learners require additional support beyond what the class teacher can provide, the **SBST** further assesses the support needed and assists the class teacher in delivering interventions. **SBSTs** should be created in each school (made up of existing staff). Their main function is to put coordinated school-, learner- and teacher-support in place (Department of Basic Education, 2014a). **District-based support teams** should provide itinerant support to schools and SBSTs, when needed. The **district-based support team** should play a role in monitoring the support provided to learners with additional support needs (through school and class visits, mentoring and consultation) (Department of Basic Education, 2014a). Specialist staff in the **district-based support team** provide specialist input in identifying barriers to learning, identifying learner support needs, and developing individual support plans. They are also responsible for providing staff development programmes in schools (Department of Basic Education, 2010). Finally, special schools will be converted into **resource centres** in each district and will provide additional support (which was previously only available in special schools) to all learners in the district (Department of Basic Education, 2014a). The services provided by the **SBST, district-based support team** and **resource centre** should enable the development of more accessible learning environments in ordinary schools and enable schools to provide reasonable accommodation for learners with disabilities, where required. Schools should also receive support for health screening from the Integrated School Health Programme, which was introduced in 2012 to provide immunisation services and basic health and sensory screening in schools.

In 2007, South Africa became a signatory to the United Nations CRPD, committing itself to Article 24. This Article holds the state to account for ensuring that: a) […] children with disabilities are not excluded from free and compulsory primary education, or from secondary education, on the basis of disability; b) (children) with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live; c) reasonable accommodation of the individual's requirements is provided; d) (children) with disabilities receive the support required within the general education system to facilitate their effective education; and e) effective individualised support measures are provided in environments that maximise academic and social development, consistent with the goal of full inclusion (United Nations, 2007).

The Sustainable Development Goals (SDGs) (2015) include Goal 4.5 which addresses inclusive education specifically. This should add some impetus to implementation of the policies outlined in this section. The SDGs are not legally binding, but countries are expected to report progress against each goal periodically to the United Nations. This includes Indicator 4.5.1 which requires countries to produce parity indices by disability status for all education indicators. However, it includes the

caveat “as data become available” in recognition that many countries are not yet able to produce disability-disaggregated data. In reality reporting on Indicator 4.5.1 rarely extends beyond gender parity in net enrolment rate, school completion rates, school life expectancy and sometimes out-of-school rates[9].

Table 1 summarises ways in which each of the policy documents addresses the principles of universal design (UD), reasonable accommodation and UDL. White Paper 6 itself does not specifically refer to UD, UDL or reasonable accommodation, but discusses the need for structural changes to support inclusive education, and focuses on the need for adaptation of curricula, teaching methods and physical school environments to remove barriers to learning. From 2010 onwards policy documents begin to emphasise the importance of providing reasonable accommodation to learners to enable effective learning. In the 2014 Policy on Selection, Identification, Assessment and Support10 there is particular emphasis on the need for reasonable accommodation. The concept of UD is found in policy documents that address infrastructure (the Minimum Norms and Standards for School Infrastructure and National Learner transport policy) and in the White Paper on the Rights of Persons with Disabilities. UDL on the other hand is not addressed in specific terms in any of the South African policy documents. Instead, policies (for example, the Guidelines on Responding to Learner Diversity in the Classroom through the Curriculum and Assessment Policy Statement, the policy on SIAS) emphasises the need for adaptation or adjustment of the curriculum and increased flexibility in teaching methods. The emphasis on increased flexibility in teaching methods is aligned with the principles of UDL, but the policy does not clearly state that this is informed by the concept of UDL. The United Nations CRPD places more emphasises on reasonable accommodation than on UD or UDL[11]. The General Comment on the CRPD emphasises the need for state parties to provide data on provision of reasonable accommodation to learners with disabilities through Education Management Information Systems (EMIS) (United Nations, 2016). Because both national policies (as laid out in Table 1) and the United National CRPD place more emphasis on reasonable accommodation and UD than on UDL, most of the analysis in this dissertation addresses these rather than UDL.

As shown in Table 1, no legislation has been finalised to domesticate the right to inclusive education set out in the CRPD. The policies which have been developed have not yet been converted into regulations (Du Plessis, 2013) or sets of norms and standards. Many still exist as policy guidelines and are not binding. In fact, more than half the documents listed in Table 1 are not legally binding (all binding policy documents in Table 1 are highlighted in bold).

[9] https://sdg-tracker.org/quality-education
[10] See Table 1
[11] Although state parties are urged to adopt UDL in the General Comment on the CRPD (2016).

Furthermore, although they form a key part of inclusive education reforms in South Africa, very little is known about the presence or functionality of disability support structures, as will be shown in Chapter 2 (page 33) and there has been little analysis of the funding that has been provided to enable their establishment and continued functioning (see Chapter 3). It is very difficult to assess progress made in implementing inclusive education if the presence, funding, and functionality of disability support structures are not regularly evaluated.

1.4 Purpose of the research and research objectives

The overall purpose of this dissertation was to critically assess how disability inclusion in ordinary schools should be measured and to report on some of these measures in South Africa. Two areas of measurement were considered: enrolment of learners with disabilities in ordinary schools and inputs, processes and enablers of disability-inclusion in ordinary schools. This is in line with the biopsychosocial model of disability which emphasises that disability cannot be measured without paying attention to the environment in which a learner with an impairment must operate.

The unavailability of disability-disaggregated data has been identified as a key challenge in improving the life circumstances of people with disabilities (Mitra, 2013). The need for disability-disaggregated data in education has been acknowledged globally (UNESCO, 2020b). Specifically, the General Comment on the United Nations CRPD recognises that the lack of disability-disaggregated data hinders development of effective inclusive education policies and interventions and highlights the importance of disability-disaggregated research and data for promoting accountability and policy development in disability-inclusive education (United Nations, 2016).

This study aims to fill some of the gaps in knowledge around implementation of disability-inclusion in South African schools. In order to achieve this, the study addresses the following three key research objectives:

1. To critically assess the data on enrolment of learners with disabilities (as collected by ordinary schools) in South Africa in line with the biopsychosocial model of disability,
2. To assess and expand current measurement of key inputs, processes and enablers needed for effective disability inclusion in schools and to assess the remaining gaps in measurement of disability inclusion at school-level, and
3. To thoroughly describe how well ordinary and full-service schools in South Africa are performing in disability accessibility, teacher training for inclusion and availability of disability support structures.

In chapters 3 to 5 the study addresses several research questions in relation to the first research objective:

- How is disability status measured in school-level processes and data in South Africa and how does this differ from measurement of disability in household surveys and best practice (in line with the biopsychosocial model of disability)?
- What is the quality and consistency of disability-disaggregated enrolment data collected in ordinary schools in South Africa?
- Does the current funding strategy for disability inclusion incentivise schools to report enrolment of learners with disabilities?
- How closely do the school-level *reported* rates of enrolment of learners with disabilities reflect rates of enrolment estimated from household surveys?
- Is school-reported enrolment of learners with disabilities more strongly associated with school wealth quintile or province?

The final research question above is guided by the premise that the capacity to identify learners with disabilities is greater in schools in higher wealth quintiles, and reporting is generally better in these schools, while there are distinct differences in prevalence of disability among children enrolled in schools by province. Hence the research question aims to determine which factor is more strongly associated with enrolment numbers: the capacity to identify (and report the presence of) learners with disabilities or the underlying prevalence of disability in the province.

The second research objective is addressed by assessing the measurement of selected inputs, processes and enablers of disability inclusion in the School Monitoring Survey (SMS) 2011 and expanding these in the SMS 2017. Specifically, aspects of disability accessibility, teacher training and the availability of disability support structures are covered in the SMS. Together these factors provide a good indication of a schools' readiness to provide reasonable accommodation for learners with disabilities. The changes in survey design and questionnaire wording made in the 2017 survey were designed by the author, in collaboration with the DBE, and are described in Chapter 6.

In addressing the second research objective, Chapter 6 addresses the following research questions:

- Did teachers find the teacher questionnaire easy to answer and were all terms easily understood?
- Is the content and wording of the 2017 SMS questionnaires well-aligned with existing policy and the biopsychosocial model of disability?
- What are some of the remaining gaps in measurement of disability inclusion at school level.

In chapters 6 and 7, the study addresses the following research questions in relation to the third research objective:

- What is the coverage of inclusive education/special needs training among teachers?
- What is the relationship between receipt of prior training in the areas of inclusive or special needs education and teachers' confidence in supporting learners with learning barriers?
- What is the coverage of disability support structures and specialist support in ordinary schools and what progress was made from 2011 to 2017?
- What are the major sources of inequality in inputs, processes, and enablers of disability inclusion across South Africa?
- Are there discernible differences in school-level inputs and processes for disability inclusion between full-service and ordinary schools?

1.5 Structure of the dissertation

Chapter 2 examines how disability status is measured in school-level processes and data in South Africa and illustrates how this differs from measurement of disability in household surveys and from the biopsychosocial model of disability. Chapter 2 also summarises the literature on measurement of disability inclusion in schools[12]. The chosen framework for the analysis (input, processes and enablers of inclusive education analysis) is described in section 2.2.1. Chapter 3 highlights the poor incentives to report learners' disability status under the current funding model for disability inclusion in South Africa. This has implications for the quality of disability-disaggregated enrolment data, which is discussed in Chapter 4. Specifically, Chapter 4 considers the quality and consistency of disability-disaggregated enrolment data collected in ordinary schools in South Africa from 2011 to 2014 in section 4.4. It also shows that disability data as collected in EMIS currently is not aligned with the biopsychosocial model of disability in section 4.5. School-level reported rates of disability are compared with rates of enrolment among children with disabilities from household surveys[13] and the resulting rates of enrolment of learners with disabilities are shown to be much lower in the school data. Finally, while it is not a core research question, data on enrolment of learners with disabilities from the annual surveys (which serve as the main source of data on learner enrolment in this dissertation) are compared to that collected in the new learner-level EMIS (SA-SAMS) in section 4.6. The quality of reporting of enrolment of learners with disabilities in the new learner-level EMIS appears to be much better than in annual surveys. In Chapter 5, reported enrolment of learners with disabilities is analysed by school characteristics. More specifically, this chapter examines whether school-reported enrolment of learner with disabilities is higher in schools in provinces where disability prevalence is higher, or whether it is higher in schools in wealthier communities. This analysis is used to conclude that the increased capacity to identify (and report enrolment of) learners with disabilities in wealthier areas influences reporting more than differences in disability prevalence by

[12] Other than enrolment of learners with disabilities.
[13] which use measures consistent with the biopsychosocial model of disability.

province. The current reporting of enrolment of learners with disabilities is likely to be substantially distorted by the varying ability to identify learners with disabilities and varying quality of reporting, both of which are likely to be greater in schools in wealthier areas.

Chapters 6 and 7 address two of the research objectives.

- To assess and expand current measurement of key inputs, processes and enablers needed for effective disability inclusion in schools and to assess the remaining gaps in measurement of disability inclusion at school-level.
- To thoroughly describe how well ordinary and full-service schools in South Africa are performing in disability accessibility, teacher training for inclusion and availability of disability support structures.

Chapter 6 focuses on ordinary schools, while Chapter 7 investigates the differences in school-level inputs, processes and enablers between designated full-service schools and ordinary schools in the SMS 2017.

1.6 Relevance of the topic for economics research in South Africa

People with disabilities' vulnerability to poverty (both income-defined and multidimensional) has received increased research attention in recent years. For example, Filmer (2008) used multivariate regression analysis of household surveys in 12 LMICs (from 1992 to 2004) to show that adults with disabilities were significantly more likely to be in the poorest 40% of the population in 8 of the 12 countries studied. The relationship between poverty and disability has, however, been increasingly understood as complex, with the possibility of bi-directional causality (living in poverty may increase the risk of disability and disability may increase vulnerability to poverty) (Banks et al., 2017; Groce, Kembhavi, et al., 2011; Groce, Kett, et al., 2011).

Inequitable access to education among people with disabilities has, however, been identified as a possible pathway into poverty in adult life (Banks et al., 2014; Filmer, 2008; T. C. McKenzie, 2022; Moodley, 2017). For example, when years of schooling was added to the regression analysis described above, Filmer (2008), found that the association between disability and poverty in adulthood became insignificant in several countries. These findings led Filmer (2008) to argue that more equitable access to education is key to reducing economic inequalities between people with and without disabilities (in line with human capital theory). This finding has been affirmed by recent research in South Africa (T. C. McKenzie, 2022).

As discussed earlier (see page 1), there is strong evidence of a disability gap in school attendance rates in South Africa. It is widely accepted that the disability gap in education enrolment cannot be closed by increased enrolment in the (relatively small) special school system. Inclusive education in

ordinary schools must be provided if disability gaps in school attendance are to be reduced in the future. However, existing quantitative research seldom addresses the question of how well South Africa's ordinary schools are doing in disability inclusion. This study provides new, more nuanced evidence on enrolment of learners with disabilities in ordinary schools and suggests improvements with regard to how disability status is identified in schools. It enables a better understanding of inequalities in enrolment of learners with disabilities between different provinces and socio-economic groups in South Africa.

Research on inequitable access to education cannot focus on enrolment or educational attainment alone. Recent evidence has shown that, in African countries, increased school enrolment is not producing the expected learning outcomes (Bold et al., 2017) and many children are not learning to read by the age of 10. Where school enrolment does not translate into learning, increased years of schooling will not result in increased future productivity and hence earnings (that is, the predictions of human capital theory are unlikely to hold) (Angrist et al., 2019). Indeed, according to the World Bank's Human Capital Index, at 18 years of age, the average child born in 2018 in South Africa will only be 40% as productive as a future worker who received 12 years of effective schooling and is in full health, due to health risks and the risk of poor schooling (Kraay, 2018). For learners with disabilities, there is an even greater risk that school enrolment will not translate into effective learning unless reasonable accommodations are provided and teachers are adequately trained to teach inclusively (Mizunoya et al., 2018).

This study provides new evidence on whether schools are physically accessible and whether ordinary schools, teachers and districts are equipped to provide reasonable accommodation for learners with disabilities. It focuses on supply-side factors affecting the education of learners with disabilities and on improving how these are measured in school-level data. Demand-side factors can also lead to parental decisions to invest less in the education of children with disabilities than those without, or to choose special schools over inclusive schools. Demand-side factors are not covered by this research.

1.7 Contribution

According to Mont (2018), data is required to justify public policy (by showing the nature and scope of the problem), for policy development (to show the nature and extent of barriers to disability inclusion), and to monitor (data on whether inputs are being allocated and intended outputs are being achieved) and evaluate policies (is policy achieving its desired goals?). The first objective of this study was to assess the consistency, quality, and accuracy of data on the aggregate number of learners with disabilities collected by ordinary schools in South Africa and to assess how well it is aligned with inclusive education policy. In addressing this objective, this research shows that the indicators of disability status currently used in schools are at odds with the trajectory of funding

reforms in South Africa, and the biopsychosocial model of disability. It highlights uneven school-level reporting of disability across the country and identifies possible reasons for poor and inconsistent reporting. This study finds that the categories of disability used in EMIS in South Africa are outdated and recommends that they are replaced with those used in the screening and assessment processes in schools. This change would improve the quality of data on disability-disaggregated enrolment and would bring the data more closely in line with the biopsychosocial model of disability. The current data is not an accurate reflection of the nature and scope of the enrolment of learners with disabilities.

The study shows evidence that enrolment of learners with disabilities is reported more widely in the new learner-level EMIS than in previously-used paper-based annual surveys. This adds to the available evidence that learner-level EMIS are better suited for the collection of data on disability status or additional support needs.

Improved data quality is critically important as school-level enrolment data are a key measure of progress in disability inclusion in South Africa and play a role in determining the level of total funding for inclusive education. The study makes a valuable contribution to the growing literature on the need for measurement of disability status, which is aligned to the biopsychosocial model of disability, from the perspective of a middle-income country. This is important given that the discourse is often dominated by those in the Global North.

Secondly, this research aimed to assess, improve, and expand the measurement of disability accessibility, teacher training and availability of key disability support structures in school surveys. New measures were developed and tested in a nationally-representative school survey. Ease of use of the improved teacher questionnaire was further tested in a follow-up qualitative study and performance of the questions were tested quantitatively. The thorough description of how the expanded questions performed provides evidence for other LMICs aiming to develop new indicators of disability inclusion for school surveys.

Expanding the measurement in the School Monitoring Survey enabled a more thorough assessment of disability inclusion than was possible with previous school survey data. The study provides the first, nationally-representative evidence on the relationship between teacher confidence and training in inclusive education. The use of multivariate techniques reveals sources of inequality in disability inclusion across South Africa. This research offers data on the nature and extent of remaining barriers to disability inclusion in South African schools, which can be used to refine policy development. The evidence provided could be used by the Department of Basic Education to ensure increased accountability for inclusive education at provincial level, which has been highlighted as a key challenge to implementation (Department of Basic Education, 2017). The descriptive analysis in this study can be used to estimate funding needs for inclusive education reforms more precisely and

to inform priority-setting. For example, this study highlights the difficulties schools face in screening, identifying, and reporting the presence of learners with disabilities and provides clear evidence for the strengthening of teacher training and improving coverage and depth of school health screening. This research should improve current understanding of what continues to drive inequality in education between children with and without disabilities by providing improved information on the readiness of ordinary schools to accommodate learners with disabilities.

It is hoped that these results lead to the adoption of the SIAS disability categories in the new learner-level EMIS as these are more appropriate and are based on a model of disability which is more consistent with inclusive education policy. The research shows that the measurement issues and gaps identified are closely related to policy and funding gaps for inclusive education.

The study aimed to operationalise the biopsychosocial model of disability in school data by analysing both enrolment of learners with disabilities and indicators of the school environment and schools' readiness to provide reasonable accommodation. The study shows that this is difficult to fully achieve without access to concurrent school-level data on enrolment and other aspects of disability inclusion, which is linked at the school- or learner-level.

1.8 Available data sources

In South Africa disability status is included in several sources of school-level and household-level data.

1.8.1 School-level data on enrolment of learners with disabilities

For the period 2011 to 2021, there are three sources of data on enrolment of learners with disabilities in South African public schools. Data on the number of learners with disabilities per school (in aggregate) was collected in all nine provinces for the purposes of enrolment reporting in the paper-based Annual School Surveys until 2014. From 2016, this data has been collected electronically at the learner-level in a new EMIS, known as the South African School Administration and Management System (SA-SAMS). As this new EMIS allows for learner-level data on reporting of disability status it has the potential to produce much higher-quality data. Data on learner disability status and the level of support need should currently be collected for screened learners on paper-based forms as part of the screening process introduced by the policy on Screening, Identification, Assessment and Support. This data is also captured electronically in the Free State province.

1.8.2 Household-level data on children with disabilities

Nationally-representative household- and individual-level data on current educational enrolment and attainment, and disability status is collected annually in the GHS, and every ten years in the census

and the Community Survey (T. C. McKenzie, 2022, p. 43). The census was last conducted in 2011[14] and the Community Survey in 2016. Since 2009, these surveys have collected data on functioning and participation using a measure which is consistent with the biopsychosocial model of disability (the Washington Group Short Set of questions, which is discussed in section 2.4.2). All three surveys allow estimation of disability prevalence among all children of school-going age (that is, for those who are enrolled in school and out of school).

Data on disability status, educational attainment and enrolment has also been collected in a nationally-representative panel data set – the National Income Dynamics Survey (NIDS) – since 2008. Disability data (collected using questions on Activities of Daily Living) was however only collected in wave 1 (2008) and wave 2 (2011) of the survey for adults in the sampled households (Moodley, 2017, p. 286). The NIDS does not provide any data on the disability status of children in the sampled households. The Demographic and Health Survey 2016 measured disability using the Washington Group Short Set, and includes some questions about education (T. C. McKenzie, 2022, p. 34).

1.8.3 Disability accessibility, teacher training for inclusion and disability support structures in schools

There are only two sources of nationally-representative data on aspects of disability inclusion in schools: The School Monitoring Survey (SMS) (2011, 2017) and the Teaching and Learning in Schools (TALIS) survey (2018). In 2018, the multi-country TALIS survey was conducted in a nationally-representative survey of 2,046 lower secondary teachers and 169 principals in 200 schools in South Africa (Le Donne & Schwabe, 2019). Among other things, it evaluated teacher training for inclusion of learners with special needs and teaching in mixed ability settings. The findings of TALIS 2018 are discussed in the literature review (see section 2.3.1).

The National Education Infrastructure Management System collects data on school infrastructure for the purposes of measuring provision against the 2013 Minimum Uniform Norms and Standards for Public School Infrastructure. Summary reports are released annually, but do not measure the provision of wheelchair-accessible toilets (although this forms part of the Norms and Standards), nor whether new school construction follows universal design principles. National Education Infrastructure Management System data was not available for analysis at the time of writing.

Rates of school health screening coverage (percentage of Grade 1 and 8 learners screened) have been reported annually at district and provincial level in the District Health Information System since 2012. This data is also available at district level.

[14] Census 2022 commenced in February 2022.

1.9 Secondary data used in this dissertation

1.9.1 Data on enrolment of learners with disabilities

This research study analysed the aggregate number of learners with disabilities per school from the Annual School Surveys 2011 to 2014, the electronic SIAS data system in the Free State (2014) and the new learner-level EMIS (one province only, 2018). This data was combined with school characteristics data sourced from the publicly-available Master List of Schools (Department of Basic Education, 2013a, 2015), which provides data on school wealth quintile[15], location, language of learning and teaching and other school-level characteristics for all registered schools in South Africa.

The estimated rate of disability among learners in the Annual School Surveys was compared with disability prevalence rates among learners using Census 2011 (10% sample) and the Community Survey 2016. The results of this comparison are described in section 4.6.

1.9.2 Data on disability inclusion in ordinary schools

The SMS 2017, a survey of approximately 2,000 schools (Nexia SAB&T, 2017a), was the main source of data on inputs, processes, and enablers of disability inclusion in ordinary schools. The design of the survey is discussed in greater detail in section 6.3.

1.10 Primary data used in this dissertation

1.10.1 Data on disability inclusion in ordinary schools

The author played an active role in designing and amending disability-inclusion questions in the SMS 2017 teacher questionnaire and school observation (described in section 0). In addition, the author conducted a follow-up qualitative study among a small purposive sample of schools in Limpopo, the Free State and the Western Cape that participated in the SMS 2017. The qualitative study aimed to test how well teachers understood questions in the teacher questionnaire and is described in more detail in section 6.3.2.

1.11 Research ethics considerations

Permission was obtained from the Department of Basic Education to use SMS 2011 and 2017 data and the Annual School Survey data for this research. Permission was granted to evaluate the SMS 2017 questionnaire design in terms of measurement of disability inclusion and to conduct further

[15] School wealth quintiles are a measure of school socioeconomic status. Historically, they were based on the average income (or other measures of socio-economic status) of the population in the immediate vicinity of the school. Quintile 1-3 schools are located in the poorest 60% of areas across the country. School quintile is not a measure of the income of the children currently attending the school. School wealth quintile is the best available measure of the socioeconomic status of the community surrounding a school.

qualitative research to assess the ease of use of the 2017 teacher questionnaire (3 October 2017). Approval to conduct research on electronic SIAS data (2014) and to interview an official in the Free State EMIS section was provided by the Free State Department of Education (27 January 2019). Ethical clearance was obtained from Stellenbosch University's Humanities Research Ethics Committee (ECO-2018-1533). All letters of ethics approval are included in Appendix B.

Informed consent was obtained from school principals and from teachers, prior to participation in the qualitative research. Informed consent was obtained prior to conducting the interview with the Free State Department of Education official. There was no direct interaction with learners in the course of this study.

Data analysis on enrolment of learners with disabilities in the new learner-level EMIS (SA-SAMS) formed part of a broader research project conducted by RESEP, Stellenbosch University. Permission was obtained from Stellenbosch University's Humanities Research Ethics Committee (ECO-2020-13135) to conduct research to evaluate the reporting of disability among learners. School identifiers (EMIS numbers) were anonymised as a means of ensuring school anonymity. Learner names were not extracted from the database.

2. Literature review: Approaches to measuring disability inclusion in schools.

2.1 Introduction

This chapter summarises the literature around two topics regarding measurement of disability inclusion in school systems. Firstly, how should learner disability status be identified in EMIS in a way that aligns with the biopsychosocial model of disability? Secondly, how has disability inclusion been measured in schools in LMICs? This chapter outlines the framework used to guide both the literature review and the development of indicators for the School Monitoring Survey (SMS)[16]. The review summarises the range of indicators that has been used to evaluate the extent of disability inclusion in school systems in LMICs and organises those that are appropriate to the South African setting into a clear framework. The chapter also identifies some of the knowledge gaps in disability inclusion in South Africa, some of which are addressed in this dissertation. It introduces the concept of barriers to learning, as embodied in South African policy, and relates this to the understanding of disability adopted in this study.

The other literature review presented in this chapter assesses the growing literature on how best to measure disability status among children in household surveys and in EMIS. It summarises the available research, which demonstrates the sensitivity of estimated disability prevalence to the wording of questions in household surveys. Section 2.4.1 describes how disability status is measured in school-level processes in South Africa and illustrates how this differs from measurement of disability in household surveys and current best practice. The review demonstrates that the dearth of measurement tools, and inappropriate measurement of disability status in school settings have contributed to poor monitoring and evaluation of disability inclusion. Finally, this chapter explores the relationship between inequitable or inadequate access to diagnosis and disability-disaggregated enrolment reporting in developing countries.

The number of learners with disabilities enrolled in ordinary schools is frequently used as an indicator of progress in disability inclusion in schools. For example, Srivastava et al. (2015) evaluate disability-inclusive education projects in LMICs using increased enrolment of learners with disabilities as the measure of effect. In 2011, South African children with disabilities were 4.5 percentage points less likely to attend school than other children in the same household (Mizunoya et al., 2018).

However, a systematic literature review by Loreman et al. (2014) demonstrates that evaluating the inclusivity of a school system is a complex question, which goes far beyond the simple measurement

[16] The modifications to this school survey and the results of the survey are described in Chapter 6.

of rates of enrolment of learners with disabilities in ordinary schools. The review revealed 14 themes that tend to be covered by research on inclusion in schools. As discussed in Chapter 1, disability-inclusive education encompasses enrolment, participation, and achievement of learners with disabilities in ordinary schools. Measuring disability inclusion in schools should thus address all these aspects, rather than focusing only on enrolment.

This is particularly important in South Africa, where Mizunoya et al. (2018) have shown the proportion of children with disabilities who have never enrolled in school and who have dropped out is roughly equal. Furthermore, quantile household fixed effects regressions have shown that the marginal effects of disability were fairly consistent across household socio-economic quantiles. This led the authors to suggest that "barriers (to access to schools)…cannot be solved even for households with higher socio-economic status" (Mizunoya et al., 2018, p. 399). Mizunoya et al.'s findings suggest there may be substantial supply-side factors that constrain provision of disability-inclusive education in South Africa. Given these findings, we need to understand South African schools' readiness to accommodate learners with disabilities (once enrolled) as well as the factors preventing children with disabilities from enrolling in school.

Several qualitative studies covering one or two districts of South Africa have documented ordinary schools' failure to provide reasonable accommodation for learners with disabilities and poor levels of knowledge and practical skills in inclusive education among teachers (Fish Hodgson & Khumalo, 2016; Human Rights Watch, 2015). While these findings are very concerning, it is difficult to generalise them to other districts. Although reporting requirements to the United Nations on the implementation of the CRPD and the Sustainable Development Goals (in particular, Goal 4.5)[17] has increased pressure on the government to demonstrate progress in disability inclusion, there has been little systematic collection of data on the accessibility of schools, their readiness to accommodate learners with disabilities, or the provision of reasonable accommodation to individual learners. In the baseline report on CRPD progress in South Africa, reporting on the provision of reasonable accommodation and individualised support is limited to the number of designated resource centres and full-service schools, accessible full-service schools, and functional district-based support teams per province. It also describes progress in the roll-out of incontinence clinics in special schools, delays in converting learner workbooks into braille and the drafting of a curriculum for South African Sign Language (Government of the Republic of South Africa, 2013, pp. 25–27). The report notes that there are no accurate statistics on physical accessibility of schools. In response to this initial report, the United Nations noted the need to report on the measures adopted to ensure

[17] "By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples, and children in vulnerable situations."

the provision of reasonable accommodation in schools and to make budget allocations to realise these measures (United Nations Committee on the Rights of Persons with Disabilities, 2007).

Internationally, there has been little quantitative evaluation of disability inclusion in schools. Two recent literature reviews highlight the lack of evidence on implementation of disability-inclusive education in LMICs. Srivastava et al. (2015) conducted a literature review of inclusive education projects implemented in regular primary schools between 2000 and 2011 in LMICs and identified 15 projects that had been documented. Most of these were policy-level interventions, and only three were implemented in Africa (Egypt and South Africa). Loreman et al. (2014) reviewed English language academic and multilateral organisations' literature on measurement or evaluation of progress of inclusive education in LMICs from 2001 to 2013. Only one study from an African country (Benin) met the (very broad) inclusion criteria.

In South Africa, the limited evidence base on implementation of disability inclusion in schools has hindered accountability (Government of the Republic of South Africa, 2013). Monitoring and research are required to determine whether ordinary schools are accessible to a range of learners with disabilities, and whether learners with disabilities are receiving reasonable accommodation to enable their participation.

2.2 Methodology

A wide body of literature was reviewed, including peer-reviewed academic literature, and publications by multilateral organisations (such as UNICEF, the Washington Group for Disability Statistics) and by large non-governmental organisations involved in promoting inclusive education in LMICs. The academic literature was mainly sourced through Stellenbosch University's online library search engine. Searches were limited to English language articles and books published since 2001, when South African inclusive education policy was first released. The review focused on literature pertaining to measurement or evaluation of disability-disaggregated enrolment and/or other measures of disability inclusion in LMICs. However, as limited literature was found on disability measurement in these contexts, the review was expanded to include relevant studies from high-income countries.

Variation in the meaning of *inclusive education* and *inclusion in education* (discussed in section 1.1) proved to be a challenge when conducting this literature review. Much of the literature on disability inclusion identifies itself within the broader field of inclusion and may not mention disability in the title or abstract. On the other hand, a large portion of the literature on measuring progress in inclusive education (more broadly) relates to target populations which are not relevant to inclusion of learners with disabilities in South Africa. For example, much of the Indian literature focuses on increasing enrolment of children from lower castes. Much of the literature on the rest of Africa focuses on

increasing participation of girls (which is not the interest of this particular research). A similar challenge was previously identified in a European data review[18], where differences in target populations for inclusion in different European countries contributed to making data collection particularly problematic (Watkins et al., 2014, p. 54). After substantial sifting of the literature, 41 articles and reports were identified as relevant to disability inclusion in the South African context.

2.2.1 Frameworks and approaches to measuring disability inclusion in schools.

Two frameworks dominate the literature on evaluation of disability-inclusive education: The Integrated Model of School Effectiveness and the Disability Rights in Education Model. Structurally, the models are quite similar, but their theoretical underpinnings are quite different.

The Integrated Model of School Effectiveness (sometimes referred to as the context-input-process-outputs model of schooling) grew out of earlier models of education as a production process (from the economics literature) which attempted to explain variation in educational outputs (as measured by student achievement) by examining variation in measurable inputs (particularly teacher qualifications and experience). Production function models generally performed poorly when applied in high-income countries (Hanushek, 1979). Variation in readily measurable inputs such as class size, teacher qualifications, and teacher experience are not systematically related to student outcomes in high-income countries (Hanushek, 2020). Some research has addressed these limitations by adding process indicators to the education production function (Scheerens, 1990). Another body of research (the school effectiveness literature) has measured school characteristics more broadly and seeks to explain the relationship between these characteristics and student achievement, holding learner background characteristics constant. The effective schools literature approaches the problem from a different angle and seeks to uncover factors which explained success by very effective schools. Scheerens (1990) integrated the education production function model with research from the school effectiveness literature on instructional effectiveness to create the Integrated Model of School Effectiveness (Scheerens, 1990).

The Integrated Model of School Effectiveness uses process variables as well as inputs to explain differences in schooling outputs, while acknowledging that the broader context influences the effectiveness of processes in the school and classroom. The context includes incentives created by education management at above-school level, and school characteristics such as school size, rurality, the socioeconomic status of the school body and the orderliness and safety of the school environment (Scheerens, 1990). The model is operationalised at a district or national, school and classroom level. Conditions at higher levels (district or national level) influence school- and

[18] A review of quantitative education data collection approaches by UNESCO, the WHO, OECD, two agencies of the European Commission, Eurodyce, Eurostat and the European Agency for Special Needs and Inclusive Education.

classroom-level conditions (Scheerens, 1990), particularly through incentives created by policy decisions and remuneration structures. The school effectiveness literature typically measures outputs by student academic achievement. Outputs are also linked to outcomes such as earnings and employment in adulthood.

The Integrated Model of School Effectiveness was used to develop indicators for inclusive education for the European Union (Kyriazopoulou & Weber, 2009). It has also been used to guide literature reviews on the effectiveness of disability inclusion in education (T Loreman et al., 2014; Srivastava et al., 2015) and to guide the analysis of disability data in the recent Global Education Monitoring Report (UNESCO, 2020b). Loreman et al. (2014) and Srivastava et al. (2015) assess processes and outcomes of inclusive education at the macro-, school-, classroom- and individual-level (teacher-, student-, or parent-level)[19]. Learner-level measurement of service delivery is proposed within this framework by a more recent review of disability-disaggregated education data (UNESCO, 2020b).

The Disability Rights in Education Model proposed by Peters et al. (2005) uses the same structure to examine the education system but applies quite different thinking to evaluate the performance of an inclusive education system. The key innovation in the Disability Rights in Education Model is the addition of enablers to the evaluation framework. These are factors that enable learners with disabilities to participate more effectively in the education process in mainstream settings (Peters et al., 2005). Peters et al. identify two major enablers that must be present for learners with disabilities to participate and learn effectively: 1) appropriate adaptation of the learning environment and 2) appropriate accommodation of individual learners' needs (often termed reasonable accommodation). By adding these two enablers to the model, the role of the environment in enabling participation of learners with impairments in the learning process is recognised. "Appropriate adaptation of the learning environment" is required where the school environment is not initially designed following principles of UD and where the principles of UDL are not fully applied when learning materials and curricula are designed.

Peters et al. (2005) evaluate inputs, processes, and outcomes at the international, national, and local level and emphasise that these three levels need to be aligned if disability inclusion is to be successful. This is similar to the Integrated Model of School Effectiveness which emphasises the importance of incentives created by the macro-level and their influence on the local level. Both models recognise the role of the context within which schooling is located.

[19] The addition of parent- and student-level to the model is a little different from the Integrated Model of School Effectiveness where parental input and student characteristics are seen as being part of the context.

The Disability Rights in Education Model defines the outcomes of education much more broadly than the Integrated Model of School Effectiveness, proposing that education aims to produce citizenship, improve physical and mental health, impart social and behavioural skills, teach independence and produce satisfaction and that all these outcomes should be evaluated in judging the success of disability inclusion (Peters et al., 2005). The Integrated Model of School Effectiveness focuses more narrowly on student academic achievement, using indicators such as schooling completion rates, and more recently on learning outcomes (as measured in large-scale surveys such as TIMSS[20] or PIRLS[21]).

This study adopted a hybrid of the two models as a framework to evaluate inputs and processes in inclusive education. The model is shown in Figure 1, with examples of factors that have been measured in the literature at each level. The school enablers identified by Peters et al. are critical to evaluate the implementation of disability inclusion and have been adopted. In this dissertation, outputs are defined primarily as academic outputs (in terms of student achievement). Outcomes are defined in economic terms (as in the Integrated School Effectiveness Model), and in terms of learning outcomes. The importance of the other outputs of education discussed by Peters et al. (such as citizenship, physical and mental health, social and behavioural skills, independence) is acknowledged. But these are seen as broader aims in education, which are less measurable, difficult to attribute to schooling, and which can only be measured several years after a learner has left school.

Outputs and outcomes are not discussed or analysed in this dissertation as the surveys analysed in this study do not include information on outputs or learner outcomes. In addition, learner-level disability-disaggregated data on grade repetition, achievement in school-level assessments, drop-out or school completion was not available[22]. Learning outcomes data is increasingly available from large standardised international studies, such as TIMSS and PIRLS, and is a much more accurate measure of learning achievement than measures of grade progression or school-level assessment. However, these studies tend to explicitly exclude learners with disabilities (both those in special schools and those who are enrolled in ordinary schools) (Schuelka, 2013; LaRoche & Foy P, 2016). The Multiple Indicator Cluster Surveys (MICS) are some of the few large sample household surveys which evaluate foundational reading and mathematical proficiency, disaggregated by disability status in LMICs[23]. The MICS has not been used in South Africa.

[20] Trends in International Mathematics and Science Study.
[21] Progress in International Reading Literacy Study.

[22] In the future it should be possible to link input and process data from school surveys to school-level assessment data (which is now available in SA-SAMS).

[23] Measured using the Childhood Functioning Module.

Level	Inputs	Processes	Enablers	Outputs	Outcomes
Macro	Education policies Teacher training Curricula		Universal design, UDL and reasonable accommodation incorporated in policy		
District	Disability support structures to provide specialised services	School health screening programme; Collaboration between schools & support structures	% of schools provided with adapted/adaptive/accessible learning materials % of schools that are physically accessible	Measures of participation: rates of school completion, drop-out, grade repetition. Measures of academic achievement: % of children with disabilities graduating from primary school at the appropriate age.	Learning outcomes (proportion of children reading for meaning by Grade 5) Future employment status (proportion of children with and without disabilities that find employment within 5 years of completing formal education) Future earnings (average earnings of people with and without disabilities)
School	Disability support structures	Collaboration between schools	Does the school have a wheelchair-accessible toilet?		
Teacher	Specialised teacher training Teacher skills	Collaboration between teachers	Are teachers using a wide range of teaching methods? Are teachers able to adapt learning materials?		
Learner	Receipt of disability support services	% of learners screened, assessed	% of learners who received appropriate reasonable accommodation or specialist support if needed.		

Context (School characteristics, socio-economic context, school funding models)

Figure 1: Factors measured in the adapted Integrated Model of School Effectiveness

The recent Global Education Monitoring report makes reference to the recommends learner-level measurement of service delivery for learners with disabilities(UNESCO, 2020b). This is something South Africa should strive for now that a learner-level EMIS has been introduced. However, a no large sample learner-level surveys This study focused on the teacher-, school-, and district-level inputs and processes that contribute to inclusive education reform[24]. It also investigated funding mechanisms for inclusive education and how these may incentivise policy implementation (see Chapter 3). The remainder of the literature review reviews indicators previously used to measure teacher-, school-, and district-level inputs, processes and enablers.

2.3 Review of the literature: indicators of disability inclusion in low- and middle-income countries

Three sets of international indicators of disability inclusion in schools were identified as relevant to South Africa: The Washington Group Inclusive Education Module, a UNICEF Guide to Including Disability in EMIS and the Pacific Indicators for Disability-Inclusive Education. An additional 35 papers and reports were identified and reviewed as they address teacher- and school-level input and processes which were considered potentially relevant to disability-inclusive education in South Africa.

The Washington Group's draft inclusive education survey module (Cappa et al., 2015) focuses on disability-inclusive education. The survey module has undergone extensive cognitive and field testing since 2013 in multiple LMIC contexts (including India, Jamaica, Cambodia, and Kazakhstan). It focuses on four barriers to school participation: attitudes, getting to school, accessibility of the school environment and affordability of schools. A final version was not available at the time of writing. In a related development, also funded by UNICEF, technical guidance on including data on disability in EMIS was published in 2016. This was informed by extensive research in Tanzania and included questions on teacher qualifications and school accessibility, which could be incorporated into school surveys (UNICEF Education Section, 2016).

The indicators of disability-inclusive education developed in the Pacific Region (a group of 14 Pacific Island countries) are closely aligned with Article 24 of the United Nations CRPD. The process of developing these indicators has been well-documented. It began with the development of an initial list of 126 indicators that should be measured at the system-, school-, community- or child-level to satisfy reporting on United Nations conventions, regional education frameworks, national strategies, and other existing monitoring and evaluation frameworks regarding inclusive education[25]. These were reduced to 48 indicators deemed to be specific, measurable, relevant, attainable, and able to

[24] These areas are shaded in Figure 1.
[25] This exercise began before the Sustainable Development Goals were developed.

be timeously reported. The resultant indicators address access, quality and effectiveness and are arranged in ten dimensions: policy and legislation; awareness; teacher training; presence and achievement; physical environment and transport; identification of disability; early intervention and services; collaboration and shared responsibility; curriculum and assessment practices; and transition pathways (Sharma et al., 2018). Core school-level indicators were chosen within these dimensions and are shown in Appendix Table 1. These indicators are potentially appropriate for South Africa following a similar process of localisation as the country is a signatory to the CRPD.

2.3.1 Teacher-level inputs

Teacher-level inputs may include teacher attitudes, knowledge, and skills, available instruction time, teaching methods and available teaching resources. Internationally, evaluations have often focused on the levels of teacher training to include learners with disabilities in mainstream classrooms. In high-income countries, there is evidence that specialised teacher training is linked to improved knowledge and skills in the area of inclusion and disability (Copfer & Specht, 2014) and higher confidence in implementing inclusion as well as more positive attitudes towards students with special education needs or disabilities (McGhie-Richmond et al., 2013). Given this evidence on the link between knowledge, skills and specialised training, some research simply evaluates the presence of specialised teacher training, rather than measuring teacher attitudes. For example, teacher education and training of other education professionals (relating to inclusion) have been shown to be key areas for assessing the implementation of inclusive education (Watkins et al., 2014). According to recent guidelines, data on teacher training for inclusion should be collected in EMIS in LMICs (UNICEF Education Section, 2016).

Another body of research advocates for direct measurement of teachers' attitudes to inclusive education and beliefs around disability, and their knowledge, skills, and self-efficacy in implementing inclusive education. A number of scales have been developed and validated in high-income countries to evaluate such attitudes (Copfer & Specht, 2014) and teachers' self-rated ability in teaching to accommodate diversity (Chan, 2008). Unfortunately, few of these scales have been validated or used in South Africa or other LMIC contexts. In South Africa, several qualitative studies have assessed teachers' attitudes towards the notion of inclusion, or their perceptions of barriers to inclusion (Adewumi & Mosito, 2019; Blackie, 2010; Motala et al., 2015). Some of these studies have tentatively linked positive attitudes to higher levels of prior training in inclusive education in one or two districts (Motala et al., 2015), but the results are difficult to generalise due to small sample sizes.

One of the 13 school quality indicators measured in the SMS 2011 and 2017 is the percentage of schools that have at least one teacher who has received some training in identifying and supporting "learners with special education needs" (the wording in the 2011 survey) or "learners experiencing barriers to learning" (the wording in the 2017 survey). According to SMS 2011, at least one teacher

had received some specialised training[26] in the identification and support of "special needs" in 71% of schools (Department of Basic Education, 2014b). Similarly, 70% of schools had at least one teacher who had received informal training on identifying "learners with special needs" (Department of Basic Education, 2013c). In 2011, the proportion of schools with at least one trained teacher was below the national average in Limpopo, the Eastern Cape, Mpumalanga, and the Northern Cape (significance levels not reported). Higher coverage of training in Free State schools in 2011 is highlighted (Department of Basic Education, 2014b). The percentage of schools with at least one trained teacher was lowest in quintile 1 schools and increased in each subsequent quintile (quintiles 2 to 5 schools). However, the statistical significance of these differences was not reported (Department of Basic Education, 2013c). On average, training was applied most frequently by teachers in Gauteng and least frequently by those in the Northern Cape.

The SMS 2011 shows that 21% of teachers were not confident in teaching "learners with special education needs"[27]. The analysis concluded that teachers who had formal qualifications and had received informal training were more confident than those who had only received informal training (Department of Basic Education, 2014b). However, these results should be treated with caution as there were high levels of missing data in this question (23%), due to interviewee errors in following skip patterns. The probability of missing data was much higher among teachers who did not receive informal training (31%) than among those who received such training (2%). This means that the data is not representative of all teachers surveyed and may bias the results on teacher confidence upwards[28]. No multivariate analysis was conducted on this data. As a result, data from 2011 SMS does not reliably illustrate the link between training and teacher confidence.

The SMS does not address the extent to which inclusive education was addressed in initial teacher education or the extent to which it prepares teachers to include learners with disabilities or to address learning barriers in mainstream classrooms. Several pieces of research have addressed this question in South Africa. Qualitative research by Engelbrecht et al. (2016) and Nel et al. (2019) concluded that initial teacher education in its current form does not adequately prepare teachers to include learners with disabilities. Another qualitative study among current teachers in special and full-service schools in three provinces concluded that initial teacher education does not equip teachers with knowledge of how to provide reasonable accommodation for learners with severe to profound disabilities, particularly those with severe to profound intellectual disability, learners who are deaf, heard of hearing, have low vision or are blind (J. McKenzie et al., 2020, pp. 9-10). Indeed, McKenzie et al. (2020) report that specialised, impairment-specific training was abolished in the

[26] Specialised training could take the form of a tertiary degree, post-matriculation diploma, post-graduate diploma or Advanced Certificate in Education or an accredited short course in special or remedial education.
[27] The 2011 survey uses this terminology, while the 2017 survey refers to "learners with learning barriers".
[28] As teachers who received training are more likely to be confident and also to have answered the question.

2000s, and that the inclusive education qualifications which replaced these specialised courses lack depth.

TALIS 2018 (another large-sample nationally-representative school survey) quantitatively evaluates whether secondary school teachers felt prepared to teach in mixed ability settings following pre-service training, and whether they feel the need for further training to teach learners with special needs (OECD, 2019b). According to TALIS 2018, 34% of teachers reported they had participated in training that included teaching "special needs students" in the past 12 months (OECD, 2019a). Despite these fairly high levels of training, 39% of teachers in South Africa reported a high need for training in teaching "special needs" (OECD, 2019a). This was significantly higher than in other countries surveyed (on average 22%). Furthermore, 53% of principals reported that quality instruction was compromised by the small number of teachers who were competent in teaching "students with special needs" in South Africa (OECD, 2019a). Overall, these results suggest that current training in this area is inadequate to prepare teachers to teach learners with disabilities in a diverse, inclusive classroom. By contrast, 81% of South African teachers felt able to cope with the challenges of teaching in multicultural or multilingual settings[29] (OECD, 2019a). The results of TALIS 2018 support previous research by Engelbrecht et al. and McKenzie et al., which concluded that initial teacher education in its current form does not adequately prepare teachers to include learners with disabilities.

Both SMS 2011 and TALIS 2018 provide a snapshot of training coverage among teachers. However, no multivariate regression analysis has been conducted to assess the associations between levels of training and school or teacher characteristics. There is no multivariate analysis of how teacher training varies across the schooling system in South Africa. Furthermore, there is no robust analysis of how teacher training status is linked to teacher confidence.

In this study, multivariate techniques are used to establish whether there is an association between training and teacher confidence in SMS 2017, and to show how training coverage varies across the public school system.

2.3.2 School-level inputs

Several evaluations of inclusive education projects in developed countries have assessed the structures to provide disability support services in schools as a school-level input (Srivastava et al., 2015). As described earlier (see section 1.3), the key disability support structures in South Africa are the SBST, the district-based support team and the resource centre. SMS 2011 and 2017 evaluate

[29] This is a significantly higher proportion than in other countries surveyed (on average 67%).

the presence of SBSTs in schools and whether SBSTs received any district support, but do not evaluate the presence of (or support received from) resource centres.

According to SMS 2011, only 54% of schools had a SBST, and these were more common in larger schools (which tend to be in urban areas). (Department of Basic Education, 2014b). Coverage of SBSTs was much higher in the urban provinces (Gauteng and the Western Cape) but was also higher (72% of schools) in the Free State and Mpumalanga. There was particularly poor SBST coverage in Limpopo (14% of schools). Coverage of SBSTs in quintile 1 and 2 schools (41 and 43%, respectively) was lower than in schools from wealthier quintiles. As quintile 1 and 2 schools tend to be in rural areas, this suggests poor penetration of SBSTs in schools in rural areas.

Evaluating the presence of SBSTs does not provide any information on their functionality. According to qualitative research in schools in southern Gauteng and the northern Free State, most teachers who mentioned SBSTs in semi-structured interviews stated that these often did not function well, or only existed “on paper” (M. Nel et al., 2014). By contrast, a more recent study in a different district in Gauteng suggested that SBSTs were generally functioning well (N. M. Nel et al., 2016).

2.3.3 District-level inputs

According to SMS 2011, district support was provided to 34% of SBSTs during district support visits to schools in 2011. District officials were far more likely to provide support to the principal (64% of visits), school management team (51%), school assessment team (43%), health and safety team (43%), school governing body (41%) or learners (39% of visits) than to SBSTs (Department of Basic Education, 2014b).

Disability support structures must be adequately staffed (with therapists and other professionals) to provide support to learners in inclusive schools (Roach & Elliott, 2009). Staffing of district-based support teams has been acknowledged as inadequate, with major disparities in the number of psychologists and social workers employed in education in different provinces (Department of Basic Education, 2017). No data on vacancy levels could be found since the publication of the district staffing norms in 2018 (Department of Basic Education, 2018c).

Qualitative research suggests that, in some districts, the district is fulfilling its mandate and teachers have an established professional relationship with the district-based support team (N. M. Nel et al., 2016), while in others, functioning teams do not exist (Fish Hodgson & Khumalo, 2016) or are under-resourced and inadequately trained (Makhalemele & Nel, 2016). The available evidence suggests that, by 2014, the functionality of district-based support teams varied tremendously between districts. Evidence on the coverage of district support for SBSTs is urgently needed. Little is known about the quality of the support provided by district-based support teams, and the impact this has on schools’

ability to support learners with additional needs. The 2011 SMS asked principals to rate their satisfaction with SBST support provided by the district. However, very few principals answered the question, and it was dropped from the 2017 SMS. Thus, SMS 2017 does not provide any new information on satisfaction with support from the district-based support team.

Support from special school resource centres is another key district-level input. There is little available information on how many special school resource centres are actively serving learners enrolled in other schools. Research has shown that resource centres in the Free State were still largely serving learners enrolled full-time at the centre (Makhalemele & Nel, 2016). Qualitative research has revealed that teachers felt that special schools were a crucial support to ordinary schools, but were under-resourced, making it difficult for them to extend support beyond their own learners (N. M. Nel et al., 2016).

2.3.4 Process indicators

Scheerens (1990) emphasises that process indicators are only valuable if they can be shown to influence outputs, or (at least) play a clear hypothetical role in determining outputs. There is little information on the achievement of South African learners with disabilities compared to children without disabilities. Thus, any proposed process indicators must have a clear hypothetical link to outputs. Process indicators are often much more difficult to measure than educational inputs and suitable proxy measures are often needed (Scheerens, 1990). School- and teacher-level processes are difficult to separate and were combined in this research.

When it comes to processes, evaluations of inclusive education projects in developed countries have assessed collaboration between schools, and between schools and disability support structures (Srivastava et al., 2015). The processes identified as the most relevant to the inclusion of learners with disabilities in ordinary schools are screening of learners and collaboration among teachers. Collaboration is seen as a key to effective inclusive teaching practice as it assists teachers to overcome their concerns about inclusion (Forlin, 2008). A lack of collaboration between teachers in ordinary and special schools has been shown to be a barrier to implementing inclusion (Montgomery & Mirenda, 2014) and collaboration between teachers and parents has been key to the success of inclusion in the United Kingdom (MacBeaton et al., 2006). Collaboration is one of the ten domains of the Pacific Indicators for Disability-Inclusive Education (see Appendix Table 1). One of the core indicators measures whether formal processes have been established in a school to systematically involve parents of children with disabilities in educational programmes (Sharma et al., 2018). In South Africa, the formal process in place (the Screening, Identification, Assessment and Support process) rests on effective collaboration and communication between teachers and parents, between SBST members, and between teachers and outside professionals.

A qualitative study conducted in South Africa among 108 teachers completing post-graduate qualifications in inclusive education or learner support addresses collaboration within inclusive education. While the authors caution that the findings may not be generalisable due to the small, purposive sample (M. Nel et al., 2014), the results are discouraging. Collaboration with parents was seen to be a vital strategy, but teachers generally had a poor understanding of the concept of collaboration and their role in collaborating with professionals such as therapists and psychologists. Eighty-seven percent of the teachers believed that their role was to refer learners to experts, or to consult experts rather than to play an active role in collaboration. Only 12% emphasised teamwork to enable effective learning for a learner experiencing some barrier to learning (M. Nel et al., 2014). Furthermore, teachers lacked confidence in playing an equal role in collaboration with specialists. The lack of opportunities to collaborate may also be key in undermining teachers' perceptions of how collaboration should work.

These findings are echoed in a similar qualitative study in other districts of South Africa, which concludes that formal support to teachers may still be focused on identification and referral to special schools and specialists, rather than on providing teachers with the knowledge and skills to support learning in their own schools (N. M. Nel et al., 2016). The authors attribute this, in large part, to initial teacher training which does not adopt an inclusive education approach; neither does it include training in collaborative approaches. The lack of training in collaborative skills in initial teacher training in the context of inclusive education practice has also been highlighted in other settings (Lancaster, 2014). Nationally-representative data on collaboration between ordinary schools and district support structures is urgently needed. Only two studies (Makhalemele & Nel, 2016; N. M. Nel et al., 2016) were found which evaluate collaboration between special school resource centres and ordinary schools in South Africa. These two studies only cover a few districts. The lack of research into this topic hampers our understanding of how effectively and actively special schools are acting in their expanded roles as support centres.

TIMSS 2015 addressed the question of general teacher collaboration to improve teaching and learning in representative samples of about 300 ordinary schools in South Africa. Grade 9 maths and science teachers were asked how frequently they interacted with other teachers at their school in five areas. The results suggest that Grade 9 mathematics teachers collaborate most frequently to discuss "how to teach a particular topic*"* (35% of Grade 9 learners are taught by mathematics teachers who *very often* collaborate in this way*)* and work "as a group to implement the curriculum" (32%). Grade 9 mathematics teachers are less likely to "work together to try out new ideas" (21% of Grade 9 learners are taught by mathematics teachers who "very often" collaborate in this way) or work "with teachers from other grades to ensure continuity" (23% of Grade 9 learners). The number of Grade 9 mathematics teachers "working with teachers from other grades to ensure continuity" is

uniformly low across no-fee, fee-charging and independent schools[30]. The TIMSS report concludes that teachers are willing to collaborate, but do not necessarily do so in structured ways (Zuze et al., 2017).

In South Africa, school-level processes to identify learners who may be experiencing "learning barriers" or have a disability are defined in the 2014 Policy on SIAS. This policy also outlines the processes to be followed to obtain additional support or formal assessments from the district.

Health screening has been conducted in schools as part of the Integrated School Health Programme since it was introduced in 2012. This includes screening of vision and hearing (Bamford, 2019, p. 121) and the identification of chronic health conditions, which could lead to disability if unaddressed (Samuels et al., 2020). Data on health screening conducted in schools has been collected in the District Health Information System (DHIS) since 2013/14. The DHIS data presented in Table 2 shows wide inter-provincial variation in school health screening coverage. Screening covered only 33% of Grade 1 learners nationally in 2017 and was lower still in the Northern and Eastern Cape, KwaZulu-Natal, Mpumalanga and the Free State. School health services are supposed to target the most disadvantaged schools; however, DHIS data in 2014/15 showed that Grade 1 screening coverage was lowest in the most disadvantaged districts (Massyn et al., 2015, pp. 123-126) . It is also worrying that provincial targets for Grade 1 screening range from 16% of Grade 1 learners in the Northern Cape to 61% in the Free State (Bamford, 2019, p. 122).

Table 2: Proportion of learners that received health screening in schools in 2017

	Proportion of Grade 1 learners screened
Western Cape	0.46
Eastern Cape	0.26
Northern Cape	0.11
Free State	0.26
KwaZulu-Natal	0.25
North West	0.50
Gauteng	0.35
Mpumalanga	0.23
Limpopo	0.50
South Africa	**0.33**
Sample	52 districts

Source: DHIS, reported in the District Health Barometer 2017/18, pp. 121-136.

Screening for learning difficulties is the joint responsibility of the school and the district, and does not fall within the ambit of the Integrated School Health Programme (Samuels et al., 2020). The 2011

[30] The results were very similar for Grade 9 science teachers. However, Grade 9 science teachers in independent schools were more likely to interact with teachers from other grades to ensure continuity (49% of Grade 9 learners were in classes where their science teacher reported interacting "very often" in this way).

and 2017 SMS asked teachers (and principals) to assess whether their school was able to screen "learners with special education needs" (2011) and screen leaners for hearing, visual or learning difficulties (2017)[31]. The question on screening did not perform well in 2011 (there were inconsistencies in the data[32] and high levels of missing data). It has been suggested that the wording ("Has your school, without the help of the district, been able to screen learners for special education needs?"), in particular the phrase "without the help of the district" may have led to confusion and, hence, refusal to answer the question (Department of Basic Education, 2014b). It would be unreasonable to expect schools to screen or identify learners for special education needs or disabilities without the support of the district, as South African teachers are not trained to use, or are not provided with basic screening questionnaires. The wording of the question was altered in 2017. The performance of the new wording is analysed in Section 6.5.4. SMS 2017 also included a question on the number of learners for whom SIAS forms had been completed. This data can be used to assess the implementation of the SIAS screening and identification process.

Rather than measuring perceptions of the ability to screen, the Pacific Region indicators focus on the outcomes of early identification and support services (see Appendix Table 1) by measuring the number of children with disabilities who are provided with relevant assistive devices and technologies. In South Africa, use of assistive devices (eyeglasses, hearing aids, wheelchairs, and walking sticks/frames) is measured in the census. Utilisation of eyeglasses has been shown to be much lower among black African and coloured[33] children of school-going age than among their white or Indian counterparts. Furthermore, a rapid increase in utilisation around the ages of 7 to 8 is apparent among white and Indian children, but not among black African and coloured children. Gustafsson (2017) concludes that neither home background nor the classroom environment supports the identification of visual difficulties in schools attended by most black African and coloured learners. Acquiring eyeglasses once visual difficulties are identified may also be difficult in these communities.

As the DHIS data does not track coverage of screening for learning difficulties, SMS 2017 is the only available data source on whether schools were able to screen learners for learning difficulties over the course of the year. Analysis of census data is an attractive alternative, but the census was last conducted before the Integrated School Health Programme was introduced. Census 2022 will show

[31] The implications of the 2011 and 2017 questionnaire wording are discussed later.

[32] 58% of schools reported being able to identify at least "some learners with special needs", but only 47% reported being able to screen "at least some learners for special needs". This suggests that teachers feel more empowered to identify (some) learners with (possibly quite visible) disabilities than to screen learners for (a wide range of often invisible) disabilities. It may also suggest confusion over whose responsibility it is to screen learners (the school or the district).

[33] Coloured is a commonly-used South African term for mixed race.

whether there are substantial improvements in utilisation of eyeglasses among school-aged children following the introduction of vision screening in schools.

2.3.5 School-level enablers

A review of the literature suggests that the physical accessibility of the school environment (or universal design of school buildings and grounds) and availability of disability-accessible learning materials (together with adaptation of learning materials, where necessary) are the most critical school-level enablers of inclusion in the South African context.

Physical accessibility of schools enables participation of learners with physical disabilities or learners who are blind or partially sighted. A recent review suggests that questions on how many classrooms or floors of the school are physically accessible to students with disabilities should be included in school surveys (UNICEF Education Section, 2016). In a review of EMIS in LMICs, 7 out of 40 information systems collected information on the roads to the school (the distance of the nearest road to the school and whether it was passable in the rainy season) (Mont, 2014) but very few collected other information on physical accessibility of schools. UNICEF recommends that, as a minimum, EMIS should monitor the physical accessibility of toilets and the main entrance to the school. But ideally EMIS should measure the accessibility of the road leading to the school[34]*;* the presence of stairs or ramps into the main entrance, and whether the main entrance of the school is wide enough for a person in a wheelchair to enter (UNICEF Education Section, 2016).

Qualitative research in South African among caregivers of children with disabilities illustrates that incontinence, the need for assistance during toileting or inaccessible or inappropriate toilet facilities are a key reason why children with severe intellectual, physical or psychosocial disabilities are not enrolled in ordinary schools (Department of Social Development, 2015). This suggests that monitoring the availability of wheelchair-accessible toilets is critically important. A recent study to inform the inclusive education strategy for the Southern Africa Development Community made recommendations on the data to be collected in EMIS on the accessibility of schools for learners with disabilities. The recommendations are strongly informed by UNICEF's technical guidance and include recording whether a school has suitably modified desks and chairs as well as handrails (presumably on stairs, in toilets) (MiET Africa, 2015).

SMS 2011 shows that 16% of schools had at least one toilet adapted for people with disabilities. Rates of access were highest in the Northern Cape and lowest in Limpopo. Unfortunately, there were high levels of missing data on questions on the presence of disability-accessible toilets, which makes the 2011 results difficult to interpret. Understanding the accessibility of sanitation in the broader

[34] "Is the road leading to the school accessible to a student in a wheelchair, including during the rainy season?"

context is important. The SMS 2011 shows that 25% of schools do not have separate, suitable toilets for boys and girls (Department of Basic Education, 2013c). These schools were concentrated in the Eastern Cape, Free State, KwaZulu-Natal and North West (Department of Basic Education, 2014b). The lack of paved access between the school gate and buildings, and between classrooms and ablution blocks is another potential source of physical inaccessibility in South African schools (Department of Social Development, Republic of South Africa, Department of Women, Children and People with Disabilities, & UNICEF, 2012).

Learning material accessibility[35] is often overlooked but is as important as physical accessibility as it enables participation of learners with intellectual, sensory and communication disabilities. A review of disability inclusion in EMIS recommends that the availability of braille books, audio books, and large, easy to read signage be measured (Mont, 2014). Interestingly, it does not suggest recording whether simplified instructions or simplified workbooks for learners with intellectual disabilities are provided. The recent technical guidance to the Southern African Development Community recommended reporting on specialised equipment available to learners with disabilities (including computer screen readers, braille typewriters, augmentative communication devices and writing frames)[36]. It did not make any recommendations for recording whether appropriate workbooks or worksheets were available (or had been adapted) for learners with intellectual disabilities, or those with low vision. SMS 2017 attempted to measure one aspect of learning material accessibility: the number of learners with disabilities supported with adapted learning and teaching support materials (LTSM). Thus, the available data on school-level enablers in SMS 2017 is largely limited to data on physical accessibility of schools. No quantitative research was found that evaluates the extent of curriculum differentiation or adaptation of learning materials in South African schools.

Research in the European Union suggests that learning accessibility is very difficult to measure directly. Instead, surveys should attempt to measure the provision of reasonable accommodation (Watkins et al., 2014). Teacher and school surveys can, however, only measure whether learners are receiving *some* reasonable accommodation of their disability. It is difficult for these surveys to measure whether a learner is receiving the *appropriate* reasonable accommodation. This is because the necessary reasonable accommodations differ according to the specific needs of individual learners. If data on the provision of appropriate reasonable accommodation was to be collected, this should be done as part of a learner or caregiver survey, which rates satisfaction with the accommodations provided. Learner-level EMIS are well suited to monitor the number of learners with disabilities who receive reasonable accommodations during exams (as is used for this purpose

[35] Use of furniture, equipment, learning materials and communication supports to enable effective learning among children with disabilities (UNICEF Education Section, 2016).

[36] This report also suggests that schools record whether they have hearing aids and loops available for learners who are hard of hearing. This recommendation is highly inappropriate. A question on whether the school had access to pre-recorded video lessons in South African Sign Language would be far more useful.

in the Pacific Region)[37]. In South Africa, national school-leaving examination[38] registration data was extracted from the learner-level EMIS (in SA-SAMS) for the first time in 2021. This means that learner disability status and national examination registration data should be simple to combine, providing a measure of the number of learners with disabilities who receive reasonable accommodations during school-leaving examinations.[39]

Watkins et al. (2014) and Sprunt et al. (2016) identify the number of learners with individual education plans (IEPs[40]) as a possible indicator of provision of reasonable accommodation. This is controversial as other researchers argue that IEPs should not be necessary if curricula are flexible and well-designed to accommodate a diversity of learners (Tim Loreman et al., 2014). They assert that the development of IEPs is resource-intensive and that a high number of learners with IEPs is a sign that the curriculum does not follow the principles of UDL.

2.4 Measuring disability status among children

Disability status is notoriously difficult to measure in datasets or surveys (Florian & McLaughlin, 2008), not least because models of disability have evolved over time (as explained in section 1.2). Internationally, disability classification systems within schooling systems have been resistant to change over the years (Florian & McLaughlin, 2008). This section explores how the understanding of disability has evolved within South African education policy since 2001. It evaluates best practice for measurement of disability status in household surveys and EMIS and shows that the choice of disability measure and the wording of questions to elicit disability status can have a substantial effect on estimated rates of enrolment of learners with disabilities in schools.

For a measure of disability status to be appropriate for use in school data collection processes, it must perform well in identifying disability in children of school-going age and be consistent with the biopsychosocial model of disability, and with education policy.

2.4.1 The definition and measurement of disability in policies and processes in South Africa

The categorisation of disability in place prior to 2001 (that is, those categories in the 1998 post-provisioning norms, shown in Table 3) only allowed learners with “organic, medical disabilities (to) access … support programmes”. The White Paper called for reform of the post-provisioning norms, so that it was based on the “actual educational support needs” of learners, and proposed

[37] See Appendix Table 1.

[38] National Senior Certificate.

[39] For example, the Pacific Region has opted to monitor the number of children with disabilities who sit exams with reasonable accommodations.

[40] Or individual support plan, as they are known in South Africa.

categorising learners by level of support need rather than by domain of disability (National Department of Education, 2001) [41].

Since 2008, the process of obtaining "disability status" in schools has been governed by the SIAS strategy (and from 2014 by the SIAS policy). As part of the SIAS process, a learner's support needs are evaluated (as low-level, moderate-level, or high-level additional needs) by the class teacher, school-based support team (SBST) and (where appropriate) the district-based support team. Learners who require formal assessment are meant to be evaluated by the district-based support team and finally, if necessary, a learner may be assessed by a health professional. Assessment by a health professional is required for a learner to be identified as having a disability. The health professional rates the extent of the activity limitation in each domain as none/mild; moderate or severe. The extent of disability is based on a functional assessment alone and the learner's medical diagnosis is not considered[42]. For example, for mobility, the health professional is asked to describe the degree of difficulty the learner experiences in getting in and out of bed/chair; walking or using a wheelchair, or climbing stairs (without assistance), rather than asking whether the child is an amputee, hemiplegic or diplegic. In line with the ICF-Child and Youth version (described in section 1.2), the age of the child is considered when scoring the extent of disability. As the domains of disability classification in the *diagnostic profile* were informed by the ICF, they are consistent with the biopsychosocial model of disability (described in section 1.2). Learners are classified into broad disability categories, as shown in Table 3. The data on disability collected within EMIS should be aligned with the SIAS categories of disability. In Chapter 4 the categories of data collected in the Annual Survey of Schools are compared against the disability types shown in Table 3.

Table 3: Disability types assessed as part of screening, identification and assessment (SIAS) processes.

Diagnostic profile, SIAS strategy (2008-2014)	Health & Disability Assessment Form: SIAS 2014
Vision	Vision
Hearing	Hearing
Mobility	Mobility
Cognition	Developmental functioning / learning disability/ intellectual disability
Mental-psychiatric diagnosis	Other mental disorders Neurodevelopmental & neurological disorders
Communication	Communication
Health care needs	Chronic health conditions
Self-care	

Sources: SIAS Schools Pack 2008. SIAS Policy 2014.

[41] These support needs categories are very clearly defined in the SIAS policy, 2014.

[42] Except in the domains of vision and hearing, where the extent of impairment is based on measurable medical criteria (levels of decibel loss and visual acuity) and functional assessment (Department of Education, 2008).

2.4.2 Eliciting childhood disability status in household surveys

This section reviews several best practice techniques for eliciting disability status among children. The variation in estimated rates of disability prevalence using the different approaches is also explored.

In Census 2001 disability status was measured by asking a single question: "Do you have any serious disability that prevents your full participation in life activities (such as education, work, social life?"*)* Respondents chose from the options: "None", "Sight", "Hearing", "Communication", "Physical", "Intellectual", "Emotional" (Statistics South Africa, 2005). Since 2009, household surveys (and the census) have used the Washington Group Short Set of questions to measure disability status.

The Washington Group Short Set of questions was designed for use in household surveys and identifies individuals who are at risk of participation exclusion (and hence disability) in six domains (hearing, seeing, communicating, mobility, remembering and concentrating, and self-care). This is achieved by asking whether an individual has "no difficulty", "some difficulty", "a lot of difficulty" or is "unable to do" activities in six domains. These questions are asked for each individual household member, including children. An adult household member would answer the questions about each child in the household.

The data on risk of participation exclusion generated by Washington Group Short Set is converted into a disability measure by applying a disability threshold (essentially a cut-off above which the level of difficulty experienced is deemed to be disabling). The choice of disability threshold will depend on the purpose for which the disability measure is used. If the Washington Group Short Set of questions was applied for the purpose of determining access to disability benefits (such as the disability grant[43]), a high disability threshold may be applied to restrict eligibility (a person may be considered to have a disability if they have at least "a lot of difficulty" in one or more domains). However, applying this threshold would exclude substantial numbers of people who need some support to access basic services. Hence, if one wanted to ensure disability support for access to basic services, a more inclusive threshold should be applied (a person may be judged to have a disability if they have at least "some" difficulty in one or more domains).

The choice of threshold also substantially affects the size of disability prevalence estimates (T. C. McKenzie, 2022). Previous research using national data sets in South Africa has shown that, applying an inclusive disability threshold (all people who score on any of the Washington Group Short Set of questions)[44] reveals a disability prevalence of 13% among children aged 7 to 15, while

[43] Which currently relies on medical diagnosis and a doctor's six-monthly assessment.
[44] The threshold used in the example above.

applying a different threshold (those who score on the Washington Set of questions as "cannot do at all") reveals a disability prevalence of only 4.3% (T. C. McKenzie, 2022, p. 47).

The UN has adopted one of four disability thresholds proposed by the Washington Group (an individual who has at least "a lot of difficulty" in performing in one domain, or "some difficulty" in two or more domains is considered disabled for statistical purposes). This threshold was initially used by Statistics South Africa and was applied to children and adults alike (Statistics South Africa, 2014a)[45]. It is used throughout this dissertation.

The Washington Group Short Set of questions uses the same scaling as the ICF, and measures participation in some of the domains used in the ICF. Hence, they are aligned with the biopsychosocial model of disability. While the Washington Group Short Set has been widely accepted as a suitable tool to gauge adult disability status in national surveys (Groce & Mont, 2017), it has some limitations when used to identify children with disabilities (Mactaggart et al., 2016; Statistics South Africa, 2018). The Washington Group Short Set was designed to identify the most common disabilities in adults and does not include questions on learning disabilities, developmental delays or mental health related disabilities[46] which are the most common disabilities experienced by children (Mizunoya et al., 2016, p. 16). As a result, it is likely to substantially underestimate disability prevalence among children (Mizunoya et al., 2016, p. 16).

The Washington Group Short Set of questions has produced somewhat different estimates of disability across surveys in South Africa. Census 2011 produced much higher estimates of disability prevalence among children aged 7 to 15 than pooled GHS data (2011 to 2017) (T. C. McKenzie, 2022, p. 47). In Census 2011, 8.2% of caregivers reported that their five to nine-year-old children had severe difficulty with self-care (washing, dressing and feeding themselves independently) (Statistics South Africa, 2014c). This resulted in an unusual "bubble" in the age distribution of disability among children under the age of 10 in Census 2011 (Budlender, 2015, p. 6; Department of Social Development, 2015). Disability rates among children of school-going age are much lower in the Community Survey 2016 than in Census 2011 (Statistics South Africa, 2018), especially among seven to nine-year-olds, as shown in Table 4.[47] Among secondary school-aged learners, the two surveys yield quite similar estimates of prevalence among learners.

[45] Since 2016, four disability thresholds have been used by Statistics South Africa when describing the socioeconomic profile of people with disabilities (Statistics South Africa, 2018).
[46] The Washington Group Short Set of questions asks about difficulties in remembering or concentrating, but not about difficulties in learning new tasks/things.
[47] Which shows data estimated by the author, as part of data preparation for this research.

Table 4: Disability prevalence among children enrolled in school, by age cohort

	Census 2011	Community Survey 2016
Age (in completed years)	Disability prevalence (%)	Disability prevalence (%)
7-9	9.23	3.33
	(0.06)	(0.04)
10-12	4.59	2.66
	(0.05)	(0.04)
13-15	2.94	2.27
	(0.04)	(0.04)
16-18	2.35	2.07
	(0.04)	(0.04)
Primary school-aged (7-12)	6.57	3.00
	(0.04)	(0.03)
Secondary school-aged (13-19)	2.44	2.18
	(0.03)	(0.03)
Sample	4,307,930	822,121

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Source: Census 2011 & Community Survey 2016 (weighted analysis). Both sources used the Washington Group Short Set of questions to measure disability. School enrolment includes enrolment in both ordinary and special schools.

There is evidence from cross-national comparisons[48] that difficulty in self-care is more prevalent in South Africa than in other LMICs. The reported rate of difficulty in self-care among children aged 7 to 13 in South Africa (estimated in GHS 2013)[49] is similar to Uganda, but much higher than in 10 of the other countries studied (Mizunoya et al., 2018)[50] [51]. The reasons for high rates of disability in self-care in South Africa and Uganda are not yet well understood and warrant further research. Among secondary school-aged children, South Africa's rate of disability estimated from GHS 2013 is comparable to most other countries[52] (Mizunoya et al., 2016, pp. 18–20).

All the same, Census 2011 data appears to be an outlier, with the reasons not well understood. As a result, where possible, estimates from the Community Survey 2016 and Census 2011 were used in this study.

In response to the shortcomings of the Washington Group Short Set for identifying childhood disability, the Washington Group of Disability Statistics in collaboration with UNICEF developed a survey module on child functioning. This module measures all domains covered by the Washington

[48] Which used the Washington Group Short Set to measure disability in household surveys from 2006 to 2013.
[49] Mizunoya et al. use a higher disability cut-off than Statistics South Africa, only considering a child to have a disability if the child has a lot of difficulty or is completely unable to perform activities in one or more domains.
[50] The exception is the West Bank and Gaza, which is in a long-term conflict situation.
[51] However, reported rates of self-care disability in Census 2011 were 4 to 16 times higher in South Africa than in the other 14 countries.
[52] Mizunoya et al. use a higher disability cut-off than Statistics South Africa, only considering a child to have a disability if the child has a lot of difficulty or is completely unable to perform activities in one or more domains.

Group Short Set, as well as anxiety, depression, learning difficulties/developmental disabilities and behavioural issues, which are critical to child development (Cappa et al., 2018). The questions[53] are prefaced with the statement "compared with children of the same age" to ensure that caregivers do not report age-appropriate difficulties. Two versions have been developed. The version for children aged 5 to 17 covers children of compulsory school-age (in most countries). The Child Functioning Module is much longer than the Washington Group Short Set (43 questions) (Statistics South Africa, 2018).

The Washington Group Short Set was tested against the Child Functioning Module for children aged 5 to 17 in a large clustered random sample (n=2913) in one region of Serbia in 2016. Both sets of questions produced very similar disability prevalence estimates in the domains of hearing, seeing, mobility, self-care and communication for children aged 5 to 17, but the Washington Group Short Set produced much lower estimates of childhood disability in the area of learning/cognition (Cappa et al., 2018, p. 510). The Child Functioning Module estimated that 1.3% of Serbian children aged 5 to 17 had disabilities in any of the six domains measured in the Washington Group Short Set[54], while 4.5% had disabilities when all domains in the Child Functioning Module were included[55]. Difficulties in socio-emotional functioning (anxiety/depression and difficulties controlling behaviour, in particular) contributed substantially to the higher estimates of disability prevalence from the Child Functioning Module (Cappa et al., 2018, p. 509).

In the MICS, round 6, the Child Functioning Module was used in various LMICs to measure disability in children aged 5 to 17[56], while the Washington Group Short Set was administered to those aged 18 and older. The different instruments have been shown to produce quite different estimates of disability prevalence, as evidenced by discontinuities in disability prevalence estimates between 17-year-olds (to whom the Child Functioning Module was administered) and 18-year-olds (to whom the Washington Group Short Set was administered). For example, in Sierra Leone in 2017/18, the rate of disability was 17% among 17-year-olds (using the Child Functioning Module), but declined dramatically to 0.3% among 18-years-olds (measured using the Washington Group Short Set)

[53] For children aged 5 to 17.

[54] And using a disability threshold of at least "a lot" of difficulty in at least one domain.

[55] Using a disability threshold of "more" or "a lot more" difficulty controlling behaviour or daily episodes of anxiety or depression or at least "a lot" of difficulty in any domain (other than anxiety or behaviour).

[56] Previous rounds of MICS used the "Ten Questions" module as a disability screening tool to identify children aged 2 to 9 who are at risk of disability. The questions cover the domains of speech, cognition, hearing, vision and motor/physical as well as experience of seizures (Gottlieb et al., 2009). They were designed for household surveys and focused on behaviour that could easily be observed and reported by parents, such as developmental delays (in sitting, standing, walking), difficulty naming objects or understanding their parents, difficulty in moving arms and legs, difficulties in learning things, or experiencing loss of consciousness (an indicator of epilepsy). A child is considered to be at risk of disability if a caregiver reports difficulty in any of the ten questions.

(UNESCO, 2020a)[57]. Again, anxiety (measured in the Child Functioning Module but not the Washington Group Short Set) contributed the most to the discontinuity in disability estimates from ages 17 to 18 in 14 countries in which MICS was administered in 2017/18 (UNESCO, 2020a, p. 259).

Statistics South Africa has field tested the Child Functioning Module and has concluded that the questionnaire is effective in measuring disability status in children aged 5 to 17, but has chosen not to include the module in the 2022 census or future household surveys as it is likely to cause interviewee burden, which may threaten the quality of the survey data (Statistics South Africa, 2018).

Cappa et al. (2018) show from field testing of the Child Functioning Module that disability prevalence estimates among children aged 5 to 17 range from 7 to 46% in Mexico, to 2 to 10% in Samoa and 2 to 23% in Serbia, depending on the disability threshold used. Disability estimates from the Child Functioning Module are sensitive to caregivers' expectations of age-appropriate child functioning, which may differ between cultures and contexts.

In summary, the evidence presented above suggests the Washington Group Short Set of questions is likely to underestimate disability prevalence among children (compared to the Child Functioning Module [58]) and would produce a lower estimate of enrolment of learners with disabilities than the Child Functioning Model if it were applied in EMIS. However, as discussed in section 2.4.4, the Washington Group Short Set is likely to result in a much broader measure of disability than a binary disability question such as that used in Census 2001.

2.4.3 Measuring disability status in EMIS

In recent years some countries, including Timor-Leste, have adapted the Washington Group Short Set of questions for use in EMIS (Mont, 2014), while Fiji has adapted questions from the Child Functioning Module for use in EMIS (Sprunt et al., 2017). The 2016 UNICEF technical guidelines on disability measurement in EMIS, which draw strongly from the work of the Washington Group, were field tested in Tanzania in 2015. The results showed that teachers in Tanzania generally understood the various disability designations well and found it relatively easy to identify learners who had "a lot of difficulty" in any of the domains. They reported that large class sizes made it difficult to identify children with some difficulties (especially in vision, hearing, and fine motor activities). At times difficulty in hearing was attributed to stubbornness or bad behaviour (UNICEF Education Section, 2016). Teachers reported that parents seldom informed the teacher when a child was having

[57] Sample size by age in years is not reported, nor is the disability threshold for the Child Functioning Module or Washington Group Short Set provided. Presumably very similar thresholds were applied to data generated by both instruments.

[58] Where comparable disability thresholds are used.

difficulties. As a result of the field testing in Tanzania, UNICEF suggests that EMIS should adopt the Washington Group Short Set to measure disability (UNICEF Education Section, 2016).

A study using a representative sample of 472 primary school-aged children in special schools in Fiji showed that responses to the questions on seeing, hearing and walking difficulties in the Child Functioning Module are consistent between caregivers and teachers and concludes that teachers can act as proxy respondents (Sprunt et al., 2017). Research in Tanzania recommended that information about disability in EMIS should be completed by a team of teachers who know the individual learners, rather than the head teacher (who completes other information in the annual survey) (UNICEF Education Section, 2016).

There is no international consensus on which disability cut-off to use when applying the Washington Group Short Set or Child Functioning Module to EMIS. In some settings research has recommended that any learner with at least "some" difficulty should be considered to have a disability (Sprunt et al., 2017), while in others, it is recommended that at least "a lot of difficulty" should be used as a cut off (UNICEF Education Section, 2016). The literature agrees that data on learners with "some difficulty" should be collected in EMIS, as including this category makes it is easier for teachers to identify those with "a lot of difficulty" (UNICEF Education Section, 2016).

Neither the Washington Group Short Set of questions nor the Child Functioning Module have yet been widely adopted in EMIS in developing countries. A review of disability measurement in EMIS in 40 LMICs (Mont, 2014; UNICEF Education Section, 2016) found that most were using very basic questions on disability status or were measuring impairment rather than disability. Nineteen of the 40 EMIS did not collect any information on learner disabilities. Three countries collected information on whether a child was in a special class or was receiving special needs services, as a proxy for disability status. Eighteen countries collected some information on type of disability (by functional area affected, or by impairment). Some countries only collected information about severe disabilities (such as Tanzania, which collected information about learners who are blind, deaf, "crippled", "mentally retarded", "dumb", or "albino"[59]). Only one country included a category for behavioural difficulties.

Some countries (including Namibia) collected information on diagnosis (such as cerebral palsy, autism) in EMIS (MiET et al., 2014). The authors note that diagnosis provides little information about a child's functioning or specific learning needs and is not very useful in an EMIS (UNICEF Education Section, 2016). Indeed, differences in these reported rates between countries can be misleading. Research in the EU has shown that the percentage of learners with identified special education

[59] The degrading terms used in describing these categories are noted. This language is only quoted to illustrate the inappropriateness of these categories.

needs ranges from less than 2% in Sweden and Luxembourg to over 10% in Iceland, Lithuania, and Scotland. However, these large differences do not reflect differences in prevalence of special education needs among learners in schools. It is more likely they reflect differences in funding mechanisms, inclusive education policies and what categories of learners are considered to have "special educational needs" in these different countries (Watkins et al., 2014, pp. 55-61). Other authors have attributed differences in reporting between different high-income countries to differences in policies on diagnosis and referral (Florian & McLaughlin, 2008).

The Ten Question module has not been used in schools (Hollenweger, 2008, p. 21). In a random clustered sample in Serbia this module was shown to over-identify 2 to 4-year-olds at risk of disability, relative to the Child Functioning Module. This is thought to emanate from the *Yes/No* nature of responses in the Ten Question module, rather than the more nuanced response categories: "No difficulty", "Some difficulty", "A lot of difficulty", "Cannot do at all" in the Child Functioning Module, which leads to fewer false positives (Cappa et al., 2018, p. 510).

2.4.4 Wording of disability questions and effect on estimated disability prevalence and rates of school attendance

Acceptability studies conducted during the development of Census 2011 showed that, by using the term *difficulty* rather than *disability* in the questions, the Washington Group Short Set yielded much higher estimates of disability prevalence than the more direct questions used in Census 2001 (Schneider, 2009; Schneider et al., 2009). Indeed the direct single question on disability elicited a national disability prevalence of 5% in 2001 (Statistics South Africa, 2005), while the Washington Group Short Set estimated national adult disability prevalence at 7.5%[60] (Statistics South Africa, 2014b) or 13.1% (using a broader disability threshold[61]) in Census 2011 (T. C. McKenzie, 2022).

Findings from other settings also suggest that where disability status is asked about directly, studies often underestimate prevalence due to reluctance to identify oneself, or a family member, as disabled due to the associated stigma (Groce & Mont, 2017; Schneider, 2009). UNICEF recently warned that the use of the term *disability* rather than *difficulty* in EMIS is likely to lead to under-identification of children in need of additional educational services for similar reasons (UNICEF Education Section, 2016)

The Child Functioning Module leads to much higher estimates of disability prevalence than a previous round of MICS in Sierra Leone, which used a single question that included the term *disability* (and estimated a disability prevalence of below 1% among 2 to 9-year-olds) (Hollenweger, 2008, p.

[60] Where the disability threshold is "some difficulty" in two or more domains or "a lot of difficulty" or "cannot do at all" in one or more domains.
[61] "Some difficulty" in one or more domains.

21; UNESCO, 2020a). Mizunoya et al. (2018) found a higher disability gap in school attendance rates in 15 LMICs than a previous study (Filmer, 2008). The authors attribute the larger disability gap in school attendance to the use of the Washington Group Short Set to identify disability in the 2018 study (Mizunoya et al., 2018, p. 397).

2.5 Further challenges in measurement of disability inclusion in LMICs and the policy implications

Poor-quality school-level disability data is frequently experienced in LMICs (International Disability and Development Consortium & Light for the World, 2017). These data problems can cause school-reported enrolment of learners with disabilities to be substantially underestimated. (International Disability and Development Consortium & Light for the World, 2017). Where funding allocation to inclusive education is informed by this data, this can cause substantial underfunding of inclusive education programmes.

There is also a risk of very skewed disability reporting in LMICs that can arise because there are often pockets of the school system where schools have better record keeping and are better able to identify children with disabilities. Better-functioning schools tend to be in wealthier areas (International Disability and Development Consortium & Light for the World, 2017). As a result, rates of enrolment of learners with disabilities can appear to be higher in schools in wealthier areas, where reporting is more thorough. Pockets of better reporting can also be driven by inequitable access to health care. In many LMICs, including South Africa, access to health care is highly inequitable, and learners attending schools in wealthier areas tend to have better access to healthcare and diagnosis. This can also lead to greater reporting of learner disability in schools in wealthier areas. Sections 5.3.1 and 5.3.2 of this dissertation explore whether schools in wealthier areas are more likely to report enrolment of learners with disabilities, while Chapter 3 discusses the implications of inequitable access to healthcare (and diagnosis) for incentives created by funding.

2.5.1 Socially desirable reporting in school surveys

There is a further challenge to data quality in school survey data, which can be experienced across all countries. Several studies have illustrated that response styles (systematic patterns in individual's responses, regardless of question content) might contaminate school survey data (Blasius & Thiessen, 2015; Colasante et al., 2019; Feuerborn et al., 2019; He & van De Vijver, 2015). Response styles include an acquiescent response style (the tendency to agree with questions in a survey, regardless of their content), extreme response styles (a tendency to choose extremes in a response scale), midpoint response style (consistent choice of the midpoint on a response scale) and socially desirable reporting (respondents' tendency to provide responses which they believe will be viewed favourably by others). Socially desirable reporting has been shown to be present in teachers surveys

in South Africa (Taylor et al., 2019). Taylor et al. uncovered evidence of this by triangulating survey data with probing qualitative interviews and by asking the same survey question of multiple respondents to evaluate agreement. In-depth interviews were used to "penetrate the façade of socially acceptable responses"(Taylor et al., 2019). In other settings, researchers warn that there is a heightened risk of socially desirable reporting in surveys which explore attitudes towards disability inclusion. To overcome this potential bias, observation should be used together with questionnaire data (Avramidis & Norwich, 2002, p. 143).

Response styles (other than socially desirable reporting) lead to patterns in responses, which can be detected with statistical techniques, such as principal component analysis or factor analysis. However, several response styles manifest in similar patterns and the results of techniques to detect them do not always converge (He & van De Vijver, 2015).

2.6 Discussion and conclusions

Narrow definitions of disability aligned with the medical model of disability in policy documents have been replaced by much broader definitions which are less dependent on access to healthcare professionals. No research has assessed whether the changed definitions of disability in policy documents have translated into changes in disability questions or categories in EMIS in South Africa. This dissertation examines this question in Chapter 4 and draws out the implications for funding adequacy and accuracy of disability-disaggregated enrolment reporting.

While TALIS (2018) concludes that 39% of teachers in South Africa have a high need for training in teaching "special needs" (OECD, 2019a), very little is known about the availability of many of the key school- and district-level inputs and processes in inclusive education in South Africa. There is little, if any, quantitative research on the availability of disability support structures across the country. The literature reveals that teachers often feel ill-equipped to support learners with disabilities (Adewumi & Mosito, 2019; N. M. Nel et al., 2016), but the key reasons for their lack of confidence are not well understood. Research has not convincingly demonstrated the link between teacher training and teacher confidence in supporting learners with learning difficulties.

Previous research suggests that the resourcing of disability-inclusive education has been very uneven between provinces (Budlender, 2015) and that slow progress in policy implementation may be partly due to a lack of buy-in to the idea of inclusive education in some provinces (Du Plessis, 2013). However, the effect of uneven funding on inequality of inputs for learners with disabilities has not been investigated in depth. Quantitative research, such as SMS 2017 which can be compared to an earlier, largely comparable 2011 survey, can highlight the areas where progress is not being made and where performance is particularly poor (in 2017).

Finally, the quite loose, and in places incoherent policy framework itself has hampered the development of appropriate indicators of disability inclusion. In 2017, the SIAS policy and school health policy were the only education policies defined in sufficient detail to allow indicators to be developed. The SIAS policy was used to guide the research presented in this dissertation.

By systematising the evaluation of inclusive education, and by suggesting indicators that are appropriate for South Africa, this research should promote the evaluation of inclusive education programmes and projects.

While disability-disaggregated enrolment may appear easier to measure than some of the input and process indicators of disability inclusion discussed in this chapter, schools may not be well-equipped for accurate data collection on a complex phenomenon such as learners' disability status. Estimates can be strongly influenced by how disability is conceptualised and identified in schools, and by funding strategies, school functionality and access to healthcare. The influence of these factors on disability-disaggregated enrolment reporting in schools has never been explored in the South African context. This study explored the quality of disability data collected in schools and critically analysed this data to determine what the patterns of reporting tell us about the ability to report on disability in different parts of the school system.

This chapter showed that the questions on disability used in school surveys and data systems may exert a strong influence on the estimated rate of disability in schools. The questions used to collect disability data in schools are analysed in Chapter 4, and the resulting rates of enrolment of learners with disabilities are compared with recent estimates of national disability prevalence among learners to draw out the implications of using such different sets of disability questions in schools. This comparison is guided by the literature review in this chapter.

3. Education funding and incentives to report enrolment of learners with disabilities.

Chapter 2 described how the wording of disability questions in school surveys influences the number of learners with disabilities identified in school systems. In addition, reporting of disability status among learners may be closely linked to incentives created by school funding models. This chapter aims to address the research question: Does the current funding strategy for disability inclusion incentivise ordinary schools to enrol, or report the enrolment of, learners with disabilities? It is important to understand the incentives created by the funding model before examining the quality of school-level reporting in South Africa (which is discussed in Chapter 4) and before reporting the analysis of this data (in Chapter 5).

Certain funding models may motivate schools to enrol learners with disabilities or may incentivise them to identify disabilities among existing learners. This chapter broadly outlines the incentive effects of the most popular funding models for disability inclusion in education. It then discusses how inclusive education has been funded in South Africa since 2001 and highlights the likely incentive effects of the current funding model. If enrolment of learners with disabilities in ordinary schools is to be used as a key indicator of disability inclusion, it is important that the financial incentives experienced by ordinary schools are well understood.

This chapter reports on a literature review and a primary review of policy documents and regulations published in the government gazette from the mid-1990s onwards, building on a thorough review of inclusive education funding by Budlender (2015)[62].

Internationally, input-, throughput- and equity-based funding models have been used to fund inclusive education (Ebersold & Meijer, 2016). In recent years, there has been a substantial shift from input- to throughput funding in high-income countries (Ebersold & Meijer, 2016; Gubbels et al., 2018; International Disability and Development Consortium & Light for the World, 2017; Meijer & Watkins, 2019; Pulkkinen & Jahnukainen, 2016).

Input-funding models (also known as per-capita or needs-based funding) allocate funding based on a measure of identified need. In South Africa, funding allocations to special schools have been based on officially-assessed disability (or impairment) types of enrolled learners[63]. Some European systems allocate additional per-capita funding for learners who are refugees or who are not learning

[62] Some of the discussion in this chapter was previously published in a much more extensive form (Equal Education Law Centre, 2022).

[63] In the 1998 post-provisioning norms. This is discussed in more detail in section 3.1.

in their home language, Roma learners, learners who are socio-economically disadvantaged, and learners with disabilities or learning difficulties (Ebersold & Meijer, 2016).

In throughput funding models, funding allocations depend on the function (or tasks) designated to each institution (Ebersold & Meijer, 2016) rather than on reported enrolment. Throughput models often allocate funding based on the total number of school-aged children per district, as reported in household surveys or census data, or on total enrolment regardless of disability status reported by schools in a district (Gubbels et al., 2018; Pulkkinen & Jahnukainen, 2016).

In high-income countries the introduction of generous input-funding in both ordinary and special schools has been associated with increased assessment and diagnosis of learners with disabilities in those schools (Barrett, 2014, p. 77; Pijl, 2016; Goddard & Foster, 2016) and with increased enrolment of learners in special education (Ebersold & Meijer, 2016; Gubbels et al., 2018). However, a recent multi-country review of funding for inclusive education in Europe concluded that the incentive effect of funding is also highly dependent on the context in an individual country (Ebersold & Meijer, 2016; European Agency for Special Needs and Inclusive Education, 2016). In particular, throughput funding is more likely to be effective in education systems where most allocation decisions are made at the municipal or school level and where there is synergy between the departments of health, education, and social development. Economies of scale in inclusive education can only be achieved in larger municipalities in Europe (Ebersold & Meijer, 2016).

Most countries have adopted supply-oriented input-funding models, under which funding is allocated to a school based on the number of enrolled learners with disabilities. Some European countries have recently implemented learner-bound budgets, which are a form of demand-oriented input-funding (with the additional funding allocated to the learner rather than the school) (Pijl, 2016). Learner-bound budgets can be used in the learner and parents' school of choice, and move with the learner if the learner changes schools (Pijl, 2016), resulting in increased choice for parents and learners. However, implementing such budgets requires the development of strict qualifying criteria. These criteria have taken the form of official diagnosis. Diagnosis then becomes a gateway to accessing additional support. Despite strict gatekeeping, the introduction of learner-bound budgets in the Netherlands from 2003 to 2014 for learners with certain types of formally-assessed special needs led to rapid expansion in numbers of learners with the qualifying disability types. In Europe in general, it has proved difficult to control expansion of the number of learners eligible for learner-bound budgets (Pijl, 2016, p. 561). As a result, learner-bound budgets were discontinued in the Netherlands in 2014 and were replaced by a throughput model of funding. This shift was associated with much lower rates of enrolment in special schools among primary school learners (Gubbels et al., 2018). There is evidence that earlier reforms which scrapped input-funding for learners with

learning and mild intellectual disabilities discouraged enrolment in special schools for learners with those disability types (Pijl, 2016)[64].

It is necessary to provide some background on basic education funding in South Africa before discussing whether the evidence on the incentive effects of funding in high-income settings is relevant to this context.

3.1 Education funding for learners with disabilities in South Africa

South Africa follows a decentralised education funding model with most allocation decisions made by the provinces. From 2002 to 2009, donor funding was used to establish full-service schools, upgrade special schools into resource centres, and establish transversal teams in 30 districts (Government of the Republic of South Africa, 2013, pp. 22–23). However, since then, most funding has come from domestic sources. Most government funding to provinces is allocated using the formula-based Provincial Equitable Share (PES). The PES is largely determined by the size of the school-aged population in the province, but is also equity-based (it considers the number of people not covered by private health insurance and the proportion of households who are poor) (Roos, 2020)[65]. Once received by provinces, PES funding is allocated between priorities at provinces' discretion. It is supplemented by (smaller) conditional grants, which provide purpose-specific funding[66].

Within provincial departments of education, there are two key mechanisms for allocating resources to schools: the post-provisioning norms, which determine the number of posts allocated to each school, and the school funding norms, which establish per-learner allocations to schools for non-salary recurrent costs[67]. Since teacher salaries make up approximately 79% of the basic education budget (Spaull et al., 2020), the post-provisioning norms is the most important tool in education budget allocation in provinces. These norms allocate posts to ordinary schools using a formula that incorporates the school wealth quintile, grades offered at the school, total enrolment and subjects offered (in Grades 10-12). By contrast, the 1998 post-provisioning norms allocate teachers to special schools based on the number of learners with different disability types in the school. Different weights are applied to different impairments and disabilities, as shown in Table 5. These disability weightings

[64] Neither Gubbels et al. (2018) nor Pijl (2016) evaluate enrolment of learners with disabilities in ordinary schools, which is the policy objective in South Africa.

[65] 36% of the PES is allocated based on the proportion of the provincial population in the poorest 40% of households (nationally), and the size of the population not covered by medical insurance.

[66] These include three grants that have direct relevance for the funding of inclusive education: The Learners with Severe and Profound Intellectual Disabilities conditional grant (introduced in 2017/18 as a result of a 2010 court judgement, which only covers learners with one disability type), the (much larger) School Infrastructure Backlogs Grant and the Education Infrastructure Grant. It is not clear to what extent physical accessibility upgrades are prioritised within the latter two grants.

[67] Known as non-personnel non-capital (NPNC) costs.

were designed with the understanding that learners with certain disability types require more teacher time (and smaller class sizes) than learners with other disability types. For example, as shown in Table 5, a learner who is blind or partially sighted is weighted as being equivalent to five learners without disabilities, while one who has a specific learning disability (such as dyslexia) receives a lesser weighting (3). Some of the categories require diagnosis by a specialist (for example, epilepsy, cerebral palsy, autism) before additional positions can be allocated to a school. In special schools, allocation of education therapists is guided by a different set of diagnosis-dependent norms, as shown in the final column of Table 5.

Table 5: Learner-based disability weightings used in special schools (1998)

Learner categories [1]	Learner weight [2]	No. of education therapists per learner [3]
Autistic	6	0.033
Blind or partially sighted	5	0.010
Deaf or hard of hearing	5	0.010
Physically disabled	4	0.040
Cerebral palsied	4	0.050
Severe behaviour problems	4	-
Severely mentally handicapped	3	0.010
Specifically learning disabled	3	0.033
Epileptic	3	0.020

[1] Language as stated in Department of Basic Education Post-Provisioning Norms (1998), [2] As per Post-provisioning Norms (1998) [3] Personnel Administration Measures (2003), section 2.4.

Data on the number of learners with each impairment/disability type is sourced from school-level disability data (reported in the annual survey of special schools). That is, funding to special schools is directly determined by their own reporting. The potential implications of this funding model for the accuracy of disability-disaggregated enrolment reporting have received little attention.

The post-provisioning norms were developed in 1998 and slightly revised in 2002 (Deloitte Consulting et al., 2013). The disability weightings in the post-provisioning norms have never been applied in ordinary schools (Department of Basic Education, 2008; Department of Education, 2002), although the wording of the 1998 policy document does not specify that these weightings are only for special schools.

Governed by the school funding norms, the per-learner funding allocation (to cover non-personnel, non-capital costs) is largely equity-based with a much larger per-learner allocation to schools in lower wealth quintiles. Historically, much higher per-learner allocations have been provided to special

schools in recognition of the higher cost of supporting learners with disabilities. By contrast, no additional per-learner allocations are made to ordinary schools who enrol learners with disabilities. The post-provisioning norms and the school funding norms are examples of input-funding models. However, neither has been applied in ordinary schools. This has essentially left inclusive education unfunded.

3.1.1 Proposed changes to funding for inclusive education

As discussed in section 2.4.3, previous research shows that diagnosis itself provides little information about a child's specific learning needs (UNICEF Education Section, 2016). Resource-based input-funding models have been proposed which avoid the use of individual learner diagnosis, while still taking differences in need into account. The OECD has developed three resource-based learner categories (learners with disabilities, learners with difficulties and learners with problems due to language barriers and socio-economic disadvantage). These are based on the resources needed by a learner, not on the underlying diagnosis (Watkins et al., 2014). This is more closely aligned with the biopsychosocial model of disability, which suggests that levels of needs may vary widely for learners with the same medical diagnosis. Education White Paper 6 and the SIAS policy in South Africa have proposed three resource-based categories based on a learner's assessed level of additional support need (high, moderate, and low-level support needs) (Department of Basic Education, 2014a; National Department of Education, 2001).

The Guidelines on Resourcing an Inclusive Education System (Department of Basic Education, 2018b) that were released in draft form in 2018 represent an attempt to move towards a throughput model for inclusive education. The guidelines propose that additional teaching posts are allocated to resource centres and to full-service schools due to their expanded roles. Funding will be allocated in expectation of the additional services these schools will provide (Department of Basic Education, 2018b, pp. 13-14, 31-32) rather than based on the number of learners with disabilities or with additional support needs enrolled in these institutions. The 2018 guidelines propose new post-provisioning norms for special schools, where posts will be allocated based on the school's intended area of specialisation (the disability type they are meant to focus on) and on total enrolment, rather than on disability-weighted enrolment.

The 2018 guidelines also propose a revised set of school funding norms, whereby additional per-learner allocations for recurrent costs would be made, based on school designation. Special school resource centres would receive the highest per-learner allocation, followed by special schools[68], full-

[68] In special schools this allocation will be determined by the school's areas of specialisation and the total number of learners, rather than by the disability mix of enrolled learners. In this way, special schools supporting learners who have autism, or who are blind or deaf would receive the largest non-salary recurrent allocation, as determined by the weights in Table 5.

service school resource centres and finally full-service schools (whose total allocation for recurrent expenses would be 10% higher than an equivalent-sized ordinary school) (Department of Basic Education, 2018b). Again, these allocations will not be determined by the number of learners with disabilities or high-level support needs per school, but by school designation and total learner numbers (irrespective of diagnosis).

3.2 Likely incentive effects of current funding models in South Africa

Janney et al. (1995) hypothesise that teachers perceive inclusion of learners with disabilities as involving additional effort, particularly if they have no prior experience of inclusion or if they expect to be left to fend for themselves, with no district support once a learner has been enrolled. Economic theory predicts that self-maximising principals will tend not to enrol learners with disabilities if the associated effort is perceived to exceed any financial (or other) benefit to the school. Thus, a funding system which links additional funding to the enrolment of a learner with a disability has the potential to incentivise principals to admit learners with disabilities. However, in order for funding to incentivise admission of learners with disabilities, it must be set at a level that offsets the perceived cost of extra effort (from the principal's perspective). The promise of additional funding must be credible, and the amount must be clearly defined. Pijl (2016) shows that where generous learner-bound budgets have been used within a well-developed health-care system and generally well-resourced schooling system, they have incentivised ordinary schools to formally assess already-enrolled learners for the conditions recognised in the funding model.

A similar situation exists with regard to identification of disabilities among existing learners. Formal identification of a disability (which is described in section 2.4.1) may involve substantial effort and time from teachers (and school management). Reporting the disability status of learners may also impose an administrative burden, as described later in section 4.8. An input-funding model has the potential to incentivise school management teams to follow official procedures to identify disabilities among existing learners and to report enrolment of learners with disabilities. There must, however, be adequate and equitable access to health care if a diagnosis-based input-funding is to incentivise enrolment of learners with disabilities. Access to healthcare professionals who assess learners for possible disabilities is highly constrained in the South African public sector. For example, in 2014 there were only 2.8 occupational therapists, physiotherapist and psychologists (each) per 100,000 uninsured population (Massyn et al., 2015, p. 290). No research was found which assesses the impact of input-funding for inclusive education in a setting where access to health care is severely constrained or highly unequal.

If the disability weightings were set appropriately[69], the 1998 post-provisioning norms would have incentivised increased enrolment of learners with the policy-defined disability types in special schools. In particular, it is possible that these post-provisioning norms have incentivised enrolment of learners with highly-weighted disability types (such as autism) in special schools. But, as the 1998 norms have never been implemented in ordinary schools, no additional teacher allocation has been provided to such schools that enrol learners with disabilities. Similarly, no additional per-learner funding has been allocated to ordinary schools that enrol learners with disabilities. Without any additional allocation of resources to offset the perceived additional effort of including learners with disabilities, there is likely to be little incentive (or capacity) to enrol (or report the enrolment of) learners with disabilities.

The literature on the relationship between funding models and enrolment of learners with disabilities in high-income countries was briefly presented in the introduction to this chapter. Overall, this literature suggests that an input-funding model would be associated with increased enrolment of learners with disabilities in that part of the school system in which the funding is implemented. However, in contexts such as South Africa, where there is constrained and inequitable access to healthcare (and thus identification of disability), it is likely that input-funding models will be less strongly associated with increased enrolment than in high-income countries where access to diagnosis is much less constrained. Indeed, South Africa's National Student Financial Aid Scheme introduced a learner-bound budget model to fund personal assistants and assistive technologies (up to R50,000 per student in 2019/20) for qualifying students with disabilities in universities and technical and vocational colleges (National Student Financial Aid Scheme, 2020). However, the number of students with disabilities in higher education has not grown since the introduction of these learner-bound budgets (National Student Financial Aid Scheme, 2020). This suggests that other factors are preventing increased enrolment of students with disabilities[70].

Constrained access to diagnosis by healthcare professionals in South Africa may have reduced the incentive effects of the post-provisioning norms in increasing enrolment of learners with disabilities in special schools. However, it is clear that the 1998 post-provisioning norms provide no financial incentive to ordinary schools to enrol learners with disabilities. Given that ordinary schools do not receive any additional funding if they enrol a learner with a disability, principals will not be financially motivated to enrol (or report the enrolment of) such learners. The lack of funding has also constrained ordinary schools' capacity to support learners with disabilities.

[69] Set at a level where school managers believe the added teacher allocation compensates adequately for the additional teacher effort in enrolling a learner with a specific disability type.

[70] The low throughput of learners with disabilities who complete the school-leaving examinations is one of these factors. Chapter 6 of this dissertation examines some of the reasons why learners with disabilities may not be receiving the support they need to enable effective learning and enrolment in tertiary education.

This situation has been exacerbated by delays in funding to district-based support teams, full-service schools and special school resource centres which are meant to provide additional support to ordinary schools. These structures have also not yet received additional staffing to fulfil their expanded roles. For example, the district staffing norms gazetted in 2018 stipulate post allocations to districts to support inclusive education. However, the gazette states that these posts can be implemented "progressively" and describes the staffing norms as "aspirational" (Department of Basic Education, 2018c, pp. 57-59). In 2020, the Department of Basic Education presented funding plans, which suggested these posts would be gradually funded from 2024 to 2030 (Department of Basic Education, 2020). As a result, district-based support teams will not be fully staffed until 2030. These funding delays are likely to exacerbate poor incentives to enrol learners with disabilities in line with the rationale put forward by Janney et al. (1995), as school principals are very likely to believe they will be left to fend for themselves once a learner with a disability has been enrolled. There is some evidence that this has led to the costs of reasonable accommodation being borne by the families of children with disabilities (Department of Social Development, 2015). Without additional once-off and recurrent funding, the financial burden of providing reasonable accommodation for learners with disabilities will continue to be borne by their families.

Despite the differences in context between high-income settings and South Africa, the available literature clearly predicts that, under the current funding model, ordinary schools have no financial incentive to enrol or report the enrolment of learners with disabilities.

Throughput funding models (such as the one proposed in the 2018 guidelines) do not directly incentivise the enrolment of learners with disabilities in ordinary schools. However, if implemented, the 2018 guidelines have the potential to improve funding of disability support structures, and in that way, reduce the effort required by teachers and principals in ordinary schools when including a learner with a disability.

3.3 Discussion and conclusion

The previous chapter discussed how the wording of questions in school surveys can influence reporting of enrolment of learners with disabilities in South Africa. This chapter showed that there are currently no financial incentives for ordinary schools in South Africa to report enrolment of learners with disabilities. This point has not been highlighted in the existing literature on the implementation of inclusive education in South Africa. No other research was found that assesses enrolment of learners with disabilities in ordinary schools in South Africa and relates this to the lack of funding to support learners with disabilities in these schools.

This study aimed to address this gap in the literature by evaluating school-level disability-disaggregated enrolment data and household survey data on disability prevalence among learners.

Given the poor financial incentive to enrol or report learners with disabilities, as described in this chapter, one would expect to find both under-enrolment of learners with disabilities and under-reporting of disability enrolment in South African ordinary schools. The rates of reported enrolment of learners with disabilities in ordinary schools are analysed in Chapters 4 and 5 to determine if there is evidence of under-reporting of enrolled learners with disabilities. This question requires detailed analysis of reported school enrolment from the census. Unfortunately, Census 2022 results will not be available for some time, and the Community Survey does not include a question about what type of school a child is enrolled in. Until Census 2022 is released the question of under-enrolment of learners with different disability types and severity in ordinary schools cannot be answered.

4. Quality of disability enrolment data in Annual School Surveys 2011 to 2014

4.1 Introduction

This chapter addresses three of research questions posed in Chapter 1. Firstly, how is disability status measured in school-level processes and data in South Africa and how does this differ from measurement of disability in household surveys and best practice (in line with the biopsychosocial model of disability)? This question is addressed in section 4.4. Secondly, what is the quality and consistency of disability-disaggregated enrolment data collected in ordinary schools in South Africa? This is addressed in Section 4.5. Finally, how closely do the school-level reported rates of disability reflect rates of enrolment among children with disabilities as estimated in household surveys[71]? This is addressed in section 4.6. While it isn't a core research question, this chapter also assesses whether the introduction of a new learner-level EMIS has led to improvements in the quality and completeness of data on learner disability status.

The quality and accuracy of routine data on disability-disaggregated enrolment in schools can be influenced by diverse factors. Chapter 2 illustrated how the reported number of learners with disabilities is influenced by the choice of disability questions used to develop disability measures. Chapter 3 showed that, in South Africa, the current funding system creates no financial incentives for schools to report enrolment of learners with disabilities. The literature also suggests that where disability data is collected in administrative systems, but is not used to manage programmes, or is not processed or cleaned, there may be little incentive for schools to collect disability data or ensure it is accurate (Mont, 2018). For these and other reasons, it has been suggested that disability data collected by schools in LMICs is likely to be of poor quality (International Disability and Development Consortium & Light for the World, 2017). Even in high-income countries, education authorities have acknowledged that schools are not good at collecting accurate disability statistics. This motivated Finland and Alberta (Canada) to begin using data collected by the national statistics body rather than by schools as the basis for their funding allocation for education (Pulkkinen & Jahnukainen, 2016).

Poor-quality reporting at school level can mean that the reported number of learners with disabilities underestimates the real presence of learners with disabilities in mainstream schools. In South Africa, the total number of learners with disabilities in ordinary schools is a key measure of progress in disability inclusion in annual reporting to parliament (Department of Basic Education, 2017), reporting to multilaterals on progress in implementing Article 24[72] of the CRPD and on achievement in relation

[71] which use measures consistent with the biopsychosocial model of disability.

[72] In particular: Article 24, 2(b): "Persons with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live" (United Nations, 2007).

to Sustainable Development Goal 4.5.[73] Recent research shows that the 2014 Annual School Survey and 10th Day Survey underestimated enrolment (across special and ordinary schools) by approximately 131,000 learners with disabilities, compared with the GHS[74] (Nuga-Deliwe, 2016), but does not explore the reasons for this discrepancy.

Given the centrality of disability enrolment in reporting and given that enrolment is a key element of the definition of disability inclusion adopted in this study, it is important to evaluate the quality of disability enrolment data and its consistency over time in ordinary schools. This chapter examines the quality of disability enrolment data in the Annual School Survey, outlining inconsistencies in and completeness of the data. The aim is to identify weaknesses and strengths in the data, and to determine whether the data is sufficiently robust to allow multivariate analysis (which follows in Chapter 5). Data cleaning is described in detail, as are the methods of imputation that were used to create a more stable, complete dataset.

The chapter includes a comparison between school-level estimates of the disability enrolment rate and household survey estimates of disability prevalence among learners. The aim of this descriptive comparison is to determine how similar the school-level *reported* rates of disability enrolment are to the estimated disability prevalence among learners (from household surveys). The chapter explores differences in the conceptualisation of disability across the different data sources and in South African education policy as one possible source of data weakness.

4.2 Data

This chapter reports on the quality of disability enrolment data from the Annual School Survey, from the new learner-level EMIS (SA-SAMS) for the Eastern Cape province (for 2018) and learner-level data on learners with additional support needs or disabilities in the Free State province (2014). Each dataset was merged with data on school characteristics from the Master List of Schools 2013 and 2015[75] and with official data on designated full-service status of schools using EMIS identifier as the linking variable. A list of EMIS identifiers for all full-service schools designated in 2011, 2014 and 2017 was supplied by the Inclusive Education Directorate in September 2018. Following the data merge, each dataset was anonymised. This process produced three snapshots of disability enrolment data in South Africa. Combining enrolment data with school characteristics data enables a much more nuanced analysis of trends in schools by observable school characteristics (including

[73] "By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities …." (UNESCO, 2017).

[74] Total enrolment in special, and ordinary schools (219,194 learners) was compared with the number of children with disabilities aged 7 to 18 reported to be in any school in the GHS 2014 (350,327).

[75] 37 schools were included in Annual School Survey data (2011 to 2014) but were not included in the Master List of Schools 2015. For these schools the Master List of Schools 2013 provided the necessary data on school characteristics.

school wealth quintile, size of school and full-service designation). To my knowledge such analysis has never previously been done in South Africa.

Disability prevalence among learners aged 7 to 18 was estimated from Census 2011 (10% sample) (Statistics South Africa, 2015b)[76] and the Community Survey 2016 (Statistics South Africa, 2020)[77].

4.2.1 Annual School Surveys

Until 2014, all ordinary schools were required to report the aggregate number of learners with disabilities per grade, per disability type, by gender, and by population group (race) in the Annual School Survey. This data was entered on paper-based forms each year. A separate survey was conducted in special schools and is not considered in this analysis.

Three sets of aggregate disability enrolment data were collected in a series of four tables in the Annual School Survey. The first two tables (Tables 3.13 and 3.14) collected data on the total number of learners with disabilities, disaggregated by grade and primary disability type. Data was collected in separate tables for female and male learners. In Table 3.15 schools were asked to report the total number of learners with disabilities by population group, gender, and primary disability type. If a learner had multiple disabilities, schools were instructed to consider only the primary disability when completing Tables 3.13 to 3.15[78]. Data from Tables 3.13 and 3.14 was the primary source for this analysis as the additional fields captured in Table 3.15 (population group) are largely observable from the characteristics of the school[79]. It was also felt that the first two tables were likely to be most accurately reported, with administrator fatigue threatening the quality of data in the third and fourth tables. A screenshot of Table 3.13 from the 2014 Annual School Survey is included in Appendix Table 2 to provide more detail on the format in which data was collected in the surveys. In the 2014 survey instrument, schools were instructed that learners should be classified as 'disabled' if medical evidence has been provided by parents, or if the district-based support team had assessed the learner and classified the learner as disabled. It is unclear which school staff member entered the disability-disaggregated enrolment data in the annual survey.

The sample of schools in this analysis is all ordinary schools that reported total learner enrolment (regardless of disability status) in the 2013 Annual School Survey. The base year 2013 was chosen as this was the last year in which all nine provinces reported disability enrolment in the annual

[76] Downloaded from DataFirst on 5 May 2017.

[77] Downloaded from DataFirst on 3 August 2020.

[78] Learners with multiple disabilities were also to be reported in Table 3.16. Data from Table 3.16 was not used in this study as there was a risk of double-counting learners who should already have been reported in Tables 3.13 to 3.15

[79] The population group of the majority of learners in a school is closely correlated with former education department, rural/urban location, and school wealth quintile.

survey[80]. Annual School Survey data for 2011, 2012, and 2014 was extracted for this sample of schools and merged with the 2013 data.

In the survey, disability enrolment is reported in aggregate at the school level. Thus, the data provides estimates of the total enrolment of learners with disabilities per school, the total number of boys and girls with disabilities per school, and total enrolment of learners with disabilities in each grade as well as by each disability type listed in the survey instrument (see Appendix Table 2 for details).

4.2.2 Free State electronic SIAS dataset

Learner-level data on disability status was electronically collected in the screening, identification and assessment (SIAS) data system in the Free State from 2010 to 2014 for all schools which were allocated a remedial or special teacher post from 2010 to 2014 (based on their weighted disability enrolment as per the post-provisioning norms). In these schools, the SIAS data was collected and entered electronically by either a remedial or special teacher, an EMIS official or a dedicated teacher (personal communication, Free State Department of Education) and was verified annually by provincial or district officials. By contrast, data on the total number of learners with disabilities enrolled per school is reported on a paper-based form in the annual surveys.

Anonymised learner-level data (as of November 2014) was obtained in electronic format from the Free State Department of Education (DoE). This data was imported into Stata 14.2 and converted into school-level data to enable a comparison with annual survey enrolment data.

This sample is not representative of all Free State schools that reported enrolment of learners with disabilities in 2014. As a result, the characteristics of the schools in the SIAS dataset differ from those of Free State schools reporting disability enrolment in the 2013 Annual School Survey, as shown in Table 6. Quintile 5 schools account for a larger percentage of schools in the SIAS dataset than among disability reporters in the 2013 survey. In the SIAS dataset, schools are less concentrated in the Mangaung Metropolitan area (which includes the provincial capital, Bloemfontein). As a result of these differences in sample characteristics, the total number of learners with disabilities reported in the Annual School Survey (2013) was compared with that in SIAS (2014) for a matched sample of schools that reported enrolment of learners with disabilities in both data sources. The aim was to verify annual survey data in the Free State, particularly for schools that reported 200 or more learners with disabilities, or where 40% of learners (or more) were reported to have disabilities in the 2013 survey.

80 The Free State province began reporting in SA-SAMS from 2015.

Table 6: Characteristics of three samples of schools in the Free State

	All schools (2013) n (%)	Schools reporting disability enrolment in Annual School Survey (2013) n (%)	Schools in SIAS dataset (2014) n (%)
Districts:			
Fezile Dabi	250 (18.3))	48 (11.8)	17 (11.0)
Lejweleputswa	264 (19.3)	117 (28.8)	47 (30.5)
Mangaung (Metro)	260 (19.0)	94 (23.2)	20 (13.0)
Thabo Mofutsanyane	505 (36.9)	91 (22.4)	46 (29.9)
Xhariep	90 (6.6)	56 (13.8)	24 (15.6)
Quintile 1	717 (55.2)	111 (27.9)	37 (24.2)
Quintile 2	199 (15.3)	98 (24.6)	19 (12.4)
Quintile 3	214 (16.5)	84 (21.1)	31 (20.3)
Quintile 4	75 (5.8)	42 (10.6)	23 (15.0)
Quintile 5	95 (7.3)	63 (15.8%)	43 (28.1)
Large school (>600 learners)	542 (39.6)	248 (60.9%)	80 (51.9)
Primary & combined schools	1,066 (77.8)	331(81.3)	144 (93.5)
Full-service schools	22 (1.6)	14 (3.4)	10 (6.5)
Sample	1,370 (100)	407 (100)	156 (100)

Note: total sample sizes by district and quintile differ due to missing data on quintile and district. Columns (1) and (2) are sourced from the Annual Survey of Schools, 2013. Col (3) is sourced from SIAS reporting in 2014. Districts are defined as per 2011 boundary demarcations.

4.2.3 SA-SAMS

From 2016, the introduction of a new learner-level EMIS (SA-SAMS) allowed learner-level disability status to be collected in schools. The SA-SAMS data was made available to RESEP for a limited time period in 2019 for a research project funded by the Michael and Susan Dell Foundation, which addressed the potential of the new EMIS for tracking learner progression data. This project provided an excellent opportunity to analyse disability-disaggregated enrolment in SA-SAMS in the Eastern Cape. The project aims were thus expanded to include the question: Has the introduction of learner-level reporting resulted in higher reported levels of reported enrolment of learners with disabilities than in the Annual School Surveys? The study also evaluated differences in patterns of disability enrolment which emerged between the two sources. This portion of the RESEP project was designed and conducted by the author of this dissertation. The results have been reported previously (see van der Berg et al., 2019), but form part of the PhD research and are reported in this chapter.

Learner-level data collected in SA-SAMS was aggregated into school-level disability data, so that it could be compared with reporting from the annual surveys. Analysis was limited to one province, as the extremely large data file size of the full dataset made it impossible to work with data from multiple

provinces at a time. The Eastern Cape was chosen as the quality of data in SA-SAMS in that province is generally good and the province is sufficiently large to allow robust analysis among learners with disabilities.

The levels of missing data on disability enrolment and the number of schools reporting implausible rates of disability enrolment in the Annual School Surveys (2013, 2014) data were compared with that reported in SA-SAMS (2018), for schools in the Eastern Cape. The aim was to determine whether the change to learner-level reporting of disability status addressed some of the data quality problems highlighted later in this chapter.

The comparison between the learner-level EMIS and annual survey data was undertaken in 2019, before imputation of missing data and full data cleaning of the dataset. As a result, the sample sizes differ somewhat from those in other analysis in this dissertation (see van der Berg et al., 2019). Van der Berg et al.'s (2019) findings are included in this chapter (and the next) as they add to the understanding of how disability data quality may differ based on the processes by which they are created and reported.

4.2.4 Census 2011 and Community Survey 2016

The census 10% sample provides a large enough sample to allow detailed analysis of specific sub-groups such as children with disabilities of school-going age. In the GHS sub-group sample sizes were insufficient to allow in-depth analysis of school enrolment by province, disability type, or age group, or to allow robust multivariate analysis. Multiple years of GHS data can be pooled to overcome these sample size challenges, but this creates its own challenges with weighting and makes trends over time more difficult to evaluate. As a result, GHS data was not used in this study.

The Community Survey is designed to provide interim data between censuses and the 2016 questionnaire is very similar, but not identical to Census 2011. A review of the Census 2011, GHS 2014 and 2019 and Community Survey 2016 questionnaires revealed that only the census includes a question on whether a child is enrolled in an ordinary or special school. Community Survey 2016 data applies to enrolment in all educational institutions (including ordinary and special schools, Further Education and Training colleges, Adult Basic Education and Training and home schooling) (Statistics South Africa, 2016a, p. 9)(Statistics South Africa, 2015a, p. 12). Thus, only census can be used to directly estimate the rate of disability enrolment in ordinary schools.

For all these reasons, Census 2011 is the most appropriate source of nationally-representative household-level data on enrolment of children with disabilities in ordinary schools. However, this chapter analyses both Census 2011 and Community Survey 2016 data as Census 2011 produces

outlier estimates of disability among children aged 10 or younger[81]. Statistics South Africa has reported problems with the geo-referenced dwelling frame used for sampling in the Community Survey 2016 which resulted in out-of-sample rate (a high proportion of dwelling units sampled were not in the original sampling frame). The out-of-sample rate was unacceptably high in all but 11 municipalities. This resulted in a reduced sample size and in less precise estimates. It also made weighting of Community Survey 2016 data more complicated as separate weights had to be created for dwelling units that were in- and out-of-sample (Statistics South Africa, 2016b). As a result, Statistics South Africa has suggested that the 2016 results be treated with caution until Census 2022 results become available (Statistics South Africa, 2018).

Tamlyn McKenzie (University of KwaZulu-Natal) provided guidance on converting the raw data gathered in the Washington Group Short Set of questions into a Disability Index as used by Statistics South Africa (2014a) and recommended by the UN (Statistics South Africa, 2018). By narrowing the Community Survey 2016 and Census 2011 sample to children aged 7 to 18 who are reported to be enrolled in an educational institution, one can obtain a sample that is representative of all learners in schools[82].

The Annual School Survey disability data is the outcome of an administrative process of diagnosis that involves parents, school-based and district-based support teams (some of the time) and healthcare professionals (some of the time). By contrast, household survey and census data represent parents' or caregivers' view of the difficulties their children experience in various domains, which is converted to a measure of disability. These substantial differences make comparison of school-level disability enrolment and national disability prevalence (from the census or household surveys) difficult.

4.3 Methods

4.3.1 Measures of disability enrolment

Two measures of disability enrolment were used in this analysis: a) the total number of learners with disabilities enrolled per school (referred to as total disability enrolment) and b) the percentage of learners with disabilities in a school (referred to as the rate of disability enrolment). Analysis of total disability enrolment allows one to clearly demonstrate the impact of inconsistent reporting across years. It is also useful when triangulating data across data sources at the school level. However, it

[81] As discussed in section 2.4.2.

[82] Six-year-olds were excluded from the sample due to unrealistically high reporting of self-care and communication disability in this age group. As the census was conducted in October, the exclusion of six-year-olds is appropriate; most children aged six in October would begin Grade 1 in the following year.

is strongly influenced by school size. The rate of disability enrolment enables a fairer comparison of disability enrolment across settings as it is not influenced by school size.

For each school, the rate of disability per 100 learners was calculated:

$$Rate\ of\ disability = \left(\frac{Total\ learners\ with\ disabilities}{Total\ enrolment}\right) * 100$$

Where:

Total learner with disabilities is the total number of learners with disabilities reported in a school, and

Total enrolment is the total reported number of learners enrolled in a school.

The rate of disability was calculated for all schools (regardless of whether or not they reported any learners with disabilities) and for schools that reported disability enrolment. The estimated rate of disability for all schools is based on the assumption that where schools did not report disability enrolment (recorded missing data) they did not enrol any learners with disabilities. This assumption is revisited in section 4.10.

The rate of disability among girls and boys, and learners in particular school phases[83] can be calculated in the same way. For example,

$$Reported\ rate\ of\ disability\ among\ girls = \left(\frac{Total\ girls\ with\ disabilities}{Total\ enrolment\ of\ girls}\right) * 100$$

Where:

Total girls with disabilities = the total number of girls who are reported to have disabilities in a school, and

Total enrolment of girls = the total reported number of girls enrolled in a school.

4.3.2 Data cleaning and verification

The consistency of Annual School Survey disability enrolment data has not been previously assessed in any detail and the data has not been subjected to multivariate analysis. As a result, the data required substantial cleaning and verification before any analysis was possible. The extent of missing data, and systematic patterns in missing data, were examined in detail. The impact of systematically missing data in certain years on total disability enrolment and provincial distribution of disability enrolment was also evaluated.

[83] Basic Education is divided into four phases in South Africa. The Foundation phase consists of Grades R to 3; the Intermediate Phase Grades 4 to 6; the General Education and Training (GET) phase Grades 7 to 9 and the Further Education and Training phase Grades 10 to 12. Currently there is only one school-leaving certificate at Grade 12.

Disability enrolment is reported by gender, and by disability type in Tables 3.13 and 3.14 and again in Table 3.15 of the Annual School Survey. This enabled triangulation of data on the total number of learners with disabilities, total boys and girls with disabilities, and total enrolment of learners with each disability type. Data errors were identified in this way. Consistency of reporting was analysed over the period 2011 to 2014 by calculating correlations in total numbers of learners with disabilities between consecutive years, overall and for schools in different school wealth quintiles, to determine the parts of the school system in which data was least consistent. The large number of disability categories (resulting small sub-group sizes) meant that it was not feasible to assess data consistency across time for individual disability categories.

In schools where there was large variation in rates of disability from 2011 to 2013, and those that reported rates of disability enrolment of more than 20%, the school-level data was examined in more detail. Schools which reported implausibly high numbers of learners with disabilities or highly inconsistent rates of disability were classified as inconsistent reporters and were excluded from further analysis (in Chapter 5).

Rates of disability (by gender, age grouping, and province) in the 2011 Annual School Survey were compared against disability prevalence among children aged 7 to 18 enrolled in ordinary schools in the Census 2011 10% sample (Statistics South Africa, 2015) and Community Survey 2016. This was done as a further check on the validity of the annual survey data. When comparing rates of disability by learner age, the 2011 Annual School Survey data was only compared against the Community Survey 2016[84]. Disability by age groupings (from Community Survey 2016) was compared against disability by (roughly comparable) grade groupings in the 2011 annual survey. This comparison rests on the assumptions that most learners start school in the year they turn seven and do not repeat a grade. The validity of these assumptions is revisited in the discussion.

4.4 Measurement of disability status across data sources in South Africa

As discussed earlier, the process of identifying learners with disabilities in schools in the period 2011 to 2014 was governed by the SIAS strategy. The identification process and categories were outlined in section 2.4. It is reasonable to expect that the categories of disability in the Annual School Survey data would reflect the categories of disability in the diagnostic profile, which forms part of the SIAS process (and are shown in column 3 of Table 7). Contrary to expectations, document analysis of the 2014 survey instrument uses disability categories (shown in column 2 of Table 7) which correlate closely with the disability categories contained in the 1998 post-provisioning norms (as shown in column 1 of Table 7). Disability is measured in the Annual School Survey by asking directly about

[84] Because the rate of disability in the domain of self-care among younger children in Census 2011 appears to be an outlier as discussed in section 2.4.2.

the presence of a set of health conditions (for example, epilepsy, autism, attention deficit disorder) or impairment types (for example, deafness, hard of hearing) and in a few cases, disability types (for example, mild to moderate intellectual disability) that were listed in the post-provisioning norms in 1998. As noted in section 2.4.1, Education White Paper 6 criticised the post-provisioning norms as they were aligned with the medical model and only allowed those learners with "medical disabilities (to) access … support programmes".

Analysis of the annual survey data shows they contained no data on functional limitations nor on the number of learners with high-level or moderate-level support needs. Learner-level data on level of support need forms part of the SIAS dataset in the Free State.

The disability questions in the Annual School Survey are not aligned with the biopsychosocial model of disability that underlies the policy documents listed in Table 1. Disability categories in the annual surveys do not correspond to the categories of functioning used in the diagnostic profile in the SIAS school pack, as shown in column 3 of Table 7, which are much more closely aligned with the ICF. Analysis of data collected in the new learner-level EMIS (SA-SAMS) in 2018 illustrates that the post-provisioning norm disability categories have been carried over into SA-SAMS without alteration. No new data on environmental barriers or learner support is collected in SA-SAMS. Thus, disability data in the new learner-level EMIS is also inconsistent with the biopsychosocial model of disability. It is particularly odd that disability questions applied in ordinary schools are aligned with the 1998 post-provisioning norms as these have never been applied to ordinary schools.

Table 7: Disability and impairment types measured in different school data systems

Post-provisioning norms (1998)	Annual School Survey (2014)	Diagnostic profile, SIAS Schools Pack (2008-2014)	Health & Disability Assessment Form: SIAS 2014
Blind or partially sighted	Blindness or partial sightedness / low vision	Vision	Vision
Deaf or hard of hearing	Deafness, hard of hearing Deafblindness*	Hearing	Hearing
Physically disabled	Physical disability	Mobility	Mobility
Severely mentally handicapped	Severe to profound intellectual disability	Cognition	Developmental functioning / learning disability/ intellectual disability
Specifically learning disabled	Specific learning disorder		
-	Mild to moderate intellectual disability		
Autistic	Autistic spectrum disorder		Neurodevelopmental & Neurological Disorders
.-	Attention deficit disorder		
Cerebral palsied, Epileptic	Cerebral palsy, Epilepsy		
Severe behaviour problems	Behavioural disorder / Conduct disorder	-	-
.-	Psychiatric disorder	Mental-psychiatric diagnosis	Other mental disorders
-	-	Communication	Communication
		Health care needs	Chronic health conditions
		Self-care	

Sources: Post-provisioning norms 1998, Annual School Survey questionnaire (2014)[85], SIAS Schools Pack 2008.

4.5 Data quality and consistency in Annual School Survey data 2011 to 2014

This section discusses the major data quality challenges uncovered by the analysis.

4.5.1 Data errors and inconsistencies in data over time, by disability category

In Tables 3.13 and 3.14 of the 2014 Annual School Survey, no learners were reported to have a specific learning disability. As illustrated in the first four columns of Table 8, this is inconsistent with previous years, where more than 20,000 learners with a specific learning disability were reported each year. Simultaneously, the reported number of learners with "psychiatric disorders" increased by more than 15,000 from 2013 to 2014. Further analysis of reporting in other tables of the 2014 survey (shown in the column headed *Table 3.15* in Table 8), led to the conclusion that learners with a specific learning disability had been misclassified as learners with "psychiatric disorders" in Tables

[85] Downloaded 15 March 2017.

3.13 and 3.14. This misclassification was corrected (as shown in the final column of Table 8). This was done before any further analysis was completed.

Table 8: Reported enrolment of learners with specific learning disabilities and "psychiatric disorders": Annual School Survey 2011-2014

	Tables 3.13 & 3.14				Table 3.15	Corrected data
Disability type	2011	2012	2013	2014	2014	2014
Specific learning disability	23,693	25,813	21,466	0	20,412	16,479
Psychiatric disorders [1]	912	952	508	16,479	2,526	2,526

Data source: Annual School Survey Tables 3.13 and 3.14, Table 3.15 (including public and independent schools). [1] Term used in the Annual School Survey.

Inconsistent use of categories of intellectual disability in the administrative data during this period may also have compromised the data. Severe to profound intellectual disability and mild to moderate intellectual disability were used consistently from 2012 to 2014. A broader category, moderate to severe intellectual disability, was used in 2011. This category is inconsistent with the post-provisioning norms (See Table 5), which only includes severe intellectual disability (in a somewhat different wording). Two categories of severe to profound intellectual disability were used in 2014 (severe intellectual disability and severe to profound intellectual disability), but not in other years. As a result, reliable comparisons are difficult to make for the sub-categories of intellectual disability from 2011 to 2014. To overcome this, the category *any intellectual disability* was created, which includes all categories of intellectual disability, to allow comparison across years.

4.5.2 Missing data on disability enrolment and inconsistency in reporting over time

As shown in Table 9, the vast majority of schools did not complete the tables on disability enrolment in the Annual School Surveys in the period 2011 to 2014. During that period, between 16 and 22% of public schools reported data on enrolment of learners with disabilities each year. However, only 3% of public schools reported disability enrolment every year from 2011 to 2014. This suggests a high level of non-compliance in reporting learners' disability status and results in erratic reporting from year to year.

Table 9: Aggregate disability enrolment reporting: Annual School Survey

	2011	2012	2013	2014
Raw data				
No. learners with disabilities				
Public schools	109,236	109,395	77,018	76,124
Independent schools	7,069	8,308	3,661	9,608
No. (%) schools with >=1 learners with disabilities				
Public schools	5,214 (22)	5,197 (22)	3,777 (16)	3,881 (16)
Independent schools	405 (27)	445 (29)	324 (21)	505 (33)
No. (%) schools not reporting disability data	19,921 (79)	18,282 (73)	20,991 (84)	19,316 (77)
No. schools reporting “0” learners with disabilities	0	0	115	340
No. schools reporting in current and previous year	.	3,538	2,075	2,359
After imputation of missing data				
No. learners with disabilities in public schools	109,236	109,395	107,217	101,174
No. (%) public schools with >=1 learners with disabilities	5,214 (22)	5,197 (22)	4,875 (21)	4,340 (18)

Source (raw data): Annual School Survey 2011-2014, Tables 3.13 and 3.14 (public and independent schools). Note: Totals in public and independent schools do not equal to overall totals due to small amounts of missing data on sector in the Master List of Schools 2013 and 2015. Note: no imputation performed for 2011, 2012 data.

Table 10 reveals two major reasons for erratic reporting. Free State schools did not report enrolment of learners with disabilities in 2014 and Western Cape schools did not do so in 2012. Further investigation revealed that the Free State switched to reporting enrolment in the new learner-level EMIS (SA-SAMS) in 2014, before the module on disability had been fully developed, resulting in no disability data being collected in the Free State in 2014. It appears that the Western Cape reported enrolment using a CEMIS Snapshot survey in 2012 (Deloitte & UNICEF, 2013) which did not collect data on disability status. These omissions introduce systematic patterns to the missing data in 2012 and 2014. Most of the Western Cape schools which reported data (88%) in 2011 were full-service schools. Thus, the 2011 data also does not represent enrolment in typical, ordinary schools in the Western Cape.

Table 10 further demonstrates that, in most other provinces, the number of schools reporting disability enrolment is highly inconsistent over time (with the possible exception of the Northern Cape and North West). An unusually low number of schools reported disability enrolment in 2013, especially in Gauteng (where the number declined to approximately a fifth of the 2012 level) and KwaZulu-Natal (where it declined to about a third of the 2012 level). The reason for this sudden change in reporting patterns is not clear.

Table 10: Number of schools reporting disability enrolment, by year and province

Province	2011	2012	2013	2014	Range
Western Cape	109	0	845	805	845
Eastern Cape	1,340	1,228	1,308	775	565
Northern Cape	176	182	187	197	21
Free State	382	461	407	0	461
KwaZulu-Natal	1,409	1,527	486	611	1,041
North West	128	128	150	159	31
Gauteng	1,049	1,121	235	1,093	858
Mpumalanga	793	716	139	393	654
Limpopo	245	283	350	354	109
South Africa	5,631	5,646	4,108	4,387	1,523

Data source: Annual School Survey 2011 - 2014, Tables 3.13 and 3.14 (public and independent schools). Number of schools = number which reported enrolling at least one learner with a disability in the year.

Table 11 demonstrates the effects of this inconsistent reporting on total disability enrolment at the provincial and national levels. The Free State's omission from the 2014 data substantially reduced the level of reported disability enrolment nationally in 2014 (compared with 2011 and 2012). The low number of schools reporting in KwaZulu-Natal and Gauteng in 2013 contributed to lower levels of overall disability enrolment in 2013.

Table 11: Reported enrolment of learners with disabilities, by year and province

Province	2011	2012	2013	2014
Western Cape	1,489	.	7,291	6,687
Eastern Cape	27,797	23,076	28,288	19,495
Northern Cape	2,335	2,736	2,326	2,917
Free State	16,950	22,254	21,330	.
KwaZulu-Natal	22,397	26,028	9,229	13,049
North West	1,597	1,868	2,209	2,283
Gauteng	23,833	27,516	4,991	29,152
Mpumalanga	15,517	11,892	2,433	9,535
Limpopo	4,405	2,337	2,608	2,616
South Africa	116,320	117,707	80,705	85,734
No. of schools reporting disability enrolment	5,631	5,646	4,223	4,709

Data source: Annual School Survey 2011 - 2014, Tables 3.13 and 3.14 (raw data for public and independent schools). Sample size differs from Table 10 as a small number of schools report zero enrolment and are included in this table.

Figure 2 and Figure 3 illustrate the effect of inconsistent reporting on provincial shares of total disability enrolment in 2013 and 2014. If one considered the 2013 data alone (in Figure 2) one might conclude that Gauteng accounted for a very small share of total disability enrolment. By contrast, if one considered the 2014 data alone (in Figure 3) one would conclude that Gauteng accounted for a very large proportion of total disability enrolment. Inconsistent reporting means the choice of data year may substantially affect one's conclusions on disability enrolment by province. For this reason, data from multiple years is analysed in Chapter 5.

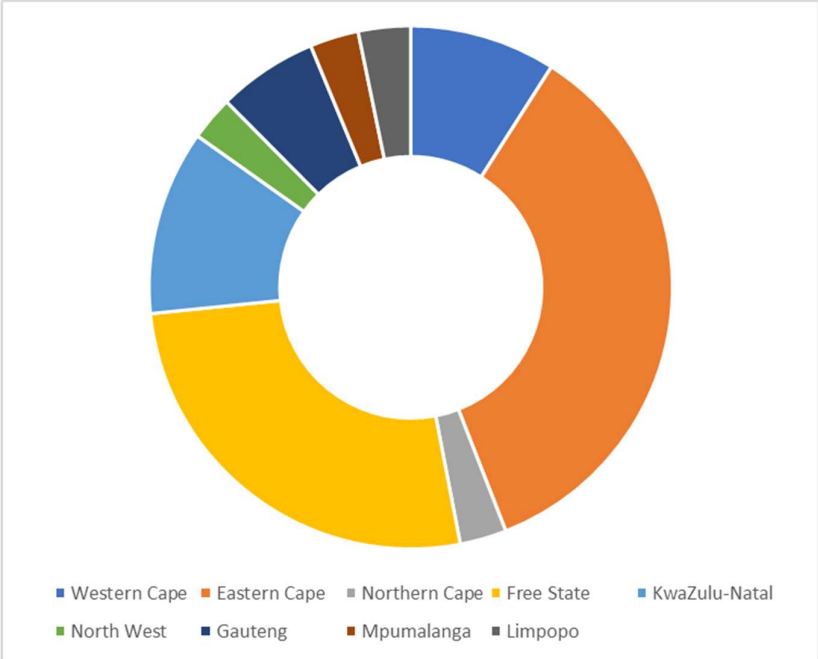

Figure 2: Total number of learners with disabilities by province (2013)

Source: Annual School Survey 2013, Raw data, including public and independent schools.

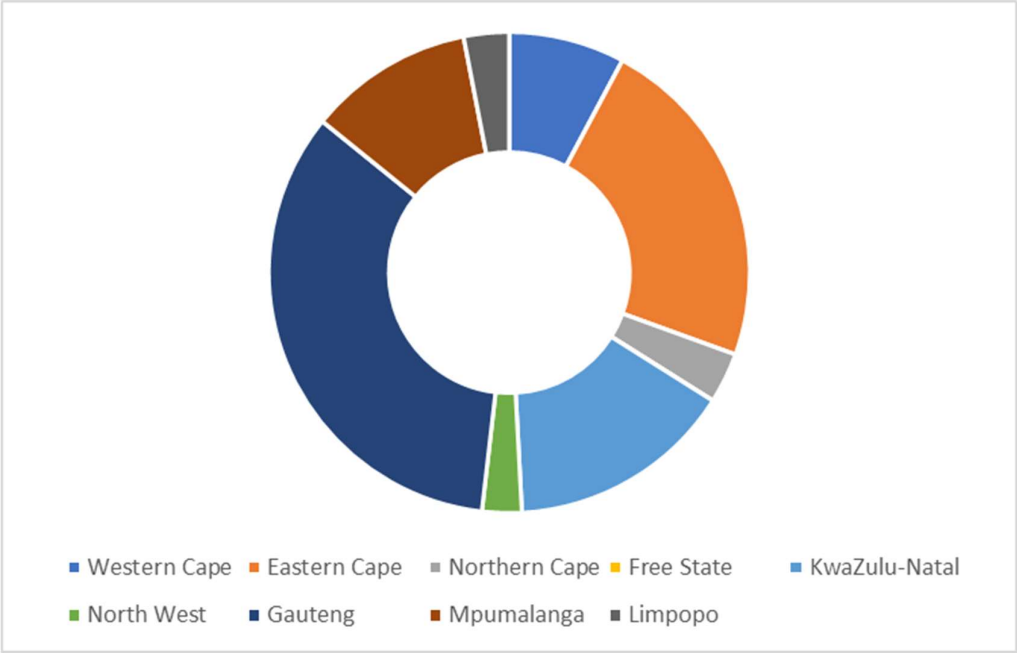

Figure 3: Total number of learners with disabilities by province (2014)

Source: Annual School Survey 2014, Raw data, including public and independent schools.

4.5.3 Consistency of reporting among schools which report disability enrolment

Among the minority of schools which reported disability enrolment in consecutive years, there is a relatively strong, positive correlation in school-level reporting across the years, as shown in Table 12. Table 12 also demonstrates that reporting is much more consistent over time among schools in wealth quintiles 4 and 5. Among those in wealth quintiles 1 to 3, reporting is weakly correlated, particularly in some years.

The first part of Table 12 is likely to overestimate the consistency of the data, as it does not take account of the many schools which did not report disability enrolment in particular years. In order to examine consistency of reporting more thoroughly, schools which did not report disability enrolment in one year were assumed to have enrolled no learners with disabilities in that year. As shown in the second part of Table 12, the data is much less strongly correlated under this assumption.

Table 12: Consistency of reporting by school wealth quintile: 2011 to 2014

	Correlation coefficient (number of schools)		
Reported disability enrolment	2014-2013	2013-2012	2012-2011
Among schools that report in both years:			
All quintiles	0.75	0.76	0.70
	(2,359)	(2,075)	(3,538)
Quintile 1 schools	0.44	0.64	0.63
	(380)	(335)	(581)
Quintile 2 schools	0.69	0.41	0.72
	(347)	(369)	(561)
Quintile 3 schools	0.85	0.62	0.41
	(391)	(415)	(616)
Quintile 4 schools	0.70	0.76	0.76
	(154)	(162)	(349)
Quintile 5 schools	0.83	0.79	0.74
	(293)	(318)	(789)
All schools (missing data recoded as zero):			
All quintiles	0.49	0.45	0.64
	(23,507)	(23,374)	(23,166)
Quintile 1 schools	0.33	0.36	0.50
	(7,211)	(7,676)	(7,638)
Quintile 2 schools	0.19	0.48	0.61
	(6,191)	(6,261)	(6,241)
Quintile 3 schools	0.60	0.53	0.43
	(5,069)	(5,100)	(5,080)
Quintile 4 schools	0.58	0.55	0.73
	(1,729)	(1,444)	(1,430)
Quintile 5 schools	0.73	0.53	0.76
	(2,004)	(1,573)	(1,566)

Source: Annual School Surveys 2011 – 2014 (raw data). Sample sizes of sub-groups are shown in brackets. Excludes schools in the Western Cape in 2012 and Free State in 2014 to allow comparison across years. Part 1 of the table excludes schools that did not report in one of the consecutive years. Part 2 includes all schools after recoding total learners with disabilities as near-zero in schools that did not report disability enrolment.

4.5.4 Discrepancies between different data tables in the Annual School Survey

For 31% of schools that reported enrolling learner(s) with disabilities, there were discrepancies between the total number of learners with disabilities reported in the two sets of data tables in the Annual School Survey. As shown in Table 13, the total number of learners with disabilities was 6.8% higher in Table 3.15 than in Tables 3.13 and 3.14 (combined) in the 2013 Annual School Survey. However, fewer schools reported disability enrolment in the former. It appears that some schools chose to complete only one set of disability data tables in the survey[86]. Overall, data on disability type was missing for 2% of learners in either set of tables. This is encouraging. Among the most commonly-reported disability types, reporting of attention deficit disorder was the least consistent across the tables. As expected, reporting of less common disability types (such as psychiatric disorders and cerebral palsy) was poorly correlated between the two sets of tables[87]. In the case of cerebral palsy, the low correlation is explained by reporting by two schools, which varied substantially between Tables 3.15 and 3.13, and 3.14. This demonstrates the fragility of data for less common disability types.

Table 13: Reported disability enrolment in ordinary schools across tables in 2013

Number of learners with disabilities (%)	Tables 3.13 & 3.14	Table 3.15	Correlation coefficient
Total	80,705	86,200	0.92
Female	32,463 (40.2)	34,259 (39.7)	0.91
Male	48,242 (59.8)	51,941 (60.3)	0.91
By disability type (%):			
Learners with intellectual disability#	23,953 (29.7)	24,839 (28.8)	0.94
Learners with specific learning disabilities	21,466 (26.6)	23,145 (26.9)	0.91
Learners with ADD##	13,908 (17.2)	15,586 (18.1)	0.83
Learners who are partially sighted	6,077 (7.5)	6,282 (7.3)	0.88
Learners with behavioural disorder	3,639 (4.5)	4,252 (4.9)	0.87
Learners who are hard of hearing	3,075 (3.8)	3,279 (3.8)	0.82
Learners who are physically disabled	2,489 (3.1)	2,642 (3.1)	0.85
Learners with epilepsy	2,137 (2.6)	2,237 (2.6)	0.96
Learners with ASD###	760 (0.9)	716 (0.8)	0.97
Learners with psychiatric disorders	508 (0.6)	489 (0.6)	0.60
Learners who are deaf	465 (0.6)	426 (0.5)	0.70
Learners with cerebral palsy	248 (0.3)	268 (0.3)	0.73
Learners who are blind	197 (0.2)	185 (0.2)	0.84
Learners who are deafblind	80 (0.1)	70 (0.1)	0.76
Learners where disability type not specified	1,697 (2.1)	1,763 (2.0)	
Sample	4,223	3,827	

Data source: Annual School Survey 2013, Tables 3.13 to 3.15 (public and independent schools). Excludes one school with erroneous data on deafblindness in Table 3.15. #Includes mild to profound intellectual disability. ##Attention Deficit Disorder. ###Autistic Spectrum Disorder.

[86] In 2013, 477 schools completed only Tables 3.13 and 3.14, while 75 completed only Table 3.15.
[87] Correlations were calculated after missing data was recoded as zero.

4.5.1 Outlier and implausible data

Most schools reported that a small percentage of learners in the school had disabilities (as expected). However, Figure 4 demonstrates that a few reported unexpectedly high rates of disability. Furthermore, some schools reported very high rates of disability in one year, but very low rates, or did not report disability enrolment in the consecutive year (these schools line the x- and y-axes in Figure 4).

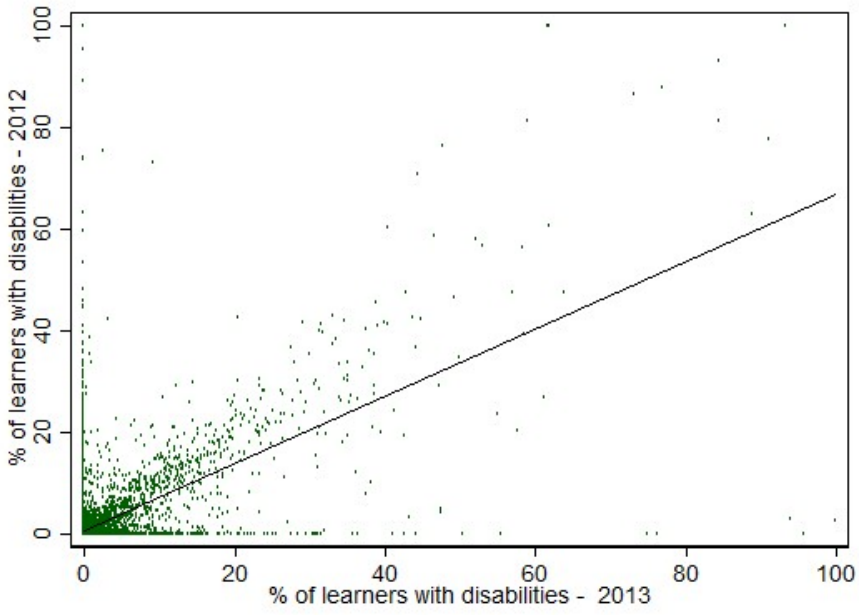

Figure 4: Percentage of learners with disabilities per school: 2012 and 2013

Sample = 23,373 schools which reported disability enrolment below 100% in 2013. Excludes the Western Cape as no 2012 data is available. For schools not reporting enrolment of learners with disabilities in an individual year, disability enrolment is assumed to be zero.

Schools which demonstrated large variation in rates of disability from 2011 to 2014 or those which reported that more than 40% of learners had disabilities were examined in more detail. Fifteen schools were identified as having highly inconsistent reporting over time [88] and 20 were found to

[88] One school reported a disability rate of more than 100% in 2013. Eight public schools reported variation in the disability rate of 40 percentage points or more from 2011 to 2014 and reported large numbers of learners with disabilities in some years. Another five public schools reported rates of disability exceeding 50% in 2013 but did not report disability enrolment in 2012 or 2014. One school reported a disability rate of more than 100% in Grades 7 to 9 in 2011.

have implausible data[89]. These 35 schools were coded as inconsistent reporters. The analysis reported in Chapter 5 excludes inconsistent reporters, but these are included in sensitivity analysis to determine the effect of their reporting on the results.

A further 86 public schools reported that between 20 and 40% of learners had disabilities. In some of these schools there was substantial variation in reported enrolment by disability type in different years. Erratic reporting in this group of schools may have the potential to skew disability-disaggregated enrolment data, but there was not enough evidence to code these schools as inconsistent reporters.

4.5.2 Triangulation of the 2013 Annual School Survey data against the SIAS 2014 dataset

Two of the six Free State schools which reported enrolling more than 200 learners with disabilities in 2013 were verified as having more than 200 learners with disabilities in 2014 (in the SIAS dataset). Enrolment for the remaining four schools was adjusted downwards in the 2013 annual survey data (by setting the total number of learners with disabilities in these schools equal to the verified total in the same schools in 2014).

4.5.3 Imputation of missing data

Given the very high levels of missing data in individual years, and to allow for more meaningful and complete analysis, missing disability enrolment data in 2013 and 2014 was imputed in several ways. Missing disability enrolment data was imputed from Table 3.15 of the 2013 Annual School Survey for 75 schools. This resulted in 712 additional learners with disabilities being included in the 2013 data. For 34 schools in the Free State, the SIAS 2014 data was used to impute missing 2013 data. These schools reported disability enrolment in 2012, and in SIAS 2014, but failed to report in 2013. For these schools, an average of the 2012 and 2014 disability enrolment was used as an estimate of 2013 disability enrolment.

In the other provinces, missing 2013 disability enrolment data was imputed for schools which reported disability enrolment in 2012 and 2014, but not in 2013. Again, the average of 2012 and 2014 disability enrolment reporting was used to impute 2013 data. No interpolation was done in the Western Cape as there was no available disability enrolment data for 2012.

89 Identified by triangulation of data across the two sets of tables in the Annual School Survey 2013. Seven schools reported a disability rate of over 100% in Table 3.15. Another 13 schools reported highly inconsistent numbers of girls and boys with disabilities between Tables 3.13, 3.14 and 3.15.

Finally, missing 2014 reporting in Free State schools was imputed using a combination of 2013 Annual School Survey data and 2014 SIAS data [90] for 154 schools. For those schools (n=304) that were not included in the SIAS 2014 data, 2013 school survey data was used as a proxy for unreported 2014 data. Overall, the imputation techniques described above were used to estimate non-zero disability enrolment data for 983 and 459 public schools in 2013 and 2014, respectively.

4.6 Results of imputation and comparison with Census 2011 and Community Survey 2016

The total number of learners with disabilities and total number of schools reporting disability enrolment after imputation are shown in Table 9. After imputation, the 2014 data is very similar to the estimates of total disability enrolment produced by Nuga-Deliwe (2016), who used multiple data sources available to the Department of Basic Education and estimated that there were 101,717 learners with disabilities enrolled in ordinary or full-service schools in 2014.

Despite the data challenges discussed earlier in this chapter, the mean percentage of learners reported to have a disability is surprisingly stable over the period 2011 to 2014, as shown in Table 14. The overall disability rates reported among ordinary schools were calculated for two samples of schools. The second part of Table 14 shows that, among schools that reported disability enrolment, between 3.6 and 3.8% of learners were reported to have disabilities during this period. However, this cannot be interpreted as the disability prevalence rate in schools as it can only be generalised to those schools that reported disability enrolment. Instead, these should be seen as rates of *reported* disability enrolment.

[90] Schools in the SIAS 2014 dataset are not representative of all disability-reporting schools. This data (on its own) is not a good proxy for missing disability enrolment data for the Free State in 2014 as it produces estimates that are 23% lower than estimates from the 2013 Annual School Survey (probably due to the verification process). It is not possible to make a judgement as to which dataset is more accurate for the purposes of this research. To minimise any possible bias, missing 2014 Free State data was imputed by estimating the average (using the SIAS 2014 data and 2013 Annual School Survey data) for each school which reported in both sources.

Table 14: Mean reported rate of disability (%) in ordinary schools

Percentage of learners reported to have disabilities	2011	2012	2013	2014
All schools:				
Mean	0.80	0.81	0.78	0.71
	(0.02)	(0.02)	(0.02)	(0.02)
Median	0.00	0.00	0.00	0.00
Sample	23,679	23,679	23,679	23,679
Among schools which report enrolment of learners with disabilities:				
Mean	3.65	3.71	3.75	3.57
	(0.09)	(0.09)	(0.10)	(0.11)
Median	1.23	1.15	1.15	0.83
Sample	5,183	5,160	4,929	4,607

Source: Annual School Surveys 2011-2014, with imputation of missing data in 2013, 2014.

Sample (Part 1 of table): all schools, except 54 schools with very inconsistent data. Sample (Part 2 of table): schools reporting enrolment of learners with disabilities (including zero), except 54 schools with very inconsistent data.

The estimates in line 1 of Table 14 show that, if one assumes that all schools with missing disability enrolment data did not enrol any learners with disabilities (that is, the data truly is missing), then the disability rate in ordinary schools was between 0.71 and 0.81% of learners from 2011 to 2014. This estimate does not include learners who have unidentified disabilities (possibly because they have not been screened or assessed), nor does it include learners with disabilities who are enrolled in a school which neglected to report disability enrolment in the ASS. This (all-school) disability rate was compared with the national disability prevalence among learners estimated in Census 2011 and the Community Survey 2016. The methodological difficulties of comparing estimates generated by very different questions on disability in these data sources are fully acknowledged (see earlier discussion in sections 1.8.2 and 2.4). However, it is still useful to investigate patterns in disability prevalence across these three sources to determine where the school survey reporting process might yield particularly low estimates of disability in schools. This exercise is also important as it demonstrates the effect of misalignment in measurement between different spheres of government, which has been noted in other research (Dube & Mont, 2021).

In Figure 5, the disability rate for all schools (Annual School Survey, 2011) is shown to be far lower than the national disability prevalence rate among learners (from both Census 2011 and the Community Survey 2016)[91]. Provincial patterns also differ. All three datasets demonstrate that the

[91] National disability rates are labelled "South Africa": on the far right of Figure 5. Figure 5 demonstrates that Census 2011 and Community Survey 2016 data provide quite different estimates of disability prevalence among learners, as discussed earlier (see section 2.4.2).

disability rates are lowest in the Western Cape, and higher than average in the Free State. However, while both Census 2011 and Community Survey 2016 data shows that disability prevalence among learners is higher than average in the Northern Cape and North West, school survey reporting does not show particularly high rates of disability in these provinces.

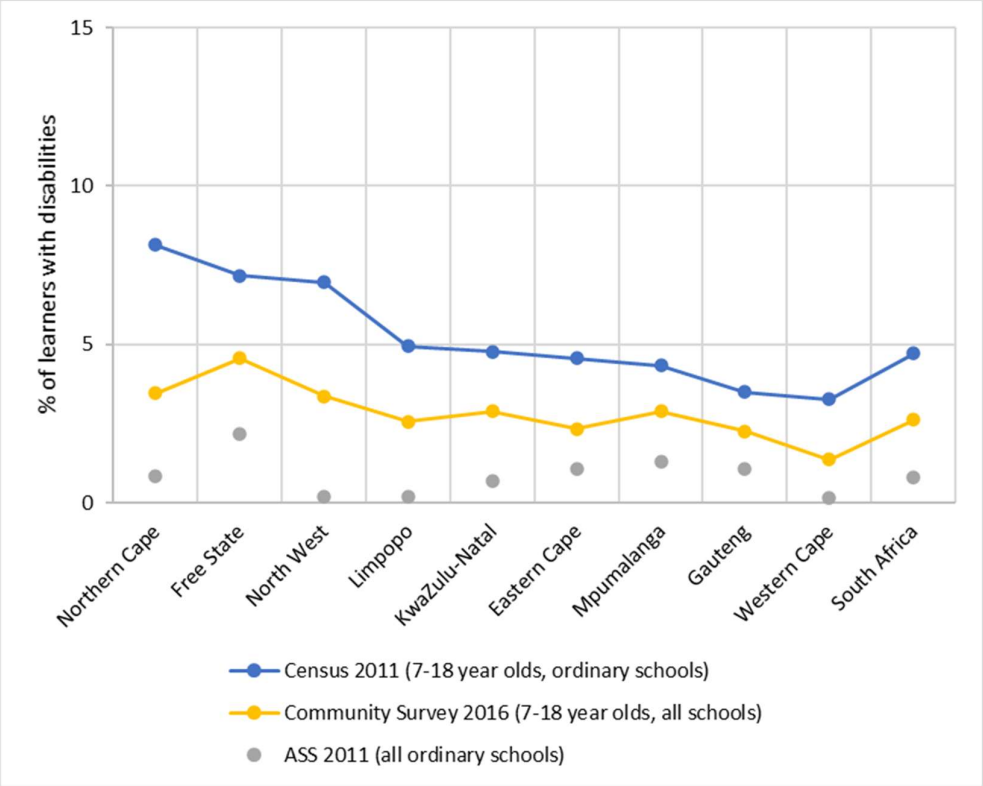

Figure 5: Rate of disability among learners across three data sources, by province (2011, 2016)

Source: Census 2011 (weighted 10% sample), children aged 7 to 18 reported to be enrolled in ordinary schools. Community Survey 2016 (weighted full sample), children aged 7 to 18 reported to be enrolled in any school. Annual School Survey 2011 (all ordinary schools) n = 23,679 schools. In the census & Community Survey, disability is measured using the Washington Group Short Set of questions, while disability status is determined by formal assessment in the school survey.

Across all three data sources, disability rates are higher among boys than girls, as shown in Table 15. However, in the Community Survey 2016 and Census 2011, the rates are only slightly higher among boys. By contrast, the school survey data suggests that there is a substantially lower disability rate among girls than among boys. Disability rates by gender are fairly consistent in the Annual School Survey from 2011 to 2014, as shown in Appendix Table 5; thus, this finding is not explained by unusually low rates of disability reporting among girls in 2011.

Table 15: Mean rate of disability (%) among learners (aged 7 – 18 years), by gender

Mean rate of disability (%)	Annual School Survey 2011 (all schools)	Census 2011	Community Survey 2016
Among female learners	0.65	4.61	2.56
	(0.02)	(0.03)	(0.03)
Among male learners	0.93***	4.83***	2.70**
	(0.03)	(0.03)	(0.03)
Sample	23,679	1,007,473	701,786

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Census 2011, Community Survey 2016 (weighted to population level). In Census 2011 & Community Survey 2016 a child was classified as disabled if the caregiver reported the child had a lot of difficulty or was unable to perform in at least one domain or had some difficulty in at least two domains. A non-parametric test (signtest) was used in Stata 14.2 to test the equality of the medians.

Table 16: Mean percentage of learners with disabilities by school phase or age grouping

Grade grouping/ Age grouping	% learners with disabilities in ordinary schools Annual School Survey 2011	Disability prevalence among learners (in all schools) Community Survey 2016
Grade R – 3/ 7-9 years	0.48	3.33
	(0.02)	(0.04)
Grade 4 – 6/ 10-12 years	0.79	2.66
	(0.03)	(0.04)
Grade 7 – 9/ 13-15 years	0.76	2.27
	0.03)	(0.04)
Grade 10 – 12/ 16-18 years	0.15	2.07
	(0.01)	(0.04)

Standard errors in parentheses. Source: Annual School Survey 2011 after data cleaning (all public schools, including those that did not report enrolment of learners with disabilities). Excludes 54 schools with very unstable reporting. In the Community Survey 2016 age is given in completed years and children were classified as disabled if the caregiver reported that the child had a lot of difficulty or was unable to perform in at least one domain or reported some difficulty in at least two domains.

In Community Survey 2016, disability rates among learners decrease with age. In the 2011 Annual School Survey, rates of reported disability are initially low in Grades R to 3, are higher in Grades 4 to 9, and decline to their lowest levels in Grades 10 to 12 [92]. However, Community Survey estimates of disability prevalence show that disability prevalence is highest among learners aged 7 to 9 and declines steadily in older groups of learners. This decline in prevalence with age (seen in both data sets) is likely due to a combination of drop-out from the school system and learned independence over time among learners with impairments (particularly in the area of self-care), which means that some older learners with impairments may no longer be considered to have disabilities (when disability is measured using the Washington Group Short Set).

The divergence in estimated disability rates among children in the youngest school cohort[93] between sources is concerning. It suggests that many learners whose caregivers report they experience substantial difficulties in functioning are not being identified as having a disability in the early grades in school-level reporting. The difference narrows as children progress through Grades 4 to 9, suggesting that some children's disabilities are identified in these later grades. The relative contribution of drop-out and increased identification of disability in the school system to explaining this pattern is not explored here and requires further research.

4.7 Has the introduction of a learner-level EMIS lead to improved data quality?

A comparison of disability enrolment data from the Annual School Surveys (2013, 2014) and SA-SAMS (2018) in the Eastern Cape was conducted to determine whether the move to once-off, learner-level reporting in the new EMIS (SA-SAMS) resulted in more widespread reporting of enrolment of learners with disabilities than annual, aggregate reporting in the annual surveys.
Table 17 shows that 743 and 1,341 schools reported enrolment of at least one learner with a disability in the Eastern Cape in 2013 and 2014, respectively. This increased substantially to 2,263 schools in 2018 when learner-level reporting was introduced in SA-SAMS.

The mean all-school disability rate across the Eastern Cape is similar across the two data sources. However, when one limits the sample to those schools that report disability enrolment, the mean disability rate is much lower, and the estimate is much more precise in 2018 than in previous years (as shown by the smaller standard errors in line 3 of Table 17). This is likely due to the larger number of schools reporting disability enrolment data via SA-SAMS. Fewer schools reported unrealistically

92 The levels of disability estimate in the Annual School Surveys (school-level, based on grade groupings) and household surveys (individual-level, in age in completed years) are not directly comparable.

93 The methodological difficulties in comparing these two datasets in this way, and the implications of this finding are discussed in section 4.8.

high rates of disability enrolment (more than 60% of learners, overall, or more than 80% of learners in a particular phase having disabilities) in 2018 than in 2013/2014.

Table 17: Enrolment of learners with disabilities in ordinary public schools in the Eastern Cape in the Annual School Survey (2013, 2014) and SA-SAMS (2018)

	Annual School Survey		SA-SAMS
Mean % of learners with disabilities per school	2013	2014	2018
Mean % (s.e.): All schools	1.3	0.9	1.4
	(0.74)	(0.67)	(0.60)
Mean % (s.e.): Schools which report disability enrolment	5.3	6.4	3.3
	(2.77)	(4.46)	(1.27)
No. of schools (%) reporting disability enrolment	1,341	743	2,263
	(25%)	(13%)	(43%)
Sample	5,501	5,501	5,222

Standard errors are shown in brackets unless otherwise stated. Disability enrolment is measured as reporting at least one learner with a disability in the year in question.

4.8 Discussion

The analysis of the Annual School Survey data for 2011 to 2014 reveals that the quality of disability enrolment reporting is generally low. The very high number of schools not reporting any enrolment of learners with disabilities, and some schools' decision to complete either Tables 3.13 and 3.14 or Tables 3.15 of the annual survey are concerning. Several factors are relevant in explaining these high levels of non-reporting. Firstly, the reporting patterns suggest that schools were not motivated to complete data on disability enrolment. This is understandable as the current funding models create no financial incentives to report enrolment of learners with disabilities, as discussed in section 3.2. Secondly, this data had not previously been cleaned or analysed in detail. This suggests that the data had not been used previously, other than for aggregate reporting of total numbers of learners with disabilities. Given that the data has not been used meaningfully, schools may not see the benefit of the additional administrative effort involved in reporting, as predicted by Mont (2018). Thirdly, this study has shown that the annual survey reporting process was cumbersome and time-consuming. Fourthly, the use of two conflicting sets of disability categories has likely exacerbated difficulty in reporting. Inconsistencies between the categories of disability in SIAS and EMIS must have made it very difficult for teachers to enter accurate data. Finally, the high levels of non-reporting or selective reporting may be part of a broader lack of buy-in to the idea of disability inclusion and/or discriminatory attitudes towards disability in ordinary schools which has been noted by previous

researchers (Du Plessis, 2013; Watermeyer et al., 2016). It may also be related to incoherent policy messaging from national and provincial departments of education on the role and expectations of ordinary schools in educating learners with disabilities, which has been raised in previous research by Donohue and Bornman (2014) and Du Plessis (2013).

Several errors in the data and numerous sources of inconsistency were identified. Many of the errors in reporting are probably due to the design of the data collection forms in the Annual School Survey. Manual, repeated aggregation of numbers of learners with disabilities across grades, gender, and population groups was required in this survey. It is easy to make simple mistakes when making these calculations. In SA-SAMS, data on disability status is collected at the learner level and disability status is permanently assigned to learners (that is, it is entered once, rather than annually). Aggregation at school level is done automatically within SA-SAMS, when required. This innovation has the potential to improve data consistency across years, as previously recognised by Nuga-Deliwe (2016). This research confirms Nuga-Deliwe's predictions as, in the Eastern Cape, the introduction of SA-SAMS was associated with more widespread reporting of enrolment of learners with disabilities. While the analysis was only conducted in one province, and may not be generalisable to urban provinces, it suggests that learner-level data collection in SA-SAMS has the potential to produce higher quality, more precise estimates of disability enrolment than the Annual School Surveys. This innovation addresses one of the five factors identified as possible drivers of poor data quality in EMIS.

According to the 2013 Annual School Survey, learning disabilities made up 27% of disabilities identified in schools. As discussed previously, the Washington Group Short Set of questions does not capture learning difficulties well (see sections 2.4 and 2.4.2). The high rates of learning disabilities generated by school data collection processes add weight to the argument that the Child Functioning Module questions on learning difficulties should be added to the census questionnaire for people under the age of 18 to improve the accuracy of childhood disability estimates.

The comparison of Annual School Survey and household survey data on disability enrolment suggests that schools in the Northern Cape and North West may be experiencing particular difficulty in identifying learners with disabilities. This is corroborated by data on screening coverage of the Integrated School Health Programme, which shows that health screening coverage is particularly low in the Northern Cape (see section 2.3.4). Another possible explanation is that there are particularly problematic gaps in other disability support structures in these provinces. This point will be picked up again in Chapter 6 (sections 6.5.3 and 6.6).

The Annual School Survey data suggests a much larger difference between disability rates between girls and boys than the household survey data. This may be because learning and behavioural issues

are included in the school survey data, but not in the household survey data. Research in Mexico has shown that, when behavioural and learning difficulties are included, disability prevalence is significantly higher among boys than girls aged 5 to 17 (Cappa et al., 2018, p. 508). However, it is also possible that the referral, diagnosis, and reporting processes in schools may favour the assessment of boys with disabilities. This issue deserves more attention. Analysis of recently-collected MICS data in other southern African countries (which uses the Child Functioning Module to measure childhood disability) may shed some light on the prevalence of disabilities by gender in the region.

This analysis shows that reported disability rates in schools are lower in Grades R to 3 than in Grades 4 to 6 or 7 to 9. This is evidence that identification of disability is not occurring early enough. It suggests that children frequently complete the first phase of formal schooling without being assessed or without their disability being identified. Delays in identification are unsurprising given that the process of obtaining a disability "label" in the school system depends on access to a SBST, district-based support team and, in some cases, assessment by a medical specialist. Chapter 6 assesses the gaps in coverage of each of these teams; and will offer low coverage as one explanation for delays in identification of disability among learners.

The declining rates of disability in high school observed in the Annual School Survey align with previous findings that among children with disabilities, school attendance is lowest among children aged 16 to 18 (Nuga-Deliwe, 2016) and with global trends which suggest that the disability disadvantage is highest in upper secondary school (UNESCO, 2020b). While the declining rates with grade progression may be partly explained by higher levels of grade repetition among learners with disabilities, it is highly likely that this trend is due to drop-out of learners with disabilities from formal schooling. Evidence from Census 2011 (Mizunoya et al., 2018, p. 397) shows that even among primary school-aged learners, approximately half of learners with disabilities (as identified by the Washington Group Short Set of questions) who were out-of-school had dropped out (see section 1). In South Africa, a more definitive analysis of the drop-out rates of learners with officially recognised disabilities, relative to learners without disabilities will be possible once sufficient learner-level data on disability status and grade progression becomes available (through SA-SAMS).

If the purpose of school-level data on disability status is to identify learners in need of additional support and to monitor whether they are receiving it, then the narrow definitions of disability used in EMIS (both in the Annual School Surveys and SA-SAMS) are not suitable. The current questions on disability in EMIS are better suited for the purpose of controlling access to learner-bound budgets (as described in Chapter 3), which are not used in South Africa. Indeed, Chapter 3 shows that funding reforms indicate a likely move to throughput funding, which is delinked from the number of learners

with disabilities enrolled in a school. Thus, from a policy and funding perspective, the questions on disability status in EMIS are inappropriate.

As shown in Table 1, a draft curriculum for learners with severe intellectual disabilities was released in 2017. Three curricula are currently being developed for learners with disability: one curriculum for learners with mild to moderate intellectual disability, one for severe intellectual disability and one for severe to profound disability (J. McKenzie, 2021). This study shows that different categories of intellectual disability were inconsistently applied in EMIS in the period under study. The current data on disability type in EMIS is not suitable to be used to allocate learners among these three curricula and should not be used for this purpose. However, if type of intellectual disability is to be used in decision-making, this is a further reason to improve the quality of this data in school systems.

4.9 Limitations

One needs to be very careful when comparing disability data from the Annual School Surveys (which uses medical questions to identify disability) with that from the census (which uses the Washington Group Short Set of questions)[94]. The comparison of disability prevalence by age (from household surveys) and disability rates by grade groupings (from the school surveys) in this analysis rests on the assumption that learners with disabilities progress, without repetition, through the grades. This assumption is unlikely to be valid as overall grade repetition rates in South Africa are high (van der Berg, Wills, et al., 2019) and may be even higher among learners with disabilities. Learners with disabilities may also be more likely to start school at an older age[95]. However, even if these assumptions do not hold, it does not change the findings of lower identification and reporting of disability in the early years of formal schooling. Late identification of disability can lead to large potential learning losses as learners will not have access to any of the available support (limited though that may be).

4.10 Conclusions

In South Africa, as in other middle-income countries, school-level disability enrolment data appears to be of low quality and is inconsistent over time. Several reasons for poor data quality are identified in this research. In addition, the questions on disability in school data systems are inconsistent with the inclusive education policy framework and the biopsychosocial model of disability.

94 As discussed previously in the literature review in sections 2.4.2 and 2.4.3.

95 Mizunoya et al. (2018) found that in South Africa, 49% of 7 to 13-year-old children with disabilities who were out-of-school in 2011 had never enrolled in school, suggesting substantial late enrolment and a high proportion that never attend primary school.

Following imputation of missing data, the estimated mean disability enrolment rate is shown to be consistent enough over the period 2011 to 2014 to allow multivariate analysis. However, as a result of the high levels of missing data in individual years of the Annual School Survey dataset, analysis of one year's data may provide misleading results. When possible, data from multiple years should be analysed.

The inconsistency in reporting between years in the annual surveys, and more widespread reporting in the new learner-level EMIS (SA-SAMS), suggest that many schools may include learners with disabilities who have not been formally assessed or whose presence is simply not reported. Section 6.5.4 presents further evidence on schools' ability to screen and identify learners with disabilities and this point will be revisited in the conclusions. As a result, the all-school rate of disability of 0.71 to 0.81% of learners (following imputation of missing data) is likely to under-estimate the true rate of the various health conditions measured in the Annual School Survey. If disability among learners in ordinary schools were to be measured using the Washington Group Short Set or Child Functioning Module questions, the estimated rate of disability among learners would certainly be much higher. As a result, all further analysis examines *reported* rates of disability enrolment, with no claim that reported rates are representative of the *actual* rate of disability enrolment in a school. To test the impact of this assumption, all regressions reported in Chapter 5 were re-run on the full-school sample under an alternative assumption that all schools that do not report disability enrolment in fact enrol zero learners with disabilities.

The failure to update the disability categories in EMIS (in the Annual School Surveys and SA-SAMS) and the post-provisioning norms to take account of the changes in the identification and assessment processes in the education system is disappointing. The current disability categories in EMIS are based on those used in the post-provisioning norms. But, as disability status is not used for post-provisioning in ordinary schools, there is no policy-related reason to maintain these categories in EMIS. As the categories of disability in the health screening forms used by school and district-based support teams (the SIAS forms) are much more consistent with the biopsychosocial model of disability, these categories should immediately be adopted in SA-SAMS in the place of the current categories.

Data on level of support need is also collected in school- and district-level screening and assessment and is more useful to schools than data on category of disability. Level of support need should be collected at the learner level in the new learner-level EMIS (SA-SAMS). According to the biopsychosocial model, disability is the result of interactions between learners with impairments and the environment. As a result, data on learner impairment must be supplemented by data on the school environment. Data must be collected on whether (and which) reasonable accommodations a learner is receiving in school. This would allow learner-level monitoring of service delivery as

recommended by the Global Education Monitoring Report (UNESCO, 2020b). At the school-level, EMIS should contain data on the physical accessibility of the school environment as suggested by Mont (2014). The analysis of data from the new learner-level EMIS (SA-SAMS) suggests this system will produce better quality and more widespread reporting on learner disability status.

Secondly, this chapter demonstrates that the continued use of very narrow, medically-defined disability questions has likely led to low estimates of disability enrolment in ordinary schools. Although questions in Census and Community Survey should be expanded to estimate learning disabilities, borrowing questions from the Child Functioning Module, these surveys should be used in preference to school-level reporting when allocating budgets between special and ordinary schools. That is, if Census shows that ordinary schools enrol as many learners with disabilities as special schools in a province, inclusive education and special school programmes should receive equivalent budgets in that province.

Finally, while this dissertation shows evidence that enrolment of learners with disabilities in ordinary schools is under-reported currently, it is likely that preferential enrolment in special schools is still occurring and some learners with disabilities remain out-of-school. This evidence should not be used to detract from efforts to include both these groups of learners in ordinary schools.

To the best of my knowledge, this is the first detailed analysis of school-level disability enrolment data quality in South Africa. As a result, this chapter serves as a guide for those wishing to conduct further analysis of school-level disability enrolment data. This chapter provides a background for the analysis of the 2013 and 2014 disability enrolment data in the following chapter. This research creates a baseline against which the quality of disability enrolment data generated by SA-SAMS can be measured in the future.

5. What school characteristics drive reporting of disability-disaggregated enrolment in South Africa?

5.1 Introduction

The previous chapter described the generally poor quality of disability-disaggregated enrolment data collected in schools in South Africa from 2011 to 2014. Chapter 4 established that school-level reporting is likely to capture only a portion of enrolled learners with disabilities due to the narrow definition of disability used in school reporting. Nonetheless, after imputation, disability-disaggregated enrolment data was judged to be sufficiently robust for further analysis, provided data from multiple years is analysed.

The published literature predicts that, in LMICs, schools in better-resourced areas are likely to have better record keeping and be better able to identify (and report enrolment of) children with disabilities (see full discussion in section 3.2 of the literature review). In South Africa, schools in the Western Cape and Gauteng and those in school wealth quintiles 4 and 5 are generally better resourced, and more functional than other schools. If the predictions of the literature (International Disability and Development Consortium & Light for the World, 2017) are applied to South Africa, one would expect to find higher rates of reported disability among learners in quintile 4 and 5 schools and in schools in the Western Cape and Gauteng. However, rates of disability prevalence among children are lower in these two provinces (as shown in Figure 5). If underlying disability prevalence drives enrolment of learners with disabilities in ordinary schools in each province, one would expect reported enrolment to be lower in schools in these two provinces.

The research presented in this chapter explores the relationship between school wealth quintile, province, and reported enrolment of learners with disabilities in ordinary schools in South Africa. The aim was to determine whether reported enrolment of learners with disabilities is more strongly associated with school wealth quintile (and hence resources available to the school) or underlying disability prevalence in the province. No previous research has explored the influences of school quintile, geographic location, and underlying prevalence on schools' reported enrolment of learners with disabilities in South Africa. The aim of this research was to examine whether school-level reporting is driven by higher disability prevalence in some parts of the country or by better identification of disability among learners and better reporting due to better resourcing in some provinces.

If schools in certain parts of the country are better able to identify, assess, and report the presence of learners with disabilities in their schools, this has far-reaching implications for equity in access to additional support and reasonable accommodation among learners. These equity concerns are very

pertinent in South Africa, where huge levels of inequality in learning already exist between schools in wealthier and poorer parts of the country (Isdale et al., 2015; Spaull & Kotze, 2015; Zuze et al., 2017).

In this chapter, multivariate analysis is used to determine whether the same patterns of disability-disaggregated enrolment are observed when higher quality, learner-level data from SA-SAMS is analysed. In this way, the impact of improved data quality in SA-SAMS on reported enrolment of learners with disabilities, going forward, is assessed.

5.2 Methods

Reported enrolment of learners with disabilities from the Annual School Survey was described by school wealth quintile, province, full-service designation, language of teaching and learning and school size by merging the dataset with the Master List of Schools dataset.

Even after imputation of missing data (see discussion in previous chapter), there were much lower levels of reporting in Gauteng and KwaZulu-Natal in 2013 than in 2011, 2012 and 2014 (not shown here). As a result, 2013 reporting of disability status among learners is likely to be biased downwards. To address this potential bias in the 2013 data, multivariate analysis was also conducted on data from 2011 and 2014. Multivariate analysis of the 2012 data was felt to be inappropriate as it excludes the Western Cape.

As noted in section 4.10, all analysis examines *reported* rates of disability among enrolled learners, with no claim that these reported rates are representative of the *actual* rate of disability among learners in a school. To test the impact of this assumption, all regressions were re-run on the full-school sample, where schools which did not report enrolling any learners with disabilities data were recoded as enrolling zero learners with disabilities.

5.2.1 Data cleaning

Initial data cleaning and imputation of missing data was described in the previous chapter. All independent schools were dropped from the sample as the aim was to assess patterns of enrolment in ordinary, public schools. Further data cleaning was conducted following imputation of missing data to check whether imputation had created any outlier values in the 2013 or 2014 data. Overall, 53 schools were identified as reporting inconsistent or implausibly high numbers of learners with disabilities[96]. The characteristics of inconsistent reporters are shown relative to all schools that report enrolling at least one learner with a disability in Appendix Table 3.

[96] As described in sections 4.3.2.

5.2.2 Multivariate analysis

Disability represents one extreme on the spectrum of human ability and, as result, will never be normally distributed in a population. The distribution of the rate of disability in schools is shown in Figure 6 (for schools that reported enrolling at least one learner with a disability in 2013)[97]. As expected, most schools reported a very low rate of disability. The rate of disability in schools is clearly not normally distributed. The median rate is 1.15 per 100 learners enrolled in 2013.

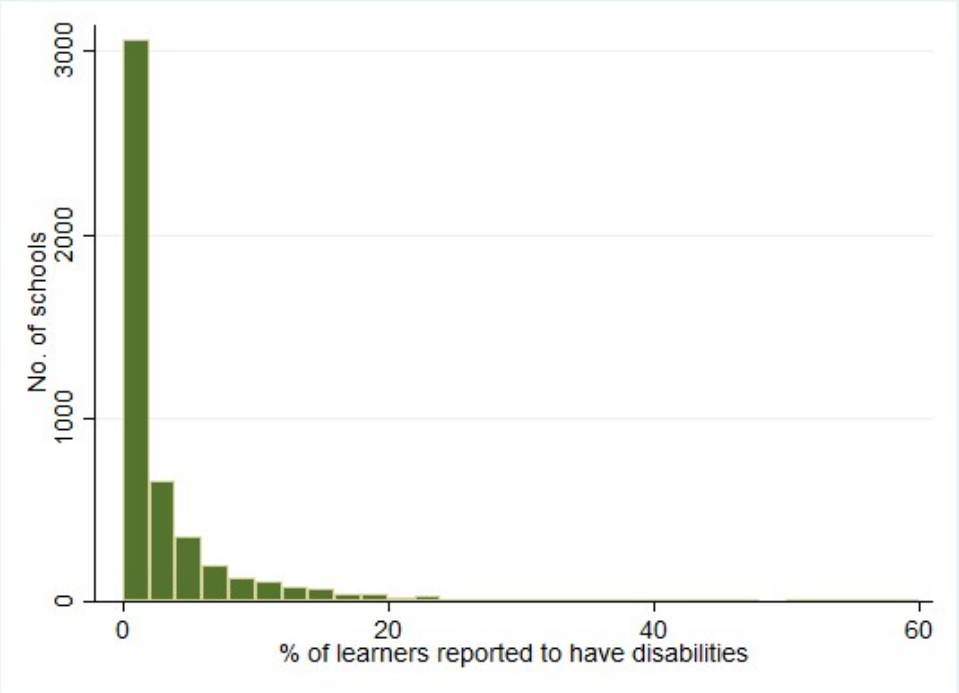

Figure 6: Percentage of learners reported to have disabilities per school (2013)

This non-normal distribution was expected but impacted the choice of statistical methods for analysis. Where means were compared, non-parametric statistical tests (two-sample Wilcoxon rank-sum tests) were used to evaluate statistical differences. In addition, ordinary least squares (OLS) techniques of regression estimation can only be used for hypothesis testing if one assumes the errors, μ_i, are normally distributed (Maddala, 2001, pp. 75–81). To enable OLS to be used, the data was transformed in two ways: through logarithmic transformation of the rate of disability among learners in a school and by creating a binary measure (does the school report enrolling any learners with disabilities?).

97 The distribution is even more dramatically skewed towards zero if non-reporting schools are included in the analysis. The distribution of total disability enrolment shows a very similar pattern, ranging from 1 to just over 600 learners with disabilities per school.

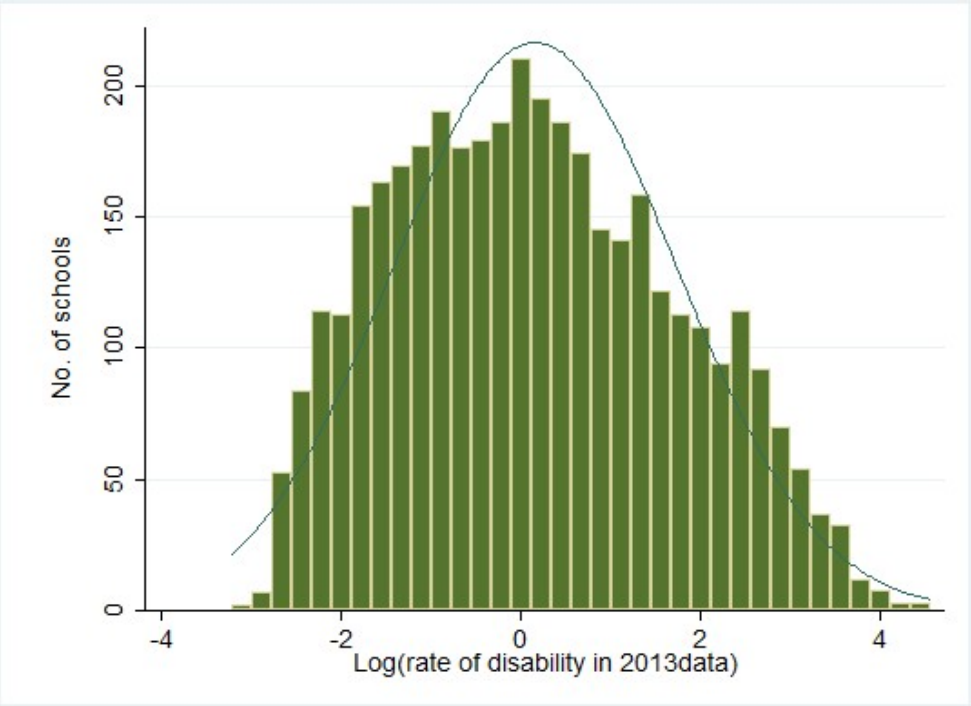

Figure 7: Distribution of log-transformed rate of disability in schools (2013)

Source: Annual School Survey 2013, after imputation of missing values and some data cleaning to address extreme outliers. Sample = 4,923 public-sector schools. Excludes schools which report very inconsistent numbers of learners with disabilities over time and 6 schools that report that in 2013 more than 60% of enrolled learners have disabilities.

Transforming the data into logarithmic form is a common solution where data is not normally distributed. This technique is frequently used in health economics research when modelling health events, which do not tend to be normally distributed in a population (D. G. Altman et al., 1983). Log transformation of the school-level rate of disability resulted in a distribution that approaches a log-normal distribution for hypothetical data with the same mean and standard deviation, as shown in

Figure 7.

The near-normal distribution of the log-transformed data enabled OLS regression techniques to be used. Thus, a log-linear model was applied to assess whether schools in wealth quintiles 4 and 5 and those in provinces with lower-than-average disability prevalence among learners are likely to report lower rates of disability. This analysis was conducted on a restricted population (schools that reported enrolling one or more learners with a disability in the year) and in the whole population of schools (setting the number of learners with disabilities equal to 0.0001 in schools that did not report disability enrolment, even after imputation).

In the log-linear model the dependent variable is a continuous variable defined as follows:

$$y = \left(\frac{No.\ of\ learners\ reported\ to\ have\ disabilities}{Total\ number\ of\ learners\ enrolled}\right) * 100$$

The dependent variable was log-transformed before running the regression. No log transformation was conducted on the explanatory variables, x_i , which are a set of dummy variables. Thus, the model is specified as:

$$\ln(y_i) = \beta_0 + \beta_1 x_1 + \beta_2 x_{2+} \beta_i x_{i+} \mu_i$$

Where $x_1 =$ a dummy variable for school wealth quintile 5,

$x_2 =$ a dummy variable for school wealth quintile 4,

$x_i =$ a set of control variables: dummy variables for provinces with lower-than-average disability prevalence, school size, and school designation (ordinary or full-service school).

The coefficients, β_i, are more difficult to interpret in this model, as they must be exponentiated before being interpreted, as follows:

$$E(y_i|x_i) = \left(e^{\beta_i} - 1\right) * 100$$

Once transformed in this way, $E(y_i|x_i)$ can be interpreted as the percentage change in y for a unit change in x. In this regression, $E(y_i|x_i)$ can be interpreted as the percentage change in the reported rate of disability among learners in schools in school wealth quintile 5 or in a particular province.

Data from Census 2011 and the Community Survey 2016 (presented in Figure 5) consistently identifies the Western Cape, Gauteng, and Mpumalanga as the three provinces with the lowest disability prevalence. These three provinces were included as explanatory dummy variables in multivariate regressions, with provinces with higher disability prevalence among learners used as the omitted category. The inclusion of these dummy variables allowed the regression analysis to test whether rates of disability were indeed lower in provinces which have lower-than-average disability prevalence. If this is not the case, patterns of reporting may be driven by differences in efficiency of identification of disability or reporting, rather than by disability prevalence.

As an alternative technique to overcome the problem of non-normality, a binary measure was created which indicates whether a school enrolled any learners with disabilities in the academic year in question. A linear probability model was applied to explain variation in this binary dependent variable. This model was used to address the first research question (Are schools in school wealth

quintiles 4 and 5 and those in provinces with lower-than-average disability prevalence less likely to report enrolling any learners with disabilities in 2013 and 2014 than those in school wealth quintiles 1 to 3 and other provinces?). A linear probability model can be estimated by OLS techniques. In the model adopted, the dependent variable is a binary variable, defined as follows:

$$y = \begin{cases} 1 \; if \; a \; school \; reports \; disability \; enrolment \\ 0 \; otherwise \end{cases}$$

The probability of reporting one or more learner with disabilities is explained by a linear combination of the explanatory variables. In this study, the linear probability model takes the form:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_{2+} \; \beta_i x_{i+} \, \mu_i$$

Where $x_1 =$ a dummy variable for school wealth quintile 5,

$x_2 =$ a dummy variable for school wealth quintile 4,

$x_i =$ a set of control variables: dummy variables for provinces with lower-than-average disability prevalence, large schools, and schools designated as full-service schools).

As a result, the value of β_1 estimates the change in y_i (the probability that a school reports enrolling one or more learners with disabilities in the year in question), given that it is in school wealth quintile 5, holding all control variables constant. One of the reasons for choosing a linear probability model for the estimation was the ease of interpretation of the coefficients.

Heteroskedasticity (where error variance is not constant for all observations but increases or decreases with the value of one of the explanatory variables) frequently arises when the dependent variable is binary. This leads to biased standard errors, which in turn invalidates significance testing when using the OLS method (Maddala, 2001). However, using the *robust* command in Stata produces robust standard errors[98], which overcomes any potential bias in the standard errors.

A very similar model was used to analyse the 2018 SA-SAMS data at the school level. The regression was specified slightly differently as data from a single province (the Eastern Cape) was analysed. The probability of reporting enrolment of any learners with disabilities is explained by a linear combination of the explanatory variables, in the form:

[98] The robust command in Stata computes White's robust variance estimator from a robust covariance matrix (StataCorp, 2013).

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_{2+} \beta_3 x_{3+} \beta_i x_{i+} \mu_i$$

Where $x_1 =$ a dummy variable for school wealth quintile 1,

$x_2 =$ a dummy variable for school wealth quintile 2,

$x_3 =$ a dummy variable for school wealth quintile 3,

$x_i =$ a set of control variables: dummy variables for rural schools, large schools and schools designated as full-service schools), and

$\mu_i =$ the error term

As a further check on the robustness of the results produced by the linear probability model, a logistic regression (logit model) was also applied to the Annual School Survey data to model the probability of reporting at least one learner with a disability. Unlike the linear probability model, the logit model is a nonlinear specification, in which the error terms (μ) are assumed to be distributed as a standard logistic distribution (Jones, 2000).

5.3 Results: Annual School Surveys

5.3.1 Are schools in wealthier areas and provinces more likely to report enrolling any learners with disabilities?

The results of regression analysis, shown in Table 18Table 18 (on the next page), suggest that schools in quintiles 4 and 5 were more likely to report enrolling learners with disabilities than those in quintiles 1,2 or 3, even when province, full-service designation, and school size were included as explanatory variables. This result was consistent in all three years tested. Quintile 5 schools were 31 to 37% and full-service schools were 23 to 34% more likely to report disability enrolment than other ordinary schools. As expected, large schools were also more likely to report the presence of any learners with disabilities. These results were not sensitive to the exclusion of inconsistent reporters.

The results on province are inconsistent. If reporting was governed only by disability prevalence in that province, one would expect the coefficients on Gauteng, the Western Cape and Mpumalanga to be negative and statistically significant.

Table 18 shows that this is only the case in the Western Cape in 2011 and in Mpumalanga in 2013. In the Western Cape, this result is likely driven by the particularly low levels of reporting in 2011. In two of the three years tested, schools in Gauteng and the Western Cape were significantly more likely to report the presence of learners with disabilities than schools in other provinces, despite the lower disability prevalence in these provinces. This result provides some support for the idea that schools in better-resourced provinces are more likely to report at least one learner with a disability.

Table 18: Probability that a school reports enrolling at least one learner with a disability

	(1)	(2)	(3)
	2011	2013	2014
School wealth quintile 5	0.312***	0.365***	0.350***
	(0.012)	(0.012)	(0.012)
School wealth quintile 4	0.129***	0.094***	0.096***
	(0.012)	(0.012)	(0.012)
Gauteng	0.073***	0.001	0.124***
	(0.011)	(0.010)	(0.011)
Western Cape	-0.280***	0.189***	0.197***
	(0.008)	(0.014)	(0.014)
Mpumalanga	0.172***	-0.025***	0.024**
	(0.012)	(0.010)	(0.010)
Designated full-service school (2011)	0.335***	0.226***	0.257***
	(0.024)	(0.021)	(0.021)
Large school: >600 learners	0.081***	0.088***	0.082***
	(0.006)	(0.006)	(0.006)
Constant	0.147***	0.122***	0.088***
	(0.003)	(0.003)	(0.002)
R-squared	0.117	0.132	0.164
Sample	23,646	23,646	23,646

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Annual Survey of Schools (2011-14), after imputation of missing data in 2013 and 2014. Public schools only. Excludes 54 very inconsistent reporters. Reference group: Small, ordinary, quintile 1-3 schools in provinces with above-average disability prevalence in Census 2011.

A logit regression conducted as a robustness check produced a very similar result. While the size of the coefficients cannot be directly compared, the sign (and significance) of the coefficients in the logit model (shown in Appendix Table 7) matched those in the linear probability model.

5.3.2 Do schools in wealthier areas report higher rates of disability among learners?

The descriptive analysis in Appendix Table 8 shows that in all four years, the mean and median reported rate of disability was higher among schools in quintile 5 than those in the other quintiles. The reported school-level rates of disability varied substantially across the provinces, as shown in Appendix Table 9 and are consistently much higher in the Free State than in any other province and lowest in the Western Cape. Rates of disability were consistently lower than average in Limpopo and North West.

The results of a log-linear regression analysis are quite consistent across 2011, 2013 and 2014, as shown in Table 19. The results show that schools in wealth quintiles 4 and 5 were likely to report higher rates of disability than those in other quintiles. The effect of being in quintile 5 was, however, much larger than the effect of being in quintile 4. Once the coefficients in Table 19 are exponentiated as described in section 5.2.2, these results suggest that, in 2014, the percentage of learners with disabilities in quintile 5 schools was 177% higher, on average than among schools from quintiles 1 to 3 (and 153% higher in 2013). The percentage of learners with disabilities in quintile 4 schools was 57% higher, on average, than among those in quintiles 1 to 3 in 2014 (and 54% higher in 2013). While the size of the coefficients varies by year, the signs were remarkably consistent, given the data quality problems identified in Chapter 4.

Table 19: Log-linear regression: Reported percentage of learners with disabilities per school

	(1)	(2)	(3)
	2011	2013	2014
School wealth quintile 5	1.149***	0.928***	1.018***
	(0.053)	(0.054)	(0.057)
School wealth quintile 4	0.314***	0.430***	0.451***
	(0.066)	(0.071)	(0.072)
Gauteng	-0.359***	0.017	-0.111*
	(0.059)	(0.066)	(0.066)
Western Cape	-0.297**	-1.081***	-0.969***
	(0.124)	(0.064)	(0.066)
Mpumalanga	-0.085	-0.336***	-0.213**
	(0.057)	(0.081)	(0.086)
Large school: >600 learners	-0.536***	-0.646***	-0.694***
	(0.044)	(0.047)	(0.051)
Designated full-service school (2011)	0.515***	0.863***	0.813***
	(0.112)	(0.093)	(0.097)
Constant	0.319***	0.434***	0.319***
	(0.027)	(0.031)	(0.038)
R-squared	0.102	0.132	0.124
Sample	5,183	4,826	4,302

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Annual School Survey (2011-14): public ordinary schools that report stable disability data, following imputation of missing data. Excludes 54 inconsistent reporters. Reference group: Small, ordinary, quintile 1-3 schools in provinces with above-average disability prevalence among learners in Census 2011.

Except for Gauteng in 2013, these results show that schools in provinces with lower-than-average disability prevalence tended to report lower rates of disability than schools in provinces with higher-than-average disability prevalence. Once exponentiated, these results show that from 2011 to 2014, the reported rate of disability in schools in the Western Cape was between 26 and 66% lower than in other provinces.

Larger schools were likely to report lower rates of disability. This is in line with Gubbels et al.'s (2018, p. 1149) prediction that small schools are often under greater pressure to maintain their learner numbers, which creates a greater incentive to prevent learners with disabilities dropping out or moving to other schools. As expected, full-services schools were likely to report higher rates.

To test the robustness of the results to the exclusion of inconsistent disability reporters these schools were added back into the sample and the regression was re-run. There was little difference in the results (not shown here). To test the sensitivity of the results to the high levels of missing data, all missing data was recoded to a near-zero number[99] to reflect an alternative assumption (that, in all schools, missing data on learners' disability status means that a school enrolled no learners with disabilities). The regression in Table 19 was re-run. Under this new assumption, the coefficient on quintiles 5 and 4 becomes more strongly positive, but the signs of the coefficient on the province variables change (results not shown here). This suggests that the results are somewhat sensitive to the assumptions about missing data. However, the distribution of log-transformed (recoded) dependent variable data does not support the use of OLS techniques, as shown in Figure 8, and these estimators are likely to be biased.

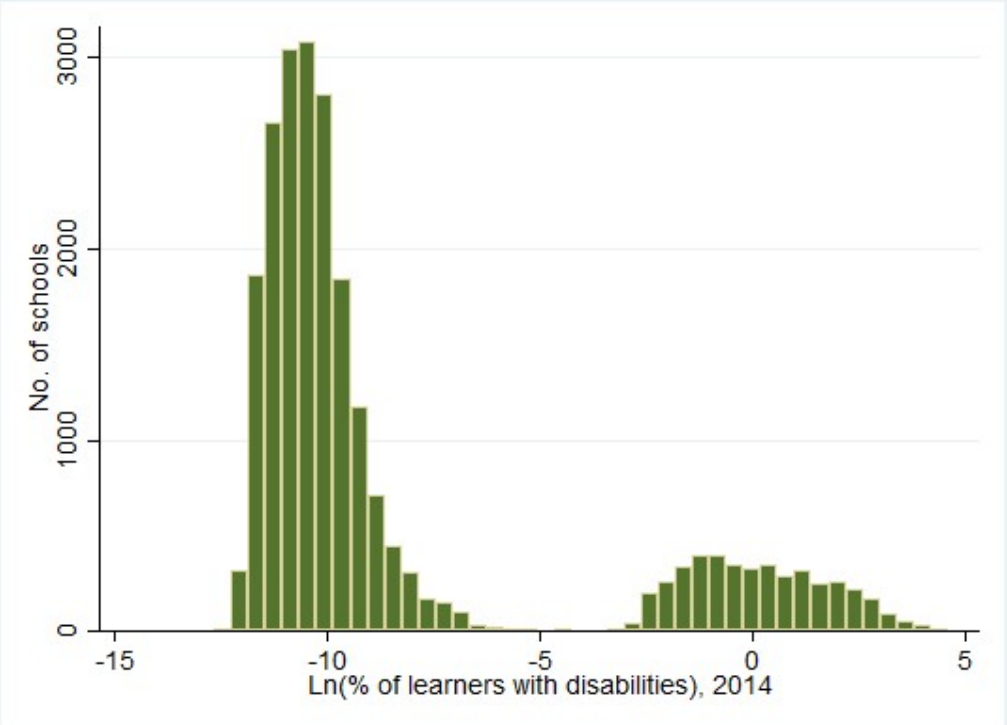

Figure 8: Distribution of log-transformed rate of disability

99 It is not possible to log transform a zero value. Thus, the number of learners with disabilities per school was set equal to 0.0001 in schools where no disability enrolment was reported.

5.3.3 *Does enrolment of learners with disabilities differ between full-service and ordinary schools?*

The descriptive data presented in Table 20 shows that 38 to 57% of full-service schools[100] reported enrolment of at least one learner with a disability from 2011 to 2014. This suggests that many full-service schools still need to begin enrolling learners with disabilities or need to improve their reporting practices.

Full-service schools are meant to be enrolling learners with disabilities up to the natural proportion[101] (Department of Basic Education, 2010). There have been reports of some full-service schools acting as de-facto special schools, enrolling large numbers of learners with disabilities, but without the benefit of the additional resource allocation that special schools receive. Annual School Survey data shows that from 2011 to 2014, between 4 and 5% of full-service schools (n=23 to 28 schools) reported enrolling 100 or more learners with disabilities each year, compared to 1% of ordinary schools (n= 204 to 216 schools).

Table 20: Proportion of schools that reported enrolling any learners with disabilities: 2011-2014

	Proportion of schools			
	2011	2012	2013	2014
Ordinary	0.21	0.21	0.20	0.17
	(0.00)	(0.00)	(0.00)	(0.00)
Full-service schools#	0.57	0.38	0.51	0.52
	(0.02)	(0.02)	(0.02)	(0.02)
Sample	23,646			

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Annual Survey of Schools, 2011-2014 (after interpolation of missing 2013, 2014 data). Sample = all schools in Annual School Survey 2013.
designated by 2011.[102]

5.3.4 *Does higher quality data in SA-SAMS result in different patterns of enrolment among learners with disabilities?*

Table 21 (which was reproduced from van der Berg et al. (2019)) shows the results of a regression run on Eastern Cape data from SA-SAMS (2018) and from the Annual School Survey 2013 and 2014. The results of these regressions can be compared with those reported in Table 18 (which applies to data from multiple provinces and uses a slightly different specification)[103]. The results in

[100] That had been designated by 2011.
[101] Which can presumably be proxied by the prevalence of childhood disability in that geographic area.
[102] Note that other analysis in this chapter is for a sample of full-service schools designated in 2017.
103 Using a different omitted category for quintile.

Table 21 show that quintile 1, 2 and 3 schools were less likely to report having any learners with disabilities than schools in quintiles 4 or 5. Thus, the analysis of the SA-SAMS data confirms the patterns of reporting by quintile that were revealed by the analysis of school survey data.

Furthermore, the 2018 SA-SAMS data shows that rural schools are 6.6% less likely than urban schools to report enrolment of learners with disabilities[104]. Analysis of the annual survey data showed much weaker evidence[105] of this association due to large amounts of missing data on rurality in the annual school surveys. Thus, the larger number of schools that reported learner disability status in SA-SAMS allows for more robust multivariate analysis of the enrolment data.

Table 21: Probability of an Eastern Cape school reporting at least one learner with a disability

	SA-SAMS, 2018	ASS, 2013	ASS, 2014
Rural school	-0.066***	-0.028**	0.004
	(0.015)	(0.013)	(0.010)
Quintile 1	-0.420***	-0.486***	-0.465***
	(0.037)	(0.032)	(0.026)
Quintile 2	-0.428***	-0.486***	-0.456***
	(0.038)	(0.032)	(0.026)
Quintile 3	-0.322***	-0.430***	-0.429***
	(0.036)	(0.031)	(0.025)
Large school (>600 learners)	0.230***	0.108***	0.083***
	(0.018)	(0.016)	(0.013)
Full-service school	0.321***	0.190*	0.240***
	(0.085)	(0.115)	(0.091)
Constant	0.799***	0.693***	0.553***
	(0.035)	(0.030)	(0.024)
R-squared	0.111	0.071	0.081
Sample	5,147	5,428	5,428

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Reproduced from my own previously published work (van der Berg, van Wyk, et al., 2019). Column (1): SA-SAMS (November 2018): All public ordinary schools in the Eastern Cape. Columns (2) – (3): Annual School Survey (2013-2014): All public ordinary schools in the Eastern Cape. Reference group: Small, ordinary, urban quintile 4/5 school.
Note: The dummy variable for full-service schools represents a slightly different group of schools in 2013/14 and 2018 as the group of designated schools in 2017 was larger than the group in 2011.

[104] This result is highly statistically significant.
[105] The association between rural location and the reduced likelihood of reporting enrolment of learners with disabilities was much smaller and less significant in the annual survey data and was not included in the final specification of the regressions in Table 18
.

5.4 Discussion

The results clearly suggest that schools in wealth quintiles 4 and 5 are much more likely to report enrolment of learners with disabilities than schools in other quintiles and, on average, report higher rates of disability. These results support the predictions in the literature (International Disability and Development Consortium & Light for the World, 2017) that better-resourced schools are better able to identify learners with possible disabilities, better able to access formal assessment or that these schools have better record keeping, which enables them to report the presence of learners with disabilities. This pattern of reporting was confirmed by the analysis of data from SA-SAMS in the Eastern Cape in 2018, where schools in quintiles 1,2, and 3 were progressively less likely to report at least one learner with a disability than those in quintiles 4 and 5.

This result is not unexpected, given that the process of gaining a disability "label" within the school system is diagnosis-driven and requires assessment by health professionals[106]. In South Africa, the number of health professionals in the private sector substantially exceeds the number in the public healthcare sector (Massyn et al., 2015, pp. 287-289), despite the fact that the private sector covers a minority of the population. Thus, access to medical diagnosis is much better among learners who have access to private healthcare. These learners are concentrated in quintile 4 and 5 schools.

Access to occupational therapists, physiotherapists and psychologists is particularly constrained in the public sector (Massyn et al., 2015, p. 290). For learners in quintile 1 to 3 schools, specialists in the district-based support teams are likely to be the most accessible route to diagnosis. Staffing norms for district-based support teams had not yet been gazetted in 2014 (as discussed in section 3.2). As a result, in many districts these teams were not fully staffed in the period covered by this data. The rates of reported enrolment of learners with disabilities among quintile 1 to 3 schools suggest that the lack of specialist staff in the district-based support teams hampered these schools' ability to identify and report learners with disabilities. School-level access to district-based support teams is explored again in section 6.5.3 in the following chapter.

It is possible that the level of enrolment of learners with (narrowly-defined) disabilities is in fact higher in quintile 4 and 5 schools and that the reporting.

This chapter also explored whether levels of resourcing or underlying provincial rates of childhood disability prevalence were driving reporting of disability among learners. The results are fairly mixed. The first regression provides fairly consistent evidence that schools in provinces with lower-than-average childhood disability prevalence are *more* rather than *less likely* to report enrolling learners with disabilities. Thus, this result provides some evidence that provincial access to resources might be more closely associated with reported enrolment of learners with disabilities than provincial

[106] See the descriptions of this process in section 2.4 of the literature review.

disability prevalence. However, the second regression shows that reported rates of enrolment of learners with disabilities were consistently lower in the lower-prevalence provinces (the Western Cape, Mpumalanga and Gauteng) in two of the three years tested. Overall, this suggests that disability prevalence exerts a larger influence on levels of reported enrolment than access to diagnosis in the Western Cape and Gauteng.

Poor data quality in Gauteng in 2013 and the Western Cape in 2011 may partly explain these inconsistent results. Alternatively, the inconsistent results across the two regressions may suggest that an interplay of forces is at work (underlying childhood disability prevalence, provincial access to resources, different levels of access to the private health sector and different levels of compliance in completing the annual survey). It is also worth noting that many factors vary by province in South Africa, including levels of funding dedicated to inclusive education (Budlender, 2015), the number of special schools and buy-in to the concept of inclusive education. Thus, province may also act as a proxy for level of commitment to disability inclusion reforms. There may also be variation in all of these factors within provinces. Once higher quality SA-SAMS data is available, district-level analysis may yield clearer results.

Finally, this analysis implicitly compares disability data from two very different sources (disability prevalence at provincial level, measured by the Washington Group Short Set of questions and reporting of disabilities, health conditions and impairments at school level). This may very well explain the inconsistent results.

5.5 Conclusions

The analysis presented in this chapter provides strong evidence that schools in quintiles 4 and 5 are more likely to report the presence of learners with disabilities and to report higher levels of disability than those in less wealthy areas. This pattern is likely because learners in quintile 4 and 5 schools have better access to formal assessment, when needed. Put differently, these results suggest that learners in quintile 1 to 3 schools have poor access to formal assessment, and hence, due to the nature of the disability categories used in EMIS (which require a formal assessment), are unlikely to be identified and reported in school-level disability statistics.

The previous chapter showed that the Annual School Survey produced a much lower estimate of the rate of disability in schools than the household surveys. The differences in definition of disability were offered as the explanation for these differences. The evidence presented in this chapter suggests that schools in quintiles 1 to 3 appear to experience difficulty in reporting disability among learners. When school-level statistics on enrolment of learners with disabilities are presented or analysed, potential under-reporting by schools in quintiles 1 to 3 must be considered.

The diagnosis-based questions on disability that are used in EMIS are likely to contribute to these reporting patterns. If reporting in SA-SAMS reflected learner support needs (whether a learner has been judged to have high-, moderate-, or low-level additional support needs) rather than health conditions and impairment types, one might observe increased reporting in lower school quintiles as formal assessment by health professionals is not always required in order to judge a learner's support needs.

If the existing disability questions remain unchanged in SA-SAMS, until such time as district-based support teams are fully staffed, and access to health professionals (and hence diagnosis) is improved, quintile 1 to 3 schools are likely to continue to report low levels of disability, which may underestimate the effort they are making to implement disability inclusion.

These results provide a baseline against which future analysis of enrolment of learners with disabilities in SA-SAMS can be compared. The analysis presented here was hampered by poor-quality data in the annual school surveys. Future analysis of SA-SAMS data should enable firmer conclusions to be drawn on what is driving enrolment of learners with disabilities in different provinces, as reporting of learner-level disability status should produce more robust data.

6. Disability accessibility, teacher training and availability of disability support structures in ordinary schools in South Africa

6.1 Introduction

This chapter presents the new evidence on the state of disability inclusion in schools from analysis of the School Monitoring Survey (SMS) 2017 by describing aspects of disability accessibility, teacher training and availability of disability support structures. The chapter presents the research undertaken to answer the following research questions:

- What is the coverage of special needs training and training on identifying and supporting learners who are experiencing barriers to learning among teachers in ordinary schools?
- What is the relationship between receipt of prior training and teachers' confidence in supporting learners with learning barriers?
- What is the coverage of disability support structures and specialist support in ordinary schools and what progress was made from 2011 to 2017?
- What are the major sources of inequality in inputs, processes, and enablers of disability inclusion across South Africa?

In particular this chapter contributes new evidence on the proportion of schools that are physically accessible, have disability support structures[107] in place, and where teachers have received training in inclusive education. These factors are critical in enabling ordinary schools to provide reasonable accommodation of learners' individual needs, which in turn enables participation of learners with disabilities.

This chapter presents an analysis of SMS 2017 which measures various aspects of ordinary schools' readiness to support learners with disabilities and those who are experiencing barriers to learning and some aspects of disability accessibility in ordinary[108] public schools in South Africa. Where possible, these results are compared with the 2011 survey to demonstrate the extent to which disability inclusion expanded from 2011 to 2017.

However, the focus of this chapter is not purely on providing new evidence of disability-inclusion in schools. This chapter also aims to:

- Describe the changes in survey design and questionnaire wording made in the 2017 survey,

[107] See section 1.3 for a description of the key disability support structures in the South African school system.

[108] The term mainstream schools is used elsewhere in the world, but the term ordinary schools is used within the Department of Basic Education.

- Describe teachers' experiences in completing the questionnaire,
- Critique the survey design and questionnaire wording in light of survey findings, existing policy and the biopsychosocial model of disability, and
- Identify some of the remaining gaps in measurement of disability inclusion at school level.

The SMS 2011 and 2017 are large, nationally-representative random samples of ordinary schools. Using multivariate regression analysis, this study demonstrates the inequalities in available disability support structures by province. The sources of inequality and the implications for policy making and for economic inequality among people with disabilities are drawn out. To the best of my knowledge, this is the first study that applies multivariate techniques to this type of data in South Africa. A qualitative study was conducted as a follow-up to the survey and the results of the qualitative study were used to enrich the findings of the quantitative survey.

Enrolment of learners with disabilities in ordinary schools was addressed in Chapter 4 and is not covered in this chapter. This analysis that provides evidence on the remaining gaps in physical accessibility of schools, teacher training and coverage of disability support structures will enable more accurate budgeting for the implementation of school-level reforms in the future.

In the next chapter, very similar aspects of disability inclusion are examined in more detail in full-service schools that were part of the SMS sample. The extent of implementation in full-service schools is compared to that in ordinary schools to determine whether the former are better equipped and prepared for disability inclusion than the latter.

6.2 Policy framework guiding development of disability inclusion indicators

Appropriate and unambiguous local inclusive education policies must be in place before indicators of disability inclusion can be developed (Sharma et al., 2018). Given that it is essential that the indicators selected align with local inclusive-education policy, locally-developed indicators of progress are far more useful than internationally-developed ones (Miles et al., 2014; Sharma et al., 2018).

As discussed previously, South Africa's inclusive education policies are based on the biopsychosocial model of disability. Thus, any indicators of disability inclusion should be aligned to this model.

Although local disability-inclusive education policies have been developed, they are incomplete and a little ambiguous. In part this is because Education White Paper 6 (2001) has not been updated in the past 20 years and has not converted into a Bill (Watermeyer et al., 2016; Du Plessis, 2013).

Secondly, as discussed in Chapter 3, there have been prolonged delays in finalising a funding strategy for inclusive education and in developing new norms and standards for teacher post allocations and key disability support structures[109].

As policy development (and funding strategies) are incomplete, and the White Paper's 20-year implementation frame ended in 2021, new indicators were developed based on the Minimum Norms and Standards for School Infrastructure (Department of Basic Education, 2013b) and SIAS policy (2014). These were the most relevant, updated, gazetted policy documents in 2017. The norms and standards for school infrastructure enable indicators on universal design to be developed, as the norms address universal design (in general terms) and provision of wheelchair-accessible toilets (which are specifically covered)[110].

The SIAS policy framework does not cover guidance on the implementation of UDL, or the number of schools providing classroom assistants or other appropriate learning assistance to learners with disabilities. More detailed policy frameworks are needed to guide the development of disability inclusion indicators. It is hoped that the current review of the White Paper will address some of the ambiguity in this document and will provide sufficient detail to guide further development of indicators of disability inclusion.

6.3 Data

This chapter reports on the analysis of the SMS 2017. Data from three of the SMS 2017 survey instruments (the school observation, principal interview and the stand-alone "learners with special educational needs" teacher questionnaire) was used in this study. Data from these three instruments was combined and then merged with data on school characteristics from the Master List of Schools 2015 (and the Master List of Schools 2013 for 37 schools which were not included in the 2015 Master List) and data on official full-service designations in 2017 (provided by the Inclusive Education Directorate). All data was anonymised by replacing the school EMIS number with an anonymous school identifier, after merging the data with the Master List of Schools.

A research team spent two days in each school completing multiple structured survey instruments and interviews with a range of educators (teachers and principals or other members of the senior management team) on a date agreed with the principal ahead of time (Nexia SAB&T, 2017a). A trained fieldworker completed a structured school observation, which assessed infrastructure. Data from three of the survey instruments was used in this study: the school observation, principal interview and a questionnaire which was administered to one selected teacher and addressed

[109] District-based support teams, full-service schools, and resource centres.

[110] All schools are to have at least one wheelchair-accessible toilet by 2030.

aspects of disability inclusion in the school. The latter is henceforth referred to as the teacher questionnaire. The author was not involved in data collection.

The author designed and conducted a follow-up qualitative study, which was conducted in a small purposive sample of schools in Limpopo, the Free State and the Western Cape that had participated in the SMS in late 2017. The sample is described in section 6.3.2. Ethics approval was obtained from the Department of Basic Education and the Stellenbosch University's Humanities Research Ethics Committee, as described on page 21. The qualitative interviews took place in March and April 2018 and were telephonically conducted by the author. In each case, the teacher who had completed the SMS 2017 teacher questionnaire was re-interviewed. Informed consent was obtained telephonically from school principals and in writing from teachers, prior to participation in the qualitative research. Participants were informed of the purpose of the study, and the potential risks to themselves as well as the benefits to the education system associated with participation.

The study evaluated the respondents' understanding of the questionnaire wording and of certain concepts pertaining to inclusive education. In particular, understanding of the term "learners with learning barriers", which was widely used in the teacher questionnaire in preference to other terms, such as learners with special needs or learners with disabilities, was interrogated. A discussion guide was used to guide the interviews, which took approximately 20 minutes each.

6.3.1 Description of 2017 School Monitoring Survey sample

SMS 2017 was conducted on a random sample of public primary and secondary schools in all nine provinces, with sample stratification by province and quintile within province. The sample was designed to include at least 100 schools per province, with approximately equal numbers of schools across provinces (Nexia SAB&T, 2017b). It was further stratified by quintile within each provincial sample. This was done to ensure that each provincial sample was representative of the quintile ratios within that province.

The planned sample was 2,000 schools (1,000 primary and 1,000 secondary). The rates of refusal were low, and similar across the three instruments (Nexia SAB&T, 2017a), as shown in Appendix Table 10. The primary and secondary school samples were combined in Stata for the purposes of this analysis.

As a result of the sampling design, the number of schools recruited to the sample was roughly equivalent (Table 22)[111]. As the total number of schools varies substantially by province[112], observations must be weighted to adjust for the uneven probability that a school is selected in the sample. School and learner weights were developed by the SMS research team. School weights were developed to account for the uneven probability that a school is selected to the sample between provinces[113]. As such those schools in provinces that are over-represented in the sample (such as the Northern Cape) receive a lesser weight (in inverse proportion to the probability that a Northern Cape school could be selected for the SMS sample). Similarly, schools in larger provinces (such as KwaZulu-Natal) receive a higher weight when statistical analysis is conducted. Learner weights take account of province (as described above) and school size to correct for the uneven probability that a learner is recruited to the sample. That is, larger schools receive a higher weight in the sample as they represent the experience of a larger number of learners and smaller schools receive a smaller weight as they represent the experience of a smaller number of learners.

[111] Schools were sampled such that at least 100 Grade 6 and 100 Grade 12 schools were selected per province. The remaining 100 Grade 6 and Grade 12 schools in the sample were distributed proportional to the total learner numbers per province. This was done by raising the population of learners per province to the power of 0.08, divided by the sum of learner populations (to the power of 0.08) in all provinces and then multiplying by 1,000. There is no explanation in the sampling report as to why this particular procedure was followed.

[112] For example, the Eastern Cape, KwaZulu-Natal, and Gauteng have much larger numbers of schools than the Northern Cape and the Free State.

[113] The sampling report (Nexia SAB&T, 2017b) is quite unclear about the details of the sampling process and there is no description on how the school weights were developed.

Table 22: Sample description: School Monitoring Survey, 2017 (unweighted)

	Grade 6 sample N=989	Grade 12 sample N=992	Total N=1981
Province in which school is located			
Western Cape	111 (11.2%)	111 (11.2%)	222 (11.2%)
Eastern Cape	114 (11.5%)	114 (11.5%)	228 (11.5%)
Northern Cape	100 (10.1%)	100 (10.1%)	200 (10.1%)
Free State	106 (10.7%)	107 (10.8%)	213 (10.8%)
KwaZulu-Natal	119 (12.0%)	116 (11.7%)	235 (11.9%)
North West	108 (10.9%)	107 (10.8%)	215 (10.9%)
Gauteng	107 (10.8%)	112 (11.3%)	219 (11.1%)
Mpumalanga	110 (11.1%)	110 (11.1%)	220 (11.1%)
Limpopo	114 (11.5%)	115 (11.6%)	229 (11.6%)
School wealth quintile			
Quintile 1	266 (26.9%)	229 (23.1%)	495 (25.0%)
Quintile 2	249 (25.2%)	217 (21.9%)	466 (23.5%)
Quintile 3	246 (24.9%)	256 (25.8%)	502 (25.3%)
Quintile 4	108 (10.9%)	132 (13.3%)	240 (12.1%)
Quintile 5	120 (12.1%)	158 (15.9%)	278 (14.0%)
School size (number of learners)			
< 600 learners	388 (39.9%)	256 (26.4%)	644 (33.2%)
>=600 learners	584 (60.1%)	713 (73.6%)	1,297 (66.8%)
Person interviewed (teacher questionnaire)			
LSEN[#] Educator	495 (50.5%)	443 (45.0%)	938 (47.7%)
Deputy Principal	89 (9.1%)	143 (14.5%)	232 (11.8%)
Principal	180 (18.3%)	201 (20.4%)	381 (19.4%)
SBST Coordinator	217 (22.1%)	198 (20.1%)	415 (21.1%)

[#] Learners with special education needs. Commonly known as special education teachers.

The low proportion of SBST coordinators responding to the teacher questionnaire is disappointing as they are likely to be best placed to answer these questions. This trend also suggests that many SBSTs are inactive. As shown in Table 22, over 50% of respondents to the teacher questionnaire identified themselves as “LSEN educators”. It is, however, possible that “LSEN educator” may have been selected by all those teachers who were not SBST coordinators or part of the senior management team, as no allowance was made for *other* respondent type.

6.3.2 Description of qualitative study sample

Eighteen of the schools that participated in SMS in 2017 in the Free State, Limpopo and Western Cape were purposively selected to participate in further qualitative research in 2018. The sample was designed such that one primary and one high school was selected from a high-, low-, and moderately-functioning district in each province. The purposive sample design further aimed to

achieve a balance between rural and urban schools, and by quintile. Interviews were completed in 72% of the planned sample (13 of 18 schools).

The response rate in the qualitative survey was lower than in the overall survey as the interviews were conducted telephonically. It proved impossible to contact the correct person by telephone in three schools, and participants refused to participate in two schools. This was likely due to interviewee fatigue as several interviews were conducted as part of the broader qualitative study. The achieved qualitative sample is skewed towards quintile 1 to 3 schools, and primary schools, as shown in Table 23. The Western Cape is under-represented in the final sample.

Table 23: Characteristics of final qualitative sample

School characteristics	%	n
Free State	46	6
Limpopo	31	4
Western Cape	23	3
Quintile 1	31	4
Quintile 2	23	3
Quintile 3	31	4
Quintile 4	0	0
Quintile 5	15	2
Primary schools	62	8
Secondary Schools	23	3
Full-service school	15	2
LSEN Educator[114]	46	6
Principal	31	4
Deputy principal	0	0
SBST Coordinator	23	3
Sample	100	13

Source: own analysis of achieved sample: qualitative study.

6.3.3 Improvements in survey design and measurement from 2011 to 2017

There are very low levels of missing data in SMS 2017 due to the use of computer-assisted personal interviewing, where interviewers directly captured data onto tablets using DROIDSurvey. The adoption of this technology also removed the possibility of interviewee/er error with questionnaire skip patterns, such as those that led to a biased sample of teachers completing the question on teacher confidence data in 2011 (see discussion in section 2.3.1).

[114] LSEN educator stands for Learners with Special Education Needs educator. In other countries this might be termed a Special Needs Educator or Remedial Educator.

The questions in SMS 2011 that pertained to learners with 'special needs' were reviewed and several changes to the wording and additional questions were suggested. These questions were piloted and some of the questions were incorporated in the final questionnaires. In developing an expanded set of disability accessibility questions, two questions from the Guide for Including Disability in EMIS (UNICEF Education Section, 2016) were used, with permission from the authors. The number of new questions was limited by the length of the questionnaires, the wide scope of the survey (it assesses 13 objectives) and the need to maintain comparability between the 2011 and 2017 surveys.

In 2011, questions on training on "special needs" and the support that teachers received from the district structures were included in the teacher questionnaire. This questionnaire was self-completed by teachers. While the study required up to ten teachers per school to be selected to complete this questionnaire in 2011, the achieved sample ranged from one to ten teachers per school (Department of Basic Education, 2013c). In schools with more than ten teachers, respondents were selected by the principal (with the instruction that at least one must have some special needs training) (Department of Basic Education, 2013c). Although the principal was instructed to randomly select participants, it is likely that there may have been some bias towards teachers who would report favourably on the school's performance. In 2017, questions on learners who are experiencing learning barriers were included in a stand-alone questionnaire (hereafter known as the teacher questionnaire), which was administered to one teacher per school. This simplification led to increased comparability between schools, simplified the calculation of school and learner weights, and reduced possible selection bias.

6.3.4 Data quality, cleaning, and verification in School Monitoring Survey 2017

This study adopted the approach described by Taylor et al.(2019) to determine if socially desirable reporting is present in the survey responses. Triangulation of data in SMS 2017 was achieved by asking the same question of more than one role-player in a school, by repeating similar questions in a single instrument, or through verification of self-reported responses with more objective school observation. Responses to open-ended questions were used to verify responses to related close-ended questions. Appendix Table 11 lists the data that was triangulated. Where triangulation was performed, it is reported in the results.

In three questions, substantial over-reporting was detected using triangulation techniques. These questions pertain to wheelchair-accessible toilets, full-service designation of the school and ability to screen for learning difficulties. There were improbably high levels of agreement (53%) with the question "Is this a full-service school?". This data was verified against 2017 official data on full-

service designation[115]. The comparison showed a 51% false positive rate (schools that incorrectly claimed they were full-service schools). The suggests that, when faced with uncertainty, teachers tend to agree with statements, or provide what they view as socially desirable responses. Triangulation detected inconsistencies in reporting between self-reported and observed wheelchair-accessible toilets (discussed in section 6.4). Analysis of the open-ended questions showed that 15% of respondents who claimed their school was able to screen for learning barriers conceded that they had not done any screening when probed for details (discussed in section 6.5.4). In these questions, either socially desirable reporting or acquiescence bias appears to have played a role. It is possible that the other results presented below may also have been influenced by over-reporting.

The small number of questions in the teacher questionnaire made it difficult to apply any of these techniques. As a result, no formal testing for other response patterns was possible. Instead, careful attention was paid to the possible presence of socially desirable reporting.

Questions on teacher self-efficacy (such as confidence) are more susceptible to acquiescence bias than the other types of questions (Vieluf et al., 2013). In the teacher questionnaire, teachers were asked to rate their own confidence in teaching learners with learning barriers. Table 24 shows that most respondents rated themselves as “confident”. However, due to evidence of acquiescence bias or socially desirable reporting in other questions in the survey, there is reason to suspect that teachers may have overstated their confidence levels. In reality, more than 19% of teachers may lack confidence in addressing learning barriers.

Table 24: Self-rated teacher confidence in addressing learning barriers

Self-rated confidence	% of respondents	As a binary variable:	% of respondents
Not confident	18.9	Not confident	41.3
Somewhat confident	22.4		
Confident	38.6	Confident	58.7
Very confident	20.1		

Source: SMS 2017 (weighted analysis) teacher questionnaire.

Partly in response to the risk of over-reporting confidence and partly to allow a linear probability model to be used in estimation, teacher confidence data was transformed into a binary variable. Table 24 demonstrates how the two negative response categories (“not confident” and “somewhat confident”) were combined into a single category, “not confident”. The two positive response

[115] This step was prompted by the findings from the qualitative study which suggested that respondents were often unaware of or uncertain about whether their school had been designated as a full-service school. Responses in the qualitative interview frequently conflicted with those given in the quantitative questionnaire (administered previously).

categories ("confident" and "very confident") were combined to form a dummy variable, "confident". In this way any upward bias in the data is tempered.

The findings of SMS 2017 were compared with the 2011 survey to ascertain progress in implementation and as a further check on data quality where the question wording was similar across years. The results on screening ability were compared with the rates of screening coverage in Grades 1 and 8 from the DHIS, as published in the District Health Barometer 2017/18. Where there were geographic differences in coverage of services, these were further compared with the disability prevalence rates calculated from the Community Survey 2016 data. These rates were estimated at a provincial level for children aged 7 to 18 whose caregivers reported they were enrolled in an educational institution.

6.4 Methods

6.4.1 Approach to analysis

Analysis of SMS data in this research was largely conducted at the school level, using school weights. The analysis was repeated at the learner level (weighted by learner weights[116]), but no substantially different results were found. Learner-level analysis of screening indicators is, however, reported as it is more intuitive to interpret and compare with school health indicators from the DHIS. All analysis was done in Stata version 14, using the *svy* commands to take account of stratification in sampling and to allow appropriate weighting.

Multivariate regression analysis of SMS data was used to explore a number of relationships at school level. It was employed to explain variation in teacher training by observable school characteristics and to examine the relationship between confidence in teaching learners experiencing learning barriers and receipt of various types of training (all of which were measured in the teacher questionnaire). It was also used to determine variation in SBST coverage, and provision of district support to SBSTs (measured in the principal questionnaire) by school characteristics. Finally, schools' ability to screen learners and complete SIAS processes was assessed relative to school characteristics, teacher training status, and the presence of SBSTs (combining data from the principal and teacher questionnaires). These results present a much more nuanced view of these relationships than univariate analysis, which looks at variation by either quintile or province, individually. Both descriptive (univariate) and multivariate analysis was conducted on the combined sample (primary and secondary schools).

[116] When analysis is done at the learner level, a learner weight is needed to account for uneven probabilities that a learner is recruited to the sample, by province and size of the school.

In SMS 2017, principals selected the respondents for the teacher questionnaire (either choosing to complete the questionnaire themselves or delegating the responsibility to the Deputy Principal, the SBST coordinator or an "LSEN educator"[117]). Principals were asked to select the person best qualified in special or remedial education or supporting learners who were experiencing learning barriers. Thus, the respondents are unlikely to be representative of the whole teacher population and one cannot apply all the findings of the teacher questionnaire to the whole population of principals, deputy principals, SBST coordinators or "LSEN educators". The effects of this selection process are shown in Appendix Table 12, which illustrates that, while 62% of principals who answered the teacher questionnaire were trained in identifying or supporting learners who are experiencing learning barriers, only 48% of principals overall had received such training. This suggests that principals who self-selected to answer the teacher questionnaire were significantly more likely to have received training in this area (and hence nominated themselves to complete the questionnaire).

More fundamentally, schools where the principal is the most qualified teacher in addressing learning barriers/ special needs (or nominates himself/herself to answer the questionnaire for other reasons unrelated to training) are likely to differ in many measurable and unmeasurable ways from schools where another teacher is better qualified (or is nominated to complete the questionnaire). For this reason, regression analysis was run for the total sample and also separately for two sub-samples: a) those schools where the principal was the respondent and b) those where another teacher was the respondent. This is particularly important as the proportion of schools in which the principal answered the questionnaire varies by province (see Appendix Table 13).

Some of the indicators examined in this survey are likely to be strongly related to general school quality and to indicate the implementation of inclusive education policy, more specifically. For example, schools that do not have a SBST in place may simply be those that have very few structures and where compliance with all policies and directives is poor. Various indicators of general school quality were collected in the SMS 2017. These included: percentage of teachers signing the attendance register on several pre-determined points in time, the number of school governing body meetings held in 2017, the principal's rating of school governing body support, the number of vacant senior management team posts, the total number of days lost due to interruptions in the past 10 days, and whether the school had developed (and could show the interviewer) an academic improvement plan or school improvement plan.

[117] Learners with Special Education Needs educator. In other countries this might be termed a Special Needs Educator or Remedial Educator.

6.4.2 Estimation framework: multivariate analysis

Several dependent variables of interest in the SMS 2017 are binary (taking the value of 1 or 0 depending on the occurrence or non-occurrence of an event). For example: Does a school have at least one teacher trained in identifying and supporting learners experiencing learning barriers? Has the respondent received training in curriculum differentiation? Does the school have a SBST in place? Where the dependent variable is binary, several estimation techniques for multivariate regression are appropriate: a linear probability model, logistic regression or probit models. Both logistic regression and probit models rely on maximum likelihood estimation, which is a large sample technique, while linear probability models are estimated by the OLS method. (Maddala, 2001). In this study a linear probability model was chosen as the sample size (n=1981) was relatively small and because the beta coefficients (β) in linear probability models are easy to interpret. For example, if one defines:

$$y = \begin{cases} 1 \; if \; a \; school \; has \; an \; SBST \\ 0 \; otherwise \end{cases}$$

Then the probability of a school having an SBST is explained by a linear combination of the explanatory variables. In this study, the linear probability model takes the form:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_{2+} \; \beta_i x_{i+} \mu_i$$

Where $x_1 =$ a set of dummy variables for province,

$x_2 =$ a set of dummy variables for school wealth quintiles 2 - 5,

$x_i =$ a set of control variables: large schools, schools designated as full-service schools and a school quality proxy variable.

In this model, if: $E(\mu i) = 0$

Then, $\mathrm{E}(y_i / x_i) = \beta_0 + \beta_i x_i$

In a linear probability model, βx_i can be interpreted as the increased probability that a school has an SBST where the value of x_i increase by one unit. So, if $x_1 = 1$ when the school is located in Gauteng province, β_1 can be interpreted as the increased probability that the school has a SBST given that it is in Gauteng province.

6.4.3 Further preparation of the data

Some of the variables of interest in the SMS 2017 data are not normally distributed. For example, the number of learners for whom SIAS forms were completed is strongly skewed to the left (as shown in Figure 9). The non-normal distribution of variables related to learner disability status is to be expected and has already been discussed (see section 5.2.2). As explained previously, a non-normal distribution violates one of the key assumptions required for OLS methods. Using one of the methodological approaches reported in Chapter 5 (see section 5.2.2), the data was transformed into a binary variable (Did the school report completing the *Support Needs Assessment* or other SIAS forms for at least one learner?). This enabled meaningful analysis using OLS techniques (and a linear probability model).

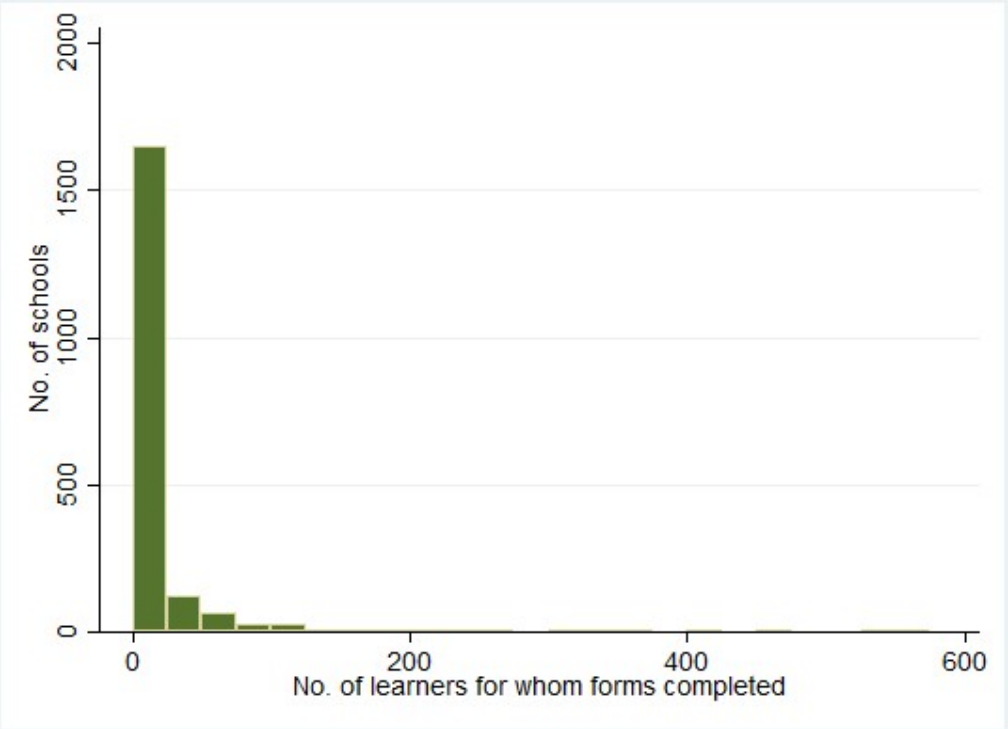

Figure 9: Number of learners for whom Support Needs Assessment and other screening, identification and assessment forms completed

Source: teacher questionnaire. Sample: all schools that report SIAS forms completed for <=600 learners (n=1958)

6.4.4 Terminology used in SMS 2017

One of the key changes in the questionnaires from 2011 to 2017 lies in the terminology used to describe learners who require additional support in the school system. In 2011 the term “learners with special educational needs” was used, while in 2017 this was updated to “learners with learning

barriers" (everywhere except in the title of the questionnaire). This term is broader and more closely aligned with domestic inclusive education policies (such as SIAS 2014). The follow-up qualitative study was used to test whether teachers were familiar with this terminology, and to elicit principals and teachers' own understanding of the term "learners with learning barriers"[118].

Two of the thirteen respondents gave very generic descriptions and were not keen to elaborate. This suggested that they were not comfortable that they fully understood the concept of learning barriers. One participant defined learners with learning barriers as:

> *"Learners who can't cope with learning." (SBST coordinator, Free State)*

The other 11 respondents elaborated at length, giving examples of the types of learners they had encountered in their school. Their understanding varied somewhat. Some respondents had a narrow interpretation, while others reported it as being a broad concept. Those who described it as a broad concept seemed to understand that learners who experience learning barriers encompass a wide range of learners with varying levels of support need:

> *"To me this is a wide concept. There are those who have physical defects, such as size, hearing, seeing and then there are those who have intellectual challenges, where physically there are no problems, you can't see anything wrong with the learner, but they can't grasp things at the same speed as others, for example slow learners." (Principal, Limpopo)*

Two respondents started with the phrase "Learning barriers can be anything that …", and another two began with "It is a wide/broad concept". For example:

> *"Learning barriers are anything that hinders a child from learning successfully: reading problems, reading with comprehension, vision, handwriting … anything that is preventing the child from achieving academically."*

It seems from the descriptions provided that most teachers see "learners with learning barriers" as a broader group of learners than "learners with special education needs". Most respondents then went on to mention a list of barriers that were internal to the learner, such as in the response above. One respondent, for example, emphasised that learning barriers are an intrinsic factor:

> *"Learners who struggle in the mainstream due to an intrinsic factor. These learners who have something intrinsic that causes them not to function on the same level as their peers." (member of SBST, Western Cape)*

[118] The term "learners who are experiencing learning barriers" would have been preferable as the terminology here may reinforce the idea that all learning barriers are internal to the learner.

Only one respondent directly mentioned a barrier that was created by the environment at that school (class size):

> *"…. In the classroom it could be because of overcrowding, or some are disabled, some cannot write well." (Principal, Limpopo)*

Four respondents cited factors that arise from the education system (such as uniform expectations for an age level), but the problem was still seen to originate in the child rather than the system. For example:

> *"Some learners have academic barriers; some have barriers because they are disabled in some way that this makes them to not grasp the curriculum as expected." (Remedial teacher & SBST member, Free State)*

> *"Children with barriers need to work at their own pace." (SBST member, Western Cape)*

While several respondents mentioned the socio-economic circumstances of the learners' families in the interview, only one cited them in response to the question about learning barriers.

> *"The child has something that naturally stops the learner from performing at the level as other learners. Either the child was born with something, or it happened due to an accident…Other learners are not performing well due to the background at home and the socio-economics." (SBST coordinator, Free State).*

Some teachers reported a wide range of support provided to socio-economically disadvantaged learners. However, most did not perceive the socio-economic context as a barrier to learning. Neither behavioural difficulties nor attitudinal barriers were mentioned as potential barriers to learning. Overall, the responses suggest that most respondents are aware of the concept of learning barriers but tend to see these as arising from within the learner. Environmental and attitudinal barriers that learners may experience in schools and communities are poorly understood. Some teachers understand the term in more depth than others.

6.5 Results

Having outlined the methodology, this section presents the results of the SMS 2017. They are grouped into teacher-, school-, and district-level inputs, processes, and enablers, as shown in Table 25. This is in line with the adapted model of school effectiveness employed as a framework in this research (discussed in section 2.2.1). Most of the results are informed by the quantitative survey, but in places the results of the qualitative follow-up study have also been integrated. As the bulk of the questions in the SMS 2017 relate to teacher-level inputs, this section is presented first.

Table 25: Elements of disability inclusion evaluated in the School Monitoring Survey 2017

Inputs	Processes	Enablers
	District level	
Provision of district support to SBST in 2017 *Provision of specialist support to schools in 2017*[#]		
	School level	
Presence of SBST	Ability to screen for visual and hearing difficulties Ability to screen for learning difficulties/barriers Number of learners for whom SIAS forms[##] were completed?	Wheelchair accessibility of main entrance *Presence of at least one wheelchair-accessible toilet* Provision of adaptive learning materials Internet availability
	Teacher level	
Teacher training *Teacher qualifications* Teacher confidence in including learners experiencing barriers to learning	Awareness of full-service status of the school	

[#] Was the school visited by psychologists, therapists, members of the district-based support team, health or learning support officials in 2017?

[##] Support Needs Assessment forms/Health & Disabilities forms/Individual Support Plan.

Items in italics are directly comparable to 2011 SMS.

6.5.1 Teacher-level inputs

SMS 2017 assessed teachers' qualifications in special needs education, training in learning barriers and teacher confidence in "dealing with learners with learning barriers"[119]. More detail was collected on training in the 2017 survey than in 2011 and several types of training were assessed in the questionnaire, as shown in Table 26. Respondents were asked to report on training provided by their own school, the provincial education department or training that they initiated themselves. Training coverage (across all types of training measured) was higher in primary schools than in secondary schools. Training in identifying or supporting learners who are experiencing learning barriers was the most frequently mentioned type of training. There is a particularly low level of coverage of training on setting assessments for learners who are experiencing barriers to learning in secondary schools.

[119] The inappropriate wording of the question has been raised with Department of Basic Education.

Table 26: Proportion of schools with at least one teacher trained in special needs or learning barriers in 2017

Training types:	Total	Primary School sample	Secondary school sample
(1) Formal qualification in special or remedial education	0.45	0.47	0.39
	(0.02)	(0.03)	(0.02)
(2) Training in identifying &/or supporting learning barriers	0.74	0.78	0.63
	(0.02)	(0.03)	(0.02)
(3) Training on curriculum differentiation	0.57	0.61	0.46
	(0.02)	(0.03)	(0.02)
(4) Training on setting assessments[#]	0.43	0.47	0.33
	(0.02)	(0.03)	(0.02)
Formal qualification (1) & training (2)	0.40	0.43	0.33
	(0.02)	(0.03)	(0.02)
Sample	1,966	981	985

Standard errors in parentheses. [#] for learners who are experiencing learning barriers.

While respondents in 74% of schools reported having received some training in learning barriers, only 57% had been trained in curriculum differentiation and only 43% had received any training on assessment differentiation (setting assessments for learners who are experiencing barriers to learning). The question on training was quite broadly worded and would cover any training, from formal courses to short informal seminars or workshops.

The relationship between receiving training in identifying/supporting learners with learning barriers and receiving training in the key skills of curriculum differentiation and setting assessments for learners experiencing learning barriers was explored further in multivariate analysis (shown in Appendix Table 14). The results show that teachers who have received training in learning barriers are only 55% more likely to be trained in curriculum differentiation and 39% more likely to be trained in setting assessments for learners who are experiencing learning barriers. This corroborates the evidence in Table 26, suggesting that the learning barriers training many teachers receive lacks depth and does not extend to curriculum and assessment differentiation.

Overall, in 78% of the primary schools, at least one teacher had received some training in identifying or supporting learners who are experiencing learning barriers. This suggests that published targets (all Grade R to 3 teachers will receive SIAS training by 2016) (Department of Basic Education, 2014a) have not been met or that training was poorly targeted, such that 22% of primary schools were not covered.

Receipt of training differs by respondent type. As shown in Figure 10, SBST coordinators are significantly more likely to have received training in learning barriers than principals and deputy principals. Both SBST coordinators and LSEN educators are also significantly more likely than

principals to have a formal qualification in special or remedial education (shown in Appendix Figure 1). It is encouraging that levels of formal qualifications and learning barriers training are higher among SBST coordinators than among respondents in other roles as this suggests that better qualified teachers are being placed in the role of SBST coordinator, or that SBST coordinators are being targeted by training.

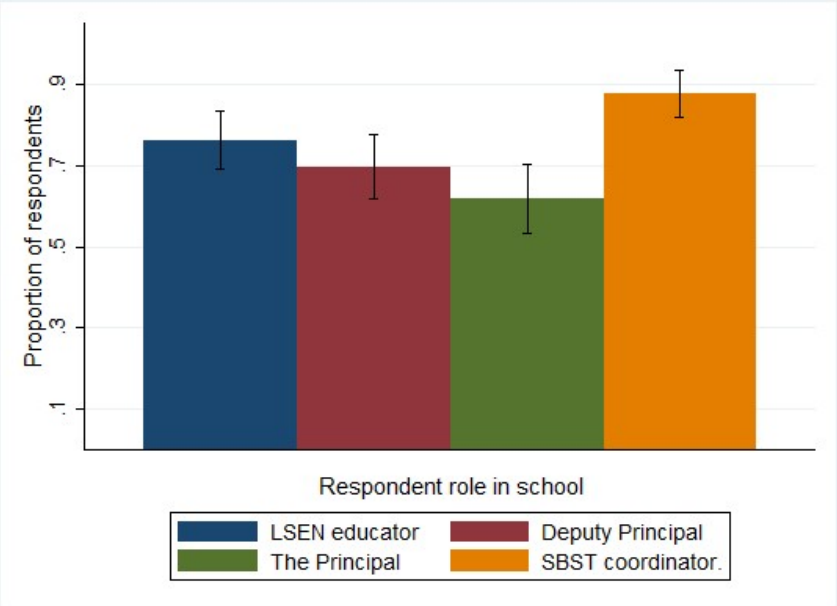

Figure 10: Proportion of teachers with some training (formal/informal) in identifying and supporting learners with learning barriers, by respondent role

Multivariate regression analysis was conducted to assess the coverage of training by school characteristics. Regressions were run on three samples, as described earlier (see section 6.4.1). The results for the regression for the full sample are shown in the column labelled “All” in Table 27. The results for the regression for schools where the principal was the respondent are shown in the column labelled “principal” and those where a teacher other than the principal was the respondent are in the column labelled “Other”.

Across all three samples, schools in Gauteng and the Free State were significantly and substantially more likely to have at least one trained teacher than schools in North West. These provincial patterns in training hold even when controlling for school phase, quintile, school quality (as proxied by the presence of a school and academic improvement plan) and full-service designation. Respondents in primary or combined schools were 14.6% more likely to be trained than those in high schools (total sample). Schools in quintiles 1 to 3 were equally likely to have at least one trained teacher as schools

in quintiles 4 to 5 [120]. Schools that could produce a school improvement and academic improvement plan were substantially more likely to have at least one trained teacher, except in schools where the principal was the respondent. There are stronger patterns of provincial variation in training levels and larger differences in training levels by school phase when the sample is limited to those schools where the principal is the respondent. Full-service schools were somewhat more likely to have at least one trained teacher (in the regressions on the full sample only). This is discussed in more detail in the next chapter (see Chapter 7, section 7.5.1).

Table 27: Probability that a school has at least one teacher who has formal training in special needs or any training in identifying and supporting learners with learning barriers

	(1)	(2)	(3)
	All	Principal	Other
Western Cape	0.125***	0.466***	0.035
	(0.046)	(0.105)	(0.049)
Eastern Cape	-0.015	-0.201	-0.002
	(0.069)	(0.151)	(0.071)
Northern Cape	-0.065	0.157	-0.119
	(0.073)	(0.159)	(0.075)
Free State	0.231***	0.511***	0.164***
	(0.050)	(0.105)	(0.054)
KwaZulu-Natal	0.085*	0.307***	0.079
	(0.050)	(0.111)	(0.050)
Gauteng	0.213***	0.493***	0.139***
	(0.045)	(0.113)	(0.046)
Mpumalanga	0.107**	0.137	0.080*
	(0.049)	(0.170)	(0.046)
Limpopo	-0.063	0.101	-0.084
	(0.070)	(0.128)	(0.088)
School is in wealth quintile 1-3	0.011	0.089	-0.011
	(0.030)	(0.078)	(0.029)
Primary (or combined) school	0.146***	0.223***	0.108***
	(0.034)	(0.074)	(0.038)
School with academic and school improvement plan	0.145***	0.057	0.174***
	(0.040)	(0.072)	(0.048)
Designated full-service school in 2017	0.055*	0.091	0.030
	(0.031)	(0.103)	(0.032)
Constant	0.514***	0.171	0.608***
	(0.057)	(0.137)	(0.057)
R-squared	0.112	0.217	0.117
Sample	1,952	1,979	1,954

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Column 1 shows regression for all respondents, column 2 shows results where the principal is the respondent, and column 3 shows results where the SBST Coordinator, LSEN Educator or deputy principal is the respondent.

[120] Quintile 4 and 5 schools are allowed to charge fees, while quintiles 1 to 3 are non-fee charging schools. Classification into quintiles is largely based on the socio-economic profile of the geographic area in which schools are located.

A similar regression was estimated on data from a similar question in the principal questionnaire[121]. Two findings are consistent across both specifications: 1) province appears to be a more important correlate of training than quintile, and 2) teachers in schools in the Eastern Cape, North West and Limpopo are less likely to have received training in learning barriers or special and remedial education than in other provinces.

Direct comparison of training coverage from 2011 and 2017 is not possible. However, comparing coverage patterns is informative. Whereas schools in lower wealth quintiles were less likely to have at least one trained teacher in 2011, there was no significant difference in training coverage at the school level in 2017. Provincial differences in training coverage persisted from 2011 to 2017, with much the same provinces lagging behind (Eastern Cape, Northern Cape, and Limpopo) and training coverage continues to be higher among primary schools than secondary schools. The proportion of teachers with formal qualifications was much higher in 2011 (71%) than in 2017 (45% of schools). This is possibly due to question wording. Respondents were asked about qualifications in special or remedial education, but not about specialised qualifications in inclusive education, such as the Advanced Certificate in Education in Inclusive Education or Advanced Certificate in Education in Learner Support. A request was made to update this question to include these qualifications, but this was denied in order to maintain comparability with SMS 2011. This resulted in a gap in the measurement of formal qualifications. For this reason, the data on training is viewed as more useful in this study.

Mean confidence levels among teachers with formal qualifications in special or remedial education and those who have some training in identifying or supporting learners experiencing learning barriers are significantly higher than among teachers who do not have such training. Teachers who work in quintile 5 schools, full-service schools and schools that have a SBST in place tend to be more confident in addressing learning barriers than those in other schools. On average, respondents in the Western Cape and Free State were significantly more confident in addressing learning barriers than those in the Eastern or Northern Cape, KwaZulu-Natal, or North West. Furthermore, in schools where a higher proportion of teachers have training in identifying or supporting learners experiencing learning barriers, the respondents tended to be more confident. Mean self-rated teacher confidence was significantly higher among SBST coordinators than among principals or deputy principals.

Again, multivariate regressions were run, with the sample split by the respondent's role in the school. The results of the regression analysis are shown in Table 28. Those in column (1) apply to all schools, those in column (2) apply to the sample of schools where the principal was the respondent

[121] The dependent variable is derived from data on the number of educators in the school trained in learning barriers (according to the principal).

and those in column (3) are for the sample of schools where the LSEN educator, SBST coordinator or deputy principal was the respondent. Quite different factors are shown to be associated with increased confidence depending on the role of the respondent. Among all respondents, quintile is insignificant as an explanatory variable.

Table 28: Probability that respondent is confident in supporting with learners with learning barriers

	All	Principal	Other
School has SBST	0.079	0.015	0.133**
	(0.053)	(0.089)	(0.057)
Formal qualification in special or remedial education	0.192***	0.239**	0.154***
	(0.044)	(0.095)	(0.041)
Training on curriculum differentiation	0.184***	0.138	0.174***
	(0.056)	(0.124)	(0.058)
Training on setting assessments for learners with learning barriers	0.163***	0.085	0.176***
	(0.057)	(0.135)	(0.052)
District visit for purpose of supporting SBST	0.077*	0.279***	-0.020
	(0.045)	(0.095)	(0.042)
Western Cape	-0.010	-0.108	0.051
	(0.067)	(0.151)	(0.068)
Eastern Cape	-0.025	-0.225*	-0.025
	(0.066)	(0.116)	(0.072)
Northern Cape	-0.072	-0.011	-0.049
	(0.072)	(0.145)	(0.079)
Free State	0.017	-0.247	0.061
	(0.068)	(0.208)	(0.063)
KwaZulu-Natal	-0.035	0.020	-0.014
	(0.069)	(0.115)	(0.074)
Gauteng	-0.068	-0.261	-0.041
	(0.066)	(0.194)	(0.070)
Mpumalanga	-0.005	-0.300**	0.032
	(0.058)	(0.117)	(0.061)
Limpopo	0.093	0.118	0.106
	(0.067)	(0.126)	(0.078)
School is in wealth quintile 1-3	0.025	0.024	0.045
	(0.042)	(0.092)	(0.043)
Constant	0.220***	0.129	0.255***
	(0.076)	(0.144)	(0.088)
R-squared	0.221	0.272	0.216
Sample	1,916	372	1,925

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Col. (1) shows regression for all respondents, Col. (2) shows results where principal is respondent, Col. (3) shows results where the SBST Coordinator, LSEN educator or deputy principal is the respondent. North West is the omitted category for province.

In schools where principals responded to the teacher questionnaire, those with formal qualifications in special or remedial education were 23.9% more likely to report being confident in addressing learning barriers than those without such qualifications, and principals in the Eastern Cape and Mpumalanga were 22.5 and 30.0%, respectively, less likely to report being confident than those in North West. There is a large positive association between receiving support from the district for the SBST and principals' confidence. However, neither the self-reported presence of a SBST nor the receipt of training in curriculum or assessment differentiation is associated with an increase in

confidence levels. Further research is needed to determine why training does not appear to shift principals' confidence in addressing learning barriers and whether this finding is valid for all principals, or only in those schools where principals are the most qualified teacher in special needs/learning barriers (and hence opted to respond to the questionnaire themselves). That is, is this result driven by specific school-level factors in this group of schools? Demographic differences may explain some of the variation (principals tend to be older[122], and male) but could not be tested, as no data was collected on teacher characteristics.

Where the respondent was a SBST coordinator, LSEN Educator or deputy principal, confidence is significantly and positively associated with prior training and formal qualifications. Training (in all its forms) is strongly associated with an increased likelihood of teacher confidence. The teacher is significantly more likely to be confident if there is a SBST in the school. Three types of training are included in this regression. Respondents who reported they had a formal qualification in special or remedial education were 15.4% more likely to be confident. Those who had received training on "curriculum differentiation for learners with learning barriers" were 17.4% more likely to be confident, and those who had received training on "setting assessments for learners with learning barriers" were 17.6% more likely to be confident. These associations can be interpreted cumulatively. Thus, teachers who have received training in curriculum and assessment differentiation were 35% more likely to rate themselves as confident in teaching learners who are experiencing learning barriers. Teacher confidence does not differ between provinces once differences in prior training are accounted for.

A probit regression on teacher confidence was conducted to test whether the findings are robust to the specification of the model. Similar associations were found to be statistically significant in the probit specification, suggesting that these findings are robust to the specification of the model. The results are shown in Appendix Table 15. The magnitude of the coefficients cannot be directly compared between the linear probability model and probit specification without transforming the coefficients of the probit regression.

6.5.2 School-level inputs

While the bulk of SMS 2017 evaluates teacher training for inclusion, the presence of SBSTs and district-level support is also evaluated. In 2017, principals in 67% of all schools reported that they had SBSTs in place, which is a substantial increase since 2011 (54%). Significant improvements were made from 2011 to 2017 in the Western Cape, the Northern Cape, North West, Mpumalanga,

[122] There is evidence from a systematic review that younger educators are more positive about inclusion of learners with disabilities in ordinary schools than older educators (Avramidis & Norwich, 2002), possibly because they are more likely to have been exposed to inclusive education thinking in pre-service training.

and Limpopo, as shown in Table 29. Improvements in SBST coverage occurred across all quintiles from 2011 to 2017, although the evidence of improvement in quintile 1 is fairly weak (only significant at the 10% level) and comes off a low base. In 2017, 90% of schools in quintile 4 or 5 reported having a SBST. This is significantly higher than among schools from less wealthy areas (quintile 1 to 3 schools).

Table 29: Proportion of schools with school-based support teams in place (self-reported): 2011 and 2017

	2011	2017
Western Cape	0.84	0.95**
	(0.03)	(0.02)
Eastern Cape	0.47	0.54
	(0.03)	(0.06)
Northern Cape	0.52	0.82**
	(0.04)	(0.07)
Free State	0.72	0.84
	(0.04)	(0.12)
KwaZulu-Natal	0.56	0.62
	(0.03)	(0.05)
North West	0.48	0.83**
	(0.04)	(0.04)
Gauteng	0.98	0.99
	(0.01)	(0.00)
Mpumalanga	0.72	0.91**
	(0.03)	(0.02)
Limpopo	0.14	0.39**
	(0.02)	(0.05)
Quintile 1	0.43	0.56*
	(0.02)	(0.05)
Quintile 2	0.45	0.67**
	(0.02)	(0.04)
Quintile 3	0.58	0.68**
	(0.02)	(0.04)
Quintile 4	0.74	0.90**
	(0.03)	(0.02)
Quintile 5	0.78	0.90*
	(0.03)	(0.03)
	(0.01)	(0.02)
All	**0.54**	**0.67**
	(0.01)	**(0.02)**
Sample	1,922	1,960

Standard errors in parentheses. Source: SMS 2011 and 2017 principal interview (school-weighted data). ** p<0.05, * p<0.1 (2017 compared with 2011 data).

By 2017, Limpopo is the only province where less than half of the schools reported having a SBST. Substantial differences in coverage of SBSTs by province remain by 2017. These differences do not reflect provincial differences in disability prevalence among children of school-going age, as shown in Table 30.

Table 30: Presence of disability support structures and disability prevalence (%), by province

	Proportion of schools with SBST (2017)	Proportion of SBSTs that received district support (2017)	Disability prevalence rate (%): children (7 to 18 years) (2016)
Western Cape	0.95**	0.90**	1.78**
	(0.02)	(0.02)	(0.001)
Eastern Cape	0.54	0.47**	2.86**
	(0.06)	(0.06)	(0.001)
Northern Cape	0.82	0.57	3.86**
	(0.07)	(0.07)	(0.002)
Free State	0.84	0.84**	4.86**
	(0.12)	(0.04)	(0.001)
KwaZulu-Natal	0.62	0.61	3.31**
	(0.05)	(0.07)	(0.001)
North West	0.83**	0.82**	3.69**
	(0.04)	(0.03)	(0.001)
Gauteng	0.99**	0.81**	2.62**
	(0.00)	(0.04)	(0.001)
Mpumalanga	0.91**	0.69	3.29**
	(0.02)	(0.04)	(0.001)
Limpopo	0.39**	0.36**	2.87**
	(0.05)	(0.06)	(0.001)
South Africa	**0.67**	**0.65**	**3.03**
	(0.02)	**(0.02)**	**(0.000)**
Sample	1,960	1,542	760,854

Standard errors in parentheses. ** p<0.05 (compared with national mean). Source: SMS 2017 & Community Survey 2016 (own calculations). Notes: In the Community Survey 2016, the Washington Group Short Set of questions was used to measure disability. Children were classified as having a disability if the caregiver reported that the child had a lot of difficulty or was completely unable to function in at least one domain, or that the child had some difficulty in at least two domains. In Col. 2 the sample is limited to those schools that had a SBST. The dark grey shading indicates that the coverage of the SBST, or disability prevalence is above national average in that province. The light grey shading indicates that SBST coverage or disability prevalence is below the national average in that province.

To disentangle the effects of province, quintile, and school size in explaining SBST coverage, a linear probability model was estimated. As having a SBST in place may be strongly correlated with general school quality, an indicator of school quality was included in the regression. In this case, a variable indicating whether the school had an academic improvement plan and a school improvement plan in place (and could show this to the fieldworker) was used as an indicator of school quality. The results (shown in Table 31

Table 31) suggest that schools in Limpopo, the Eastern Cape and KwaZulu-Natal are significantly and substantially less likely to have a SBST than those in North West once the effect of quintile, school size, full-service designation, and school quality[123] are accounted for. The effect is particularly large in Limpopo: schools in that province are 40% less likely to have a SBST than schools in North West. Large schools are 11% more likely and full-service schools 8% more likely to have a SBST, *ceteris paribus*. Quintile 2, 4, and 5 schools are more likely to have a SBST than quintile 1 schools (schools in the poorest areas). SBST coverage varies more by province and school size than by quintile and does not vary between metropolitan and non-metropolitan areas once other covariates are controlled for. Schools which have both a school improvement plan and academic improvement plan are 9.3% more likely to report having a SBST.

6.5.3 District-level inputs

Table 30in the previous section shows that 65% of SBSTs received support from the district during a district visit in 2017. This is a substantial improvement on 2011, where only 34% of SBSTs received such support (Department of Basic Education, 2013c).
Table 30 also illustrates that SBSTs in Limpopo and the Eastern Cape were less likely to receive any support during district support visits.

Regression analysis confirmed the existence of significant provincial differences in the provision of support from the district. The regression results (in column 2, Table 31) show that receipt of support for the SBST is strongly associated with whether the school received any other district visits in 2017. Schools that received support visits from other role-players were 53% more likely to receive support for the SBST. Once this is controlled for, SBSTs in Limpopo, the Eastern Cape, the Northern Cape, KwaZulu-Natal, and Mpumalanga were still much less likely to receive district support than those in North West. The differences by province are large in some cases: SBSTs in Limpopo are 32% and schools in the Eastern Cape are 20% less likely to receive support than SBSTs in North West. Schools in wealth quintiles 2 to 5 are no more likely to receive support from the district in 2017 than those in quintile 4 and 1. Full-service schools are 17% more likely to receive support for their SBSTs than other ordinary schools. There is weak evidence that higher quality schools that have school and academic improvement plans in place are more likely to receive support visits for the SBST.

[123] School quality was proxied with a measure that ascertained whether a school had a school improvement plan and academic improvement plan. This was measured as part of the document review in SMS 2017. Other measures of school quality were tested (number of vacant senior management team posts, number of school days lost in the past 10 days, number of school governing body meetings held in 2017, percentage of educators who signed the register over four days). None of the other school quality measures was correlated with having a SBST in place.

Table 31: Probability that disability support structures are in place in 2017 (self-reported)

	Probability (School reports having an SBST)	Probability (SBST received support from district in 2017)
Western Cape	0.047	0.098**
	(0.054)	(0.047)
Eastern Cape	-0.234***	-0.199***
	(0.070)	(0.069)
Northern Cape	-0.018	-0.165**
	(0.072)	(0.067)
Free State	0.015	0.016
	(0.107)	(0.053)
KwaZulu-Natal	-0.196***	-0.113*
	(0.066)	(0.061)
Gauteng	0.088*	0.050
	(0.049)	(0.052)
Mpumalanga	0.054	-0.134**
	(0.050)	(0.057)
Limpopo	-0.399***	-0.323***
	(0.063)	(0.068)
Quintile 2	0.114**	-0.009
	(0.054)	(0.052)
Quintile 3	0.057	0.004
	(0.062)	(0.047)
Quintile 4	0.090*	-0.075
	(0.053)	(0.055)
Quintile 5	0.091*	-0.077
	(0.051)	(0.057)
Large school (>600 learners)	0.107***	0.052
	(0.031)	(0.032)
Designated full-service school in 2017	0.082**	0.167***
	(0.038)	(0.033)
School has academic and school improvement plan	0.093**	0.071*
	(0.045)	(0.040)
School received a district visit for another purpose		0.533***
		(0.052)
Constant	0.661***	0.215***
	(0.065)	(0.071)
R-squared	0.219	0.255
Sample	1,917	1,506

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: SMS 2017, principal interview (school-weighted). North West is the omitted category for province and quintile 1 is the omitted category for school wealth quintile. In column 2, n = all schools where principal reported there was a SBST.

There is an association between the principal's satisfaction with the district overall, and the SBST receiving support from the district. However, this cannot be included in the regression analysis as the direction of causality is not obvious. In previously tested regressions, neither school density in the district (the number of schools in the district) nor location in a metropolitan area is independently associated with receiving SBST support from the district.

A second aspect of district support for learners with disabilities and/or those experiencing learning barriers relates to specialist support to schools. Overall, 47% of principals reported their school had received a visit from at least one of the following in 2017: psychologists, therapists, members of the district-based support team, learning support officials or health officials. There was no significant improvement in provision of these services between 2011 and 2017[124].

Coverage was much higher among primary (and combined) schools than in secondary schools. The Western Cape outperformed all other provinces in the provision of specialist district and/or health services to schools in 2017, as illustrated in Figure 11: Proportion of schools visited by psychologists, therapists, members of the district-based support team, learning support officials or health officials in 2017, by province. The provincial differences are substantial. Low levels of specialist support from the district and the provincial differences in this provision have a bearing on school-level screening processes, which are discussed in the next section.

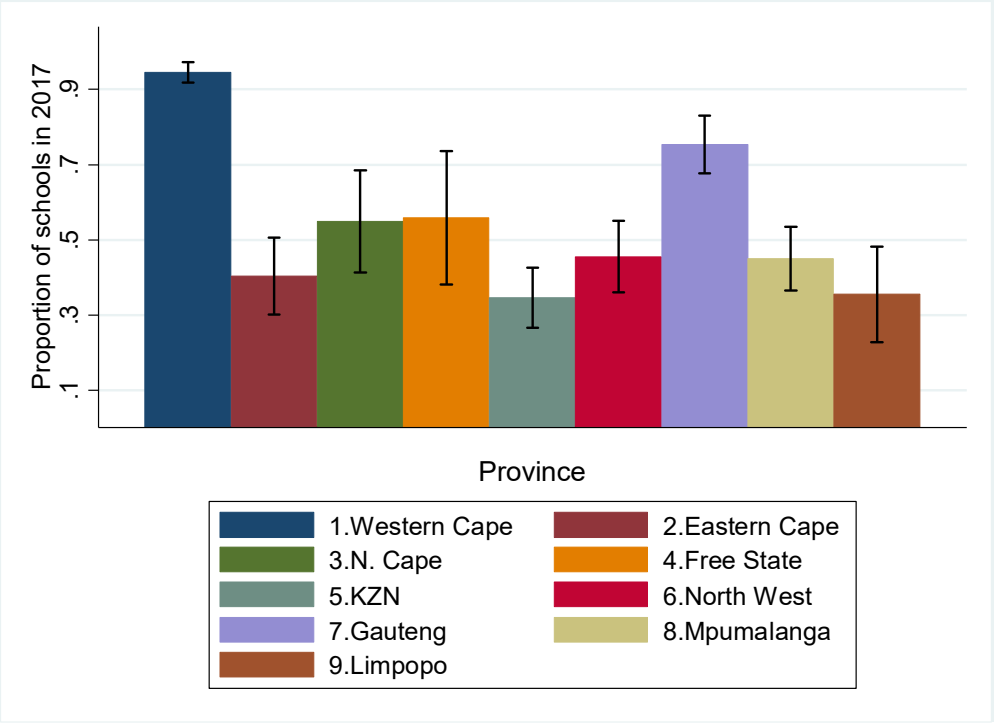

Figure 11: Proportion of schools visited by psychologists, therapists, members of the district-based support team, learning support officials or health officials in 2017, by province

6.5.4 Process indicators

Less than 50% of schools were able to screen at least some learners' hearing or vision or screen at least some learners for possible learning barriers. Teachers' and principals' responses to these

[124] Whether one considers the full sample of schools (44% of schools in 2011, 95% confidence interval (42.9% - 46,3%) or those schools with a SBST (2011, 57% of schools, s.e. = 0.02).

questions are highly consistent (as shown in Table 32), which suggests the data is reliable. The results are consistent whether the analysis is conducted from the school level (shown in Table 32) or the learner level (shown in Appendix Table 17

Appendix Table 17). However, in the follow-up question, respondents were asked to specify the screening activities they had undertaken and 15% conceded that no screening had been done, with a further 16% unable to provide any details. Only 34% of schools reported being able to conduct screening for learning barriers and readily provided details of the screening activities undertaken or learning barriers which were investigated. This suggests that the percentage of schools that were able to screen learners for learning difficulties in 2017 lies somewhere between 34 and 41% (shown in lines 3 and 4 of Table 32).

Table 32: Proportion of schools able to screen at least some learners for visual, hearing or learning difficulties

Proportion of schools:	Teacher questionnaire	Principal Interview
Able to screen at least some learners for visual difficulties	0.47	0.47
	(0.02)	(0.02)
Able to screen at least some learners for hearing difficulties	0.41	0.42
	(0.02)	(0.02)
Able to screen at least some learners for learning barriers	0.41	0.37
	(0.02)	(0.02)
Able to screen at least some learners for learning barriers & able to specify screening done	0.34	-
	(0.02)	-
Where SIAS forms completed for at least one learner in the school	0.50*	-
	(0.02)	-
Sample	1,966	1,973

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: SMS 2017 (Teacher, and principal questionnaire).

As shown in Table 33, 56% of primary schools in the SMS 2017 sample reported being able to screen learners' hearing or vision. This exceeds the DHIS school health screening coverage indicator in 2017, which showed that 33% of learners in Grade 1 were screened in that year (Bamford, 2019, pp. 121-127). The SMS 2017 data reports the percentage of learners in schools that were able to screen at least some learners' vision and hearing, whereas the DHIS data measures the percentage of Grade 1 learners who were screened. This suggests that school health screening may not cover all Grade 1 learners in the schools it reaches or that other screening activities (outside the School Health Programme) are occurring in some schools.

Inter-provincial differences in the proportion of learners in schools that can screen learners' vision and hearing in 2017 are also illustrated in Table 33. The SMS data shows that learners in Gauteng and the Western Cape were significantly more likely to be enrolled in schools where screening of vision or hearing occurred in 2017. Learners in Mpumalanga and the Northern Cape were less likely to be in a school where any screening occurred in 2017 than those in the rest of South Africa. This

result is corroborated by the DHIS data, which shows that screening coverage rates were lowest in the Northern Cape, and lower-than-average in Mpumalanga, the Eastern and Northern Cape and the Free State in 2017.

Table 33: Proportion of learners enrolled in primary schools that can perform health screening, compared with DHIS screening coverage

	Proportion of learners in primary schools that can screen vision	Proportion of learners in primary schools that can screen hearing	Proportion of Grade 1 learners screened (DHIS)
Western Cape	0.75**	0.67**	0.46
	(0.04)	(0.04)	
Eastern Cape	0.43	0.40	0.26
	(0.05)	(0.05)	
Northern Cape	0.40**	0.36**	0.11
	(0.05)	(0.05)	
Free State	0.50	0.41	0.26
	(0.05)	(0.05)	
KwaZulu-Natal	0.56	0.52	0.25
	(0.04)	(0.04)	
North West	0.51	0.46	0.50
	(0.05)	(0.05)	
Gauteng	0.74**	0.68**	0.35
	(0.04)	(0.05)	
Mpumalanga	0.44	0.31**	0.23
	(0.05)	(0.04)	
Limpopo	0.52	0.47	0.50
	(0.05)	(0.05)	
South Africa	0.56	0.49	0.33
	(0.02)	(0.02)	
Sample	1,043	1,043	52 districts

Standard errors in parentheses. ** p<0.05 (compared with national mean). DHIS = District Health Information System. Source: Data in columns 1, 2 is from the SMS 2017 teacher questionnaire (learner-weighted data). Data in column 3 is from the DHIS, reported in the District Health Barometer 2017/18.

Multivariate analysis demonstrates that Gauteng schools in general and primary schools were more likely to be able to screen learners' vision than other schools, even once school size, phase, presence of a SBST and previous training are accounted for (see Appendix Table 18). This result is consistent regardless of who answered the questionnaire. Schools with SBSTs were more likely to be able to screen learners' vision (according to principals). Schools in Gauteng and the Western Cape, primary schools, and those with SBSTs were more likely to be able to screen learners' hearing (see Appendix Table 19)[125]. School quintile is not significant in explaining variation in health screening ability.

[125] Receipt of support from the district for the SBST is not included in the regression analysis. The ability to screen learners for visual, hearing and learning difficulties is positively, but not very strongly, correlated with the districts' support to the SBST (see Appendix Table 20). However, the direction of causality is not clear.

The results in Table 32 suggest that half the sampled schools were unable to complete the SIAS forms, even for one learner. Completing the SIAS forms is part of the process of screening for learning barriers and identifying learners at risk of learning breakdown. The SIAS forms include three sets of *support needs assessment* forms (the first of which is completed by the class teacher, the second by the SBST and the third by the district-based support team, if required). The process of completing the *Support Needs Assessment* forms is the portion of the screening process for which teachers are directly responsible.[126] Thus, it is not surprising that a substantially higher proportion of schools reported being able to complete the SIAS forms than reported being able to screen at least some learners. The differences in reporting between these two questions suggests that teachers (correctly) see screening as a wider process than the SIAS process. The findings of the qualitative portion of this study illustrate that completion of the *Support Needs Assessment* forms, or review of a learner by the SBST is not seen by teachers as being part of the screening process.

> *"No screening happens at this school. Screening happens at the special school. If we think a child has a problem, we ask the district, and the district refers the child to the special school for screening as they have the special equipment. At the school, we just fill the Support Needs Assessment forms in and ask for help if we feel there is a problem with the learner."*

This response suggests that teachers underestimate the importance of the initial work they do in the screening process, that of identifying the child who they *"think …has a problem"***.** It is interesting that the respondent sees screening as something that occurs away from the school at a very specific location (the special school). This suggests that no support was provided by the Integrated School Health Programme, which is meant to visit schools annually to conduct vision and hearing screening of all learners in Grade 1 and 8, as described in section 2.3.4. It also suggests that screening is seen as something that is beyond teachers' control. Several responses illustrated that screening is often equated to diagnostic tests. Another response suggested that learning barriers do not require screening such as hearing and vision testing. Instead, the teachers just "picked these up". A telling comment was made by a respondent from a full-service school:

> *"Often other schools ask us: What is screening?"*
> *(SBST coordinator, Free State)*

This suggests that there is general confusion around what screening entails. Taken together, the results of the qualitative and quantitative research suggest that teachers do not understand that they

[126] The forms completed by the class teacher include initial identification of areas where the learner needs more support. In cases where the class teacher is unable to successfully intervene to support the learner, the barriers identified and strategies implemented by the class teacher are reviewed in the second set of forms by the SBST, culminating in a SBST assessment and intervention schedule. This may include an individual support plan. Only when interventions by the SBST fail or formal medical assessment is required is the case referred to the district-based support team (and the District-based Support Needs Assessment is completed). At this stage, the Health and Disabilities form will be completed by a medical practitioner, should formal assessment be required.

play a vital part in the screening process by identifying children who should be screened or assessed further. As a result, the multivariate analysis focused on the data generated by the more specifically-worded question on ability to complete SIAS forms, rather than data on the ability to screen learners.

The multivariate analysis shows that schools in Gauteng, primary schools, and schools where the respondent had prior training were more likely to complete these forms than other schools, even when other school-level characteristics are controlled for, as shown in Table 34. This result is consistent, regardless of the respondents' role in the school. Prior training[127] increases the probability that the school was able to complete these forms by 15% (where the principal is the respondent) and 21% (where another teacher is the respondent). Schools in metropolitan areas and those with SBSTs are better able to complete the SIAS forms according to reports by SBST coordinators, LSEN educators and deputy principals.

Table 34: Probability that a school is able to complete SIAS[#] forms for at least one learner

	All	Principal	Other
Western Cape	0.094	0.237	0.085
	(0.081)	(0.153)	(0.092)
Eastern Cape	0.152**	0.050	0.154**
	(0.068)	(0.128)	(0.077)
Northern Cape	0.006	-0.036	0.095
	(0.073)	(0.098)	(0.077)
Free State	0.172*	0.296	0.160
	(0.096)	(0.199)	(0.102)
KwaZulu-Natal	0.038	0.128	0.089
	(0.074)	(0.095)	(0.078)
Gauteng	0.261***	0.471***	0.220***
	(0.065)	(0.143)	(0.074)
Mpumalanga	0.026	-0.078	0.037
	(0.064)	(0.088)	(0.072)
Limpopo	0.126	0.108	0.194*
	(0.084)	(0.108)	(0.107)
Respondent is trained [##]	0.236***	0.147**	0.209**
	(0.061)	(0.075)	(0.087)
School has a SBST	0.176***	-0.005	0.263***
	(0.056)	(0.106)	(0.062)
Primary (or combined) school	0.141***	0.131*	0.174***
	(0.043)	(0.070)	(0.050)
School is in wealth quintile 1-3	-0.073*	0.015	-0.074*
	(0.039)	(0.085)	(0.042)
Metropolitan area	0.079**	0.068	0.086**
	(0.040)	(0.096)	(0.043)
Designated full-service school in 2017	0.242***	0.307	0.186***
	(0.052)	(0.225)	(0.052)
Constant	0.034	-0.019	-0.001
	(0.080)	(0.123)	(0.096)
Sample	1,924	1,975	1,930

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: SMS 2017, teacher questionnaire.

[#] Screening, identification, assessment, and support forms. These include the Support Needs Assessment forms to be completed by multiple role-players. [##] has either a formal qualification in special needs or remedial teaching or any learning barriers training. Column 1 shows regression for all respondents to teacher questionnaire, Col. 2 shows results where the principal is the respondent. Col. 3 shows results where the SBST coordinator, LSEN educator or deputy principal is the respondent.

6.5.5 School-level enablers

Two aspects of physical accessibility of the school for learners who use wheelchairs were assessed in 2017: accessibility of the main entrance to the school and of toilets. Both were measured through self-reporting (by the teacher) and from observation. However, the results were poorly correlated (as shown in column 4 of Table 35), and there were large differences in mean reporting between the observed and self-reported on wheelchair toilets. All the same, the proportion of ordinary schools

with wheelchair-accessible toilets almost doubled from 2011 to 2017[128]. Univariate and multivariate analysis show there was no significant difference in wheelchair toilet provision by school quintile in 2017.

Table 35: Indicators of physical accessibility of ordinary schools

	2011	2017		
Proportion of schools with:	Observed data	Observed data	Self-reported data	ρ
At least one toilet suitable for wheelchair users	0.16	0.31	0.48	0.65
	(0.01)	(0.02)	(0.02)	
Stairs at main entrance	-	0.28	0.26	0.59
		(0.02)	(0.02)	
Stair-free or ramped main entrance*	-	0.84	0.86	0.52
	-	(0.02)	(0.02)	

Standard errors in parentheses. Source: SMS 2011 & 2017.

* This measure was created by combining two questions (Are there stairs at the entrance of the school? If yes, in your opinion, is there a ramp in a good condition that is not too steep, that could be used by a person in a wheelchair?).

The findings of the qualitative research suggest that the respondents found the questions on physical accessibility more difficult to understand, largely because most had not considered these questions before. As one respondent explained:

> *"The questions on wheelchairs were difficult to answer because I had not opened my eyes. I couldn't answer whether there were ramps and stairs. The question made me open my eyes and look and ask other teachers. I wasn't aware of it, but we do have some ramps. We don't have special toilets." (SBST Member, Western Cape)*

Furthermore, the wording of the question on ramped access *("*In your opinion, is there a ramp in a good condition that is not too steep, that could be used by a person in a wheelchair?") was reported to be difficult to understand. This question was adopted from among the recommended questions in a technical guide on including disability in EMIS (UNICEF Education Section, 2016). It is long-winded, and this may have made it difficult to understand. More fundamentally, it may be difficult for a teacher who has no experience with using a wheelchair to judge whether a ramp is "not too steep" or "in good condition". This question may produce more reliable data when completed by a trained fieldworker or a member of an Organisation of People with Disabilities (OPD). Because of

[128] In 2011 self-reported data was not collected on sanitation. All comparisons of 2011, 2017 data were based on fieldworker observation.

discrepancies between the observed and self-reported data, and the results of the qualitative study, all further analysis is based on observed data, which was judged to be more accurate.

Overall, 84% of schools were found to have wheelchair-accessible main entrances (stair-free or with a suitable ramp), but there are large differences in accessibility by province, as shown in Table 36. Only 60% of schools in the Western Cape were found to have accessible entrances. This is significantly lower than the national average.

Table 36: Proportion of schools with accessible entrance, by province

	Stairs at main entrance	Stair-free or ramped
Western Cape	0.629**	0.602**
	(0.047)	(0.056)
Eastern Cape	0.184	0.875
	(0.032)	(0.026)
Northern Cape	0.506**	0.706
	(0.067)	(0.065)
Free State	0.288	0.818
	(0.054)	(0.040)
KwaZulu-Natal	0.189	0.886
	(0.030)	(0.023)
North West	0.384	0.843
	(0.050)	(0.045)
Gauteng	0.318	0.795
	(0.044)	(0.042)
Mpumalanga	0.199	0.916
	(0.032)	(0.025)
Limpopo	0.334	0.812
	(0.064)	(0.069)
South Africa	**0.277**	**0.837**
	(0.018)	**(0.016)**
Sample	1,978	1,978

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: SMS 2017.

The poorer accessibility in the Western Cape is driven by the larger proportion of schools with stairs at the main entrance in that province. As shown in Table 37**Error! Not a valid bookmark self-reference.**, higher proportions of quintile 4 and 5 schools have stairs at the front entrance and quintile 4 schools are the least likely to have a wheelchair-accessible main entrance.

Table 37: Proportion of schools with accessible entrance, by quintile

	Stairs at main entrance	Stair-free or ramped
Quintile 1	0.191	0.861
	(0.037)	(0.036)
Quintile 2	0.219	0.897
	(0.030)	(0.023)
Quintile 3	0.287	0.820
	(0.033)	(0.026)
Quintile 4	0.523**	0.662**
	(0.045)	(0.045)
Quintile 5	0.595**	0.734
	(0.043)	(0.040)
South Africa	**0.277**	**0.837**
	(0.018)	**(0.016)**
Sample	1,978	1,978

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: SMS 2017.

6.6 Discussion

The results suggest that there are substantial gaps in current teacher training for inclusion. These findings align with TALIS 2018, which found that a large proportion of lower secondary school teacher reported a substantial need for training in teaching special needs students. The results show that too few teachers have been trained in curriculum differentiation and setting assessments. Both are core skills which teachers require to support learners who are experiencing barriers to learning. It is particularly worrying that coverage of training on setting differentiated assessment is so low in secondary schools as the process of granting permission for reasonable accommodation for assessments (such as the use of a scribe or writing in a separate venue) usually only begins in secondary school. A renewed focus on training on curriculum differentiation and provision of reasonable accommodation during assessment (or use of differentiated assessments) is clearly needed, especially in secondary schools.

These results provide evidence of a strong relationship between training and increased confidence in addressing learning barriers among SBST coordinators, LSEN educators or deputy principals. The results suggest that if the levels of SBST coverage and SBST support from districts, as well as coverage of teacher training in under-performing provinces could be raised to the levels seen in the Western Cape, Gauteng or the Free State, provincial differences in teacher confidence could be eliminated. This is extremely encouraging as it provides policy levers to address inequality between provinces. School wealth quintile is not associated with lower teacher confidence once key inputs are factored into the regression[129].

[129] There is a small risk that there is a greater tendency towards socially desirable reporting in lower quintile schools, resulting in inflated reports of confidence levels in these schools, but this cannot be assessed in this data.

SMS 2017 focused on measuring teacher training, qualifications, and confidence rather than measuring attitudes to learners with disabilities, knowledge of approaches to address learning barriers, or skill in teaching learners with disabilities. For example, this research cannot demonstrate whether teachers who received training in curriculum differentiation had the required skills to differentiate their teaching to effectively teach all learners in their classes. However, indirectly the results suggest that current training does not provide teachers with the skill to screen learners. The results also suggest that teachers do not understand their role in the screening process. Evidence from the qualitative survey and responses to open-ended questions in the quantitative survey suggest that screening for learning barriers is not closely associated with the SIAS processes. The results of TALIS 2018 point to low perceived levels of competence in teaching learners with special needs effectively. Previous qualitative research has shown that in-service training on the provision of impairment-specific reasonable accommodation (such as braille, South African Sign Language and inclusion of learners with severe to profound intellectual disability) is insufficient to equip teachers to support learners with these impairment types (J. McKenzie et al., 2020). The results of SMS 2017 add to these findings by suggesting that further deepening of training in screening and the SIAS process is also required.

The presence of a SBST emerges as one of the key determinants of a school's ability to screen learners for visual, hearing or learning difficulties, and of teacher confidence (where the respondent is someone other than the principal). The SBST acts as a gateway to receiving specialist support from the district (psychologists, social workers, etc.). Between 2011 and 2017 there was a substantial increase in the proportion of schools with SBSTs. However, SBST coverage among quintile 1 schools remains lower than in other parts of the school system. If coverage of SBSTs could be raised in quintile 1 schools to the levels reported by quintile 4 and 5 schools, wealth inequalities in disability inclusion could be dramatically reduced.

The proportion of SBSTs receiving district support almost doubled from 2011 to 2017 and this is cause for celebration. Even more promising, there is evidence that SBSTs in schools from lower quintiles are more likely to receive such support. This suggests SBST support has been prioritised in less-wealthy areas.

The results suggest that schools in Limpopo, the Eastern Cape and KwaZulu-Natal are significantly less likely to have an SBST and, where they do, they are significantly less likely to receive support from the district. If, in line with the suggestions of Watkins et al. (2014), the existence of disability support structures in schools is a rough proxy for accessibility of the learning environment, this means that learning environments are much less accessible in schools in the Eastern Cape, KwaZulu-Natal, and Limpopo than in other provinces. On the flipside, learning environments in the Western Cape and Gauteng are likely to be much more accessible than in other provinces. As school

quality was controlled for in the analysis, these provincial differences are unlikely to be explained by differences in school quality between different areas of the country.

There was no significant improvement in the proportion of schools visited by district specialists (psychologists, social workers, therapists, learning support specialists) or by health officials from 2011 and 2017. Substantial improvement was expected in this period as the Integrated School Health Programme was introduced in 2012.

Several of the findings in this study corroborate previous evidence on uneven funding of inclusive education between provinces (Budlender, 2015). These results suggest that the large provincial differences in the number of functional, fully-staffed, district support teams reported in 2013 (Government of the Republic of South Africa, 2013) still existed in 2017.

Neither the results of SMS 2017 on health screening nor the DHIS health screening coverage indicators suggest acceptable coverage of vision or hearing screening. Both suggest a substantial risk that hearing or visual impairments are not identified in the early grades. Across both data sources, screening appears to be more entrenched in primary schools than in secondary schools. This is appropriate, given the value of early screening. Both indicators suggest wide inter-provincial differences in screening capacity, which could have serious implications for learning and income inequality between provinces. The particularly low levels of screening ability in the Northern Cape may explain the especially large difference between school-reported disability rates and disability prevalence in Census 2011 and the Community Survey 2016 in that province (see section 4.6).

Given that the questions on screening of vision and hearing in the 2017 survey may not have performed well and that the findings are in line with those reported in the DHIS, it may be advisable to drop the two questions (on screening of hearing and vision) from the next survey and to rely on the DHIS data on health screening coverage instead. In their place, a simple question on the number of children per class observed to be wearing eyeglasses or hearing aids should be included in the classroom observation in the SMS as this observable data may act as a better proxy for access to screening and eye health services. A simple question along these lines was used in the Early Grade Reading Study II in teacher interviews and at the end of the learner (reading) assessment (Department of Basic Education & University of the Witwatersrand, 2017). The researchers plan to analyse this data against norms for prevalence of refractive errors among young children to estimate the level of unmet need for eye care in these schools.

According to the 2013 Minimum Norms and Standards for School Infrastructure, every school must have at least one wheelchair-accessible toilet by 2030 (Department of Basic Education, 2013b, p. 28). SMS 2017 suggests that impressive progress was made in the provision of wheelchair-

accessible toilets in schools from 2011 to 2017. It also shows that in 2017, 20% of schools in the sample did not have suitable toilets for any learners (regardless of disability)[130]. While this is discouraging, it points to an opportunity to improve wheelchair toilet access at low cost. If the principles of universal design are followed in upgrading the sanitation facilities at these schools, wheelchair accessibility could be greatly improved. The literature suggests that where universal design is followed from project conception, the total construction cost of designing and constructing fully accessible buildings is just 1% higher than the cost of building inaccessible buildings (World Bank, 2005). Thus, South Africa may be able to provide wheelchair-accessible toilets in a further 20% of schools in the near future with a 1% increase in the budget for infrastructure development. This would be far more cost-effective than retro-adaptation of inaccessible school toilet facilities.

The results described here show that, in most schools, the school entrance is not a major barrier to inclusion of learners with physical disabilities. Physical accessibility is worst in quintile 4 schools and in the Western Cape. Some caution should be exercised when interpreting the overwhelmingly positive reported data on these two aspects of physical accessibility of schools. There was substantial inconsistency between the self-reported and observed data in SMS 2017. There may have been some confusion around which was the main entrance to the school, or an element of socially desirable self-reporting. The qualitative study showed that teachers had difficulty recalling the details of the school buildings. It also illustrated that the question on ramps was long-winded and difficult to understand. Finally, it is unclear how thoroughly the fieldworkers were trained on what to expect in a disability-accessible toilet. Direct observation by field workers who are not familiar with disability could lead to upwardly biased estimates of physical accessibility.

More fundamentally, it is difficult to judge whether a school is wheelchair-accessible based on only two indicators. SMS 2017 did not evaluate physical accessibility of the surrounding neighbourhood or transport to and from school. These aspects of school accessibility are emphasised in the draft version of the Washington Group Inclusive Education Module, which measured them from the perspective of caregivers of children who are not enrolled in school (that is, those that have not succeeded in overcoming the accessibility barriers) (Cappa et al., 2015). Such an approach should be tested in South Africa. Alternatively, simplified accessibility audits should be developed and used to evaluate the accessibility of schools for children with a range of functional limitations against a uniform standard (once that is agreed within the sector).

Neither the wording of SMS 2011 (“learners with special educational needs”) nor that of the SMS 2017 (“learners with learning barriers”) directly applies to the group of particular interest in this dissertation (learners with disabilities*)*. The results of the qualitative study suggest that, in general,

[130] That is, suitable toilets (flush or ventilated, improved pit latrines or enviroloos), with separate toilets for boys, girls, and educators.

the respondents understood “learners with learning barriers” to include learners with disabilities as well as other learners with lesser participation limitations. The wording may have skewed the participants to think mainly about learners with intellectual and learning disabilities. However, as these are the two largest disability groups in South African schools (according to the Annual School Survey data, see Table 13), this is not necessarily a problem. Specific questions about vision and hearing should have prompted the respondents to also consider these impairment types. Overall, the same support structures serve learners with special educational needs, learners with learning barriers, and those with disabilities. The questions on formal qualifications addressed the area of special needs and remedial teaching while those on training were specific to learners with learning barriers. Overall, the survey provides good evidence on the physical accessibility of schools and availability of disability support structures, even though only a few questions asked directly about learners with disabilities.

The wording in the 2017 survey (“learners with learning barriers”) should have read “learners who are experiencing learning barriers”. The wording “learners with learning barriers” was used as there was a need to maintain comparability between the 2011 and 2017 survey. Essentially, DBE agreed to allow the wording of the 2011 questionnaire to be tweaked and to add extra questions. The wording “learners who are experiencing learning barriers” made the questions, as worded in the 2011 survey, very long and clumsy. As English is not the first language of most teachers, simply-worded questions perform better in teacher surveys in South Africa. Indeed, as reported earlier, teachers reported that the longest question in the survey was difficult to understand.

The term “learners with learning barriers” was a compromise between maintaining comparability, achieving ease of understanding and pursuing correct phrasing. Unfortunately, the use of this term may have perpetuated the idea that the learning barrier always reside in the learner rather than in the environment. In particular, the question on whether the school was able to screen *learners* for learning barriers is problematic, as the wording firmly locates the learning barrier within the child. For this reason, the results of that question are not discussed in detail in this dissertation, as explained in section 6.5.4.

The qualitative study demonstrated that teachers tended to identify learning barriers within the child rather than in the environment. This suggests that teachers’ attitudes to disability is still strongly influenced by the medical model, rather than the biopsychosocial model. This is an indication that there has been little underlying change in thinking and that training may not have been effective. Unfortunately, the questionnaire wording may have contributed to these responses by prompting the idea of “learners with learning barriers”. The finding is, however, in line with those of other qualitative studies discussed in section 2.3.4 of the literature review which show that fundamentally teachers’ approaches to learners with disabilities have changed little. These studies suggest teachers still see

their role as one of referring learners to experts, rather than of playing an active role in collaboration (M. Nel et al., 2014) and that initial teacher training does not adopt an inclusive education approach or train teachers in collaborative approaches (N. M. Nel et al., 2016). If teachers have not been trained adequately in inclusive education approaches, it is quite likely that they will continue to be strongly influenced by the medical model of disability which informed the school system in the past."

In future rounds of the survey, it would be ideal to completely change the teacher survey with one that fully incorporates the inclusive education approach. For example, a question on whether the school had successfully identified any barriers in the school environment, the curriculum, in frequently-used learning materials or in teaching methods would have been more appropriate than the existing question on screening *learners* for learning barriers.

SMS 2017 provides useful information on the extent of system-level change towards disability inclusion from 2011 to 2017, but it is not well suited to measuring the levels and quality of individual-level support provided in schools. Neither is it well-suited for measuring whether individual learners are receiving appropriate and sufficient reasonable accommodation. These latter aspects of disability inclusion should be addressed by parent and learner surveys.

Similarly, a large-scale school and teacher survey such as the SMS is not an ideal tool for assessing whether the three principles of UDL are being fully implemented. An assessment of UDL would require assessment of available learning materials, observation of teaching methods and critical reviews of the CAPS curriculum in the light of UDL. This would involve reviews of learning materials and classroom observations, which did not form part of SMS 2017[131]. In the SMS teacher questionnaire, if space had permitted, it would have been ideal to extend the questions on teacher training further to evaluate whether UDL had been covered in initial teacher education or in-service training.

6.7 Findings and conclusions

The SMS 2011 and 2017 provide the first set of comparable data on disability inclusion at different points in time in the public school system in South Africa. The results show that SBST coverage and levels of district support to these teams had improved since 2011. However, availability of specialist services did not improve despite the introduction of the Integrated School Health Programme during that time.

[131] The classroom observation that formed part of SMS 2017 was not designed to assess teaching against the principles of UDL.

As of 2017, many ordinary schools in the impoverished (and more rural) provinces of South Africa are unlikely to be able to provide the support required by children with disabilities (and those experiencing barriers to learning) to facilitate their effective education. To couch this in terms of the biopsychosocial model of disability, learning environments in most schools in these parts of the country are probably exacerbating learner disability.

Further, the gaps in coverage identified in this study mean that the additional support needs of many learners are unlikely to be identified. This makes it highly unlikely that they are receiving the reasonable accommodation they require to enable full participation in learning. Largely, this situation has arisen as schools are not receiving the necessary support from disability support structures and teachers are not fully trained for disability inclusion.

Availability of disability support structures and coverage of teacher training to support disability inclusion vary between provinces. These provincial inequalities are likely related to uneven funding of inclusive education between provinces, as described previously by Budlender (2015) or to differing levels of political will to promote disability inclusion. As discussed in the introduction, the quality of education in South Africa differs substantially between schools in wealthier areas (quintiles 4 and 5) and in more impoverished areas (quintile 1 to 3 schools). For children with disabilities and those facing learning barriers, these results suggest that the province in which children live is an additional source of education inequality.

The 2017 SMS produced the first large-sample nationally-representative set of data on teacher confidence in teaching learners with learning barriers. Teacher confidence has been shown to be strongly associated with prior training in special needs/learning barriers and the presence of a SBST in a school, except among principals. Principals' confidence is driven by support from the district. The study provides evidence that, if equality of training, SBST coverage and district support could be achieved across provinces, inter-provincial differences in teacher confidence could be eliminated in South Africa. Further research is needed to determine whether more confident teachers are more likely to have better attitudes towards inclusion in general, and towards learners with disabilities more specifically. This research should aim to identify the parts of the schooling system where teachers' attitudes have become more positive as well as the factors that have enabled such change.

School wealth quintile is not strongly associated with teachers' prior training on learning barriers or special education needs, teacher confidence or physical accessibility of schools, once other factors such as province, school size and the presence of a SBST are accounted for. This suggests that the implementation of inclusive education policy and rollout of training that has occurred has been progressive in terms of its focus on poorer schools. The one important exception is the coverage of SBSTs, which is much lower in quintile 1 schools than in all other schools.

This research offers guidance to improve the SMS further for future rounds. While the SMS 2017 adds comprehensive evidence on the depth of implementation of disability support structures, teacher training for inclusive education and disability accessibility in schools, some key measurement gaps remain. While special school resource centres are one of the key support structures in inclusive education policy (and will receive the highest levels per-learner funding of any of the disability support structures when/if the 2018 funding guidelines are implemented), the support they provide is not measured in the SMS nor in any other quantitative study in South Africa. The literature review (see sections 2.3.3 and 2.3.4) demonstrated that resource centres in the Free State were still largely serving learners enrolled full-time at these centres, rather than in surrounding ordinary schools (Makhalemele & Nel, 2016) and that teachers (in ordinary schools) believe that under-resourcing at special schools made it difficult for them to extend support beyond their own learners (N. M. Nel et al., 2016). The SMS is a good vehicle to evaluate whether there is any collaboration between ordinary and special schools resource centres. It is strongly recommended that future rounds of the SMS include a few questions aimed at identifying whether ordinary schools are aware of where the closest special school resource centre is, what support they can request from this centre, how often they have engaged with this centre and their satisfaction with the support provided. If these changes were implemented now this would allow analysis of engagement with special school resource centres before and after implementation of new funding rules. For ordinary schools that received such support, it would be useful for such support to be evaluated by the SBST coordinator.

Finally, the SMS does not evaluate whether the school has been able to identify or address any learning barriers in the school environment or classroom or teaching practices. Given that inclusive education involves a shift from focusing on learner deficits to making changes in the learning and physical environment to eliminate learning barriers, it is critical that this aspect is measured.

This research has provided a more comprehensive quantitative analysis of disability inclusion than has previously been conducted in South Africa. The changes made to the School Monitoring Survey improve the alignment with the biopsychosocial model of disability, by expanding knowledge on the extent to which teachers are trained and schools are supported to provide adequate support to learners with disabilities. However, it was not possible to fully operationalise the biopsychosocial model of disability in the School Monitoring Survey, due to limitations in how much the survey could be changed and because access to school-level data on total enrolment of learners with disabilities for these schools for 2017 could not be obtained and linked to the school survey.

7. Disability accessibility, teacher training and availability of disability support structures in full-service schools

7.1 Introduction

Education White Paper 6 proposed the development of a designated cadre of specially resourced full-service schools which would be "*equipped* and *supported* to provide for the full range of learning needs among all learners" (National Department of Education, 2001). The idea of full-service schools is elaborated in the SIAS Policy of 2014, which describes them as "ordinary schools that are inclusive and welcoming of all leaners in terms of their cultures, policies and practices. Such schools increase participation and reduce exclusion by providing support to all learners to develop to their full potential irrespective of their background, culture, abilities or disabilities, their gender or race. These schools will be *strengthened* and *orientated* to address a full range of barriers in an inclusive education setting." (Department of Basic Education, 2014a, p. ix). The rationale for introducing full-service schools is that they should provide examples of best practice which could be applied to ordinary schools in the future. In this way, full-service schools should chart the way for all schools to ultimately become inclusive (Department of Basic Education, 2010).

Designation of full-service schools has been ongoing since they were first piloted from 2004 to 2009. By 2020, there were 848 designated full-service schools, of which 139 were also designated as resource centres (Department of Basic Education, 2020).

Despite the high expectations of full-service schools, there has been little monitoring or evaluation of disability inclusion in these schools. One exception was an audit of 87 full-service schools by the Auditor-General (2019), which found that most designated full-service schools were not functioning as intended[132]. According to a departmental circular, the audit found that, in most instances, designation had not been followed up with resourcing or capacity building of the schools. No business plans existed at provincial level to resource, convert or capacitate full-service schools to fulfil the role outlined in the 2010 Guidelines on Full-service Schools (Department of Basic Education, 2019, p. 2). As a result of the audit, further designations of full-service schools were suspended until 2022 to allow the Department of Basic Education to focus on resourcing these schools and linking them to special schools and outreach teams, where possible (Department of Basic Education, 2019, p. 2). Apart from this audit only a few case studies (Conway, 2017; Makhalemele & Nel, 2021; Makhalemele & Payne-van Staden, 2018) have evaluated inclusion in full-service schools.

132 The Auditor-General's full report could not be found.

The study aimed to compare various aspects of inclusion (as measured in the SMS 2017) in ordinary and full-service schools to determine whether there are discernible differences between these two groups of schools. This chapter uses the analysis of data collected in the SMS 2017 to determine the extent to which full-service schools have been "*strengthened* and *orientated* to address a full range of barriers in an inclusive education setting" (Department of Basic Education, 2014a, p. ix). It also refers back to trends in disability-disaggregated enrolment in full-service schools, which were presented in Chapter 5.

The best available evidence to date on teacher training for inclusion in full-service schools relative to ordinary schools is outlined, as well as current levels of support from the district and full-service schools' readiness to screen learners and to complete SIAS processes. This analysis will provide evidence of the extent to which full-service schools have been specially *equipped, supported* and *strengthened*, and the extent to which teachers in these schools have been *oriented* to recognise and address learning barriers (as stated in the 2010 Guidelines).

While the Auditor-General's full report is not widely available, this dissertation provides a publicly-available, measurable baseline against which progress in full-service schools can be measured in the future.

Education White Paper 6 is currently being reviewed. One of the points of debate in this review is whether full-service schools should be abolished. There has been criticism in some quarters that these schools go against the principles of the United Nations CRPD, Article 24, 2(b), which states that learners with disabilities should be included in the (ordinary) school closest to their homes. Other critics of the full-service school strategy have argued that creating a specially designated tranche of schools detracts from equipping all schools for disability inclusion. However, it seems sensible to assess the support available to full-service schools and training of teachers in these schools before deciding on their future role. By providing new evidence on these aspects of disability inclusion in full-service schools, this research should inform ongoing policy discussions on the best pathways to achieving inclusive education in South Africa and other LMICs.

7.2 Implementation in full-service schools and full-service school funding since 2001

The idea of full-service community schools was first proposed in the USA as integrated centres of health, social care, and education (Dryfoos, 1996, 1998). The concept was adapted for South Africa and adopted as one of the key strategies for introducing inclusive education in 2001.

Guidelines for full-service schools were developed in 2010; these state that full-service schools should be "enabled to include learners with disabilities and implement all possible means to reasonably accommodate them" (Department of Basic Education, 2010). A number of criteria that define full-service schools are included in the guidelines. Among other things, they state that full-service schools should have the capacity to provide appropriate education that meets the individual needs of diverse learners, including learners with disabilities. They should ensure that additional support is available to learners who need it, should embrace the vision of the CRPD and should aim to overcome and reduce barriers to participation. Furthermore, there should be a spirit of collaboration within full-service schools, which should extend to collaboration with community stakeholders, OPDs and other schools in the area. A school culture of mutual respect and non-discrimination is emphasised. All teachers should have the skills and knowledge they need to support one another and ensure the success of all learners (Department of Basic Education, 2010). There should be ongoing continued professional development in inclusive education and disability sensitisation among staff (Department of Basic Education, 2010, p. 15).

The critical role of the principal in driving transformation towards inclusion is highlighted in the guidelines. The principal of a full-service school is expected to have considerable knowledge and skills in translating the principles of inclusive education into practice and should be a vocal advocate for inclusion (Department of Basic Education, 2010, p. 13). Outside specialist support for individual learners (from learning support facilitators, to counsellors, speech-, physio- and occupational-therapists) should be welcomed and coordinated so as to disrupt learning and social needs as little as possible. According to the guidelines, a full-service school should have additional support programmes and structures for teaching and learning[133]. Full-service schools should be aware of practices which exclude learners and should actively work to identify, address, remove, or reduce barriers in practices and policies. They should be well-functioning schools that are clean, orderly and practice good governance (Department of Basic Education, 2010).

The guidelines emphasise the role of the district-based support team in supporting curriculum differentiation. The district-based support team is tasked with assisting teachers to develop more flexible teaching and assessment methods. In part, the district would do this by providing illustrative learning programmes, learning support materials and assessment instruments (Department of Basic Education, 2010). Qualitative research in some full-service schools in the Free State and Gauteng has shown that district-based support teams are not providing transformational leadership in this area. Furthermore, the relationship between full-service school principals and district-based teams appears to be combative and characterised by mistrust. Some SBST members report feeling like

[133] It may not necessarily have all forms of learner support in place, but it should have the capacity to develop them.

"intimidated child(ren)" in the presence of the district-based support team (Makhalemele & Payne-van Staden, 2018).

Another qualitative study evaluated the effectiveness of the SBST teams in seven full-service schools in two districts of the Free State province from the perspective of district officials and from that of the SBSTs themselves. The study found that full-service school SBSTs do not function as effective teams, despite having clarity of purpose. Communication problems, poor levels of trust, confusion over the role of the principal and SBST in decision-making, and poor conflict resolution were identified by the research. Improper processes were also identified, such as principals handling cases that should be handled by the SBST coordinator, teachers not involving the SBST when drawing up individual support plans, backlogs in the SBST's workload and delays in attending to cases (Makhalemele & Nel, 2021). Taken together, these studies suggest that full-service schools in these provinces have not engendered collaboration within the school or with external partners.

The Auditor-General's 2019 study concluded that 51% of SBSTs and educators at full-service schools had not received adequate training to plan and implement inclusive education. By 2018 all learners in full-service schools should have been screened and assessed through the SIAS process (National Department of Education, 2014); progress in this area has not been reported.

Enrolment of learners with disabilities in full-service schools is not regularly reported, either in aggregate or by disability type (Watermeyer et al., 2016). This makes it difficult to judge the extent to which this group of schools is opening its doors to learners with disabilities and what types of disabilities are being accommodated. This chapter provides new evidence in this area.

School buildings and the grounds of full-service schools are required to comply with the principles of universal design, as laid out in the Minimum Uniform Norms and Standards for School Infrastructure (Department of Basic Education, 2013b, p. 10)[134] [135]. As a result, as described in section 6.6, existing full-service schools must adhere to the principles of universal design (as they pertain to buildings, access ways, indoor and outdoor facilities, signage, communication, and other services) when additions, alterations, and improvements are made. Any full-service schools built after 2013 must be fully accessible to all (Department of Basic Education, 2013b, pp. 10–11). Since 2001, full-service schools may have allocated funding through the school infrastructure conditional grants. However, as conditional grant expenditure is not reported in a disaggregated form, it is difficult to identify what proportion has been allocated to upgrade the physical infrastructure of full-service schools (Financial

[134] The norms and standards specify the need for immediate, full physical accessibility for special schools only. Full-service schools are treated the same as other ordinary schools.

[135] Which includes a detailed description of the number of wheelchair-accessible toilets needed in relation to the number of learners.

and Fiscal Commission, 2020). According to the 2018 guidelines (not yet implemented) each full-service school will receive a once-off infrastructure allocation and equipment allocation to ensure that they are accessible (Department of Basic Education, 2018b). No detail is provided on the proposed amount of this allocation. The 2019 audit found that 79% of full-service schools did not have the resources to create a safe and accessible environment for effective learning (Auditor-General of South Africa, 2019).

The accessibility of learning materials receives little attention in the 2010 Guidelines on Full-service Schools. Rather, the focus is on the adaptation of existing learning materials for learners with functional difficulties. There is no specific mention of collaboration to develop accessible learning materials and no discussion of how to apply the principles of UDL when designing learning materials.

Progress in disability inclusion in full-service schools is closely linked to the funding and staffing allocated to these schools. The 2010 guidelines state that class sizes in full-service schools should be reduced (no details provided) so that they can provide additional support programmes (Department of Basic Education, 2010). The 2018 funding guidelines (discussed earlier in section 3.1.1) modify this recommendation, stating that the province and district must manage class sizes in full-service schools to ensure they do not exceed the norms (which state a maximum class size of 40 learners for Grades 1 to 12) (Department of Basic Education, 2013b, p. 14) and that an education counsellor post should be created in each full-service school. The 2019 audit established that 69% of full-service schools had classes of more than 40 learners and/or did not have any education counsellors or educators to provide additional support programmes (Auditor-General of South Africa, 2019). This is unsurprising given that the 2018 funding guidelines had not been converted into the new post-provisioning norms, as discussed in section 3.2.

The 2018 funding guidelines further propose that an additional managerial post be created in each full-service school to enable the senior management team's teaching loads to be reduced, and to enable senior management to effectively run the SBST. They also state that a class assistant post should be created per phase in all full-service schools (Department of Basic Education, 2010, 2018b).

The revised school funding norms (proposed as part of the 2018 funding guidelines) propose that the non-personnel non-capital (NPNC) allocation to full-service schools should be increased by 10% (Department of Basic Education, 2018b). The additional NPNC funding for full-service schools has been calculated for the average full-service school[136] and is shown in Table 38. Essentially,

[136] For a school with 800 learners. The mean number of learners per full-service school is 797 learners in the 2016 Master List.

according to the proposals in the 2018 guidelines, full-service schools in quintile 1 to 3 areas would receive an additional R117,000 per annum to cover recurrent costs, while quintile 4 and 5 full-service schools would receive a much lower allocation. A recent parliamentary update (Department of Basic Education, 2020) proposed that amended school funding norms for full-service schools (shown in Table 38) would be phased in from 2024.

Table 38: Proposed additional non-personnel non-capital (NPNC) allocation to full-service schools

School wealth quintile	Basic NPNC per learner	Total NPNC per ordinary school	Additional NPNC per full-service school
Quintile 1-3	1466	R1,172,800	R117,280
Quintile 4	735	R588,000	R58,800
Quintile 5	254	R203,200	R20,320

Sources: Guidelines on Resourcing an Inclusive Education system (2018). Master List 2016. Provincial lists of designated full-service schools, 2017. Parliamentary Monitoring Group, 2019. National target school allocations: Amended national norms and standards for school funding (2020). Government Gazette No. 43145. 27 March 2020.

7.3 Data

The research reported in this chapter analyses data from the SMS 2017, which has been fully described previously (see section 6.3.1). By coincidence, rather than design, the SMS 2017 sample contains 95 full-service schools. As a result, this dataset provides a unique opportunity to compare a large sample of full-service schools with a nationally-representative sample of ordinary schools[137].

Similar to the analysis reported in Chapter 6, most of the data in the current analysis was sourced from the teacher questionnaire in SMS 2017, with some data from the principal questionnaire and the school observation (also from SMS 2017). The survey was supplemented by a qualitative follow-up study, which included a question on the full-service designation of the school. The design of the qualitative study and sample characteristics are described in section 6.3.2 and in a previously published paper (Deghaye, 2021, pp. 20-21).

This chapter reports on full-service schools' ability to screen learners and complete the SIAS process, the availability of disability support structures, and teacher training status in full-service schools in the SMS 2017 sample relative to ordinary schools. Some additional variables which were

[137] This opportunity was not present in the 2011 SMS as too few full-service schools were included in the sample (n=34) to allow a robust comparison of full-service and ordinary schools.

not analysed in Chapter 6 were analysed in this study (number of district support visits to a school[138] and number of teachers trained in identifying and supporting learners experiencing barriers to learning).

The SMS 2017 collected limited data on learning material accessibility pertaining to internet availability, and access to a library. This data is analysed in full-service schools relative to ordinary schools. One question on the number of learners supported with adaptive LTSM was included in the survey. Adaptive LTSM (also termed differentiated LTSM) refers to teaching or learning materials which have built-in flexibility and can easily be adapted to meet the needs of individual learners with differing abilities within a class setting (Hardy et al., 2019). This question on the use of adaptive LTSM was an attempt to operationalise one of the principles of UDL (namely, multiple forms of representation). The question on adaptive LTSM was not reported in the previous chapter as there was concern that this particular question may have been poorly understood as *adaptive learning materials* were not defined in the question and the qualitative research suggested it was not well understood. The data is explored in this chapter within the sub-sample of full-service schools as teachers in these schools report higher levels of prior training and were thought to be more likely to have received some training on UDL and thus more likely to have understood the question and to have provided appropriate responses.

The literature recommends that provision of reasonable accommodation is measured alongside the total number of learners with disabilities in school surveys (UNICEF Education Section, 2016). Unfortunately, the number of learners with disabilities was not measured in the SMS, and it was not possible to obtain this data for 2017 from SA-SAMS. To overcome this, the SMS 2017 data was merged with data on the total number of learners with disabilities per school for 2013[139].

7.3.1 Description of the sample

Sample stratification in SMS 2017 and sample weights for the overall sample were described in Chapter 6 (section 6.3.1). As discussed in section 6.3.1, the weights used in the SMS data set are designed to account for the uneven probability that an (ordinary) school is selected for the sample, given the (fairly) equal number of schools in different provinces in the sample, as shown in Table 22. By contrast, the number of full-service schools in the sample differs substantially by province, as

[138] In the SMS, data on the number of district support visits was collected in the categories: 0, 1, 2, 3-6, 7-12 and more than 12 visits in 2017. Categoric data was converted to numeric data to allow for analysis; schools that reported 3 to 6 visits or 7 to 12 visits were assigned the mean (4.5 visits and 9.5 visits, respectively). Schools that reported receiving more than 12 visits were conservatively assumed to receive 13 visits. Given the structure of the questionnaire, it is not possible to estimate the number of visits at which the SBST was supported.

[139] The latest year in which data was available for all nine provinces in the Annual Survey of Schools. The data includes imputed disability enrolment data from the Annual School Surveys 2012 and 2014 for schools which did not report this data in 2013 (as described in section 4.5.3).

shown in Table 39. Full-service schools in the Free State and North West make up a large number of the full-service schools in the sample. Within the Free State, two districts (Thabo Mofutsanyane and Fezile Dabi) are strongly represented (a total of 21 schools). The different provincial mix of full-service and ordinary schools within the SMS sample has implications for weighting.

Indeed, Table 39 shows that, when weighted using sample weights designed for ordinary schools, full-service schools in the Western Cape are over-represented and those in North West are under-represented, compared with the population of designated full-service schools in 2017. At the same time, the unweighted sample of full-service schools in SMS 2017 over-represents full-service schools in the Free State, Northern Cape, and Western Cape and under-represents those in all other provinces. That is, neither the unweighted nor the weighted sample is representative of the population of full-service schools. Developing a new set of weights that results in a representative sample of both full-service and ordinary schools is not possible, given the limited information about weighting in the SMS survey documentation. Instead, all analysis was conducted on both the weighted and unweighted sample. Both sets of results are reported.

Although, the current sample is not nationally representative of all full-service schools in 2017, it is the largest sample of full-service schools for which a comprehensive set of measures exists. Of the sampled full-service schools, 39% reported enrolling one or more learners with disabilities in 2013, while the figure was 41% for the overall population of full-service schools in the same year. This suggests that levels of implementation in this sample are fairly similar to that in the overall population. As shown in Table 39, the distribution of schools across the school wealth quintiles in the unweighted and weighted sample matches that for the full population of full-service schools quite well. As a result, data on availability of disability support structures, and accessibility should provide reasonable evidence on availability in other full-service schools.

It seemed appropriate to continue to analyse this rich dataset, despite its limitations. As the measurable characteristics of the sample of full-service schools differs from those of other ordinary schools in the sample, multivariate analysis was used to control for covariates such as province and school size, before conclusions about relative provision in full-service schools were made.

Table 39: Characteristics of the School Monitoring Survey 2017 sample of full-service schools compared to the population of all designated full-service schools in 2017

	Full-service sample (unweighted, %)	Full-service sample (weighted, %)	All full-service schools (n=685)
Western Cape	10 (10.5%)	13.5	40 (5.8%)
Eastern Cape	3 (3.2%)	5.0	31 (4.5%)
Northern Cape	7 (7.4%)	2.0	12 (1.8%)
Free State	32 (33.7%)	21.4	155 (22.6%)
KwaZulu-Natal	6 (6.3%)	15.2	99 (14.5%)
North West	19 (20.0%)	17.2	177 (25.8%)
Gauteng	2 (2.1%)	3.8	21 (3.1%)
Mpumalanga	15 (15.8%)	20.6	133 (19.4%)
Limpopo	1 (1.1%)	1.2	17 (2.5%)
Quintile 1	24 (25.3%)	30.4	169 (24.7%)
Quintile 2	24 (25.3%)	24.6	178 (26.0%)
Quintile 3	28 (29.5%)	26.1	198 (28.9%)
Quintile 4	12 (12.6%)	13.0	94 (13.7%)
Quintile 5	7 (7.4%)	5.9	45 (6.6%)
Large school (>=600 learners)	81 (85.3%)	71.7	433 (63.2%)
Primary & Combined schools	90 (94.7%)	97.3	656 (95.8%)
School enrolled >=1 learners w. disabilities in 2013	37(38.9)	34.9	282 (41.2%)
Reported % of learners w. disabilities in 2013(se)	1.61 (0.39)	1.55 (0.45)	2.96 (0.43)
Person interviewed for teacher questionnaire			
LSEN educator	48 (50.5%)		
Deputy principal	8 (8.4%)		
The principal	6 (6.3%)		
SBST coordinator	33 (34.7%)		

Source: Col. 1: SMS, 2017 (unweighted data). Col. 2: SMS, 2017 (weighted). Col. 3: Master List of Schools 2015 & 2013 for all designated full-service schools in 2017 (as provided by Inclusive Education Directorate). Data on number of learners with disabilities sourced from Annual Survey of Schools, 2013.

A comparison of Table 39 and Table 22 shows that the SBST coordinator was far more likely to answer the teacher questionnaire in full-service schools than in ordinary schools. While principals answered the teacher questionnaire in 20% of ordinary schools, they only responded in 6% of full-service schools. This is a further source of difference between full-service and ordinary schools. It

suggests that SBSTs are more entrenched in full-service schools and that the SBST coordinator was more readily identified by principals.

7.3.2 Quality of data reported by full-service schools

As described in Chapter 6, rates of refusal were low, and similar across the three instruments used in this analysis. Data triangulation was used to assess data quality (discussed in Chapter 6) and revealed some evidence of socially desirable reporting or acquiescence bias in the teacher questionnaire (see sections 6.3.4 and 6.5.4. See also Deghaye, 2021). As a result, data from the school observation was analysed in preference to self-reported data.

Document analysis formed a key part of SMS 2017. Respondents were asked to produce school documents including the school improvement plan, the academic development plan, school budgets, teacher attendance registers and inventories of LTSM. The document analysis was intended to verify responses given by teachers and principals. Fieldworkers was asked to verify the number of completed *Support Needs Assessment* forms as part of this process. Where access was granted (in 61% of schools that had completed SIAS forms), fieldworkers recorded the number of forms that had been completed. No information about the learners was collected or recorded. This exercise was only used to assess the accuracy of the responses to a question in the teacher questionnaire (which asks, “For how many learners has the school completed the SIAS forms (*Support Needs Assessment*/Health and Disabilities/ISP, etc.)?”.

In general, the correlation between the self-reported and verified numbers was fairly high and positive (ρ=0.56). As shown in Table 40, the correlation between these fields was very high where the SBST coordinator answered the teacher questionnaire and was very low when the principal was the respondent. The correlation was higher among full-service than ordinary schools. This suggests that the quality and accuracy of the data was higher when SBST coordinators and respondents from full-service schools answered this question. The more accurate responses from SBST coordinators make sense as they should be closely involved in the process and as analysis in the previous chapter shows they are more likely to have received training in this area.

As a result of the poor quality of self-reported data on full-service status (see section 6.3.4), data provided directly from the Department of Basic Education was used instead.

Table 40: Correlation between self-reported number of SIAS forms completed and number of SIAS forms located in document analysis

	Self-reported number of SIAS forms				
		Respondent type		School type	
ρ	All	Principal	SBST coordinator	Full-service	Ordinary
Count of SIAS forms in document analysis	0.56	0.12	0.95	0.88	0.53
Sample	604	92	156	52	552

Data source: SMS 2017 teacher questionnaire (weighted using school weights). Column labelled "All" shows ρ for all respondents, Col. labelled "principal" shows ρ where the principal was the respondent for the teacher questionnaire. Column labelled "SBST coordinator" shows ρ where the SBST Coordinator was the respondent.

7.4 Methods

In this chapter, inputs, processes, and enablers of disability inclusion (collected in the SMS 2017) in full-service schools and ordinary schools are compared using descriptive and multivariate analysis.

First, the results of SMS 2017 were analysed to determine if there were statistical differences in the availability of disability support structures, levels of disability accessibility, and teacher training status between the sample of full-service schools and ordinary schools. Where significant differences were observed, multivariate analysis was used to test whether the observed differences are explained by differences in other observable school characteristics.

In this analysis, data on the number of teachers who have been trained in identifying or supporting learners experiencing learning barriers (reported by principals) was used to analyse differences in the depth of training in full-service and ordinary schools. Similar to the data analysed in previous chapters (number of learners with disabilities enrolled in Chapter 4, or the number of learners for whom the SIAS forms were completed in Chapter 6), the data on the number of teachers trained is not normally distributed (as shown in Appendix Table 21). A logistic transformation of the data was performed but the distribution of the log-transformed data did not approach a log-normal distribution (not shown here). Instead, the data was transformed into a binary variable (*Were 20% or more of teachers in the school trained?*) to allow meaningful analysis using a linear probability model estimated using OLS techniques[140].

[140] See earlier discussion on the appropriateness of the linear probability model where data is not normally distributed (section 5.2.2), and where a logistic transformation does not produce a normal distribution.

7.4.1 Model specification

Other binary dependent variables analysed in this chapter include whether a school was visited by a district specialist, a member of the district-based support team or a health official in 2017, whether a school participated in a professional learning community and whether a school had a wheelchair-accessible toilet. In all regressions, the model is defined in a similar fashion. For example, if one defines:

$$y = \begin{cases} 1 \; if \; a \; school \; has \; a \; wheelchair - accessible \; toilet \\ 0 \; otherwise \end{cases}$$

Then the probability of a school having a wheelchair-accessible toilet is explained by a linear combination of the explanatory variables. In this study, the model takes the form:

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_{2+} \; \beta_i x_{i+} \mu_i$$

Where $x_1 =$ 1 where a school is a full-service school,

$x_2 =$ a set of dummy variables for province,

$x_i =$ a set of dummy variables for school wealth quintile 2 - 5,

$x_j =$ a set of control variables.

In this linear probability model, β_1 can be interpreted as the increased probability that a school has a wheelchair-accessible toilet where $x_1 = 1$ (where the school has been designated as a full-service school). All regression analysis in this chapter seeks to identify the size and magnitude of β_1 (associated with a school's designated status) to allow conclusions to be drawn on how the probability of event y increases for full-service schools relative to other ordinary schools. Province and school wealth quintile are included in all the regressions as these are the variables which were used to stratify the sample. The control variables, x_j, differ between regressions, but include school size, whether a school has a SBST, respondents' inclusive education training status, and school quality (as proxied by having a school improvement and academic improvement plan).

7.5 Results

7.5.1 Teacher-level inputs

Across all six indicators of teacher training, full-service schools significantly outperformed ordinary schools, as shown in Table 41. Ninety-four percent of respondents to the teacher questionnaire and 91% of principals from full-service schools had received some training in identifying and supporting learners experiencing learning barriers. This is substantially higher than in ordinary schools (as shown in Table 41). A substantially higher proportion of teachers in full-service schools (84%, compared with 56%) had received training on curriculum differentiation or training on setting

assessments for learners who are experiencing learning barriers. Seventy-eight percent of respondents from full-service schools had been trained in both topics. This suggests that teachers in full-service schools have received more extensive training than teachers in ordinary schools. The results are consistent across the unweighted and weighted sample (as shown in Appendix Table 16).

On average, teachers in full-service schools (who had received training in setting assessments for learners experiencing learning barriers) reported they had applied what they had learned more frequently[141] than teachers in ordinary schools who had received the same training[142]. Table 41 also shows that in 78% of full-service schools, more than 20% of teachers had been trained in learning barriers. This is almost twice as high as in other ordinary schools and suggests wider training coverage within full-service schools[143].

Previous regression analysis (see Chapter 6, Table 27) showed that full-service schools were 5.5% more likely to have at least one trained teacher than other ordinary schools. This was weakly statistically significant (10% level). The substantial collinearity between full-service designation and being a primary school may explain the weakly significant associations between full-service school designation and teacher training status. School phase was consequently excluded from further regression analysis.

To further test the relationship between full-service school status and depth of training coverage in schools, the indicator in row 6 of Table 41(*Were more than 20% of teachers in the school trained in identifying or supporting learners with learning barriers?*) was regressed on full-service designation. The regression results in Table 42 show that full-service schools are 35% more likely to have more than 20% of their teachers trained in learning barriers than other ordinary schools (weighted analysis). The results of the unweighted regression (shown in column 2 of the table) are very similar.

[141] Mean ratings on a 4-point Likert scale (1 = "not at all" to 4 = "all the time") were significantly higher among educators in full-service schools (3.50, s.e. = 0.12) than those in ordinary schools (2.96, s.e.=0.07).

[142] No specific instruction was given as to whether respondents should reflect only on training on setting assessments; thus, the responses could also apply to training on curriculum differentiation.

[143] Data derived from principals' reports on the number of educators, combined with principals' reports on the number of educators who had received training in full-service and ordinary schools in the SMS 2017 sample.

Table 41: Indicators of teacher training status, by school designation

Proportion of schools where at least one teacher has:	Full-service schools	Ordinary schools
(1) Formal qualification in special or remedial education	0.61***	0.44
	(0.06)	(0.02)
(2) Training in identifying or supporting learning barriers	0.94***	0.73
	(0.03)	(0.02)
(3) Formal/ informal training on curriculum differentiation	0.84***	0.56
	(0.05)	(0.02)
(4) Formal / informal training on setting differentiated assessments	0.80***	0.42
	(0.05)	(0.02)
(3) and (4)	0.78***	0.39
	(0.05)	(0.02)
Proportion of schools where:	**Full-service schools**	**Ordinary schools**
(5) Principal has received any training on identifying / supporting learning barriers	0.91***	0.46
	(0.03)	(0.02)
(6) More than 20% of teachers trained about learning barriers	0.78***	0.40
	(0.05)	(0.02)

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1, using two-sample Wilcoxon rank-sum.

Source: Part 1 of table: SMS 2017 (teacher questionnaire). Part 2: Principal questionnaire. Weighted analysis of full sample. Note: Respondents were asked to report the training provided by their own school, the provincial education department, or training that they initiated themselves.

Table 42: Regression results: Teacher training and collaboration

	Probability (> 20% of teachers trained in identifying or supporting learners with learning barriers).		Probability (School participates in a PLC)	
	Weighted	Unweighted	Weighted	Unweighted
Designated full-service school in 2017	0.35***	0.36***	0.20***	0.12**
	(0.06)	(0.05)	(0.07)	(0.05)
Control variables:	Province, School wealth quintile, Large school (>600 learners), proxy for school quality#		Province, School wealth quintile, Large school (>600 learners)	
Constant	0.56***	0.44***	0.26***	0.29***
	(0.08)	(0.05)	(0.05)	(0.04)
R-squared	0.168	0.118	0.096	0.132
Sample	1,591	1,593	1,935	1,935

Standard errors in parentheses (col 1). Robust standard errors (col. 2) *** p<0.01, ** p<0.05, * p<0.1. Source: SMS, principal questionnaire. #School has an academic and school improvement plan.

7.5.2 School- and district-level inputs

The regression analysis also shows that full-service schools are more likely to participate in Professional Learning Communities than ordinary schools, as shown in Table 42. While the size of the coefficient differs depending on whether or not the regression is weighted, the results are not sensitive to weighting.

Principals in nearly all full-service schools (95%, s.e.=0.03) reported having a SBST in place. This is significantly higher than in ordinary schools (67% of schools, s.e.=002). The multivariate analysis presented in Chapter 6 (Table 31 in section 6.5.2) shows that designated full-service schools are 8.2% more likely to have a SBST than other ordinary schools. School quality and school size are, however, more strongly associated with the increased probability of having a SBST than full-service status. The multivariate regression analysis (presented in Table 31 on page 133) also shows that SBSTs in designated full-service schools are 17% more likely to receive support at a district support visit than SBSTs in other ordinary schools[144].

Full-service schools were substantially more likely to receive district support for the SBST, heads of department or the school assessment team or to receive a visit from specialists (including psychologists and learning support specialists) in 2017, as shown in Appendix Table 16. Regression analysis confirms that full-service schools were 14 to 16%[145] more likely than ordinary schools to receive a visit from a psychologist, therapist, learning support specialist, district-based support team member or health official in 2017, as shown in Table 43. These results suggest that there is more district support in this sample of full-service schools[146], but coverage is not universal.

[144] Primary school was initially included as an explanatory variable in the regression (not shown in Table 31) but was insignificant and was subsequently excluded. Its exclusion had little effect on the coefficient on full-service designation, suggesting that the full-service effect is not inadvertently reflecting the effect of primary school due to the high proportion of primary schools in the full-service school sample. Unweighted regressions were performed for completeness. The results were very similar to the results of the weighted regression and are not shown here.

[145] Depending on whether the data is weighted or unweighted in the regression analysis.

[146] For completeness the same descriptive analysis was repeated in the unweighted sample. The results (see Appendix Table 16) are consistent when weighted and unweighted.

Table 43: Regression results: Specialist visits to schools in 2017 and school's ability to complete SIAS forms

	Probability (School visited by district specialist, DBST or health official in 2017)		Probability (School completed SIAS forms for at least one learner)	
	Weighted	Unweighted	Weighted	Unweighted
Designated full-service school	0.14**	0.16***	0.21***	0.18***
	(0.06)	(0.05)	(0.05)	(0.04)
Other control variables:	Province School wealth quintile No. other district role-players visit school in 2017 Proxy for school quality #		Province School wealth quintile School is in a metropolitan area School is able to screen at least some learners Respondent is trained ^	
Constant	0.04	0.07	0.09	0.11**
	(0.08)	(0.05)	(0.11)	(0.05)
R-squared	0.220	0.212	0.165	0.165
Sample	1,923	1,923	1,569	1,527

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: SMS 2017. Column (1): Principal questionnaire. Column (2): Teacher questionnaire. Notes: # School has an academic & school improvement plan. ^ Has formal qualification in special needs education/informal learning barriers training.

7.5.3 Process indicators

In the previous chapter, multivariate analysis showed that there was no detectable statistically significant relationship between a school's full-service designation and the self-reported ability to screen learners' hearing and vision in 2017 (see Appendix Table 18 and Appendix Table 19)[147]. The regression analysis (results shown in columns 3 and 4 of Table 43) suggests that full-service schools are 18 to 21% more likely to have completed the *Support Needs Assessment* or other SIAS forms for at least one learner[148]. Appendix Table 16 also shows that a much higher proportion of full-service schools reported being able to screen some of their learners for learning difficulties. When probed for further details about the screening activities undertaken, a much larger proportion of full-service schools were able to specify the screening activities that had been conducted or the learning barriers/difficulties. As shown in Figure 12, generic answers of "learning barriers" of "learning difficulties" dominated reporting in ordinary schools. A much higher proportion of full-service schools mentioned multiple screening activities or screening for multiple impairments or barriers and a wide

[147] Data (from the same questions on vision and hearing screening) in the principal questionnaire was analysed. This data (in column 3 of Appendix Table 18 and Appendix Table 19) suggests that full-service schools were 15.2% more likely to be able to screen vision and 11.6% more likely to be able to screen learners' hearing. However, the data from the teacher questionnaire was considered to be more reliable as it was provided by SBST coordinators and LSEN educators who would have been more closely involved in the screening process.

[148] than similar ordinary schools.

array of learning difficulties was reported. This suggests better understanding of the question among respondents from full-service schools. Only 7% of respondents in full-service schools and 6% of those in ordinary schools mentioned the SIAS processes when asked about screening conducted by their school. Only 4% of respondents in full-service schools mentioned external barriers to learning.

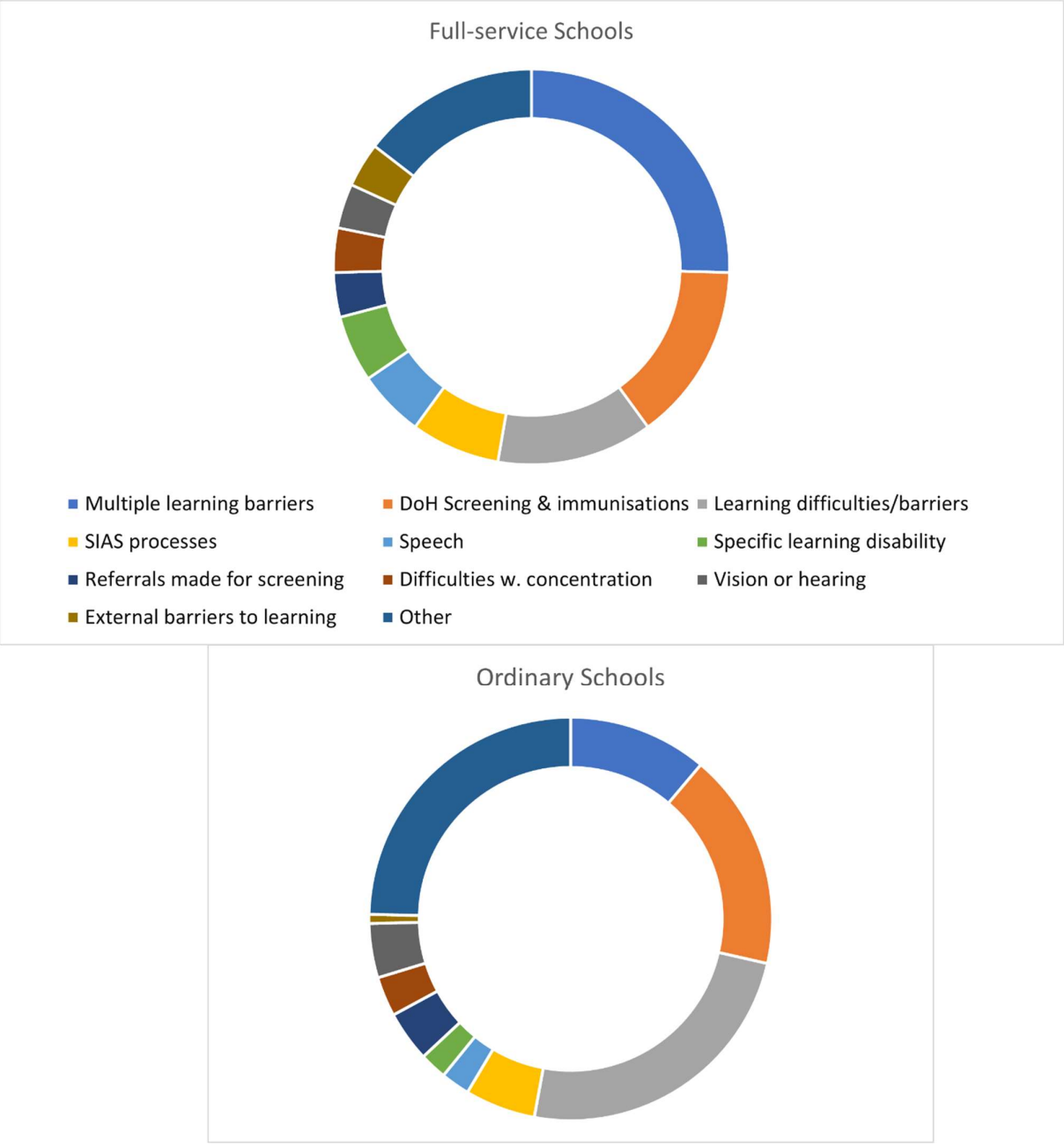

Figure 12: Types of screening reported by full-service schools and ordinary schools

Source: SMS, teacher questionnaire.

7.5.4 School-level enablers

On average, full-service schools were more likely to provide one or more learners with adaptive learning materials (see Table 44) and supported more learners with adaptive learning materials in 2017 [149]. Five full-service schools in the sample reported supporting more than 100 learners with adaptive LTSM. When these schools are excluded, there is no difference in the number of learners supported in this way in ordinary and full-service schools.

Learners and teachers in full-service schools are more likely to have access to the internet at school, but internet access is far from universal. Access to libraries was better in full-service schools than in ordinary schools; but 20% of full-service schools had no library at all, as shown in Table 44. The same analysis was repeated using unweighted data, with similar results (See Appendix Table 22 for details). Simple correlation analysis, shown in Table 46, suggests that full-service schools' ability to support learners with adaptive learning materials is correlated with prior receipt of training in curriculum differentiation, e-learning support from the district, and support visits from the district LTSM coordinator during the year. By contrast, receiving district support for the SBST is not well correlated with provision of adaptive learning materials.

Overall, 89% of full-service schools had accessible main entrances, but this is not statistically different from accessibility in other ordinary schools. Full-service schools in this sample were significantly and substantially more likely to have wheelchair-accessible toilets. Multivariate regression analysis (shown in Table 45) confirms that full-service schools are 15% more likely to have a wheelchair-accessible toilet than ordinary schools (when weighted).

[149] When one limits the sample to those schools that provided adapted learning materials.

Table 44: Physical and learning materials accessibility in full-service and ordinary schools in 2017

Proportion of schools:	Full-service schools	Other ordinary schools
With at least one toilet suitable for wheelchair users	0.48**	0.30
	(0.06)	(0.02)
With accessible main entrance[#]:	0.89	0.84
	(0.04)	(0.02)
That support at least one learner with adapted LTSM	0.45**	0.18
	(0.07)	(0.01)
In schools that provide adapted LTSM	33.0**	16.15
Mean number of learners supported with adapted LTSM	(8.88)	(2.10)
Internet available to teachers	0.74**	0.49
	(0.06)	(0.02)
Internet available to learners	0.31**	0.17
	(0.06)	(0.01)
No library at all	0.20**	0.49
	(0.05)	(0.02)

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Two-sample Wilcoxon rank-sum tests used for test of significance. Source: SMS 2017 (school-weighted). Data sourced from school observation, teacher questionnaire and principal interview. [#] This measure was created by combining two questions (Are there stairs at the entrance of the school? If yes, in your opinion, is there a ramp in a good condition that is not too steep, that could be used by a person in a wheelchair?).

Table 45: Association between full-service status and having a wheelchair-accessible toilet

	Probability (School has a wheelchair-accessible toilet)	
	Unweighted	Weighted
Designated full-service school in 2017	0.11**	0.15**
	(0.05)	(0.07)
Control variables	Province School wealth quintile Large school (>600 learners) Metropolitan area Accessible entrance to school	
Constant	0.27***	
	(0.05)	0.19***
		(0.06)
R-squared	0.039	
Sample	1,940	0.045
		1,940

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: SMS 2017, school observation.

Table 46: Correlation coefficients: Adapted LTSM in full-service schools

	Trained in curriculum differentiation	Received e-learning support	Received visit from LTSM coordinator	Received district support visits for SBST
School supports one or more learners with adaptive LTSM	0.144	0.128	0.104	0.03
Sample	95	95	95	94

Source: SMS 2017 principal interview (weighted using school weights).

7.5.5 Uncertainty around full-service designation

As discussed in Chapter 6 (section 6.3.4), triangulation of survey data with official data on full-service school designation showed a 51% rate of false positive reporting (schools that incorrectly claimed they were full-service schools) in SMS 2017. Data triangulation also revealed a 17% false negative rate (schools that incorrectly claimed they were *not* full-service schools). These response patterns suggest that there is a high level of uncertainty about what a full-service school is. They also suggest that communication on full-service designations of individual schools has been unclear and inadequate.

The high level of false negative reporting suggests that in almost one in five full-service schools, awareness of the schools' designation is poor. This suggests that these schools are not functioning effectively in their envisaged role.

7.6 Discussion

Neither the funding guidelines for full-service schools nor the district staffing norms had been released when the 2017 SMS was conducted. Thus, this data must be seen as evaluating what full-service schools had managed to achieve and provide without the support of a fully-staffed district team (in many districts) and without any additional funding or staffing for full-service schools.

7.6.1 Are full-service schools any different to ordinary schools?

This study shows that more teachers in full-service schools have been trained in identifying and supporting learners who are experiencing learning barriers and in curriculum and assessment differentiation. This suggests that full-service schools have been prioritised in the provision of training.

The previous chapter (see page 128) demonstrated that although more teachers in full-service schools have received training, this has not translated into increased confidence in addressing learning barriers. The guidelines for full-service schools include high expectations of teachers - teachers must be able to use a variety of approaches in their teaching, and their teaching strategies

must be responsive to the learning needs of the learners in their classes (Department of Basic Education, 2010). The lack of confidence among full-service school teachers may reflect that teachers feel they are not meeting these high expectations. This suggests that training of teachers in full-service schools needs to be further enhanced. It may also suggest that teachers in full-service schools need to be supported by the additional funding promised in policy.

This study provides evidence that full-service schools are more likely to be able to complete the SIAS forms and processes than ordinary schools, which is encouraging. However, while the SIAS policy states that all Grade R to 4 learners in full-service schools should have been screened for additional support needs by 2016 (National Department of Education, 2014), in this sample of full-service schools, only 56% reported being able to screen at least some learners for learning difficulties and could specify what screening was done. This suggests that the ambitious goals in the SIAS policy had not been met by late 2017. This finding is corroborated by the 2019 audit, which concluded that 90% of full-service schools were not adequately implementing the SIAS processes by 2019.

The results with regard to screening suggest that teachers in full-service schools have not been fully *oriented* to recognise difficulties in hearing, vision, and learning, as promised in the 2010 Guidelines.

Full-service schools are supposed to have measures in place to enable alternative or adaptive assessment (Department of Basic Education, 2010). It is thus concerning that in 20% of full-service schools the best qualified teacher had not received training in setting assessments for learners experiencing barriers to learning by 2017. Full-service schools should be conducting audits of available teaching and learning materials, including adapted LTSM (Department of Basic Education, 2010). However, SMS 2017 shows that 55% of full-service schools in the sample were not supplying any learners with adaptive learning materials and 20% did not have access to a classroom or central library, or regular access to a municipal or mobile library. It is encouraging that internet availability is at a higher level in full-service schools than ordinary schools, but this is still drastically insufficient. Low levels of internet availability limit the adaptive learning technology that is available to learners with disabilities. It prevents access to freely available, high quality assistive technologies which use cloud computing and require a stable internet connection (for example: dictation, screen-reading and live captioning in Microsoft and Google for Education products). The alternative is to purchase expensive stand-alone software.

It is encouraging that nearly all full-service schools have established SBSTs as this is one of the first critical steps in implementing disability inclusion in schools. The much higher number of SBST coordinators answering the teacher questionnaire in full-service schools suggests that the SBST is more likely to be functional in full-service schools than in ordinary schools and that SBST coordinators are more likely to take ownership of inclusive education in their schools. The large

number of full-service schools that were unaware of their schools' designation (17% of schools) suggests that official designation made little difference to the daily running of almost one in five full-service schools in the sample. It may also suggest that information on the official designation was poorly communicated to schools.

Participation in communities of practice has been advocated for as a particularly useful way of collaborating to embed implementation of inclusive education (Lancaster, 2014). Therefore, it is encouraging that more full-service schools are involved in PLCs than ordinary schools. However, given the broad role envisaged for full-service schools in the 2010 guidelines (which state that there should be "exchange of knowledge between full-service schools and neighbourhood schools") (Department of Basic Education, 2010), one would expect almost universal involvement in PLCs.

The terrain of the school property and condition and accessibility of the buildings, toilets and playground are considered before a school is designated as a full-service school (Department of Basic Education, 2010). As a result, one would expect all full-service schools to be physically accessible. This is not the case in this sample of full-service schools. The once-off infrastructure allocations to full-service schools must be allocated to remedy this situation. A full-service school cannot be considered to be a "flagship school of inclusion" if the main entrance to the school is not physically accessible.

The multivariate analysis presented in Chapter 5 (see Table 18 on page 100) demonstrates that nationally, full-service schools were between 23 and 34% more likely than ordinary schools to report the presence of any learners with disabilities in 2011, 2013 and 2014. Full-service status was one of two factors with the largest effect size in the model[150]. However, a large proportion of all full-service schools (59% in 2013) were not yet reporting any learners with disabilities.

The 2010 guidelines for full-service schools emphasised that full-service schools would need support visits from the district-based support team or special school resource centre for staff training and individual learner interventions so they could fulfil their expanded role (Department of Basic Education, 2010). This study provides some evidence that SBSTs in full-service schools are receiving more support from the district than ordinary schools. However, the coverage of district support services remains unacceptably low.

Both this study and the 2019 audit consistently show that full-service schools are unlikely to be meeting the mandate set in the 2010 guidelines. The number of full-service schools (n=95 in 29 districts) included in this analysis slightly exceeds the number of full-service schools assessed by

[150] The other factor was being in school wealth quintile 5.

the Auditor-General and covers more districts (n=87 schools in 22 districts). This study paints a more optimistic picture of full-service school functionality than the (summary) results of the Auditor-General. Several aspects of the study design may explain this difference. There are many Western Cape full-service schools in the sample. As the previous chapter demonstrated, schools in the Western Cape generally score better on all indicators of disability inclusion than schools from other provinces in the SMS 2017. Similarly, the Western Cape performed much better than other provinces in the Auditor-General's assessment (there were no audit findings in the Western Cape in eight of the 13 areas investigated, while six other provinces had audit findings in all 13 areas). Thus, the bias towards Western Cape schools in the SMS sample may be partly responsible for the more positive assessment of full-service schools. The difference may also be because the Auditor-General's assessment was more qualitative in nature, which allowed for the collection of more nuanced, in-depth data, and data on perceived quality of services. Support from the provincial education department and district were assessed in more detail in the audit. The more pessimistic findings of the audit suggest that the questions in the SMS 2017 may skim the surface of full-service school functionality. The questions do not provide sufficient detail and are not probing enough to make a full assessment of the functioning of full-service schools. This accords with previous findings that school surveys may not "penetrate the façade of socially desirable reporting" (Taylor et al., 2019) and can present an overly optimistic view of school functionality in South Africa.

Finally, the audit and the current study evaluate different research questions. This study aimed to determine whether full-service schools perform better than ordinary schools in several aspects of inclusion, while the audit aimed to assess if full-service schools were meeting the expectations of the 2010 guidelines.

7.6.2 Further improvements needed in measurement

Further triangulation of data demonstrated that SBST coordinators provided more accurate responses on SIAS processes than other role-players. As a result, in future rounds of SMS, only SBST coordinators should answer the teacher questionnaire, where possible. The same triangulation process shows that reporting on SIAS processes was more accurate in full-service schools than in ordinary schools. As a result, more detailed questions on the SIAS process and disability inclusion should be posed to full-service schools in future research.

The need for disability-disaggregated enrolment to be measured alongside other data on disability inclusion was discussed in Chapter 6. The further analysis undertaken in this chapter supports this argument. Multivariate analysis failed to show any significant association between previous enrolment of learners with disabilities (in 2011, 2013 or 2014) and physical accessibility, provision of adaptive learning materials, or teacher training or confidence in 2017. This suggests that data on historical numbers of learners with disabilities is a poor proxy for current enrolment and cannot be

used in the future. Without data on enrolment of learners with disabilities in these schools in 2017, it is not possible to determine whether low levels of provision of adaptive learning materials in some full-service schools are indicative of unmet need or of low enrolment of learners with disabilities in these schools. Furthermore, five full-service schools reported supporting more than 100 learners with adaptive learning materials in 2017 but did not report high numbers of learners with disabilities between 2011 to 2014. However, without data on the number of learners with disabilities or number of learners supported by the SBST in 2017, it is difficult to come to any firm conclusion about the accuracy of this reporting. In the future, it would be sensible to limit this question to schools that enrolled at least one learner with high-level additional support needs[151].

The wording of this question on *adaptive LTSM* should be improved to make the meaning clearer. Questions on provision of learning materials in different formats (such as multiple languages, large or reduced print, digitally, video, pictograms, in audio) should be added for future surveys of full-service schools. More information is needed about the relationship between full-service and special school resource centres and the support that is being provided by resource centres. This study did not directly assess coverage of school health screening in full-service schools as various types of support are investigated in a single question. For full-service schools in particular it is essential that separate questions on support services provided (psychologist, social workers, health screening by the Integrated School Health Team, support visits from the district-based support team) be asked so that the availability of all these services can be individually tracked. Information is also needed on the quality of support from each of these sources.

Only two aspects of physical accessibility were assessed (toilets and main entrance) in SMS 2017. A more thorough assessment of physical accessibility is needed, particularly for full-service schools. Simplified disability accessibility audits should be conducted on a regular basis at full-service schools. It is also important to assess innovative ways in which full-service schools have overcome inaccessible school infrastructure in terms of timetabling changes, or changes to the structure of the school day. This would require a more detailed, dedicated survey of a representative sample of full-service schools.

The SMS does not contain any measures of parental involvement (particularly in the SIAS process) or OPD involvement at the school. Given the description of full-service schools in the 2010 guidelines, collaboration with parents, OPDs and non-governmental organisations in the disability sector should be measured. Given the existing evidence on poor relationships between district-based support teams and SBSTs (Makhalemele & Payne-van Staden, 2018), the effectiveness of

[151] The question may not have been understood among educators who had not worked with learners with high-level support needs.

these relationships should be explored in a large survey once these teams are staffed in most districts (after 2024).

Finally, there are no questions in the SMS which investigate the extent to which schools have attempted to identify barriers to learning in the curriculum, their own teaching methods or in the physical environment in their schools.

7.6.3 Implications for funding of full-service schools

Many of the results described in this chapter (inadequate access to the internet, adaptive learning materials, non-universal coverage of teacher training) may be explained by the lack of additional funding to full-service schools for ongoing costs from 2001 to 2021. Without additional recurrent funding allocated through the amended school funding norms, these inputs are unlikely to improve.

These results suggest that, at an absolute minimum, additional capital funding will be needed in 66% of full-service schools to upgrade learner toilets and in 11% of full-service schools, to renovate inaccessible main entrances. Libraries need to be established and stocked in 20% of full-service schools. It is quite likely that further renovations and adjustments are needed to make full-service schools physically accessible, but this would require more detailed accessibility audits of all full-service schools.

7.7 Limitations

Although the full-service school sample closely matches the population of full-service schools, there are only five secondary schools in the sample. As a result, the findings of this analysis are not generalisable to full-service secondary schools. The composition of the sample meets expectations as, when the concept of full-service was first mooted in 2001, only full-service primary schools were planned (National Department of Education, 2001, p. 22).

As discussed earlier, the sample of full-service schools is not provincially representative (see section 7.3.1). This limits the generalisability of the results. In particular, there is only one full-service school from Limpopo in the random sample. This limits the generalisability of findings to full-service schools in Limpopo.

7.8 Conclusions

Overall, this study shows that, in 2017, full-service schools outperformed ordinary schools in the availability of disability support structures, teacher training, and accessibility of physical infrastructure and learning materials. This data suggests that the process of specially equipping, supporting and strengthening full-service schools has begun and there has been some prioritisation of these

schools, but that much more progress is needed. In relation to several other aspects of disability inclusion, full-service schools are not performing any better than ordinary schools (teacher confidence, ability to screen learners' hearing and vision). Many full-service schools are not reporting higher enrolment of learners with disabilities than ordinary schools. There are clear knowledge gaps among teachers regarding what a full-service school is, and its role. Communication on full-service designation needs to be much clearer.

The results suggest that full-service schools are not meeting the (very ambitious) vision laid out in the 2010 guidelines. However, the blame for not meeting the expectations of these guidelines cannot be laid entirely at the door of principals of full-service schools. Firstly, it is very difficult to measure full-service schools against the 2010 guidelines as they are vague, far too extensive, and idealistic. The expectations of full-service schools in the 2010 guidelines should be consolidated into fewer, more concrete criteria which all full-service schools have a realistic chance of achieving in the medium term, if fully funded.

Secondly, full-service schools have not received additional funding to support their expanded role. District-based support teams have not been fully staffed. As a result, full-service schools are still an unfunded (and therefore untested) strategy in South Africa. It would be premature to discard the idea before the country has had the opportunity to learn from best practice among these schools. There is much to be learned and documented from this group of schools about the cost of making schools physically accessible, the training needs of teachers in truly inclusive schools, securing accessible scholar transport, ensuring effective collaboration with OPDs and non-governmental organisations, district-based teams and the School Health Programme, and developing an inclusive school culture.

Until such time as new post-provisioning norms for full-service schools are published, staffing of these schools is likely to remain unchanged. This will hamstring implementation of disability inclusion in full-service schools.

8. Conclusions

This study set out to address three key research objectives:

1. To assess the data on enrolment of learners with disabilities (as collected by ordinary schools in South Africa) in line with the biopsychosocial model of disability,
2. To assess and expand current measurement of key inputs, processes and enablers needed for effective disability inclusion in schools and to assess the remaining gaps in measurement of disability inclusion at school level, and
3. To thoroughly describe how well ordinary and full-service schools in South Africa are performing in disability inclusion.

This chapter summarises the evidence generated by this research in addressing each of these objectives. It also describes the study's contribution to the body of knowledge in the area of measurement of disability inclusion in schools, new evidence on the progress of disability inclusion in South African schools, and outlines some of the remaining gaps in existing knowledge.

8.1 School-level disability-disaggregated enrolment data

This dissertation explored several research questions in relation to disability-disaggregated enrolment data, as collected by ordinary schools.

- How is disability status measured in school-level processes and data in South Africa and how does this differ from measurement of disability in household surveys and best practice (in line with the biopsychosocial model of disability)?
- What is the quality and consistency of disability-disaggregated enrolment data collected in ordinary schools in South Africa?
- Does the current funding strategy for disability inclusion incentivise schools to report enrolment of learners with disabilities?
- How closely do the school-level *reported* rates of enrolment of learners with disabilities reflect rates of enrolment estimated from household surveys?
- Does school-reported enrolment of learners with disabilities reflect differences in disability prevalence by province, or provincial differences in the capacity to identify (and report) enrolment of learners with disabilities?

This research shows that in the Annual School Surveys (2011-2014), and the new learner-level EMIS (SA-SAMS), disability status is identified using a set of medical questions. This is despite the implementation of the screening and identification process in schools from 2008 onwards which uses functional assessment of disability (aligned with the biopsychosocial model of disability). The

continued use of medical categories of disability in school data systems is at odds with South Africa's inclusive education policy and with the CRPD.

Previous research has suggested that where schools collect data on learner disability status or on total enrolment of learners with disabilities, it is often of poor quality (International Disability and Development Consortium & Light for the World, 2017; Pulkkinen & Jahnukainen, 2016) .This study adds to this literature by showing that disability-disaggregated enrolment data collected in the Annual School Surveys from 2011 to 2014 was generally of poor quality, and (at the school level) was inconsistent across these years. Mont (2014) suggested that low data quality is likely where there is little use of disability-disaggregated enrolment data, once it is collected. This explanation fits in the South African context. Poor data quality may also be explained by the general lack of buy-in to the idea of inclusive education previously identified by Du Plessis (2013) and Watermeyer et al. (2016). This study identified three additional factors contributing to poor data quality. Firstly, the review of funding policies that was conducted as part of this dissertation revealed that there are currently no financial incentives for schools to enrol learners with disabilities or to report the enrolment of these learners. This has likely contributed to the haphazard, inconsistent reporting of enrolment observed in the annual survey data. Secondly, the co-existence of two very different sets of questions on disability status within the Department of Basic Education systems (the categories used in EMIS and those used in the screening and identification process) has very likely led to confusion, which would have fuelled inconsistent reporting. Finally, the cumbersome process of reporting aggregate numbers of learners with disabilities per grade, gender and disability category in the Annual School Survey made the data prone to errors.

Previous research (Bamford, 2019) provided evidence on the poor coverage of school health screening. This has very likely contributed to delayed identification of disability among school children. This study highlighted two other factors that undermine identification of learners with disabilities in schools: schools' poor ability to screen learners for visual, hearing or learning difficulties and low coverage of district support for SBSTs. These gaps in identification mean that school-level reporting of enrolment of learners with disabilities is likely to be incomplete. All of these factors must be addressed if disability-disaggregated enrolment (as reported by schools) continues to be used as a key indicator of progress in disability inclusion[152].

Nuga-Deliwe (2016) predicted that the introduction of the new learner-level EMIS (SA-SAMS) would improve data consistency over time by streamlining the data collection process. The findings in this dissertation support this prediction. It appears that, in the Eastern Cape, collection of learner-level data on disability status (in SA-SAMS) has encouraged reporting of learner disability status. This

[152] All these factors must also be addressed to promote early identification of disability among learners.

confirms suggestions by previous researchers (Sprunt et al., 2016) that learner-level EMIS are much better suited than school surveys to provide disability-disaggregated schooling data. No other studies were found which directly compare disability-disaggregated enrolment data generated by a learner-level and school-level EMIS. However, a learner-level EMIS is a demanding data system that would be difficult to maintain and extract data from in most low-income countries. In middle-income countries, the introduction of a learner-level EMIS is recommended as a strategy to improve quality of disability-disaggregated learner data.

Research by two international disability advocacy groups previously suggested that in LMICs, schools in better-resourced areas are much better able to identify learners with disabilities in their school populations (International Disability and Development Consortium & Light for the World, 2017). Indeed, this study showed that schools in quintiles 4 and 5 are more likely to identify, and report, enrolment of learners with disabilities. There is some evidence that schools in the Western Cape and Gauteng (the wealthiest provinces in South Africa) are more likely to report enrolment of learners with disabilities despite lower childhood disability prevalence in these provinces. This is corroborated by other evidence from this study (presented in section 6.5.4), which shows that schools in the Western Cape and Gauteng are more likely to report being able to screen learners' vision and hearing. Gauteng schools are also more likely to complete the screening, identification, and assessment process for any of their learners than schools in other provinces. The results suggest that the current reporting of enrolment of learners with disabilities is highly distorted.

This study provides evidence for other LMICs, to show that school-level reporting of disability can be flawed for a number of reasons. As a result, school-reported disability enrolment should not be used to allocate funding for inclusive education.

No previous quantitative research on disability inclusion in South Africa has addressed the accuracy of responses by different stakeholders in schools. The analysis of the SMS 2017 in this study suggests that SBST coordinators provide more accurate responses on disability inclusion than principals, deputy principals or LSEN educators. This suggests that in South Africa SBST coordinators should be responsible for entering data on disability status in the EMIS. In this way, the study provides a further strategy to improve the quality of data in EMIS.

8.1.1 Recommended changes to the measurement of disability status in EMIS

South Africa's inclusive education policies are based on the biopsychosocial model of disability. Thus, any indicators of disability inclusion used in school data systems should be aligned to this model.

As discussed in section 2.4, some previous research has recommended the use of the Washington Group Short Set of questions in EMIS (Mont, 2014; UNICEF Education Section, 2016), while other studies identified some shortcomings in identifying learning disabilities in young children using the Washington Group Short Set (Mactaggart et al., 2016; Statistics South Africa, 2018). Research in the Pacific Region has shown that some questions from the Child Functioning Module can be adapted and used to identify childhood disability in learner-level EMIS (Sprunt et al., 2017). This module has been shown to be well understood by teachers in Tanzania (Mont, 2014) and parents in South Africa (Visser et al., 2016) and seems a good candidate for use in SA-SAMS. A more recent report[153] (Dube & Mont, 2021) recommended that the Washington Group Extended Set of questions should be adopted across government departments in South Africa.

However, as pointed out in this study[154] and in previous research (Sprunt et al., 2016), the categories of disability used in the Health and Disability Assessment Forms by district-based support teams are well-aligned with the biopsychosocial model of disability. A recent report (Dube & Mont, 2021) notes that these forms are well-aligned with the Washington Group Extended Set of questions. Dube and Mont (2021) recommend some modifications to the wording of the other forms used in the screening and assessment process (the Support Needs Assessment forms) to align these more closely with the Washington Group Extended Set of questions. However, for practical reasons, this study warns against this. Training on the SIAS process has already been rolled out to schools (Department of Basic Education, 2017), and the SIAS categories of disability should now be familiar to teachers. Introducing questions from the Child Functioning Module or Washington Group Extended Set into SA-SAMS or the screening and assessment forms at this stage may lead to confusion and undermine SIAS training.

Instead, this study recommends that SA-SAMS, all school surveys and the updated post-provisioning norms (due in 2022) should be aligned with the SIAS data collection tools and should use the disability categories, as detailed in the Health and Disability Assessment Form.

This study recommends that where learners have been assessed by the district-based support team, their assessed level of additional support need (low-, moderate- or high-level) should be collected in SA-SAMS. If this data were collected, there would be no need to collect proxy data on level of assessment and support in the School Monitoring Survey (on the number of learners for whom the SIAS forms had been completed and the number of learners for whom adaptive learning materials had been provided).

[153] This report was obtained when this dissertation was near completion and was thus not included in the literature review.
[154] And as recognised by Dube and Mont (2021).

In other LMICs, data on the level of support needs is simpler to complete within schools than that on category of disability and provides information which is directly useful for teachers and useful in resource planning (Sprunt et al., 2016).

This study highlighted the weaknesses of current questions on disability status in the school-level data and suggested changes to improve this data in the future. Better data on enrolment of learners with disabilities would enable more meaningful research on the inequalities in education faced by the current generation of learners with disabilities. Improved identification of disability status in schools will allow many new research questions on the presence and performance of learners with disabilities in ordinary schools to be addressed by quantitative research in the future. Several of these are outlined in section 8.3. The changes to disability questions recommended in this study would also bring the school data into alignment with data from household surveys and other government departments (if the Washington Group Extended Questions are to be adopted across different spheres of government, as suggested in a recent report (Dube & Mont, 2021)).

This study shows that rates of enrolment of learners with disability reported by schools are much lower than those estimated in household surveys. Until the changes outlined above have been implemented, the Department of Basic Education and Treasury should use household survey data on disability prevalence rather than school-level data when making decisions about total funding allocations for inclusive education.

Previous research has shown that children with disabilities are not identified early enough in the school system (Department of Social Development, 2015; Department of Social Development et al., 2012) and that coverage of health screening in schools remains low (Bamford, 2019). This research adds to the literature by showing that schools lack the ability to screen learners for disabilities and difficulties. The *Support Needs Assessment* forms provided to schools are not supplemented with any screening tools that can be used by teachers. Currently the Child Functioning Module is designed for use in surveys, rather than in classrooms. However, it may have potential as a screening tool for teachers and should be tested for this application. In particular, it could be used to guide discussions between caregivers and teachers when a learner is identified as being at risk of learning breakdown.

Previous research which assessed disability accessibility and inclusion levels in healthcare services in South Africa demonstrated that exposure to disability inclusion questions in the research process led to increased sensitisation of healthcare staff who then began to implement changes to increase the accessibility of their environment (Hanass-Hancock & Alli, 2015). Similar sensitisation was apparent in the qualitative research in this dissertation (see page 140). Using the Child Functioning

Module as a screening tool could also sensitise teachers to disabling factors in the school environment and may empower them to implement changes in their own schools.

8.2 Measurement of disability inclusion in schools

Previous research highlighted that little evaluation has been undertaken in the area of disability inclusion in schools in Africa (Tim Loreman et al., 2014; Srivastava et al., 2015). This study shows that very little quantitative research has explored disability inclusion in schools in South Africa. Previous research on disability inclusion in the country's schools (Engelbrecht et al., 2016; Fish Hodgson & Khumalo, 2016; Human Rights Watch, 2015; Makhalemele & Nel, 2016; J. McKenzie et al., 2020; M. Nel et al., 2019; N. M. Nel et al., 2016) provided useful insights into gaps in provision for learners with disabilities, but the findings are difficult to generalise as they cover a small number of districts. By contrast, the findings of this study are generalisable as the data analysed is nationally representative.

As discussed in section 2.1, previous reports on CRPD implementation (Government of the Republic of South Africa, 2013) largely outlined policies that support the CRPD, but provided little evidence on provision of reasonable accommodation, individual support or physical accessibility of schools. This is partly because the SMS 2011 only assessed teacher education and training in disability inclusion and schools' ability to screen learners for "special needs".

This study resulted in substantially expanded measurement of inputs, processes, and enablers of effective disability inclusion in the SMS 2017. It tested new questions on wheelchair accessibility of the main school entrance, proxy questions on levels of assessment and support in schools, and more detailed questions on teacher training. The new questions on wheelchair accessibility and teacher training could be utilised in future reporting on Article 24 of the CRPD.

The study has not only expanded measurement of disability inclusion in the SMS but also provided much-needed new analysis of the state of disability inclusion in ordinary schools in South Africa. The results presented in Chapter 6 describe the coverage of SBSTs, district support for SBSTs and visits by specialists in 2017 and show that progress has been made in the coverage of the first two of these, but not in the latter.

Initial data from 10 LMICs that have implemented MICS (round 6, which includes Washington Group) suggests that children with disabilities (aged 7 to 14) are 19% less likely to achieve a minimum reading proficiency than children without disabilities (UNESCO, 2020b, p. 9). For these countries, this study has demonstrated some of the areas in which South Africa has fallen short in providing inclusive education to learners with disabilities. It provides some examples to other LMICs on the

type of factors they should consider measuring as they try to identify reasons for the poorer reading proficiency among learners with disabilities who are enrolled in mainstream schools.

Within South Africa. the differences in coverage by province are highlighted. In identifying particularly poor screening ability and low levels of specialist services in the Northern Cape, this study is able to provide a further explanation for low levels of identified disability among learners in this province in the Annual School Survey data. This research highlights the importance of having a SBST and suggests that universal SBST coverage is one means of reducing inequality in disability inclusion.

This study is also the first to report on progress in similarly measured aspects of disability inclusion in South Africa in a large sample of schools over time (2011 to 2017). For example, it allows progress in provision of accessible toilets in schools to be tracked from 2011 to 2017.

Applying multivariate techniques to the SMS data and school-level data on enrolment of learners with disabilities enabled a much richer analysis of these datasets than has previously been undertaken. It allowed provincial and wealth inequalities in education inputs and processes for learners with disabilities to be demonstrated. Schools in the Eastern Cape and Limpopo are shown to be lagging behind across the range of inputs that were measured. Schools in Gauteng and the Western Cape were shown to be performing better than schools in other provinces in screening, identification and assessment processes and were more likely to receive specialist visits in the year. The results strongly suggest that learners in impoverished provinces are unlikely to be receiving reasonable accommodation of their disabilities.

Watkins et al. (2014) highlighted that teacher education and training in disability inclusion is a key area that must be assessed when monitoring implementation of inclusion in schools. Analysis of the 2011 SMS showed that teacher training coverage was lower than average in Limpopo, the Eastern and Northern Cape and Mpumalanga, and that coverage increased with school quintile (Department of Basic Education, 2013c, 2014b). By expanding questions on teacher training in SMS 2017, this study has shown that while coverage of training may be high, such training may lack depth. Low coverage of training in curriculum differentiation was identified as particularly concerning gap in teacher training for disability inclusion in ordinary schools. More in-depth training is required to improve teachers' understanding of the role of full-service schools and the screening process, and to empower them to use lay screening tools (such as smartphone-enabled hearing screening apps). Multivariate analysis demonstrated that teachers who had received prior training were more likely to be confident in supporting learners who are experiencing learning barriers.

Previous research has shown that the school health screening programme only covers 33% of Grade 1 learners (Bamford, 2019). In addition, Samuels et al. (2020) found that collaboration between the

Integrated School Health Programme and the Department of Health is poor. Low levels of collaboration are likely to reduce the effectiveness of the school health screening programme. This research adds evidence of teachers' poor understanding of their role in screening. The lower rates of disability identified among learners in the first four grades of school provide evidence that early identification of disability is not currently occurring. This finding, together with the findings of Bamford (2019) and Samuels et al. (2020) suggests that the health screening programmes offered by the Integrated School Health Programme must be further strengthened so that early identification of disability can be improved.

The CRPD emphasises the need to provide accessible physical environments in schools. Mont (2014) shows that most EMIS in LMICs do not measure any aspects of physical accessibility of schools. UNICEF (2016) recommends that, at a minimum, accessibility of the main entrance and toilets be measured in schools. Through this research, the SMS 2017 adopted this recommendation and provides new evidence which suggests that most South African public schools have a wheelchair-accessible main entrance. This is a first step towards routinely collecting physical accessibility data in a school survey.

The need for improved provincial accountability for the implementation of inclusive education has been highlight by the Department of Basic Education (Government of the Republic of South Africa, 2013). These new measures could play an important role in bringing about increased accountability for inclusive education. However, allocation of funding for key disability support structures by the national Department of Basic Education is essential before provinces are held to account for implementation.

Studies by Mont (2014) and UNICEF (2016) recommend that enrolment of learners with disabilities should be measured alongside school accessibility, teacher training for inclusion and provision of assistive devices. This is in line with the biopsychosocial model of disability. This study has incorporated this recommendation to the greatest extent possible with current data, by conducting an analysis of disability-disaggregated enrolment and other indicators of schools' readiness to provide reasonable accommodation for learners with disabilities. In doing so, this research provides new insights into how factors intersect to reduce teachers' and schools' ability to provide reasonable accommodation of learners' individual needs. For example, the study demonstrates that rates of reported enrolment of learners with disabilities in the foundation phase are low, teachers have a poor understanding of their role in screening, a large number of schools had not completed the SIAS forms for any learners, and there are relatively low levels of support from the district and from specialists. All of these factors suggest that teachers find it difficult to screen for and identify disabilities and learning difficulties among learners without adequate support from key disability support structures (particularly district-based support teams). However, the study is limited by the

fact that access could not be obtained for concurrent data on enrolment of learners with disabilities. This makes evidence from SMS 2017 difficult to interpret in some instances. For example, data on provision of adaptive learning material (from SMS 2017) is difficult to interpret without concurrent data on whether any learners with disabilities have been identified and reported in that school. By exploring funding of inclusive education, this study also shows that low levels of support are a direct result of the lack of funding of these support structures.

Weaknesses in the survey questions on teacher training, screening activities and SIAS processes were identified in this research and suggestions were made to improve measurement in these areas. The Department of Basic Education has engaged with the study's preliminary results and is in the process of making further refinements to the SMS 2022 in the area of disability inclusion. This will enable progress in some indicators to be measured from 2017 to 2022 and others to be tracked from 2011 to 2022.

Several remaining gaps in measurement of disability inclusion were identified (see Chapters 6 and 7 for details). In a school survey, it is difficult to directly measure the provision of reasonable accommodation for learners with disabilities. Indeed, these results tell us little about the provision of reasonable accommodation directly. However, they do show that fewer schools in the Eastern Cape, Limpopo, and KwaZulu-Natal have support structures in place to effectively provide learners with disabilities with reasonable accommodation.

According to Watkins et al. (2014, p. 71), receipt of support services is one of the key elements of disability inclusion which should be monitored in schools. This study recommends that data should be collected in SA-SAMS on which additional support services learners have been referred for and have received. In particular, additional fields should be added to SA-SAMS to record whether each learner identified as having a disability has received support from the district-based support team or resource centre. This will enable monitoring of which learners are receiving support services, as recommended by Watkins.

Many LMICs are grappling with the challenge of reporting meaningfully on progress made in reforming their education systems to become more disability-inclusive. This study adds to the body of knowledge on appropriate measurement of disability accessibility, teacher training status, the extent of screening activities in schools and availability of disability support structures in school surveys. The findings can also be used to provide guidance to other middle-income countries in their efforts to develop appropriate disability-inclusion indicators. Furthermore, it describes the questions teachers found difficult to answer, weaknesses in the questionnaire design, and methods of data triangulation that have reduced socially desirable reporting. Utilisation of this information may also help other countries to design improved school surveys to assess inclusion in ordinary schools.

The study also aimed to determine whether there were discernible differences in school-level inputs and processes for disability inclusion between full-service and ordinary schools in the SMS sample. The results showed that some school-level inputs and processes for disability inclusion are discernibly better in full-service than in ordinary schools (full-service schools are more likely to have an SBST, be visited by a specialist in the year, receive district support for the SBST, and to complete the SIAS process for any of their learners). However, no difference was found between full-service and ordinary schools on other indicators of disability inclusion, such as teacher confidence and ability to screen learners' hearing and vision. Despite performing better than ordinary schools on a number of indicators, the average full-service school is falling far short of the (rather ambitious) expectations laid out in the 2010 guidelines. This is unsurprising given that this group of schools has not yet received additional staffing or funding to cover the cost of providing reasonable accommodation. Indeed, the findings of this research clearly demonstrate the urgent need for funding for district-based support teams, resource centres and full-service schools. The draft funding guidelines for inclusive education need to be completed and finalised immediately. Once the White Paper has been reviewed and updated, these funding guidelines must be converted urgently into a set of minimum norms and standards, with associated timelines. Vague and extended timelines such as those in the Amended national norms and standards for District staffing must be avoided.

The analysis of the SMS 2017 provides much more generalisable findings than previous research on the functionality of full-service schools, which only covered a few districts. All the same, the analysis only scratches the surface in evaluating the state of disability inclusion in these schools. Given the very high expectations of full-service schools, a dedicated and much more probing survey of a random sample of full-service schools would provide more detailed data on disability inclusion (including enrolment). Respondents in full-service schools showed more meaningful understanding of inclusive education concepts and should cope well with more detailed questions.

More detailed information on accessibility of schools is needed for full-service schools, in particular. Research in the health sector has suggested that full disability audits may not be feasible in South Africa at this stage (Hanass-Hancock & Alli, 2015). Simpler tools are being developed for use in this sector. A similar tool should be developed to enable disability accessibility to be rapidly assessed in South African schools. This research is needed to inform government on the investment required made to make full-service (and ordinary) schools universally accessible.

Previous research has shown that the costs of reasonable accommodation are often borne by caregivers (Department of Social Development, 2015). A recent study (Equal Education Law Centre, 2022) called for urgent finalisation of funding allocations for inclusive education in South Africa. While this study did not set out to evaluate funding of disability inclusion, its findings clearly illustrate the effect of not allocating funding to inclusive education. This research demonstrates that, until the

inclusive education policy is backed by a funding strategy which asserts the responsibility of the state to fund reasonable accommodations for children regardless of the type of school they are enrolled in, these costs will continue to be borne by caregivers or to be a barrier to enrolment in ordinary schools. The study demonstrates that the 2018 funding guidelines must be immediately converted into new post-provisioning norms, and a new set of school funding norms.

8.3 Future research priorities

Collection of learner-level disability data in SA-SAMS will allow research on these aspects of learner achievement to be addressed for the first time. This study has showed that in the early grades fewer learners are reported to have disabilities than in the intermediate phase of schooling. However, because of the cross-sectional nature of the data analysed in this study, it is difficult to reach clear conclusions on what is causing this phenomenon. Future analysis of the SA-SAMS data should establish grade-age profiles for learners with disabilities and track the progression of learners with disabilities over multiple years This would enable analysis of drop-out and repetition among learners with disabilities in different parts of the school system. Using learner-level data, one could calculate the mean age and grade at which learners are identified as having a disability. This would provide insights into the relative contribution of drop-out and delayed identification of disability on the low rates of enrolment of learners with disabilities observed in this study. As SA-SAMS integrates data collection across special and ordinary schools for the first time, it will enable comparison of learner characteristics and performance across special, full-service, and ordinary schools in the future.

Data on learning outcomes for learners with disabilities has not been collected in South Africa, as special schools and students with disabilities who are enrolled in ordinary schools are explicitly excluded from large international surveys of learning outcomes such as TIMSS (Schuelka, 2013) (LaRoche & Foy P, 2016). Surveys such as TIMSS have been key to monitoring learning outcomes in the wider education system in South Africa in recent years. The design of TIMSS, PIRLS and other such surveys should be altered to include consistent disability questions (such as the Washington Group questions) across countries. While measuring learning outcomes for children with disabilities is beyond the scope of these surveys, the current situation (where learners identified as having disabilities or learning difficulties are excluded from the sample) is unacceptable. Future research should explore how these surveys could be modified to measure learning outcomes among learners identified as having disabilities, while avoiding the floor effects encountered in applying these surveys in contexts such as South Africa (Department of Basic Education, n.d.).

In future analysis, it is crucial that indicators of disability inclusion in schools are linked with reliable, concurrent, school-level data on enrolment of learners with disabilities. This would allow a much more thorough analysis of unmet need for reasonable accommodation and access to support services at school level and would allow the biopsychosocial model of disability to be more fully

operationalised. To enable this analysis, data from the forthcoming 2022 SMS must be merged with school-level data on enrolment of learners with disabilities from SA-SAMS.

DHIS monitoring has previously highlighted the exceptionally low screening targets set by some provinces (Bamford, 2019, pp. 122-123). The funding and operation of the Integrated School Health Programme needs to be evaluated in the light of poor results on screening in schools and lower reported rates of disability in quintile 1 to 3 schools. Future research should assess the feasibility of integrating DHIS screening coverage data and school survey data, at the district or school level, and whether this provides further insights into implementation of the school screening policy.

Assistive devices are a key enabler of school enrolment, which is not investigated in this research. Household surveys such as the GHS and census collect some data on the use of assistive devices. Research of Census 2022 should explore access to assistive devices differentially for children who are in and out-of-school.

The National Senior Certificate (school-leaving) examination registration data includes information on whether a learner has been allocated any reasonable accommodation, concessions[155] or adaptation to assessment in the examination. If data on permitted reasonable accommodation could be merged with learner-level data (including disability status) in SA-SAMS, this could prove a reliable indicator of disability inclusion processes in the senior years of secondary school. The results would not be generalisable to the whole school population due to selection bias (it would only be measurable for those learners who remain in school up to the start of Grade 12). Future research could track the proportion of learners who have been allocated reasonable accommodations in school-leaving examinations and monitor their performance.

In South Africa little research has explored demand-side constraints on disability-inclusive schooling. Parents of children with disabilities may perceive that the returns on education are lower for a child with disabilities than for their other children without disabilities. This will likely lead to sub-optimal investment in education for children with disabilities, and decisions not to enrol a child in school. Where the state has not provided accessible learning environments and reasonable accommodation, the direct cost of education to households becomes higher for children with disabilities than for those without. Both sets of factors may lead to parental decisions not to enrol children with disabilities in school, or to withdraw their children from school at a younger age (Mizunoya et al., 2016, p. 390). These factors may lead to a preference for special schools. Future research should investigate the role played by these factors in parents' decisions about initial enrolment and decisions to withdraw a child from school, once enrolled.

[155] Permission to be exempted from assessment in certain subjects or sections of assessment due to dyslexia or a mathematical disorder, for example.

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Appendix A

Appendix Table 1: Core school-level indicators of the Pacific Indicators for Disability-Inclusive Education (2018).

Dimension	Core indicator
Presence & achievement	Number of regular schools enrolling children with disabilities
	Number of children with disabilities completing primary school
Physical environment & transport	% of schools with adapted infrastructure and materials for students with disabilities
Early identification & services	Number of children with disabilities who are provided with relevant assistive devices & technologies
Collaboration, shared responsibility & self-advocacy	Formal processes are established to systematically involve parents of children with disabilities in educational programmes
Curriculum and assessment practices	Number of children with disabilities who sit exams with reasonable accommodations
Transition pathways	Number of children with disabilities graduating at an age-appropriate level from primary school and transitioning to secondary school

Source: Sharma et al., 2018.

Appendix Table 2 Disability data collection form 3.13 in Annual School Survey 2013

EMIS NUMBER

3.13	Number of disabled learners according to grade and PRIMARY DISABILITY: MALE (Learners may NOT be double-counted.) Learners can be classified as having a disability if medical evidence has been provided by parents or if the District-based Support Team has assessed the learner.																
GRADE	Attention Deficit Disorder	Autistic Spectrum Disorder	Behavioural disorder/ Conduct Disorder	Blindness	Cerebral Palsy	Deafness	Deaf-Blindness	Epilepsy	Hard of Hearing	Mild to Moderate intellectual disability	Severe to profound intellectual disability	Partial Sighted/ Low vision	Physical disability	Specific learning disability	Psychiatric disorder	Total	
Pre-Grade R																	
Grade R																	
Grade 1																	
Grade 2																	
Grade 3																	
Grade 4																	
Grade 5																	
Grade 6																	
Grade 7																	
Grade 8																	
Grade 9																	
Grade 10																	
Grade 11																	
Grade 12																	

Appendix Table 3: School characteristics of inconsistent disability reporters, compared with all disability reporters.

	Schools that report enrolling learners with disabilities in 2013	
	Total no. of schools (%)	No. of inconsistent reporters (%)
Western Cape	753 (15.6%)	0 (0.0%)
Eastern Cape	1327 (27.5%)	21 (39.6%)
Northern Cape	205 (4.2%)	1 (1.9%)
Free State	424 (8.8%)	10 (18.9%)
KwaZulu-Natal	631 (13.1%)	10 (18.9%)
North West	138 (2.9%)	3 (5.7%)
Gauteng	658 (13.6%)	2 (3.8%)
Mpumalanga	345 (7.1%)	4 (7.5%)
Limpopo	345 (7.1%)	2 (3.8%)
School wealth quintile 1	1047 (21.7%)	13 (24.5%)
School wealth quintile 2	935 (19.4%)	10 (18.9%)
School wealth quintile 3	1061 (22.0%)	15 (28.3%)
School wealth quintile 4	565 (11.7%)	7 (13.2%)
School wealth quintile 5	1208 (25.1%)	8 (15.1%)
Secondary schools	1133 (23.5%)	15 (28.3%)
Primary and combined	3693 (76.5%)	38 (71.7%)
Number of schools	4826	53

Source: Annual Schools Survey 2013, after imputation of missing data.

Appendix Table 4: Disability prevalence among learners aged 7 to 18 years.

Mean	Census 2011 (ordinary schools)	Community Survey 2016 (all schools)
% of learners with disabilities (all educational institutions)		2.63 (0.02)
% of learners with disabilities in ordinary schools	4.72	-
	(0.02)	-
Sample	1 007 473	701 786

Notes: Census 2011, Community Survey 2016: Six-year-olds were excluded from the sample due to high reporting of self-care and communication difficulties in Census 2011 in this age group.

Appendix Table 5: Mean reported percentage of girls and boys with disability: 2011-2014.

	2011	2012	2013	2014
Mean % of. girls with disability reported	0.65	0.66	0.61	0.50
	(0.02)	(0.02)	(0.02)	(0.02)
Mean % of boys with disability reported	0.93	0.93	0.89	0.74
	(0.03)	(0.03)	(0.03)	(0.02)
Sample	23679	23679	23679	23679

Standard errors in parentheses. Source: Annual School Survey 2011-2014, with interpolation of missing 2013 values. Sample: All schools, except 54 schools with very unstable reporting.

Appendix Table 6: Mean reported number of learners with disabilities per 100 learners, by phase.

No. learners with disabilities reported per 100 learners	2011	2012	2013	2014
Grade R - 3	2.94	3.00	3.01	2.67
	(0.10)	(0.10)	(0.11)	(0.12)
Sample	3852	3845	3601	3261
Grade 4 - 6	4.79	5.07	5.27	4.99
	(0.15)	(0.16)	(0.17)	(0.19)
Sample	3916	3925	3639	3300
Grade 7 - 9	3.93	4.07	4.15	3.84
	(0.12)	(0.13)	(0.13)	(0.15)
Sample	4564	4596	4359	4085
Grade 10 - 12	2.79	2.57	2.23	2.15
	(0.18)	(0.14)	(0.13)	(0.14)
Sample	1301	1289	1255	1209

Standard errors in parentheses. Source: Annual School Survey 2011-2014, with interpolation of missing 2013 values. Sample: Schools that report total enrolment of learners with disabilities, including zero enrolment. Excludes 54 schools with very inconsistent reporting.

Appendix Table 7: Logit model: probability of a school reporting at least one learner with a disability.

	(1)	(2)	(3)
	2011	2013	2014
School wealth quintile 5	1.615***	1.724***	1.711***
	(0.058)	(0.054)	(0.055)
School wealth quintile 4	0.707***	0.539***	0.597***
	(0.059)	(0.059)	(0.060)
Gauteng	0.314***	0.010	0.707***
	(0.057)	(0.060)	(0.058)
Western Cape	-2.318***	0.950***	1.083***
	(0.116)	(0.063)	(0.064)
Mpumalanga	0.873***	-0.162**	0.212***
	(0.055)	(0.068)	(0.067)
Designated full-service school (2011)	1.811***	1.144***	1.331***
	(0.107)	(0.100)	(0.100)
Large school: >600 learners	0.493***	0.578***	0.610***
	(0.037)	(0.038)	(0.040)
Constant	-1.760***	-1.942***	-2.268***
	(0.023)	(0.024)	(0.027)
Pseudo R^2	0.104	0.110	0.143
Sample	23646	23646	23646

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Annual School Survey (2011-14). Sample: All public schools, excluding 54 very inconsistent reporters. Reference group: Small, ordinary, quintile 1-3 schools in provinces with above-average disability prevalence in Census 2011. The regression was not conducted on 2012 data as there was no data for schools in the Western Cape.

Appendix Table 8: Mean, median reported rate of disability among learners per school, by quintile: 2011-2014.

	2011		2012		2013		2014	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50
Quintile 1	2.519***	0.95	2.702***	0.91	3.007***	0.92	2.827***	0.58
	(0.133)		(0.164)		(0.197)		(0.221)	
Quintile 2	3.380	1.00	3.040	0.89	3.549	0.89	3.410	0.57
	(0.206)		(0.195)		(0.250)		(0.279)	
Quintile 3	3.527	0.97	3.424	1.00	3.410	1.00	3.211	0.64
	(0.200)		(0.194)		(0.205)		(0.242)	
Quintile 4	3.768	1.32	4.238	1.32	3.812	1.12	3.511	0.89
	(0.291)		(0.300)		(0.299)		(0.289)	
Quintile 5	5.439***	3.11	5.634***	3.04	4.773***	2.29	4.583***	1.93
	(0.218)		(0.229)		(0.190)		(0.201)	
n	5,171		5,156		4,920	4,920	4,606	4,606

Standard errors in parentheses. *** p<0.01. Two-sample Wilcoxon rank-sum (Mann Whitney) tests used for test of significance as data is not normally distributed. Source: Annual School Survey 2011-2014. Note: Based on 2013 data, with interpolation of missing values, Sample = schools that report total numbers of learners with disability (including zero).

Appendix Table 9: Mean reported rate of disability in schools (%), by province: 2011-2014.

	(1)	(2)	(3)	
	2011	2012	2013	2014
Western Cape	1.959*	-	1.457***	1.436***
	(0.176)		(0.094)	(0.094)
Eastern Cape	4.704***	4.554***	4.982***	6.011***
	(0.226)	(0.263)	(0.247)	(0.417)
Northern Cape	2.710***	2.803	2.610	3.447***
	(0.286)	(0.361)	(0.280)	(0.454)
Free State	7.848***	8.346***	8.651***	7.702***
	(0.452)	(0.438)	(0.447)	(0.417)
KwaZulu-Natal	2.840***	3.143***	3.666*	3.077***
	(0.150)	(0.158)	(0.277)	(0.278)
North West	2.388***	2.457**	2.307***	2.153**
	(0.606)	(0.444)	(0.388)	(0.376)
Gauteng	2.641***	2.858	3.370***	3.100***
	(0.127)	(0.137)	(0.168)	(0.171)
Mpumalanga	3.080	2.767***	2.692***	2.684***
	(0.193)	(0.176)	(0.325)	(0.316)
Limpopo	3.390***	1.644***	1.459***	1.474***
	(0.628)	(0.219)	(0.201)	(0.199)
South Africa	3.646	3.707	3.747	3.566
	(0.091)	(0.094)	(0.099)	(0.108)
Sample	5183	5161	4929	4608

Standard errors in parentheses. ***p<0.001 ** p<0.05 * p<0.01, using a non-parametric test (the two-sample Wilcoxon rank-sum test) comparing values in a province with values in all other provinces. Source: Annual School Survey 2013. Note: Based on 2013 data, with interpolation of missing values, Sample limited to schools which reported total number of learners with disabilities (including zero) in the year in question.

Appendix Table 10: Rate of instrument completion: School Monitoring Survey 2017.

Survey Instrument	Number of schools (%) completing instrument	Number of schools (%) where whole instrument is missing
Principal interview	1972 (98.6)	28 (1.4) [1]
Teacher questionnaire	1966 (98.3)	34 (1.7) [2]
School observation	1979 (99.0)	21 (1.0)

Source: SMS 2017/18 Fieldwork Report

[1] Reasons for non-completion: Access to school denied (n=19); No-one available to complete questionnaire (n=6); Unwilling to complete this questionnaire (n=3)

[2] Access to school denied (n=19); No-one available to complete questionnaire (n=11); Unwilling to complete this questionnaire (n=4)

Appendix Table 11: Details of data triangulation performed.

Question	Triangulated against:	% of sample (n) for which data could be triangulated:
Questions in teacher questionnaire		
Have you received any formal/informal training on identifying/supporting learners with learning barriers? [#]	Similar question in principal interview	19% (n = 379)
School has one or more toilet(s) accessible for wheelchair use	School observation	100% (n=1,978)
Step-free front entrance	School observation	100% (n=1,978)
If there are stairs at the front entrance, is there a ramp in good condition that is not too steep?	School observation	100% (n=1,978)
Is this a full-service school	Provincial reports to Inclusive Education Directorate, 2017	100% (n=1,978)
% of learners in a school that is able to screen	DHIS Grade 1 screening coverage, Grade 8 screening coverage	100% (n=1,978)
Questions in principal interview		
How many educators in your school have received training in identifying and supporting learners with learning barriers? [#]	Asked twice in principal questionnaire	100% (n =1981)

Notes: DHIS = District Health Information System.

[#] Triangulation was only possible where the Principal completed the teacher questionnaire.

Appendix Table 12: Proportion of Principals trained in identifying/supporting learners who experience learning barriers, across two instruments.

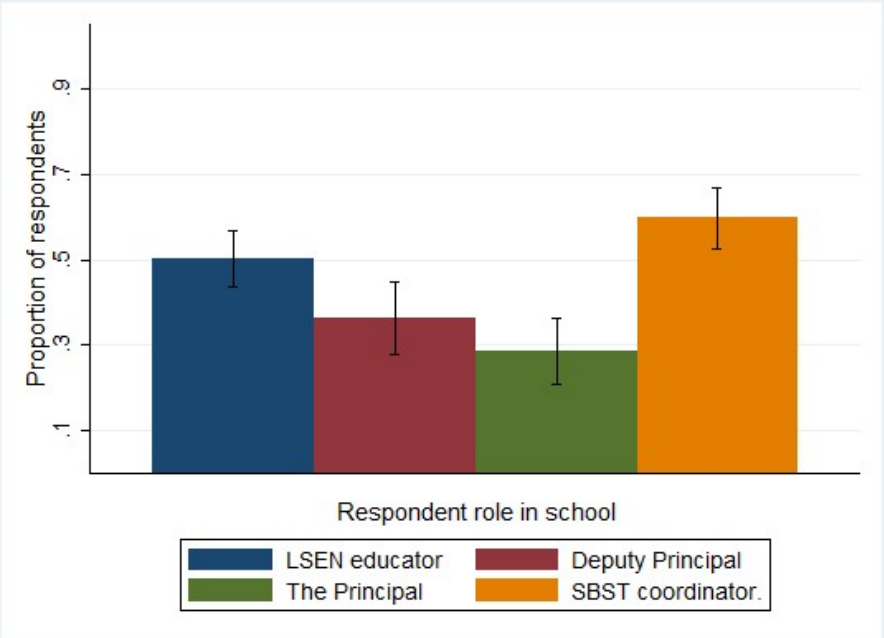
	All principals	Principals who responded to teacher questionnaire
Proportion of Principals with learning barrier training	0.48	0.62
	(0.02)	(0.04)
Sample	n=1891	n=381

Standard errors in parentheses. Source: SMS 2017, Column 1: Principal questionnaire. Column 2: Teacher questionnaire.

Appendix Table 13: Proportion of schools where Principal responded to teacher questionnaire, by province.

Province	Principal is respondent to teacher questionnaire
Western Cape	0.19
	(0.03)
Eastern Cape	0.12**
	(0.02)
Northern Cape	0.23
	(0.03)
Free State	0.08**
	(0.02)
KwaZulu-Natal	0.43**
	(0.03)
North West	0.21
	(0.03)
Gauteng	0.09**
	(0.02)
Mpumalanga	0.10**
	(0.02)
Limpopo	0.27
	(0.03)
South Africa	**0.19**
	(0.01)
Sample	1981

Standard errors in parentheses. Source: School Monitoring Survey 2017, teacher questionnaire



Appendix Figure 1: Proportion of teachers with formal qualification in special or remedial education, by respondent role: 2017

Appendix Table 14: Probability that respondent has received training on curriculum differentiation or setting assessments for learners experiencing barriers to learning.

	Teacher received training in curriculum differentiation	Teacher received training in setting assessments
Formal qualification in special or remedial education	0.169***	0.174***
	(0.031)	(0.041)
Any training in identifying/ supporting learners with learning barriers	0.552***	0.394***
	(0.032)	(0.033)
Western Cape	0.111**	0.191***
	(0.051)	(0.066)
Eastern Cape	-0.093*	-0.082
	(0.054)	(0.057)
Northern Cape	0.023	0.003
	(0.056)	(0.070)
Free State	0.050	0.120*
	(0.059)	(0.070)
KwaZulu-Natal	0.090*	0.057
	(0.050)	(0.067)
Gauteng	0.016	0.082
	(0.060)	(0.064)
Mpumalanga	0.025	0.011
	(0.058)	(0.062)
Limpopo	-0.061	-0.092*
	(0.052)	(0.052)
School is in wealth quintile 1-3	-0.045	0.007
	(0.030)	(0.041)
Constant	0.146***	0.068
	(0.051)	(0.060)
R-squared	0.428	0.284
Sample	1966	1966

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: School Monitoring Survey 2017, teacher questionnaire. School-level analysis (weighted). Sample: all schools. Column (1) reports results for the regression of receipt of training in curriculum differentiation on the listed explanatory variables. Column (2) shows results for receipt of training on setting assessments for learners experiencing learning barriers.

Appendix Table 15: Probit regression: Teacher is confident in teaching learners experiencing learning barriers.

	All	Principal	Other
School has SBST or similar structure	0.230	0.008	0.393**
	(0.158)	(0.289)	(0.178)
Formal qualification in special or remedial education	0.584***	0.780***	0.489***
	(0.124)	(0.298)	(0.124)
Training on curriculum differentiation	0.495***	0.412	0.482***
	(0.151)	(0.349)	(0.159)
Training on setting assessments for learners with barriers to learning	0.508***	0.271	0.576***
	(0.163)	(0.386)	(0.154)
District visit for purpose of supporting SBST	0.223	0.883***	-0.075
	(0.138)	(0.285)	(0.136)
Western Cape	0.023	-0.399	0.267
	(0.237)	(0.485)	(0.240)
Eastern Cape	-0.076	-1.474***	-0.068
	(0.209)	(0.439)	(0.231)
Northern Cape	-0.214	-0.109	-0.119
	(0.226)	(0.461)	(0.249)
Free State	0.074	-0.785	0.263
	(0.242)	(0.607)	(0.236)
KwaZulu-Natal	-0.121	0.040	-0.054
	(0.212)	(0.352)	(0.237)
Gauteng	-0.220	-0.861	-0.132
	(0.209)	(0.581)	(0.226)
Mpumalanga	-0.001	-1.064**	0.128
	(0.188)	(0.427)	(0.207)
Limpopo	0.302	0.393	0.364
	(0.213)	(0.384)	(0.258)
School is in wealth quintile 1-3	0.084	0.110	0.155
	(0.136)	(0.285)	(0.143)
Constant	-0.816***	-1.140**	-0.751***
	(0.246)	(0.455)	(0.286)
Sample	1916	372	1925

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: School Monitoring Survey 2017, teacher questionnaire. Column (1) shows regression for all respondents. Column (2) shows results where Principal is respondent. Column (3) shows results where the SBST Coordinator, LSEN Educator or Deputy principal is the respondent. North West is the omitted category, for province. School improvement plans was included in an earlier version of this regression but was insignificant and its inclusion made very little difference to the size or direction of the coefficients of other explanatory variables. It was excluded from further analysis.

Appendix Table 16: Schools' receipt of support during district support visits and ability to screen for learning barriers.

	Proportion of schools, by school designation:			
	Full-service		Ordinary	
	wgt	unwgt	wgt	unwgt
School has a SBST in place	0.95***		0.66	
	(0.03)		(0.02)	
During district visit, support was provided to:				
Principal	0.85	0.87	0.76	0.83
	(0.05)	(0.03)	(0.02)	(0.01)
Teachers	0.76	0.81	0.69	0.79
	(0.06)	(0.04)	(0.02)	(0.01)
Heads of Department	0.80**	0.84***	0.60	0.75
	(0.05)	(0.04)	(0.02)	(0.01)
School Assessment Team	0.78**	0.80***	0.57	0.68
	(0.05)	(0.04)	(0.02)	(0.01)
School-based Support Team	0.87**	0.89***	0.51	0.62
	(0.04)	(0.03)	(0.02)	(0.01)
School was visited by specialist / district-based support team / health official in 2017	0.71**	0.73	0.46	0.54
	(0.06)	(0.05)	(0.02)	(0.01)
School was able to screen at least some learners for learning barriers	0.66**	0.68	0.41	0.39
	(0.06)	(0.05)	(0.02)	(0.01)
School was able to screen at least some learners for learning barriers & able to specify screening done	0.56*	0.56	0.33	0.36
	(0.07)	(0.05)	(0.02)	(0.01)
SIAS forms completed for at least one learner in the school	0.83**	0.83	0.49	0.52
	(0.04)	(0.04)	(0.02)	(0.01)

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Source: School Monitoring Survey 2017. Part 1, 2 of table: Principal questionnaire (full sample). Part 3 of table: Teacher questionnaire. The column headed *wgt* shows weighted analysis, the column headed *unwgt* shows unweighted analysis. Data is weighted using school weights. Specialist includes psychologist, therapist or learning support official.

Appendix Table 17: Proportion of learners enrolled in schools able to screen at least some learners for visual, hearing or learning difficulties.

Proportion of learners enrolled in a school that is:	
Able to screen at least some learners for visual difficulties	0.47
	(0.01)
Able to screen at least some learners for hearing difficulties	0.40
	(0.01)
Able to screen at least some learners for learning barriers	0.42
	(0.01)
Where SIAS forms completed for at least one learner in the school	0.47
	(0.01)
Sample	1966

Standard errors in parentheses. Source: School Monitoring Survey 2017 teacher questionnaire (weighted).

Appendix Table 18: Probability that a school is able to screen learners' vision.

	Teacher questionnaire		Principal questionnaire
	All	Other	
Western Cape	0.099	0.113	0.218***
	(0.078)	(0.090)	(0.076)
Eastern Cape	-0.110	-0.117	-0.033
	(0.073)	(0.086)	(0.071)
Northern Cape	-0.051	-0.066	0.033
	(0.078)	(0.079)	(0.077)
Free State	0.111	0.187*	0.118
	(0.101)	(0.096)	(0.080)
KwaZulu-Natal	0.017	0.032	0.109
	(0.072)	(0.082)	(0.072)
Gauteng	0.156**	0.151*	0.277***
	(0.071)	(0.082)	(0.064)
Mpumalanga	-0.109	-0.106	-0.049
	(0.066)	(0.074)	(0.066)
Limpopo	0.081	0.046	0.171**
	(0.079)	(0.094)	(0.080)
Respondent is trained #	0.132**	0.068	0.071
	(0.053)	(0.074)	(0.050)
School has a SBST	0.120**	0.080	0.222***
	(0.054)	(0.062)	(0.050)
Primary (or combined) school	0.205***	0.233***	0.185***
	(0.038)	(0.042)	(0.037)
School is in wealth quintile 1-3	0.001	0.012	-0.012
	(0.041)	(0.046)	(0.038)
Designated full-service school in 2017	0.100	0.072	0.152**
	(0.066)	(0.068)	(0.065)
Total schools in municipal district	0.000**	0.000**	0.000***
	(0.000)	(0.000)	(0.000)
Constant	-0.004	0.055	-0.103
	(0.085)	(0.107)	(0.082)
R-squared	0.109	0.093	0.146
Sample	1924	1930	1938

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: School Monitoring Survey 2017. Columns 1-2 show results from the teacher questionnaire. Column 3 shows results for the principal questionnaire. Column 1 shows regression for all respondents to teacher questionnaire, Col. 2 shows results where SBST coordinator, “LSEN educator” or deputy principal is respondent.

has either a formal qualification in special needs or remedial teaching or any learning barriers training.

Appendix Table 19: Probability that a school is able to screen at least some learners for hearing difficulties.

	Teacher questionnaire		Principal
	All	Other	questionnaire
Western Cape	0.136*	0.177**	0.152*
	(0.077)	(0.089)	(0.078)
Eastern Cape	-0.060	-0.047	-0.129*
	(0.071)	(0.084)	(0.071)
Northern Cape	-0.013	-0.036	-0.016
	(0.077)	(0.076)	(0.079)
Free State	0.114	0.198*	0.096
	(0.109)	(0.108)	(0.113)
KwaZulu-Natal	0.070	0.096	0.034
	(0.071)	(0.080)	(0.072)
Gauteng	0.230***	0.240***	0.244***
	(0.071)	(0.081)	(0.066)
Mpumalanga	-0.102	-0.095	-0.127*
	(0.064)	(0.070)	(0.066)
Limpopo	0.125	0.106	0.105
	(0.079)	(0.092)	(0.079)
Respondent is trained #	0.076	0.006	0.046
	(0.053)	(0.075)	(0.050)
School has a SBST	0.139***	0.112*	0.175***
	(0.054)	(0.061)	(0.052)
Primary (or combined) school	0.240***	0.261***	0.211***
	(0.037)	(0.042)	(0.037)
School is in wealth quintile 1-3	0.054	0.064	0.057
	(0.041)	(0.046)	(0.040)
Designated full-service school in 2017	0.038	0.016	0.116*
	(0.067)	(0.069)	(0.068)
Total schools in municipal district	0.000*	0.000*	0.000**
	(0.000)	(0.000)	(0.000)
Constant	-0.117	-0.071	-0.074
	(0.085)	(0.106)	(0.084)
R-squared	0.112	0.101	0.128
Sample	1924	1930	1938

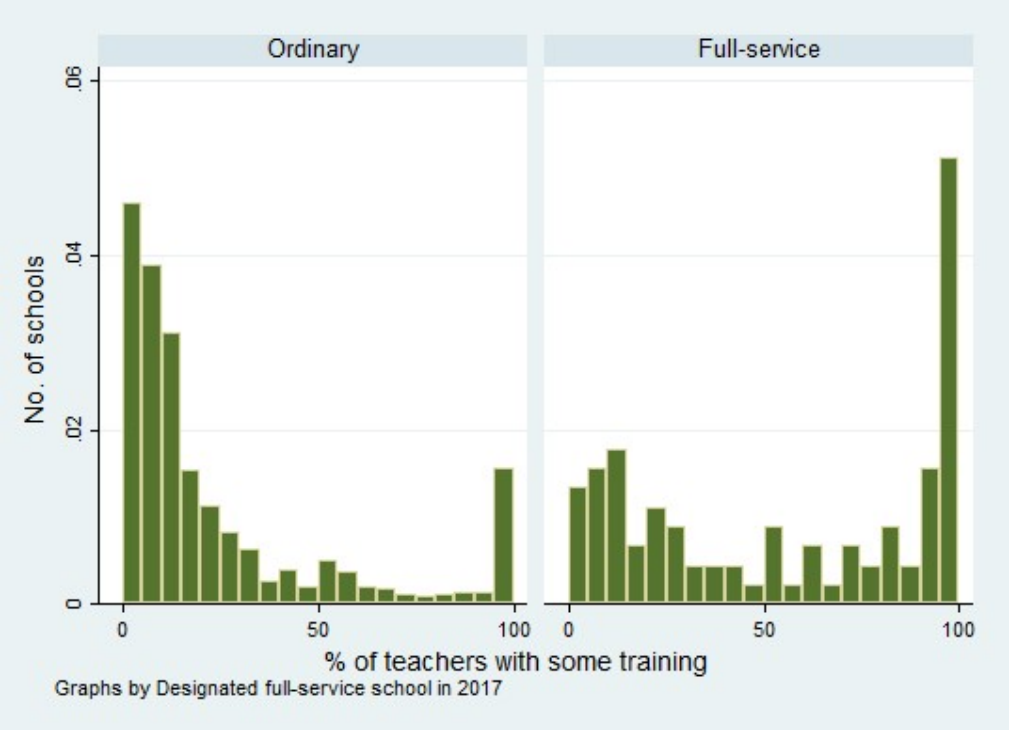
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: School Monitoring Survey 2017. Columns 1-2 show results from the teacher questionnaire, column 3 shows results for the principal questionnaire. Column 1 shows regression for all respondents to teacher questionnaire, Col. 2 shows results where SBST coordinator, “LSEN educator” or deputy principal is respondent. # has either a formal qualification in special needs or remedial teaching or any learning barriers training.

Appendix Table 20: Correlation coefficients: Ability to screen and support from district.

District support provided in 2017	School able to screen:		
	Vision	Hearing	Learning barriers
School visited by district-based support team/ district specialist/ health official	0.17	0.15	0.16
Sample	1924	1924	1924
District provided support to SBST at support visit	0.16	0.15	0.18
Sample	1929	1929	1929

Data source: School Monitoring Survey 2017 principal interview (weighted).

Appendix Table 21: Percentage of teachers trained in identifying or supporting learners with learning barriers.



Source: School Monitoring Survey, principal interview. Sample: all schools (n=1628)

Appendix Table 22: Physical accessibility and use of adapted learning materials in full-service and ordinary schools in 2017 (unweighted).

Proportion of schools:	Full-service schools	Other ordinary schools
With at least one toilet suitable for wheelchair users	0.48***	0.36
	(0.05)	(0.01)
With accessible main entrance#:	0.86	0.82
	(0.04)	(0.01)
That support at least one learner with adapted LTSM	0.45**	0.18
	(0.07)	(0.01)
In schools that provide adapted LTSM, Mean number of learners supported with adapted LTSM	29.85	19.31
	(7.84)	(1.96)

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Two-sample Wilcoxon rank-sum tests used for test of significance. Source: School Monitoring Survey 2017. Part 1 - school observation (school-weighted). Part 2 – teacher questionnaire (school-weighted). # This measure is created by combining two questions (Are there stairs at the entrance of the school? If yes, in your opinion, is there a ramp in a good condition that is not too steep, that could be used by a person in a wheelchair).

Appendix Table 23: Association between full-service designation and learner-educator ratios, learners per classroom

	Learners per state-paid educator		Learners per classroom	
	weighted	unweighted	weighted	unweighted
Designated full-service school	6.24	5.19**	1.71	4.85***
	(5.26)	(2.54)	(1.65)	(1.62)
Control variables		Province		
		School wealth quintile		
		Large school (>600 learners)		
		Metropolitan area		
Constant	46.74***	43.73***	26.10***	23.18***
	(3.92)	(2.64)	(1.39)	(1.05)
R-squared	0.053	0.022	0.176	0.144
Sample	1926	1926	1915	1915

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: School Monitoring Survey 2017, principal interview. Notes: weighted analysis uses school weights. Learner-educator ratios include state-paid teachers only.

Appendix B

UNIVERSITEIT
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NOTICE OF APPROVAL

REC Humanities New Application Form

5 March 2018

Project number: 1533

Project Title: Measuring enrolment and support for children with disabilities at school-level

Dear Ms Nicola Deghaye

Your REC Humanities New Application Form submitted on 12 February 2018 was reviewed and approved by the REC: Humanities.

Please note the following for your approved submission:

Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
5 March 2018	4 March 2021

GENERAL COMMENTS:

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

If the researcher deviates in any way from the proposal approved by the REC: Humanities, the researcher must notify the REC of these changes.

Please use your SU project number (1533) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

FOR CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

Please note that a progress report should be submitted to the Research Ethics Committee: Humanities before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary)

Included Documents:

Document Type	File Name	Date	Version
Proof of permission	Letter of permission to access ASS	12/10/2017	
Informed Consent Form	SMS 2017 qual_IC form	25/01/2018	
Information sheet	SMS qual 2017_info to participants	25/01/2018	
Proof of permission	approval_qual SMS 2017	04/02/2018	
Research Protocol/Proposal	Phd proposal_Final	12/02/2018	
Data collection tool	SMS 2017 qual rough draft_29Jan	12/02/2018	

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.

Sincerely,

Clarissa Graham

REC Coordinator: Research Ethics Committee: Human Research (Humanities)

National Health Research Ethics Committee (NHREC) registration number: REC-050411-032.
The Research Ethics Committee: Humanities complies with the SA National Health Act No.61 2003 as it pertains to health research. In addition, this committee abides by the ethical norms and principles for research established by the Declaration of Helsinki (2013) and the Department of Health Guidelines for Ethical Research: Principles Structures and Processes (2nd Ed.) 2015. *Annually a number of projects may be selected randomly for an external audit.*

Investigator Responsibilities

Protection of Human Research Participants

Some of the general responsibilities investigators have when conducting research involving human participants are listed below:

1.Conducting the Research. You are responsible for making sure that the research is conducted according to the REC approved research protocol. You are also responsible for the actions of all your co-investigators and research staff involved with this research. You must also ensure that the research is conducted within the standards of your field of research.

2.Participant Enrollment. You may not recruit or enroll participants prior to the REC approval date or after the expiration date of REC approval. All recruitment materials for any form of media must be approved by the REC prior to their use.

3.Informed Consent. You are responsible for obtaining and documenting effective informed consent using **only** the REC-approved consent documents/process, and for ensuring that no human participants are involved in research prior to obtaining their informed consent. Please give all participants copies of the signed informed consent documents. Keep the originals in your secured research files for at least five (5) years.

4.Continuing Review. The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once per year. There is **no grace period.** Prior to the date on which the REC approval of the research expires, **it is your responsibility to submit the progress report in a timely fashion to ensure a lapse in REC approval does not occur.** If REC approval of your research lapses, you must stop new participant enrollment, and contact the REC office immediately.

5.Amendments and Changes. If you wish to amend or change any aspect of your research (such as research design, interventions or procedures, participant population, informed consent document, instruments, surveys or recruiting material), you must submit the amendment to the REC for review using the current Amendment Form. You **may not initiate** any amendments or changes to your research without first obtaining written REC review and approval. The **only exception** is when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.

6.Adverse or Unanticipated Events. Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as well as any research related injuries, occurring at this institution or at other performance sites must be reported to Malene Fouche within **five (5) days** of discovery of the incident. You must also report any instances of serious or continuing problems, or non-compliance with the RECs requirements for protecting human research participants. The only exception to this policy is that the death of a research participant must be reported in accordance with the Stellenbosch University Research Ethics Committee Standard Operating Procedures. All reportable events should be submitted to the REC using the Serious Adverse Event Report Form.

7.Research Record Keeping. You must keep the following research related records, at a minimum, in a secure location for a minimum of five years: the REC approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and all correspondence from the REC

8.Provision of Counselling or emergency support. When a dedicated counsellor or psychologist provides support to a participant without prior REC review and approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in the progress report or final report.

9.Final reports. When you have completed (no further participant enrollment, interactions or interventions) or stopped work on your research, you must submit a Final Report to the REC.

10.On-Site Evaluations, Inspections, or Audits. If you are notified that your research will be reviewed or audited by the sponsor or any other external agency or any internal group, you must inform the REC immediately of the impending audit/evaluation.

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Private Bag X895, Pretoria, 0001, Sol Plaatje House, 222 Struben Street, Pretoria, 0002, South Africa
Tel.: (012) 357 3000, Fax: (012) 323 0601, www.education.gov.za

Ref no: ODG-0117/18-01/02/2018
Enquires: Mr AT Tshirado
Tel: 012 357 3656
Email: Tshirado.T@dbe.gov.za

Mrs N Deghaye
87 Albert Dlomo Rd
Glenwood
DURBAN
4001

By email: Nicola.deghaye@gmail.com

Dear Mrs Deghaye

RESPONSE TO A REQUEST FOR PERMISSION TO PARTICIPATE IN THE QUALITATIVE COMPONENT OF SCHOOL MONITORING SURVEY 2017/18

The Department of Basic Education (DBE) received your request to participate in the qualitative component of school monitoring survey 2017/18 for research purposes. The qualitative data collection will take place in 18 schools in Limpopo, Western Cape and Free State Province between 22 February and 15 March 2018.

The research request to participate in the instrument development and administer an additional instrument focusing on inclusive education is approved. The conditions are that you, as the applicant of the research, adhere to the conditions set in the research protocol of the Department and to the ethical conduct of using research data and information.

It is emphasised that the data collected through this exercise should solely be used for the purpose of this research.

We request that you share the findings of the research with the DBE at the conclusion of your study.

Yours sincerely

MR HM MWELI
DIRECTOR-GENERAL
DATE: 01/02/2018

basic education
Department:
Basic Education
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Ref no: ODG-3401/17-03/10/2017
Enquires: Mr AT Tshirado
Tel: 012 357 3656
Email:Tshirado.T@dbe.gov.za

Mrs N Deghaye
87 Albert Dlomo Rd
Glenwood
DURBAN
4001

By email: Nicola.deghaye@gmail.com

Dear Mrs Deghaye

RESPONSE TO A REQUEST FOR PERMISSION TO HAVE ACCESS TO ANNUAL SCHOOL SURVEY AND SCHOOL MONITORING SURVEY DATASETS

The Department of Basic Education (DBE) received your request to have access to the Annual School Survey (ASS) and the School Monitoring Survey (SMS) datasets for research purpose.

The research request is approved on condition that you, as the applicant of the research, adhere to the conditions set in the research protocol of the Department (**Annexure A**) and to the ethical conduct of using research data and information.

It is emphasised that the data received from the DBE should sorely be used for the purpose of this research. The Research Co-ordination Monitoring and Evaluation Directorate will liaise with relevant DBE section on your behalf to obtain the dataset.

We recommend that you submit this letter as evidence that the Department is aware of your research intent to interview DBE officials.

We request that you share the findings of the research with the DBE at the conclusion of your research.

Yours sincerely

MR HM MWELI
DIRECTOR-GENERAL
DATE: 12/10/2017

Enquiries: KK Motshumi
Ref: Notification of research: NM Deghaye
Tel. 051 404 9207 / 079 503 4943
Email: K.Motshumi@fseducation.gov.za

education
Department of Education
FREE STATE PROVINCE

The Director Inclusive Education
The Chief Education Specialist: EMIS

Dear Ms Qwelane and Mr Kok

NOTIFICATION TO CONDUCT RESEARCH BY NM DEGHAYE

1. The abovementioned candidate was granted permission to conduct research in your directorate as follows:

   Research Topic: Measuring enrolment and support for children with disabilities at the school level.

   Target Population: Officials from EMIS and Inclusive Education

2. **Period**: From the date of signature of this letter until 30 September 2019. Please note the department does not allow any research to be conducted during the fourth term / academic quarter of the year nor during normal school hours.

3. **Research benefits:** The Free State DoE can use the results to argue that the current disability data is not useful and changing the definitions of disabilities, making them closer to those used in SIAS and to argue that disability status in SA – SAMS should not be completed by school administrators. Appropriate, reliable data on enrolment of learners with disabilities will allow for better monitoring of inclusive education implementation in the Free State. More appropriate measurement should be one step in enabling implementation of the SIAS policy. The research should assist the Free State Department of Education in understanding the differences in disability prevalence estimates that arise from differences in disability definitions used at school-level and in Census / GHS and may assist the Department of Education responding to queries from civil society about the number of out-of-school children with disabilities in the province.

4. Logistical procedures were met, in particular ethical considerations for conducting research in the Free State Department of Education.

5. The Strategic Planning, Policy and Research Directorate will make the necessary arrangements for the researcher to present the findings and recommendations to the relevant officials in your district.

Yours sincerely

DR JEM SEKOLANYANE
CHIEF FINANCIAL OFFICER

DATE: 23/01/2019

Enquiries: KK Motshumi
Ref: Research Permission: NM Deghaye
Tel. 051 404 9283 / 9221
Email: K.Motshumi@fseducation.gov.za

education
Department of Education
FREE STATE PROVINCE

NM DEGHAYE
87 Albert Dlomo Road
Glenwood
DURBAN, 4001

082 900 5848

Dear Ms Deghaye

APPROVAL TO CONDUCT RESEARCH IN THE FREE STATE DEPARTMENT OF EDUCATION

1. This letter serves as an acknowledgement of receipt of your request to conduct research in the Free State Department of Education.

   Research Topic: Measuring enrolment and support for children with disabilities at the school level.

   Target Population: Officials from EMIS and Inclusive Education sections.

2. **Period of research**: From the date of signature of this letter until 30 September 2019. Please note the department does not allow any research to be conducted during the fourth term (quarter) of the academic year nor during normal school hours.
3. Should you fall behind your schedule by three months to complete your research project in the approved period, you will need to apply for an extension.
4. The approval is subject to the following conditions:
   - 4.1 The collection of data should not interfere with the normal tuition time or teaching process.
   - 4.2 A bound copy of the research document or a CD, should be submitted to the Free State Department of Education, Room 319, 3rd Floor, Old CNA Building, Charlotte Maxeke Street, Bloemfontein.
   - 4.3 You will be expected, on completion of your research study to make a presentation to the relevant stakeholders in the Department.
   - 4.4 The ethics documents must be adhered to in the discourse of your study in our department.
5. Please note that costs relating to all the conditions mentioned above are your own responsibility.

Yours sincerely

DR JEM SEKOLANYANE
CHIEF FINANCIAL OFFICER

DATE: 23/01/2019