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ABSTRACT

Investment in early childhood development (ECD) has the prospect of cultivating potential within individuals and can assist in bridging the social equity gap from a very young age. Over the past decade Grade R has been the strongest policy lever used by the Department of Basic Education to improve early learning. The National Development Plan calls for universal access to two years of early childhood development prior to entering Grade 1. This paper explores the merits of this proposal, given the specific South African context. More specifically, this analysis intends to bring new information to bear on three matters. The first relates to the demand side and aims to identify participation trends among four- and five-year-olds. The second objective is to consider the supply side and aims to understand the policy space in which pre-Grade R will function, the quality and quantity of infrastructure already in place, and the expertise of ECD practitioners. The final matter considers the implementation of a universally accessible pre-Grade R within a constrained system and the requirements to ensure that it will have a significant impact on those children most in need.

Keywords: National Development Plan, childhood development, quality preschool, pre Grade R, early childhood care and education, policy

JEL codes: I20, I21, I28

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1. Introduction

Early childhood is an opportune period during which pertinent development has the prospect of cultivating potential within individuals. The fleetingness of this critical period, however, means that there is a distinct risk of leaving that potential untapped, never to be fully developed. The National Development Plan (NDP), released in 2012, recognises this and makes early childhood development (ECD) "a top priority among the measures to improve the quality of education and long-term prospects of future generations" (NPC, 2013:71). The policy instrument put forward by the National Planning Commission (NPC) to improve early childhood development is to make two years of preschool education accessible to all children.

The past decade has seen a policy shift towards harnessing the benefits of ECD. Since 2001, there has been a drive towards making one year of preschool education (formally known as 'Grade R') universally accessible in South Africa. Ever since, this has led to a rapid national expansion of providing Grade R, but this expansion has produced "virtually no measurable impact for the poorest three school quintiles" (Van der Berg et al, 2013:2). The reason given for this lack of impact is the poor quality of ECD and Grade R provisioning within a system suffering from various failures.

The NDP proposes the introduction of a universally accessible pre-Grade R, so that at least 75% of South Africa's four- and five-year-olds can participate in formal early childhood care and education (ECCE) by 2024. For this additional year of preschool education to have the intended outcomes, it is crucial to understand the binding constraints which will prevent the delivery of a high-quality, well-functioning pre-Grade R. Despite the large body of research in South Africa on ECD, local research neither provides much empirical insight on the current context in which the additional year of preschool will be rolled out, nor the demand for such a service. Identifying the binding constraints in the ECD sector will therefore require a systematic quantitative overview of the sector.

The analysis in this paper intends to bring new information to bear on three matters specifically. The first relates to demand-side issues and to identifying the participation trends of four- and five-year-olds. Under this objective an attempt is made to understand the profile of those learners not attending any form of preschooling currently. The second objective is to consider the supply-side issues and aims to understand the policy space in which pre-Grade R will function, the quality and quantity of infrastructure already in place, and the qualifications and expertise of the practitioners. In essence, the question is asked: what is the reality on the ground, and what will need to change in order to implement an effective pre-Grade R successfully? The final matter considers the implementation of a universally accessible pre-

Grade R within a constrained system and the requirements to ensure that it will have a significant impact on those children most in need.

2. The potential of pre-Grade R

Research in the fields of nutrition, health, neuroscience, psychology, cognition and education unequivocally agree that cognitive and non-cognitive stimulation in early life is critical to the development of a person's full potential. Early childhood is the time where key brain pathways are established which are necessary for subsequent skill development, lifelong learning and long-term capabilities. The human capital model argues that the development of these neural pathways follows hierarchical rules, in the sense that later attainment of skills builds on foundations laid down earlier. This model regards skill formation as a life cycle process, where the productivity of the investment made at one stage is enhanced by the levels of skills a person has already obtained in earlier stages (Cunha, Heckman, Lochner & Masterov, 2006; Heckman & Masterov, 2004; Heckman, Stixrud & Urzua, 2006). In essence, during this critical period, children are being taught the skill of learning. As conceptualised by Heckman and Masterov (2004:3): "Skill begets skill, and learning begets more learning. Early childhood education is therefore an integral part of basic education as the skills formed during this period are necessary for the attainment of future skills (Cunha et al, 2006; Currie, 2000; Heckman et al, 2006).

The advantage of this critical period of children's brain development is that some abilities are produced more effectively than they would during other life periods. Heckman et al (2006) argue that early investment in education therefore gives greater returns to society than investments later in life. Not only are certain skills obtained more effectively, but early educational experiences also prepare children to fully benefit from future educational experiences. A strong multiplier effect is associated with the public investment in early education, especially for disadvantaged children where early investment can make investment in later years more effective.

In fact, this critical period of skill development also means that the lack of development of certain cognitive and non-cognitive functions can have permanent detrimental effects (Heckman et al, 2006). Consequently, the lack of investment in the early years can result in the need for remedial help later in life, at which stage it will be costlier and less effective. The appeal for public investment in early childhood education therefore lies in that it is more effective for a government to equalise initial endowments through ECD programmes than to compensate for differences in outcomes later in life (Cunha et al, 2006; Currie, 2000).

In South Africa this argument is of utmost importance. The inequalities in the South African education system are incontestable, with ability gaps between children from different socio-economic backgrounds already opening up at the early ages. By September in Grade 1 the performance gap between children attending Quintile 5 schools and children attending Quintile 1 to 3 schools in the 2014 Annual National Assessments (ANAs) is 0.52 standard deviations in mathematics, and 0.64 standard deviations in home language. This roughly equates to a gap of about a year and a half's learning already present at the start of formal schooling (Hill, Bloom, Black & Lipsey, 2007; Spaull & Kotzé, 2015).[2] Given the hierarchical nature of learning, this gap will continuously widen as the children of the poor will not obtain as much from schooling as the children of the wealthy.

The large majority of South African children are from low socio-economic backgrounds and live in households with adults who have very low literacy levels. Typically, children from these homes are seldom exposed to books or regular literacy practices such as storybook reading (Pretorius, 2014). As certain emergent literacy practices are particularly effective in supporting children's development of higher cognitive functions, the lack of regular literacy practices could potentially have lasting detrimental effects on their development. Given the lack of development of these critical skills during early childhood, remedial help later on in children's lives will prove to be prohibitively costly and highly ineffective. Given that many South African children enter formal schooling with their developmental potential significantly compromised, investment in ECD is arguably the most cost-efficient fiscal expenditure which will directly impact the equality gaps in South Africa.

Evidence to support this theory is widespread, with investment in early childhood education having been found to benefit a child's cognitive, linguistic, social and emotional development. This evidence is mostly from Western Europe (Hall, Sylva, Sammons et al, 2013; Sylva, Sammons, Chan et al, 2013; Sylva, Melhuish, Sammons et al, 2014) and North America (Barnett, 1985; Heckman, Moon, Pinto et al, 2010; Schweinhart, Montie, Xiang et al, 2005). Although the encouraging results from these countries might lead to high expectations about similar programs in other settings, the results are most likely not generalizable to developing countries. There is a growing literature of the benefits of preschool attendance in developing countries, but studies in Africa (Martinez, Naudeau & Pereira, 2012; Woldehanna, 2011; Woldehanna & Gebremedhin, 2012; Taiwo & Tyolo, 2002) are scant, and empirical evidence from developing

[2] Assuming that in Grade 1, 0.4 standard deviation equates to a year's worth of learning.

countries mostly comes from Latin-American literature (Baker-Hemmingham & Boo, 2010; Behrman, Yingmei & Todd, 2014; Berlinski, Galiani & Gertler, 2009; Berlinski, Galiani & Manacorda, 2008).

Empirical evidence on the educational benefits of ECD in South Africa is hard to come by. Lidell and Rae (2001) found that cognitive ability and school readiness are significant predictors of later school progress.[3] Naudé, Pretorius and Viljoen (2003) investigated the language development and subsequent readiness to learn of preschoolers in the Griqua community. They found that lack of language development was associated with "impaired knowledge-acquisition processes" (ibid:273). Both these studies used very small and particular samples, rendering their findings externally invalid. The only two larger-scale studies that have been conducted in South Africa are the evaluation of the Sobambisana Programme and the evaluation of Grade R. The evaluation of the Sobambisana Programme made use of a quasi-experimental design to determine the effect of the programme on school readiness.[4] Biersteker, Dawes and Hendricks (2012) found that the cognitive development of children in community playgroups improved if attendance was high and the focus was on skills required in school. Van der Berg et al (2013) evaluated the impact of the Grade R programme in South Africa and found a net positive impact of Grade R on learning outcomes in South Africa, but the impact in the more impoverished schools were near negligible. They concluded that "[c]urrently Grade R further extends the advantage of more affluent schools, rather than acting to reduce inequalities" (ibid:79).

This final evaluation raises the quality imperative. Merely attending a preschool does not necessarily mean that children will develop the required skills to prepare them for future learning. Often preschools lack the human and infrastructural resources to stimulate children cognitively and non-cognitively, and therefore rather function as child-minding facilities. International research unanimously agrees that high-quality preschools produce medium to large gains in cognitive and social skills, whereas poor-quality preschools produce very little to no gains (Currie, 2000). The Effective Preschool, Primary and Secondary Education study (EPPSE) in the U.K. quantifies preschool quality using two different scales: the Early Childhood Environmental Rating Scale-Extension (ECERS-E) and the Caregiver Interaction Scale (CIS). Using these variables, Hall et al (2013) found that high-quality preschool mediates the risk of

[3] They conducted this study among 150 preschoolers in a rural community in KwaZulu-Natal.

[4] Sobambisana is a component of the Ilifa Labantwana ECD programme and attempted to develop a local evidence base for interventions aimed at improving ECD in South Africa.

poor performance later, and argue that quality preschool can therefore act as an "educational protector" as it promotes resilience in a situation of adversity.

Recognised indicators of quality at preschool level include physical resources, curriculum choices, school ethos and school management. The most vital element to quality teaching and learning, however, remains the teacher (Christie, 2008; Wood, 2004). Teachers need to understand the developmental realities of children in preschools, and especially appreciate that *what* children learn is as important as *how* children learn (Excell & Linington, 2011). The risk in South Africa currently is that Grade R and pre-Grade R will merely take on the form of a watered-down Grade 1, with little focus on the importance of play and other non-cognitive skill development. A low-quality provisioning of preschool will inevitably lead to very little gains, and will most likely just perpetuate educational inequalities in South Africa.

3. Available data sources

High-quality, nationally representative data on ECD has been quite scarce in South Africa. Both the National Income Dynamic Study (NIDS) and the General Household Survey (GHS) include some questions on ECD participation. These questions, however, do not lend themselves to rigorous analysis, but they are useful in analysing the trends of ECD participation over different ages and years. In 2013 an audit was conducted of ECD centres in South Africa, providing new insights into the current condition of ECD centres.[5] This audit was analysed to gain a better understanding of the supply side of ECD provisioning.

More recently, the 2013 Verification Annual National Assessment (V-ANA) background questionnaires asked more detailed questions about a learner's exposure to preschool before formally entering Grade 1. Unfortunately, the weak phrasing of these questions has led to inconsistent responses. The first question asked the learners whether they had attended Grade R, Educare, a day mother, another preschool or if they did not know.[6] The option 'Did not attend' was not provided, which left those children who had not participated in any early childhood education without an answering option. It is unclear how these children answered the question, as only 5% of responses were recorded as missing values. The follow-up questions asked about the respective duration of attendance at each of the institutions (Grade R, Educare,

5 In this research paper, ECD centres comprise all preschools, crèches, day care and Educare facilities.

6 'Educare' has become the popular term for a preschool or a crèche. As the name suggests, it incorporates the 'education' and 'care' of young children.

day mother), but the responses between institutions were not restricted and are therefore not mutually exclusive.[7] The result is therefore inconsistent responses across the questions and consequently the data lacks credibility. For this reason, the 2013 V-ANA data will not be used in this analysis.

3.1. National Income Dynamics Study (NIDS)

NIDS is a nationally representative, longitudinal survey of individuals and their households living in South Africa. The survey focuses specifically on the dimensions of the well-being of South Africans over time. The first wave of data collection was done in 7 305 households in 2008, with the second and third waves of data collection returning to these households in 2010 and 2012. Over these three years, 2 056 households had four-year-olds as part of the household.[8] The NIDS questionnaire contains a section which was administered to all the children in a household who were younger than fourteen years old, and is the only household survey in South Africa making the distinction in the enrolment categories between primary school, Grade R and preschool. This is greatly beneficial to analysing the participation trends since Grade R and other preschool activities have only been formally separated since 2000.

3.2. General Household Survey (GHS)

GHS is an annual data collection exercise that started in 2002 and is based on a collection survey of about 25 000 households and 95 000 individuals. Unlike NIDS, GHS is not longitudinal as it does not follow the same households over time, but nevertheless it does provide one with a sense of the changes in the national participation rates over time. The question on preschool attendance in GHS only recently started to differentiate between primary, Grade R and preschool. Furthermore, there was also a change in the questions asked about preschool attendance in 2009. Up to 2008, a question was asked to all members in the household on which educational institution they were attending, whereas from 2009 children of four years and younger were asked whether they attended an ECD program and children of five years and older were asked about which educational institution they were attending. These changes in the

7 Question 2 (Q2) asked learners which institution they attended before going to Grade1; Q3 asked how long they had attended Grade R; Q4 asked learners how long they had attended Educare; and Q5 asked how long they been with a day mother. These last three questions were not mutually exclusive, and learners were not restricted to fill out only the category that corresponded to Q2. Consequently, some learners stated that they attended Grade R in Q2, but in Q3 stated that they did not attend any Grade R.

8 594 households in 2008, 666 households in 2010, and 796 households in 2012.

phrasing of the questions complicates the comparison of the national trend in participation rates.

3.3. 2013 ECD audit

In 2013 an audit of ECD centres in South Africa was commissioned by the Department of Social Development (DSD) with the goal of gathering reliable information on providing ECD services and programmes across the country (RSA DSD, 2013). Although a total of 19 971 ECD centres were visited, only a total of 17 846 ECD were audited. The 2 125 ECD centres not audited are centres where the questionnaires could not be administered either because access was denied (395); the centre was closed (935); the centre could not be found (153); the centre was not aware of its registration status; or the centre appeared in the system more than once. Of the audited centres, 8 032 were fully registered with the DSD, 1 922 were conditionally registered and 7 892 were not registered. Information was collected on an array of topics including governance structures, staff characteristics, infrastructure conditions, and nutrition and food provisioning (Economic Policy Research Institute, 2014). It is, however, necessary to realise that the limitation of the ECD audit lies in the self-reporting of ECD practitioners and therefore the responses on qualification – or on salaries received – might be biased.[9]

4. Current participation rates

Over the last decade, the main ECD policy priority in South Africa has been providing Grade R to all children of five to six years old. This policy was put forth in 2001 with the target of making Grade R compulsory for all children of the appropriate age by 2010. The target was then extended to 2014, and by the end of 2012, 75% of Grade 1 children enrolled in public schools for the first time, had attended Grade R (Van der Berg, Girdwood, Sheperd et al, 2013). Based on the latest statistics of the Department of Basic Education (DBE), enrolment in Grade R more than doubled from about 300 000 in 2003 to 779 370 in 2013 (RSA DBE, 2015).

A Grade R applicant must be age four and turning five before 30 June in the year of admission to Grade R. The introduction of a pre-Grade R will therefore most likely target children who are four to five years old, an age group of which at present relatively little is known. A universally accessible pre-Grade R could potentially require a vast scale-up of current resources (both

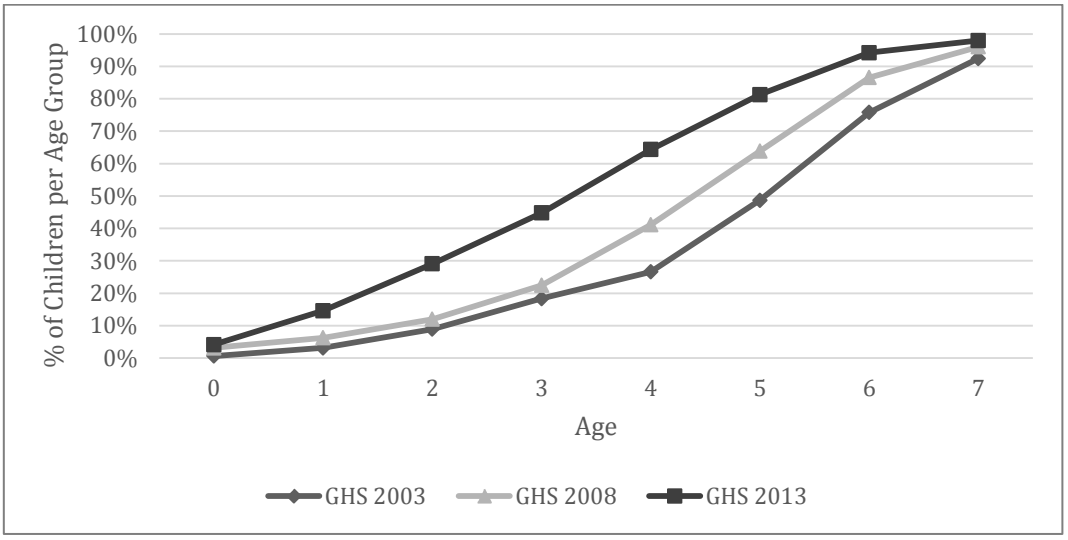
[9] Unfortunately, the sample of ECD practitioners in the Quarterly Labour Force Survey is too small to credibly check their qualifications and average salaries.

human and infrastructure) and therefore an understanding of the recent trends in ECD participation among this age group could provide us with a sense of the magnitude of the task at hand.

The first trend which is useful to consider is the progression of general participation of four-year-olds in any ECD programme over the past ten years. Figure 1 uses the GHS data to compare the overall net enrolment rates of children in any institution of education or early childhood care over the period 2003 to 2013. It shows that there has been an increase in participation rates in all the age groups, with the largest increase being among four-year-olds (38%). In 2013, 64% of four-year-olds and 81% of five-year-olds attended an educational institution. This increase could partly be ascribed to the national drive over the past few years in promoting ECD services, as well as the opening of more ECD centres (Economic Policy Research Institute, 2014).

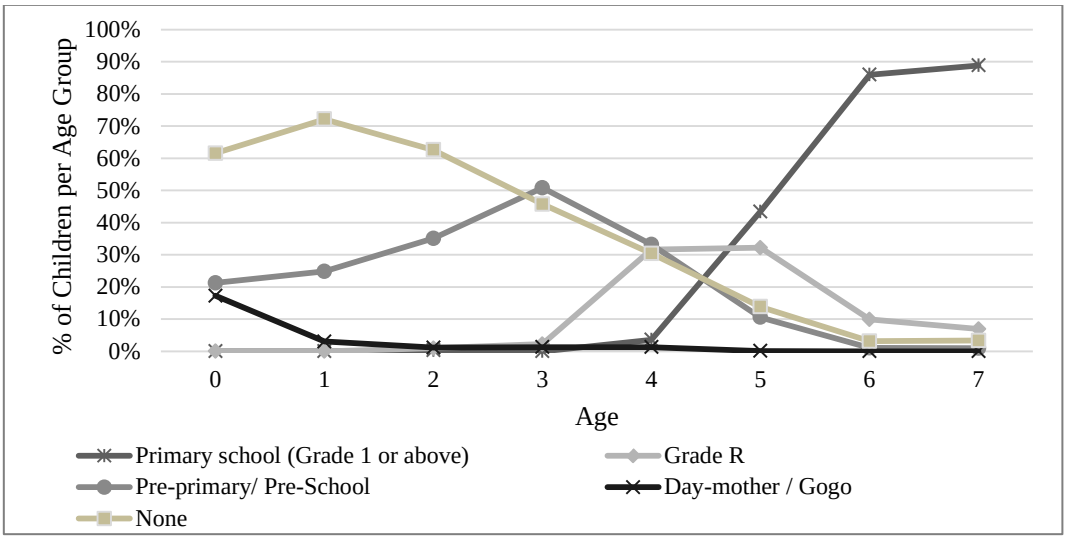
The NIDS data enables one to further decompose current participation rates, as the questions on the educational institution which children currently attend include an additional category of early childhood care, namely 'day mother/gogo'. This category is of great importance in the South African context as this form of child care is popular among the poor living in rural areas and in informal settlements. The concern with this mode of early childhood care, however, is the ability of the caretakers to provide sufficient nutrition and appropriate cognitive stimulation. Furthermore, the NIDS dataset also has the advantage of having collected data on the month in which a child was born. This enables one to determine the age of a child at the start of the year, allowing for a more accurate comparison of equally aged children. Figure 2 shows participation in the different forms of early childhood care per age group. In 2012, only a small percentage of children were in the care of day mothers, and mostly during their first year. By age 3, about half of children were attending some form of preschool (either pre-primary or Educare) and the other half had received no early childhood care in an institution outside of the home. By age four, about a third of children participated in a formal Grade R, another third in preschool and the other third still did not participate in ECCE outside of the home. Due to the entry-age requirements, children who were born in the first six months of the year have the choice of either entering Grade R during the year they turn five, or in the year they turn six. This would explain the trend in Grade R participation. By age seven, 96% of children were attending formal schooling.

Figure 1: Overall enrolment rates of children in any education institution



Source: 2003, 2008 and 2013 General Household Surveys. **Notes:** The categories which were considered in the calculations are primary schools, Grade R, pre-schools, crèches and ECD centres.

Figure 2: Pre-School choices in 2012



Source: National Income Dynamic Study, waves 1 – 3. **Notes:** Age is the age the child was at the 1st of January 2012.

The phrasing of the questions regarding which educational institution a child attended in the 2012 NIDS dataset and the 2013 GHS dataset are similar enough to compare the different samples.[10] There is no statistically significant difference between the estimates for four-year-olds attending some form of preschool, with the NIDS estimate being 51% and the GHS estimate being 54%. The NIDS data, however, estimates that 45% of four-year-olds were not attending any ECD programme, whereas the GHS data estimates this figure to be quite a bit lower at 28%. The discrepancy between these two figures comes from the definition of an ECD programme used by the GHS, and therefore capturing significantly more children (10 percentage points) attending Grade R, than the NIDS dataset. Regardless, one can say with some certainty that half of South African four-year-olds are currently participating in ECCE.

It is essential to understand the trend in ECD participation across the provinces, as well as to know the spatial distribution of four-year-olds who are currently not participating in ECD. When analysing the participation trends by province, it is evident that significant strides have been made in ECD provisioning since 2003. In the majority of provinces there was a rapid rise in participation between 2003 and 2009, with less dramatic increases between 2009 and 2013. The Free State is the only province that had a consistently significant increase in participation over both the five-year-periods. A concern which arises from this analysis, however, is the flattening of the participation rates in KwaZulu-Natal during the last five years, as this is the province with the second largest number of four-year-olds (about 250 000, second after Gauteng).[11] In 2013, 51% of four-year-olds in KwaZulu-Natal did not attend any early childhood care institution at all.

KwaZulu-Natal is also the province with the largest percentage of four-year-olds in tribal areas who are not attending ECD.[12] Over the ten-year-period from 2003 to 2013, there has been a significant increase of about 46 percentage points in ECD participation in tribal areas. As 40% of all four-year-olds live in tribal areas, this increase is encouraging. During this period there has also been a drop in the number of four-year-olds living in formal rural areas and quite a significant increase in the number of four-year-olds in urban informal areas.[13]

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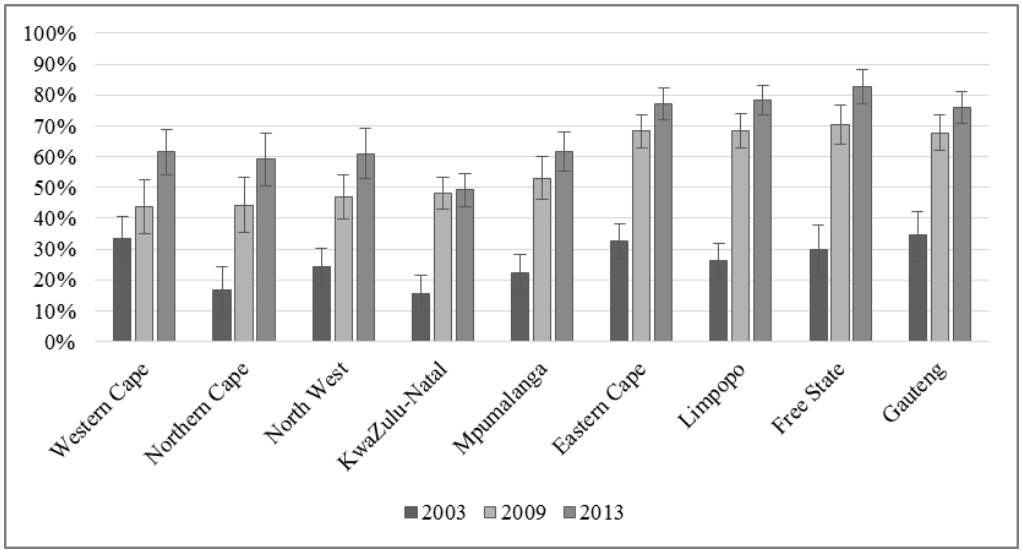
[10] For this comparison, the NIDS ages were therefore calculated for the end of the year.

[11] Using the GHS 2013 data, there are 247 509 four-year-olds in KwaZulu-Natal, and 218 821 four-year-olds in Gauteng.

[12] The sample size of tribal areas in Gauteng is too small to yield any significant information.

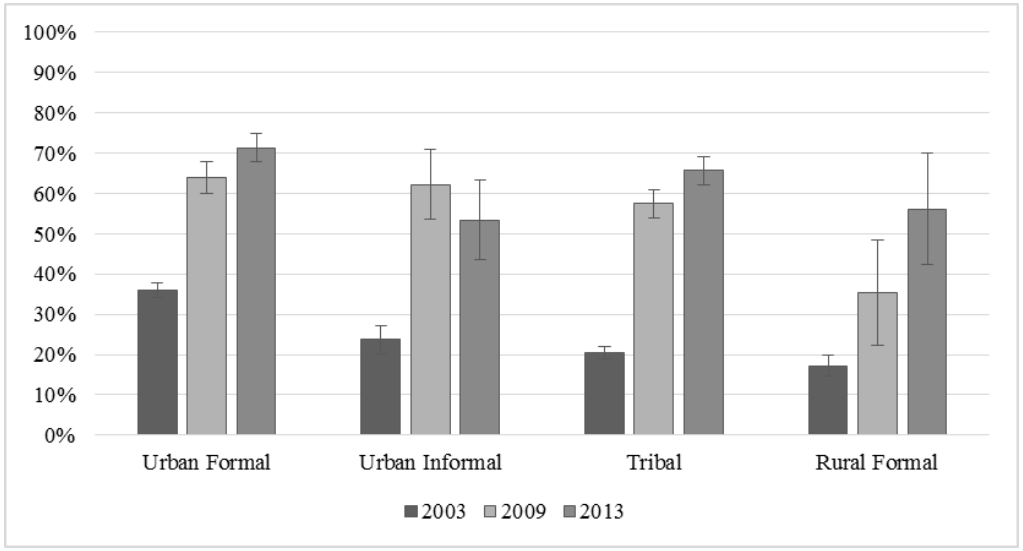
[13] The sample of four-year-olds living in formal rural areas is only about 3% of the total number of four-year-olds.

Figure 3: Edu-Care Participation among four year olds by province:



Source: General Household Survey, 2003, 2009 and 2013. **Notes:** ECD participation in 2003 is defined as four year olds participating in pre-school, in 2009 it is defined as children who responded that they attend an ECD facility and in 2013 as four year olds attending any pre-school, nursery school, crèche or Edu-Care

Figure 4: ECD participation of four year olds by Geographical Area



Source: General Household Survey, 2003, 2009 and 2013. **Notes:** ECD participation in 2003 is defined as four year olds participating in pre-school, in 2009 it is defined as children who responded that they attend an ECD facility and in 2013 as four year olds attending any pre-school, nursery school, crèche or Edu-Care

5. Factors determining a child's participation in preschool

A further step in understanding the complexities of introducing a universally accessible pre-Grade R is to understand the profile of the four-year-olds who are not currently attending any ECD institution. Table 1 summarises the difference in basic characteristics between children who are currently attending ECD centres and those who are not. One in every two coloured four-year-olds are not attending ECD centres, whereas only one in every three black four-year-olds, and one in every ten white four-year-olds are not attending ECD centres. There is no significant difference between boys and girls, with one in every three of both genders not attending ECD centres. Three quarters of children who are not in ECD are receiving the child support grant, whereas only 64% of children in ECD centres receive the grant. KwaZulu-Natal is the province with the highest percentage of children not attending ECD centres (51%), followed by the Northern Cape (41%), North West (39%), Mpumalanga (39%) and the Western Cape (39%). The Free State is the province with the highest participation rate with 83% of all four-year-olds currently attending ECD activities.

A logit model was run to identify those factors which are robust predictors of ECD participation at ages three and four (full results appear in the Appendix). A logit, or logistic regression model, calculates the correlations between the explanatory variables and the binary-dependent variable by estimating probabilities using a logistic function. The coefficients on the explanatory variables can therefore be interpreted as the log-likelihood of the specific characteristic to have a success (or 1) in the dependent variable. The dependent variable was defined as a 0-1 binary variable if a child attended any educational institution apart from a day mother. Although there are some serious endogeneity issues present here, there is still some value to be gained from running the model. The results show that four-year-olds were much more likely to attend ECD centres than three-year-olds, coloured children are much less likely to attend any ECD centre and children in KwaZulu-Natal are at a definite disadvantage relative to children in Gauteng. Children in formal urban areas, as well as children in tribal areas are also more likely to participate in ECD activities than children from urban informal areas. Socio-economic status is a strong determinant of ECD participation, although neither parental education nor maternal work status played a significant role. Finally, if a parent perceived their child to have poor health, the child is also less likely to have attended an ECD institution. The explanatory power of these characteristics is relatively low, suggesting that there are other unobservables which play a larger role in determining ECD participation. These factors could include parental motivation, access and proximity to a preschool and affordability of the nearest preschool. Further analysis is needed to explore these factors in more depth.

Table 1: The composition of four year olds.

Attend ECD	Not attending ECD
68% of Black children	32% of Black children
51% of Coloured children	49% of Coloured children
64% of Indian children	36% Indian children
89% of White children	11% of White children
66% of Males	34% of Males
68% of Females	32% of Females
64% Receive the Child Support Grant	75% Receive the Child Support Grant
61% of Children in the Western Cape	39% of Children in the Western Cape
77% of Children in the Eastern Cape	23% of Children in the Eastern Cape
59% of Children in the Northern Cape	41% of Children in the Northern Cape
83% of Children in the Free State	17% of Children in the Free State
49% of Children in KwaZulu-Natal	51% of Children in KwaZulu-Natal
61% of Children in North West	39% of Children in North West
76% of Children in Gauteng	24% of Children in Gauteng
61% of Children in Mpumalanga	39% of Children in Mpumalanga
78% of Children in Limpopo	22% of Children in Limpopo

Source: General Household Survey 2013

6. Supply side: The current conditions in the ECD sector

The policy space in which the ECD sector functions in South Africa is extremely complex, with various departments accorded responsibility for the different aspects constituting ECD. The recently gazetted 'Draft Policy on Early Childhood Development' (RSA DSD, 2015) stipulates that the Department of Health shall be responsible for providing health and nutrition programmes to pregnant mothers, infants and children under two years old. Furthermore, it is also responsible for implementing parenting support programmes and for providing learning opportunities for children under two years of age. The DSD is responsible for "ensuring the universal availability and adequate quality of, and equitable access to opportunities for learning for children aged 0-5" (ibid:104), whereas the DBE is to take responsibility for the development of the early-learning curriculum and the implementation of a Grade R and pre-Grade R programme. A large number of other departments are also implicated in the draft policy, but to a lesser extent than the three departments mentioned above (RSA DSD, 2015).

6.1. Hosting pre-Grade R

The implementation of a universally accessible pre-Grade R therefore falls under the responsibility of both the DBE and the DSD. This sharing of responsibilities clearly poses challenges in the implementation of pre-Grade R as it introduces various opportunities for communication failures, perverse incentives and abdicating responsibility. Furthermore, this means that, as in the case of Grade R, there is no clear host for pre-Grade R and that both primary schools and ECD centres could potentially provide this service. The two environments,

however, are vastly different and the nature and quality of pre-Grade R are bound to be influenced by the host institution. Given that primary schools only cater for Grade R, most children who are eligible for pre-Grade R are currently attending ECD centres (73% of four-year-olds attending an ECD programme). This article therefore focuses on the current conditions in ECD centres.

6.2. Physical resource challenges

Given the limited funding available to ECD centres to spend on infrastructure, as well as the lack of support from municipalities, it is necessary to consider the physical resource challenges that ECD centres face. From the 2013 ECD audit it is clear that 44% of ECD centres were built with the sole purpose of functioning as an ECD centre, 29% operate from houses, and others use the premises of community halls (4%), primary schools (3%), places of worship (5%) and containers (1%).[14] A further 12% operate from informal structures made of zinc-plates or mud.[15] When considering four-year-olds specifically, 73% of them attend an ECD centre in a community-based establishment, 15% at a home-based centre, and only 10% at a school-based institution.

Table 2 shows the percentage of ECD centres per province which suffer from infrastructural inadequacies. KwaZulu-Natal, the Eastern Cape and Limpopo are the three provinces with the largest percentage of ECD centres lacking adequate basic infrastructure. In Limpopo, 70% of ECD centres do not have adequate ablution facilities, whereas in KwaZulu-Natal, 60% of ECD centres are not connected to electricity. This means that more than half (52%) of ECD centres in KwaZulu-Natal have to cook the children's meals on open fires. In these three provinces, roughly half of ECD centres stated that they require urgent maintenance and repair, roughly a quarter do not meet the minimum requirements for being an ECD centre and about 10% are reported as not safe for children.

Over and above the infrastructural challenges faced by ECD centres, one in every four is overcrowded – a problem faced by registered and unregistered centres, both rural and urban. Moreover, many lack basic recreational equipment and resources such as jungle gyms, books, puzzles, tables, chairs and other educational toys. Figure 5 illustrates the differences between

[14] The questionnaire had two separate categories for houses and houses with garages; both are included here.

[15] The final 2% of centres stated that they use 'Other Structures' as ECD Centres.

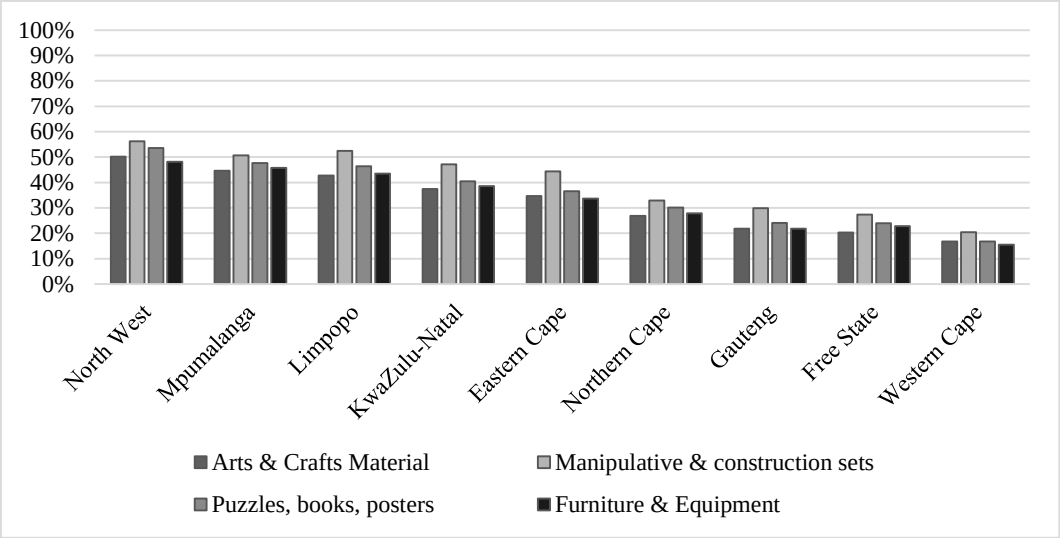
provinces, with one in every two ECD centres in North West lacking the basic learning and teaching support material, compared to only one in every five centres in the Western Cape and one in every four in Gauteng and the Free State.[16]

Table 2: Percentage of ECD Centres lacking adequate infrastructure

	Inadequate Water	Inadequate Electricity	Inadequate Toilets
Limpopo	42%	40%	60%
KwaZulu-Natal	36%	60%	39%
Eastern Cape	41%	48%	33%
Northern Cape	15%	39%	20%
Mpumalanga	15%	24%	41%
North West	25%	22%	36%
Free State	5%	18%	14%
Gauteng	2%	9%	9%
Western Cape	2%	4%	2%
National	***20%***	***25%***	***26%***

Source: 2013 ECD Audit. **Notes**: Adequate water supply is defined as any water supply from a tap, either inside the centre or on the site, adequate electricity supply is defined as being connected to the electricity mains, and adequate toilets are defined as flushing toilets either connected to the sewerage system or a septic tank, chemical toilets and potties. The options on toilet types were not asked as mutually exclusive, but the percentages should still provide an overall idea regarding the current situation.

Figure 5: Inadequate Learning and Teaching Support Material



Source: 2013 ECD Audit. **Notes:** LTSM is rated as inadequate if a centre responded that there are not enough of the specific material for the number of children attending the centre.

[16] Basic learning and teaching support material are defined as arts and crafts material, puzzles, books and posters, manipulative and construction sets, and furniture and equipment. The provincial differences stated here are statistically significant.

6.3. Human resources

ECD practitioners play a crucial role and are the single most important factor in ensuring the pertinent development of the children in their care. They are in the unique position to provide the fundamental skills and opportunities for children to transition successfully into formal schooling. A high-quality practitioner can enable this learning to take place, regardless of whether a child is from an impoverished or an enriched environment. Therefore, ECD practitioners have the potential to make an invaluable contribution to the basic development of children.

The minimum requirement for practising as an ECD practitioner is a Basic Certificate: ECD (NQF Level 1). This qualification was initially intended to provide existing unqualified ECD practitioners with basic training in the needs of the developing child, but has since expired (the last teachers were to graduate in 2013). The Further Education and Training Certificate: ECD (NQF level 4) replaced the Basic Certificate as the required qualification for entry, and is equivalent to a Grade 12 qualification (Atmore, Van Niekerk & Ashley-Cooper, 2012). The entry requirement for this qualification is a Grade 9 certificate, which makes it accessible to any person who did not pass Grade 12 and has very few other options of employment. Formally, the Children's Act stipulates that staff working in ECD programmes should have a National Certificate in ECD at a NQF Level 1-6, or an appropriate ECD qualification, or a minimum of three years' experience implementing ECD programmes (Berry, Jamieson & James, 2011).

Table 3 summarises the qualifications and specialisations of ECD staff who are in teaching positions. Only 10% of practitioners and assistant practitioners have any qualification above that of a Grade 12, which is to be expected given that the Grade 12 requirements were only set in 2013. Principals and supervisors tend to be slightly more qualified, but still almost 80% do not have any qualification above that of Grade 12. When looking at the number of practitioners with qualifications specialising in ECD, however, it is evident that the minimum norms and standards do not apply in practice. Where one would expect to see the majority of practitioners to have at least the NQF basic certificate, it is shown that 74% of practitioners and 88% of assistant practitioners do not have any qualification in early childhood development. Once again, principals and supervisors seem to have received slightly more training, with at least 35% of principals and 41% of supervisors having at least a certificate in ECD.

Table 3: ECD Practitioner Qualifications and Specialisations

		Assistant	Practitioner	Principal	Supervisor
Qualifications:	*< Grade 12*	48%	45%	36%	36%
	Grade 12	39%	42%	43%	44%
	ABET 1 – 4	6%	7%	9%	8%
	Post-matric diploma	2%	2%	5%	4%
	Degree	0%	1%	2%	1%
	Other	4%	3%	5%	6%
	Total	100%	100%	100%	100%
Specialisations:	*None*	88%	74%	55%	51%
	Certificate	11%	23%	35%	41%
	Diploma	1%	3%	9%	7%
	Degree	0%	0%	1%	1%
	Total	100%	100%	100%	100%

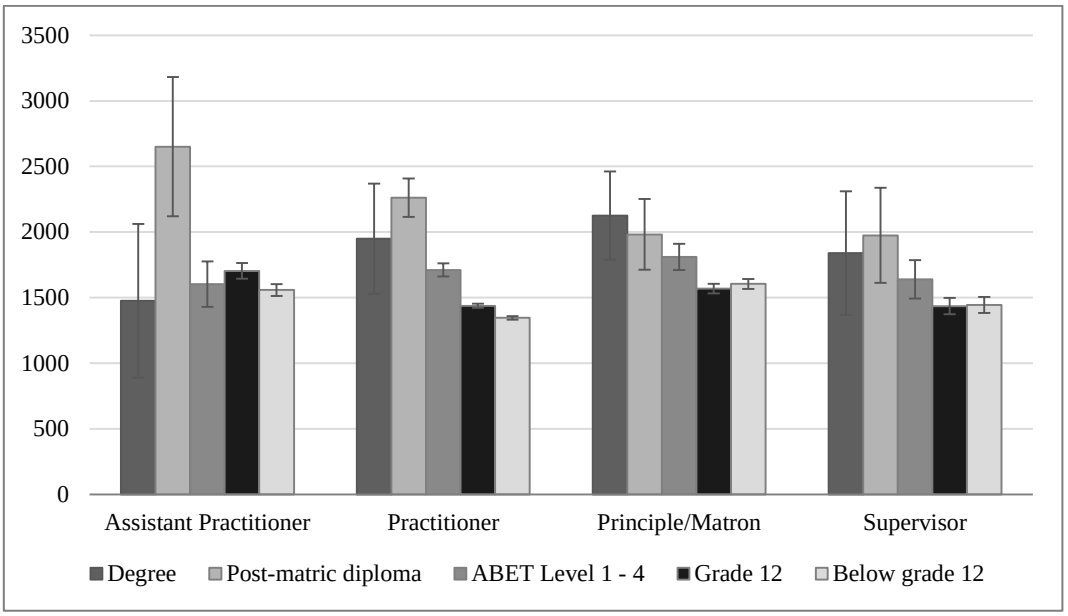
Source: 2013 ECD Audit. **Notes:** The sample is not necessarily nationally representative, but rather representative of all teachers who participated in the national audit.

Both international and local literature agree that there is an association between teacher qualification and the quality of care and learning provided, but that qualifications are not exclusively required for quality teaching (HSRC, 2010; Sylva, Melhuish, Sammons et al, 2014; Warren & Haisken-DeNew, 2013). However, given the low entry requirements, the high number of unskilled workers, as well as the very high unemployment rates in South Africa, being an ECD practitioner is a worthwhile option for unqualified women to access a stable income. It is therefore essential to ensure that practitioners receive high-quality training in order to understand and appreciate the complexity and importance of cognitive and non-cognitive development for children.

In South Africa there is very little concrete data on the quality of teaching taking place at ECD centres. Ideally, one would like to evaluate the quality of an ECD centre using a proper instrument such as the Early Childhood Environment Rating Scale (ECERS), but unfortunately such an evaluation has not been undertaken in a manner that any deduction can be made of the system as a whole. From the ECD audit one can deduct that 73% of centres follow their own learning programmes with pre-Grade R children, and that only 40% of these programmes are approved by the DBE and registered with the DSD. Twenty-eight per cent (28%) of ECD centres stated that their learning programmes do not follow National Early Learning Development Standards (NELDS), but among unregistered centres this percentage is higher, with 40% of programmes not following the national standards. In 68% of ECD centres evidence was found that a structured learning programme was followed on the day of the audit.

The average monthly salary of an ECD practitioner is unacceptably low and even a person with a post-matric diploma or a degree receive salaries similar to uneducated individuals. Despite there being a statistically significant premium on having a qualification above Grade 12, the difference is negligibly small in monetary terms. Regardless of a person's qualification or position at an ECD centre, on average their monthly salary will range between R1 400 and R2 000, not including any other benefits such as a pension fund, medical aid benefits or housing subsidies. In 2013 the salary scales from the DBE made provision for a primary school teacher with a relative education qualification value (REQV) of 14 and above to receive an entry-level state salary of R185 184 per annum, excluding benefits. This relates to R21 141 a month, including the 37% benefits which comprise pension, medical aid and housing-subsidy contributions (Barry, 2014). This is almost ten times more than the average ECD practitioner with a degree. The salary prospects of practitioners in rural areas are even lower – about R442 per month less than their peers in urban areas.[17] Moreover, practitioners in the Western Cape earns on average R614 per month more than their peers in Gauteng.[18]

Figure 6: Average Monthly Salary by Level of Qualification (in Rand)



Source: 2013 ECD Audit. **Notes:** Sample sizes for Assistant Practitioners with a degree or a post-matric diploma is very small. Sample is not necessarily nationally representative, but rather representative of all teachers who participated in the national audit.

[17] See Figure 7 in the Appendix.

[18] See Figure 8 in the Appendix.

Delivering high-quality and effective early childhood care and education rely heavily on the quality of ECD practitioners, but also the quality of the structures supporting them. District- and provincial-level support is essential in providing ECD practitioners with the necessary training, resources and equipment to function productively. Very little information is currently available on the capacity of the staff at provincial and district level to support ECD practitioners sufficiently. Ensuring that the human resources in the ECD sector are capable and effective is key to delivering a high-quality service.

6.4. Registration and funding of ECD centres

As mentioned above, the ECD audit captured data on 17 846 ECD centres, of which 45% were fully registered with the DSD, 11% were conditionally registered and 44% were not registered. Of the centres who are conditionally registered, the largest prohibitive factor to full registration was a lack of adequate infrastructure and adequate equipment. Furthermore, 52% of ECD centres who are not registered have applied for registration, and are still awaiting response from government. Only half (54%) of the ECD centres who provide Grade R are registered with the DBE. Regarding pre-Grade R: 54% of centres registered their learning programme with DSD, about 54% registered with DBE and 45% registered with both institutions.

One of the main benefits of being registered with the DSD or DBE is that a centre can qualify for a subsidy. In 2013, an ECD centre could have received R330 per month per qualifying child registered at the centre. The DSD subsidies, however, are only available to means-tested children in non-profit-registered ECD centres, and are dependent on the availability of the departmental budget. Centres who have registered Grade R classes with the DBE could receive a DBE subsidy of between R110 to R374 per month per child, based on the quintile ranking of the school and the province in which it is located. In addition to these subsidies, most ECD centres also charge basic fees to help cover their costs, which include practitioner salaries, the children's meals, maintenance and infrastructure, and all other necessary resources.

Unregistered centres do not qualify for these subsidies, which makes it disconcerting that 77% of all unregistered ECD centres – 6 004 in total – are providing services in disadvantaged areas.[19] Given the socio-economic circumstances these centres function in, they are severely restricted in raising funds through fees, donations or other fund-raising events. On average, fees

[19] The areas included in this calculation constitute farms, reservations, villages/settlements, informal housing communities, non-residential areas and townships.

comprise about 78% of funding of unregistered centres and only 16% of income received is from grants or subsidies. These centres serve approximately 190 000 children who are likely to be from homes where they will not be receiving the necessary nutrition and cognitive stimulation to succeed in life. These are therefore the centres which have the largest responsibility for providing high-quality early childhood development services to children.

The current funding structure is therefore counterproductive and exposes unregistered centres to a low-resource trap. Inherently, unregistered centres in poorer areas are constrained in raising the funds required to invest in the necessary physical and human resources which will enable them to register, and subsequently qualify for the government subsidies.[20] In essence, ECD centres are left to their own devices to cover all start-up investment and only once they comply with the norms and standards, do they qualify for state assistance.

7. Conditions in Non-Registered and Conditionally Registered Centres:

Quite a large proportion of ECD centres are either still unregistered, in the process of registering or conditionally registered. The concern with these centres are that the conditions under which they provide care for children is unregulated and consequently very little information is available on the quality of the physical and human resources in these centres. To gauge the difference between fully registered schools and conditionally or unregistered schools, indices were compiled to get an overall measure of the level and quality of the physical and human resources at ECD centres.

To get a comprehensive understanding of the overall level and quality of infrastructure, equipment and staff at each ECD centre, an index was constructed for each resource area required for delivering a high quality ECD programme. The indices constructed are unidimensional composite indicators of a set of questions in the audit which reflects the underlying level of conditions of each resource area. The index score for each ECD centre is then the linear combination of the set of questions (or variables), with weights assigned to each of the underlying questions. These weights are calculated based on the variance and covariance of these variables, using Multiple Correspondence Analysis. This method constructs each index by attributing unique weights to each of the variables included, based on the amount of common information each variable contributes in relation to the latent variable (in this case the level and

[20] The Municipal Infrastructure Grant is earmarked to assist unregistered centres with their infrastructural inadequacies, but this is rarely the case.

quality of infrastructure,[21] equipment[22] and human resources[23]). By construction each index is centred on zero and has a standard deviation of one.

Figure 7 illustrates the difference in the mean of each index by centre registration status. Conditionally registered centres do significantly worse than all other centres on the infrastructure index, but on the equipment and human resource index they perform better than both centres who have applied for registration and centres who have not applied for registration. Both the equipment and human resource index reflect a trend where conditionally registered centres perform worse than fully registered centres, and centres who have applied for registration perform worse than conditionally registered centres. On both these indices, centres who have not applied for registration perform the worst.[24]

It is not surprising that conditionally registered centres perform significantly worse on the infrastructural index than fully registered centres, since infrastructural inadequacies were the main reason provided by ECD centres for being conditionally registered. The main features[25] which these centres seem to be lacking is proper ventilation and heating (respectively 29% and 68% of conditionally registered centres does not have this), access to water in either the building or on the site (only 38% of sites have tap water in the building), electricity for both lighting and cooking (24% has no electricity for lighting, and 65% have no electricity for cooking). Fewer conditionally registered centres have these facilities relative to non-registered centres who have both applied or not applied for registration.

Figure 7: Resource Indices by Registration Status[26]

[21] Underlying variables of the Infrastructure Index: Structure of ECD Centre; heating & ventilation; condition of roof, inside of centre, plumbing; need for maintenance; access to water, energy for lighting and cooking; play area size; floor space; teaching area; paved surfaces.

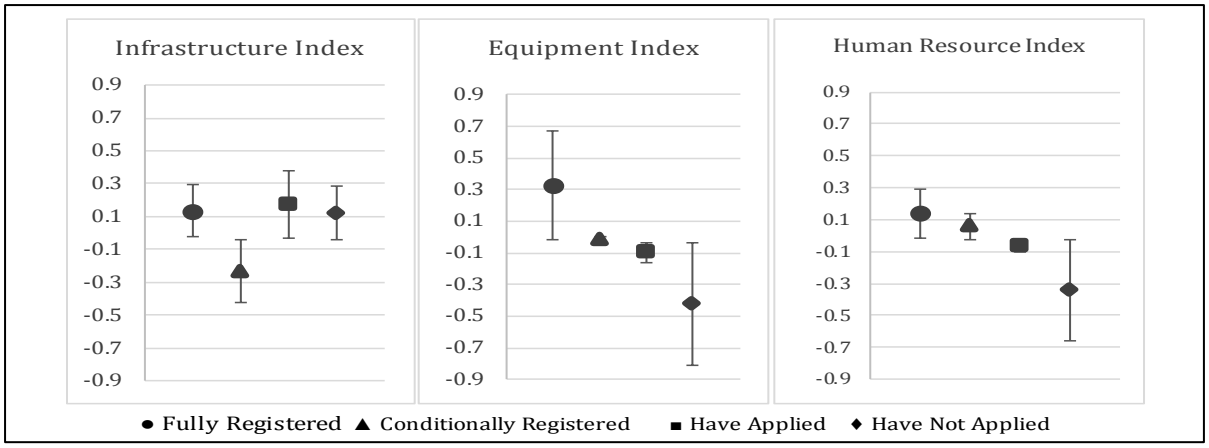
[22] Underlying variables of Equipment Index: Quality and availability of toilets, arts and craft material, music equipment, educational games, manipulative and construction sets, puzzles, fantasy and make believe materials, outdoor and active play equipment, classroom furniture, "Discovery of Nature" poster, other colourful posters; an outside gate; a fridge; a food garden.

[23] Underlying variables of Human Resource Index: Qualifications; Specialisations in ECD; Study Duration; Training attended in the past 24 months; nature of appointment; having a clearance certificate. The index was only calculated for staff who act in a teaching position.

[24] In both indices these rakings are statistically significantly different from each other.

[25] See Tables 6 - 8 in the Appendix for the full set of variables included in each index.

[26] Table 5 in the Appendix provides the statistics for these graphs.



Source: 2013 ECD Audit. **Notes:** Indices were constructed by making use of a range of questions from the ECD audit data on each subject area, and by applying Multiple Correspondence Analysis to the variables. The Human Resource Index is calculated by taking only teaching staff into consideration.

Regarding space, non-registered centres who have not applied for registration seem to have significantly smaller play areas, floor space and teaching space. A higher proportion of non-registered centres, both those who have applied for registration and those who have not, have no supporting materials (eg. musical instruments, educational games, arts and crafts), or few supporting material which are in a poor condition. For example, only a third of fully registered centres have few or no arts and crafts material, whereas half of the centres who have applied for registration, and two-thirds of centres who have not applied for registration have few or no arts and crafts material.

There is a significant difference in the human resource index between centres with different registration statuses. These differences originates from factors such as the ECD specialisations which practitioners have obtained, whether practitioners have attended any training in the past 24 months, and whether staff members have a National Child Protection Clearance certificate. There is a lot of variation in the proportion of practitioners with ECD specialisations, with just less than half (45%) of the practitioners in fully and conditionally registered centres having some specialisation in ECD, but only 14% of practitioners in centres which have applied for registration, and merely 9% of practitioner in centres which have not applied for registration. Furthermore, 46% of practitioners in fully registered centres have attended training in the past 24 months, whereas only 26% practitioners in centres who have not applied for registration have attended any training. Finally, two thirds of practitioners in fully registered centres do not have a Clearance certificate, and nine out of ten practitioners in centres who have not applied for registration do not have a Clearance certificate.

8. Discussion

Using a variety of datasets, the preceding analysis considered both the demand for and the supply of ECCE. On the demand side it is evident that the participation of four-year-olds in ECCE has increased significantly over the past decade with about 45% of all four-year-olds participating in an early-learning programme in 2013. Although it is unclear exactly how many learners are not participating in any form of ECCE, a lower-bound estimate would be around 28%, that is about 300 000 children.

Children living in urban informal areas are the least likely to participate in ECCE, although these are the areas in which high-quality ECCE may have the greatest impact. Children living in urban informal settings are at risk of receiving inadequate nutrition and very little cognitive stimulation at home, and will therefore greatly benefit from attending a high-quality ECD centre. Furthermore, KwaZulu-Natal has the lowest participation rates and has shown the least growth in participation over the past five years.

The supply-side focus has been on both the quantity and quality of ECD provisioning. Although there is still very little information available about four-year-olds' access to ECD centres, one is able to get a sense of the nature of ECD centres currently. One in five ECD centres is battling with inadequate drinking-water supply, one in four centres has inadequate electricity supply and a quarter struggle with inadequate ablution facilities. The prevalence of the infrastructural inadequacies differs between provinces, with ECD centres in Limpopo, KwaZulu-Natal and the Eastern Cape being the worst off. Moreover, the lack of learning and teaching support materials are rife and centres in these same provinces are the most in need of additional resources.

Another feature of the current state of ECD centres is the low levels of qualifications among ECD practitioners. Merely one out of every ten practitioners has a qualification above matric, and only a quarter has received some training in ECD. The entry requirements to become an ECD practitioner is very low, and it is evident that ECD centres are not presently implementing these norms and standards. Although qualifications are not mandatory for quality teaching, it is critical to ensure that practitioners are aware of the importance and complexity of both cognitive and non-cognitive stimulation for the development of young children. It is therefore necessary to focus on the needs of these practitioners and to provide them with the skills and capacities needed to be more effective. Therefore, in order to implement an effective pre-Grade R, an entire teaching force will need to be trained.

Finally, the policy space in which the ECD sector currently finds itself does not reflect the importance of this sector for development, and is not conducive to the proper implementation of a pre-Grade R. There is no evidence available on the expertise or capacity of district officials,

but the successful implementation of a high-quality pre-Grade R will depend strongly on their capability. Implementing an additional year of ECCE will not have the expected (and much needed) impact if it will only be of the same quality as current Grade R provision. ECD first has to become a core function within government, and resources (both financial and human capital) and authority structures need to reflect this at national, provincial and district levels.

In light of the abovementioned features, the relevance of the proposed pre-Grade R in the National Development Plan is considered. The introduction of a pre-Grade R could potentially have a significant impact on the future development of children, but these benefits will only be realised if pre-Grade R provision is of high quality, especially among the poor. The issue of quality is imperative here, and the current landscape in which the ECD sector functions does not lend itself to the implementation of a high-quality service. Five policy recommendations follow from this analysis:

1. Extensive investment in infrastructure and learning and teaching support material will be necessary regardless of whether pre-Grade R will be implemented in primary schools or in ECD centres. Among other things, this will entail assisting unregistered and conditionally registered ECD centres to attain the required health and safety standards.

2. Large-scale capacity building will be required among the national departments, provincial departments and districts. Sufficient staffing and ECD expertise are required on all three levels to ensure that ECD centres and practitioners will receive the necessary professional support in implementing a pre-Grade R curriculum.

3. An entire teaching force will need to be trained and provided with the vital skills to be more effective in unlocking the untapped potential of young children.

4. Significant additional funding needs to be made available for practitioners. Given the lack of training and qualifications, however, additional funding could be linked to compulsory training and practical qualification.

5. The policy space in which the ECD sector is positioned needs to be clarified. The current milieu lends itself to perverse incentives, abdication of responsibility and a wide array of communication failures. Designing an organisation structure which will provide exceptional leadership and guidance on governance and accountability issues is complex as it needs to have sufficient capacity, authority and funding. The Draft Policy on Early Childhood Development proposes an inter-sectoral ECD agency to coordinate all the functions that comprise ECD, but whether this is the most appropriate vehicle to fulfil this function is still open for debate. What is essential, however, is to establish the policy space of the ECD sector

with proper leadership and authority. The quality of pre-Grade R is inextricably linked to the policy environment in which it is situated.

In conclusion, this research attempted to bring new information to bear on the current environment in which the National Development Plan proposes to implement an additional year of preschooling. Although pre-Grade R may seem like a commendable idea, the effectiveness of this policy is fully dependent on the quality of the service provided. Therefore, for pre-Grade R to fulfil its role as an equalising stepping stone to social equality, the required structures must first be put in place before commencing with the implementation of this policy.

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Appendix:

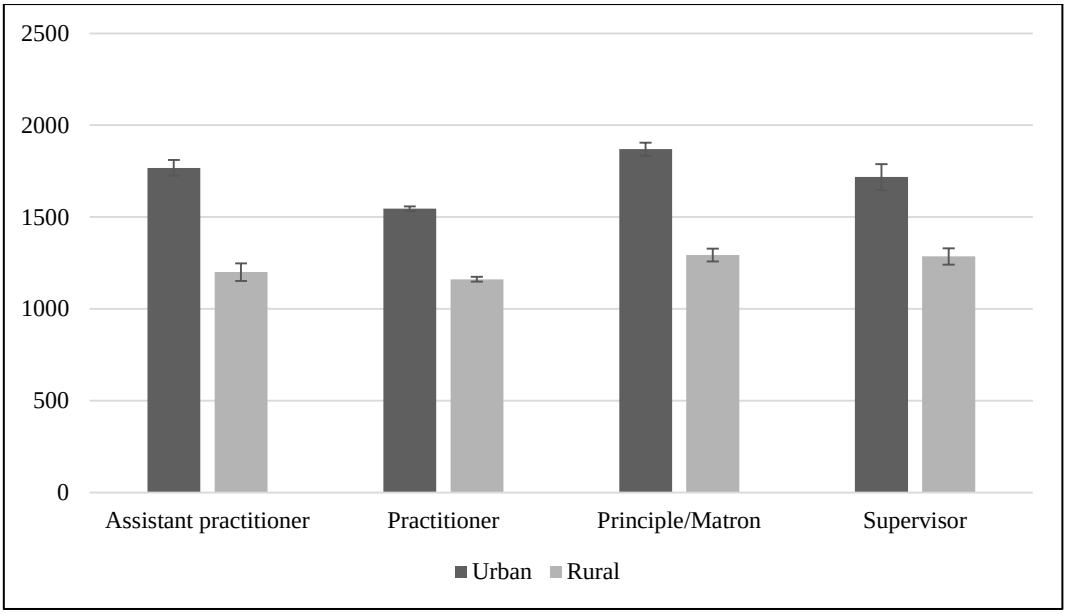
Table 4: Logit Model for Ages 3 and 4

		Psuedo R2		0.1134
		Observations		2529
		Coefficient		**s.e.**
Age (Ref: Age 3)	Is Aged 4	0.970	***	0.101
Race (Ref: Black)	Is Coloured	-0.843	***	0.285
	Is Indian/Asian	-1.594		1.130
	Is White	-1.369		1.365
Gender (Ref: Boy)	Is a girl	0.032		0.099
Province (Ref: Gauteng)	Lives in the Western Cape	0.049		0.297
	Lives in the Eastern Cape	0.183		0.221
	Lives in the Northern Cape	-0.539	**	0.271
	Lives in the Free State	0.802	***	0.246
	Lives in KwaZulu Natal	-0.971	***	0.216
	Lives in North West	-0.431	*	0.243

	Lives in Mpumalanga	-0.402	*	0.236
	Lives in Limpopo	0.097		0.235
Area Type (Ref: Urban Formal)	Lives in a Urban Informal Area	-0.497	***	0.206
	Lives in a Tribal Area	0.049		0.209
	Lives in a Rural Formal Area	0.008		0.385
Household Characteristics	Mother does not live at home	0.014		0.125
	Socio-Economic Status	0.442	***	0.107
	Receives a Child Support Grant	-0.723		0.829
	Mother has a job	-0.055		0.134
Highest Education Level in Household (Ref: No Schooling)	Primary School	0.938		1.301
	Secondary School	1.136		1.290
	Matric	1.472		1.295
	Post Matric Diploma	2.133		1.314
	Degree	1.318		1.302
	Post Graduate	0.548		1.719
Perceived Health (Ref: Good)	Fair	-0.224		0.200
	Poor	-1.544	***	0.542
	Constant	-0.962		1.562

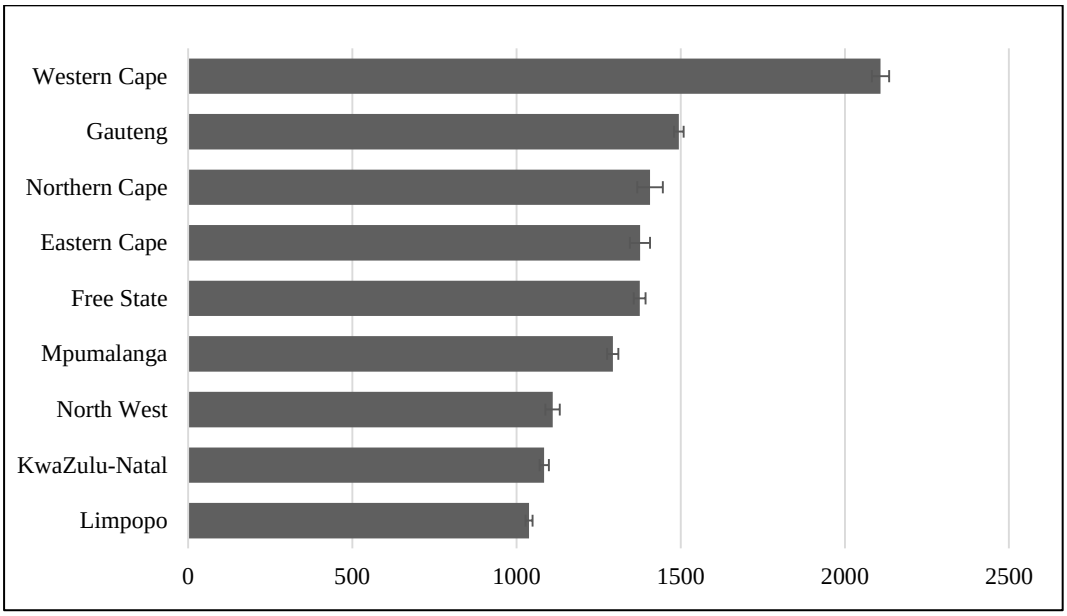
Source: 2013 GHS data. **Notes**: Dependent Variable is a 0-1 dummy for children currently attending any education institution apart from a day-mother. * p<.1; ** p<.05; *** p<.01

Figure 8: Average Monthly Salary in Rural and Urban Areas (in Rand)



Source: 2013 ECD Audit.

Figure 9: Average Monthly Salary per Province (in Rand)



Source: 2013 ECD Audit.

Table 5: Resource Indices by Registration Status

				Confidence Interval		Range	
		Mean	*Std. Err*	*Upper Limit*	*Lower Limit*	*Min*	*Max*
Infrastructure:	*Full*	0.134	0.012	0.159	0.110	-6.415	1.710
	Conditional	-0.232	0.022	-0.189	-0.274	-6.415	1.686
	NR: Applied	0.170	0.018	0.205	0.135	-6.415	1.710
	NR: Not Applied	0.122	0.019	0.160	0.085	-6.415	1.710
Equipment:	*Full*	0.326	0.011	0.347	0.305	-3.020	2.205
	Conditional	-0.020	0.020	0.020	-0.060	-2.540	1.852
	NR: Applied	-0.099	0.017	-0.065	-0.132	-2.711	2.061
	NR: Not Applied	-0.421	0.016	-0.389	-0.454	-2.711	2.061
Staff:	*Full*	0.139	0.007	0.153	0.126	-2.024	4.218
	Conditional	0.057	0.014	0.084	0.030	-1.897	3.184
	NR: Applied	-0.060	0.011	-0.038	-0.083	-2.134	3.862
	NR: Not Applied	-0.343	0.012	-0.320	-0.365	-1.897	3.623

Source: 2013 ECD Audit. **Notes:** Indices were constructed by making use of a range of questions from the ECD audit data on each subject area, and by applying Multiple Correspondence Analysis to the variables.

Table 6: Factors underlying the Infrastructure Index

		Full	Conditional	Applied	Not Applied
Type of Structure:	*Other*	4%	3%	5%	4%
	Informal	10%	13%	14%	18%
	House	20%	20%	37%	41%
	Community	13%	13%	13%	11%
	Formal	53%	51%	32%	26%
Roof Condition:	*Many & Major*	2%	3%	3%	3%
	Many & Minor	0%	0%	1%	0%
	Some & Major	3%	4%	3%	3%
	Some & Minor	16%	19%	14%	13%
	None	78%	73%	80%	81%
Inside Conditions:	*Many & Major*	2%	3%	3%	3%
	Many & Minor	0%	0%	1%	0%
	Some & Major	3%	4%	3%	3%
	Some & Minor	16%	19%	14%	13%
	None	78%	73%	80%	81%
Condition of Plumbing:	*Many & Major*	1%	1%	0%	0%
	Many & Minor	0%	0%	0%	0%
	Some & Major	1%	1%	1%	0%
	Some & Minor	6%	5%	4%	3%
	None	92%	94%	95%	96%
Electrical Wiring:	*Exposed & Major*	1%	2%	1%	1%
	Exposed & Minor	4%	4%	4%	3%
	Not Exposed	96%	94%	95%	96%
Heating Facilities:	*No*	50%	68%	58%	63%
	Yes	50%	32%	42%	37%
Sufficient Ventilation:	*No*	19%	29%	24%	26%
	Yes	81%	71%	76%	74%
Maintenance Required:	*No*	62%	59%	61%	65%
	Yes	38%	41%	39%	35%
Water Supply:	*Borehole water on-sit*	3%	4%	2%	2%
	Other	2%	5%	3%	3%
	Public or communal ta	8%	13%	9%	10%
	Rainwater tank on-sit	7%	8%	3%	3%
	Tap water in building	57%	38%	61%	62%
	Tap water on-site	23%	32%	22%	20%
Electricity - Lighting:	*Electricity from main*	81%	75%	82%	80%
	Electricity from own	1%	1%	1%	0%
	Gas/parafin/candles	11%	9%	8%	10%
	None	6%	14%	9%	9%
	Other	1%	1%	1%	1%
Electricity - Cooking:	*Electricity from main*	50%	34%	61%	60%
	Electricity from own	1%	0%	1%	0%
	Gas/wood/coal/parafin	46%	61%	30%	30%
	None	2%	3%	7%	7%
	Not applicable	1%	1%	2%	2%
	Other	1%	0%	0%	1%

Source: 2013 ECD Audit.

Table 7: Factors underlying the Equipment Index

		Full	Conditional	Applied	Not Applied
Toilets:	*None*	1%	1%	2%	3%
	Other	0%	1%	1%	1%
	Bucket	6%	9%	7%	11%
	No Vent	14%	31%	14%	15%
	Vent	10%	13%	8%	8%
	Potties	31%	24%	36%	35%
	Chemical	4%	5%	2%	2%
	Septic	3%	1%	2%	1%
	Flush	30%	14%	29%	25%
Arts & Crafts:	*None & Poor*	4%	5%	11%	16%
	None & Fair	0%	1%	2%	2%
	None & Good	0%	0%	0%	0%
	Few & Poor	5%	6%	8%	8%
	Few & Fair	19%	26%	24%	29%
	Few & Good	5%	7%	5%	7%
	Most & Poor	1%	1%	1%	0%
	Most & Fair	15%	14%	12%	12%
	Most & Good	16%	15%	14%	11%
	All & Poor	1%	1%	1%	0%
	All & Fair	5%	4%	4%	2%
	All & Good	28%	21%	18%	11%
Music:	*None & Poor*	15%	19%	25%	31%
	None & Fair	2%	2%	4%	6%
	None & Good	1%	2%	1%	1%
	Few & Poor	6%	8%	6%	6%
	Few & Fair	23%	30%	23%	26%
	Few & Good	7%	8%	6%	6%
	Most & Poor	1%	1%	1%	1%
	Most & Fair	11%	10%	9%	8%
	Most & Good	12%	8%	10%	7%
	All & Poor	1%	0%	0%	0%
	All & Fair	3%	2%	2%	1%
	All & Good	18%	9%	12%	7%
Games:	*None & Poor*	6%	7%	13%	17%
	None & Fair	1%	2%	2%	3%
	None & Good	0%	1%	0%	0%
	Few & Poor	5%	5%	6%	7%
	Few & Fair	21%	29%	25%	30%
	Few & Good	5%	6%	5%	6%
	Most & Poor	1%	1%	1%	1%
	Most & Fair	13%	13%	11%	10%
	Most & Good	15%	12%	13%	11%
	All & Poor	1%	0%	0%	0%
	All & Fair	5%	3%	4%	2%
	All & Good	28%	22%	20%	12%

Factors underlying the Equipment Index (continued)

Manipulative and Construction Sets:	*None & Poor*	10%	14%	21%	27%

	None & Fair	2%	2%	3%	5%
	None & Good	0%	1%	1%	1%
	Few & Poor	5%	6%	6%	7%
	Few & Fair	25%	33%	26%	29%
	Few & Good	6%	8%	5%	5%
	Most & Poor	1%	1%	1%	0%
	Most & Fair	13%	11%	10%	9%
	Most & Good	14%	9%	11%	9%
	All & Poor	1%	0%	0%	0%
	All & Fair	3%	1%	2%	1%
	All & Good	20%	12%	14%	8%
Puzzles:	*None & Poor*	5%	7%	12%	18%
	None & Fair	1%	1%	1%	3%
	None & Good	0%	1%	0%	1%
	Few & Poor	6%	7%	7%	7%
	Few & Fair	22%	31%	27%	31%
	Few & Good	6%	9%	6%	7%
	Most & Poor	1%	1%	0%	1%
	Most & Fair	14%	13%	12%	10%
	Most & Good	16%	14%	13%	10%
	All & Poor	1%	0%	0%	0%
	All & Fair	3%	2%	3%	1%
	All & Good	25%	15%	17%	10%
Fantasy and Make Believe:	*None & Poor*	9%	13%	19%	26%
	None & Fair	1%	2%	3%	5%
	None & Good	0%	1%	1%	1%
	Few & Poor	7%	7%	7%	8%
	Few & Fair	25%	32%	26%	29%
	Few & Good	6%	7%	5%	5%
	Most & Poor	1%	1%	1%	0%
	Most & Fair	13%	11%	11%	9%
	Most & Good	14%	11%	11%	9%
	All & Poor	1%	0%	0%	0%
	All & Fair	3%	2%	2%	1%
	All & Good	20%	12%	14%	8%
Outdoor Equipment:	*None & Poor*	10%	13%	23%	28%
	None & Fair	1%	2%	3%	5%
	None & Good	0%	1%	1%	1%
	Few & Poor	7%	8%	7%	7%
	Few & Fair	24%	33%	25%	28%
	Few & Good	7%	8%	6%	6%
	Most & Poor	1%	1%	1%	0%
	Most & Fair	12%	10%	9%	7%
	Most & Good	15%	13%	11%	8%
	All & Poor	1%	0%	0%	0%
	All & Fair	3%	1%	2%	1%
	All & Good	20%	10%	13%	7%

Factors underlying the Equipment Index (continued)

Furniture:	*None & Poor*	4%	6%	10%	14%
	None & Fair	1%	2%	2%	3%

	None & Good	0%	1%	0%	1%
	Few & Poor	6%	6%	8%	9%
	Few & Fair	21%	28%	26%	32%
	Few & Good	5%	7%	6%	6%
	Most & Poor	1%	1%	1%	1%
	Most & Fair	14%	14%	12%	10%
	Most & Good	17%	17%	14%	11%
	All & Poor	1%	0%	0%	0%
	All & Fair	4%	2%	3%	1%
	All & Good	28%	17%	19%	11%
Nature Poster:	*No*	41%	44%	53%	62%
	Yes	59%	56%	47%	38%
Colour Poster:	*No*	9%	15%	18%	28%
	Yes	91%	85%	82%	72%
Fridge:	*No*	21%	33%	36%	43%
	Yes	79%	67%	64%	57%
Food Garden:	*No*	54%	49%	77%	82%
	Yes	46%	51%	23%	18%

Source: 2013 ECD Audit.

Table 8: Factors underlying the Human Resource Index

		Full	Conditional	Applied	Not Applied
Qualification:	*< Gr 12*	42%	40%	42%	47%
	Gr 12	41%	48%	42%	41%
	ABET	8%	7%	7%	5%
	Diploma	3%	2%	4%	3%
	Other	4%	3%	4%	3%
	Degree	1%	0%	1%	1%
ECD Specialisation:	*None*	54%	55%	71%	80%
	Certificate	29%	24%	16%	10%
	Diploma	5%	5%	3%	2%
	Degree	1%	0%	1%	0%
	Other	12%	15%	10%	7%
Training attending in past 24 months:	*No*	54%	62%	62%	74%
	Yes	46%	38%	38%	26%
Nature of Appointment:	*Other*	2%	1%	1%	1%
	Temporary	7%	6%	7%	7%
	Substitute	0%	0%	0%	1%
	Contract	6%	8%	5%	5%
	Permanent	86%	85%	87%	86%
National Child Protection Clearance:	*No*	67%	74%	75%	89%
	Yes	33%	26%	25%	11%

Source: 2013 ECD Audit.