



DATA INSIGHTS

The Early Learning Positive Deviance Initiative - Summary report of quantitative and qualitative findings

By Junita Henry and Sonja Giese | July 2023

ABSTRACT

The limited availability of metadata in early childhood development (ECD) settings prompted the creation and utilisation of DataDrive2030's first meta-dataset. Applying an asset-based Positive Deviance (PD) approach, this study aimed to identify factors associated with young children from lower socioeconomic backgrounds who outperform their peers. This report documents insights derived from both quantitative and qualitative analyses.

To investigate the metadata comprehensively, five teams were contracted, employing multiple definitions of PD. Concurrently, conversations with Early Learning Programme (ELP) practitioners and an open data competition were conducted. The research included secondary analyses of outcomes data from over 12,000 children in approximately 2,000 ELPs/Grade R classes across South Africa. Primary analyses involved observational and interview data from six PD case study sites, with an additional seven sites interviewed remotely.

The findings emphasise the multifaceted nature of PD in ELPs. Factors associated with PD include children's socio-emotional functioning, ELP organisational practices, pedagogical strategies, community embeddedness, strong leadership, and practitioner attentiveness. Understanding and implementing these interconnected factors has the potential to enhance the effectiveness of ELPs significantly, ultimately reducing disparities in developmental outcomes.

Future plans involve utilising these findings to design and test pilot interventions in low-income settings. This process will engage behavioural experts to customise a framework, leverage networks and partnerships to identify impactful and scalable behaviours, design innovative interventions, conduct micro-experiments, and monitor and evaluate outcomes. More detailed information will be provided in an upcoming report.

ACKNOWLEDGEMENTS

DataDrive2030 wishes to acknowledge and thank the following individuals:

- The analysts for their careful thinking, curiosity, and commitment to seeking out what may be hidden: Percept (Dave Strugnell, Elizabeth Vale, and Claire Gomes), Dr. Jessica Ronaasen, Frankie Mattes, Grace Bridgeman, Juliet McCann, Dr. Joshua Jeong, Lily Bliznashka, and Prof. Catherine Draper.
- Percept (Elizabeth Vale, Michelle Flowers, and Maryke Rademeyer) for conducting the qualitative analysis.
- Dr. Basma Hassan, Dr. Gabrielle Wills, Dr. Dieter von Fintel, and Dr. Abbie Raikes for being thought partners, and challenging our assumptions and processes.
- The competition participants for taking part in our wild card competition and Jaco van Rensburg at Explore for being a key partner throughout the competition process.
- The practitioners, facilities, and interview participants we engaged in conversation, who have helped to keep us grounded in the realities of early learning programmes.
- Yellowwoods and This Day for making this work possible through their funding.

COMMONLY USED ACRONYMS

CEF	Cognition and Executive Functioning
ELOM	Early Learning Measurement
ELP	Early Learning Programmes
ECD	early childhood development
ELL	Emergent Literacy and Language
ENM	Emergent Numeracy and Mathematics
GMD	Gross Motor Development
FMC-VMI	Fine Motor Coordination and Visual Motor Integration
PD	Positive Deviance
SEF	Socio-emotional Functioning
SES	Socioeconomic Status

INTRODUCTION

With the development and widespread use of the Early Learning Measurement (ELOM) suite of tools, we now have, for the first time, access to a large, nationally representative, and continuously growing preschool child dataset in South Africa. The ELOM 4-5 Years Assessment tool categorises children into those that are On Track for their development (i.e. meet expected development standards), Falling Behind, or Falling Far Behind for learning overall and for each of five key developmental domains¹ which are listed below:

- Gross Motor Development (GMD)
- Fine Motor Coordination and Visual Motor Integration (FMC-VMI)
- Emergent Numeracy and Mathematics (ENM)
- Cognition and Executive Functioning (CEF)
- Emergent Literacy and Language (ELL)

The socioeconomic gradient by outcomes observed in South African pre-schoolers

aged 50 to 59 months, as measured by ELOM, reflects persistent inequalities in children's early experiences. Analyses of data from the Thrive by Five Index² showed that only one-third of children in ELPs charging less than R110 per month (the lowest fee band) are on track for their age overall, while the majority (81%) in the highest fee band (charging over R1,751 per month) meet expected standards.³

Of particular concern is that the poorest children exhibit inadequate performance in crucial developmental areas that are vital for foundational learning and future academic achievement. For example, 36% of children in the lowest fee band are Falling Far Behind in CEF⁴ and struggling with basic tasks for their age.^[1] This has significant implications as CEF plays a crucial role in facilitating learning, surpassing the importance of IQ in terms of school readiness and impacting long-term well-being, including career success, physical health, and social life.^[2-9]

1 The cut-off points for On Track, Falling Behind, and Falling Far Behind on the ELOM 4-5 Years Assessment tool were set empirically and in consultation with key stakeholders (in 2016). Details on cut-off scores can be found in the ELOM [technical manual](#).

2 A nationally representative survey conducted at the end of 2021, including over 5,000 children aged 50 to 59 months.

3 DataDrive2030's full analysis of the socioeconomic gradient in learning outcomes for children who participated in the Thrive by Five Index is accessible via the [DataDrive2030 website](#).

4 CEF refers to a specific set of mental skills that enable us to pay attention, plan, think creatively, problem solve, and use self-control.

AN ASSET-BASED APPROACH TO FINDING SOLUTIONS

While reducing child poverty must remain a priority, we should simultaneously explore ways of levelling the playing field for young children entering school, even amidst poverty. This study aims to identify factors associated with exceptional ELOM 4-5 outcomes for young children from lower socioeconomic backgrounds, whom we refer to as "positive deviants". By leveraging these factors, we can design interventions that bridge the outcome gap across the socioeconomic spectrum. Positive Deviance (PD) is based on the concept that certain individuals or groups develop unique practices or behaviours that lead to improved outcomes compared to their peers facing similar challenges.^[10]

Existing research on PD focus on maternal and child health^[11–20] and nutrition,^[11,13–21] with few studies examining middle-late childhood.^[22–24] Only one study focused on PD in an early childhood education setting.^[25] Across these studies, different definitions and methods have been used to identify positive deviants, ranging from binary indicators,^{[11][13]} to characteristic traits,^[14,16,18,21] higher performance compared to predicted results,^[12]^[22,24] or scoring above the 70th percentile^[23] or

90th percentile.^[25] The studies employ various qualitative and quantitative approaches, with some incorporating realist evaluation⁵ and longitudinal data. Findings include identifying positive deviant characteristics and uncovering unexpected mechanisms contrary to the existing literature. Methodological considerations emphasise the importance of qualitative work and the role of context,^[11,13,14,17] culture,^[22] and community engagement^{[15,26][24]} in understanding PD.

Challenges cited in the literature include generalisability, scalability, limited sample size, the cross-sectional nature of data, and the difficulty establishing causal relationships, which the use of metadata may address^{[14,26,27][15]} by reducing the time and cost and minimising Hawthorne effects.^[27]

We aimed to identify factors and behaviours associated with children attending low fee ELPs who significantly outperform their peers across various outcomes such as the total ELOM score and specific developmental domain scores. Our approach follows the framework developed by The Data Powered Positive Deviance⁶ (DPPD) Initiative which comprises 5 stages:

BOX 1: SUMMARY OF STAGES OUTLINED IN THE DATA POWERED POSITIVE DEVIANCE INITIATIVE FRAMEWORK

- 1** **STAGE 1:** Discuss the reason why a PD approach is used (the problem-method fit)
- 2** **STAGE 2:** Define and determine positive deviants
- 3** **STAGE 3:** Uncover the underlying factors associated with positive deviants using both qualitative and quantitative approaches
- 4** **STAGE 4:** Use these findings to design and pilot scalable intervention(s)
- 5** **STAGE 5:** Monitor and evaluate the effectiveness and suitability of the intervention

In this report, we synthesise our approach to the first three stages. Finer details on the quantitative approach and qualitative processes are reported separately.

5 An approach to impact evaluation that emphasises the importance of context for programme outcomes.

6 For more information, please see <https://www.datapoweredpd.org>

STAGE 1: ASSESSING THE SUITABILITY OF THE APPROACH

We assess the suitability of the PD approach by looking at the nature of the problem, the likelihood that positive deviants exist (suitability), and the data available to use the approach effectively (feasibility).

THE NATURE OF THE PROBLEM: TARGETING BEHAVIOURAL PRACTICES

Literature suggests that providing materials alone is not effective for improving learning outcomes. Older studies lack causal evidence and there are concerns that materials may benefit high-achieving students only or be unsuited to the child's context.^[28] Effective interventions to enhance early

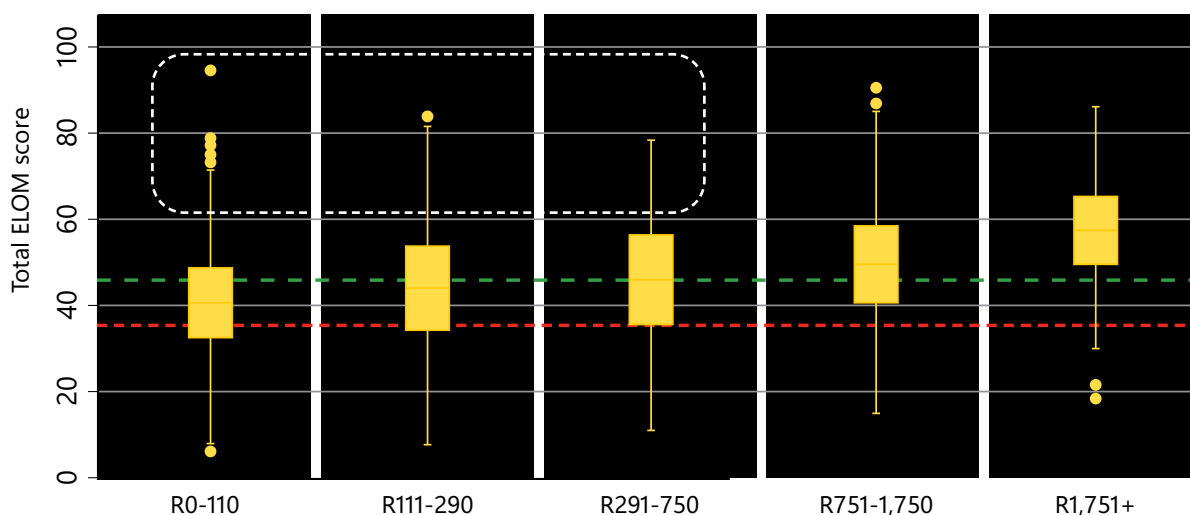
learning outcomes typically combine materials with coaching or support to target practitioner practices.^[29] While we considered material factors (such as infrastructure and the availability of learning resources) in our analyses, we focused on identifying behavioural practices associated with PD.

THE LIKELIHOOD OF POSITIVE DEVIANTS: VARIATION IN OUTCOMES

Figure 2 displays the relationship between socioeconomic status and ELOM outcomes. It shows significant variation in performance between and within income groups.⁷ The white box highlights positive outliers in the lower-income groups. This variation identifies the likelihood of positive deviants in lower-income bands in

comparison to their counterparts. For our analyses, we therefore focused on children in programs charging up to R750 per month (where the majority of the children are distributed), allowing us to uncover factors that can help reduce the disparity in early learning outcomes across socioeconomic status.

FIGURE 2: VARIATION IN TOTAL ELOM SCORES BY ELP FEE BAND



Notes: The red dashed line indicates the cut off between those Falling Far Behind and those Falling Behind. The green dashed line indicates the cut off between those that are Falling Behind and those On Track.

SOURCE: DATADRIIVE2030, 2022

⁷ The yellow boxes contain the middle 50 per cent of scores (interquartile range). The whiskers (outer lines) provide a sense of the total variation in scores. Learners below the red dashed line were Falling Far Behind the expected standard in their early learning, those between the red and green lines were Falling Behind and those above the green line were On Track.

FEASIBILITY OF THE APPROACH

The two most important factors of feasibility include data availability/accessibility and the capability needed to apply the method. DPPD leverages three broad categories of data: outcome data, contextual data, and behavioural data. Below, we describe the feasibility of the approach using the data available.

The data used to determine and define positive deviants come from programmes and research studies in South Africa that used the ELOM tools between 2016 and 2022. These data were collated to create a meta-dataset that includes 12,719 preschool children aged 50-69 months across South Africa. We discuss the data sources and assessment tools in more detail in the The Early Learning Positive Deviance Initiative Technical Report.

CHILD OUTCOME DATA: The child outcome data were collected using the ELOM 4&5 tool which

comprises five domains. Each domain is scored out of 20, summing to a total ELOM score out of 100. For data to be included in the meta-dataset, children had to have a complete and valid ELOM 4&5 assessment.⁸

CONTEXTUAL DATA: Contextual data from various studies were also used to provide additional context for the outcomes data, although the data collection methods and tools varied across studies.⁹ In addition, contextual data allowed us to control for factors that are likely to influence performance but are not related to practices or behaviour.

BEHAVIOURAL DATA: In the qualitative study, behavioural data were collected (in Stage 3) to better understand the relationship between contextual factors and child outcomes, particularly focusing on the practices of high performing, low fee ELPs (we refer to these as positive deviant ELPs).

DATA COLLECTION TOOLS

- 1. The ELOM 4&5 Years Assessment (ELOM 4&5) tool** measures a child's development across 23 items comprising five domains. This tool also includes a rating scale for task orientation that is completed by the assessor.
- 2. The Social-Emotional Functioning (SEF) Rating Scale** assesses a child's social relations, emotional readiness for school, and self-care.
- 3. The Home Learning Environment (HLE) tool** evaluates the home environment in terms of early learning resources in the home, early learning activities (i.e. reading or singing songs), and the caregiver's time with the child.
- 4. The Learning Programme Quality (LPQ) tool** measures the quality of group learning programs for pre-schoolers in areas such as the learning environment, teaching strategies, relationships and interactions, curriculum, and learning and teaching methods.

⁸ ELOM assessments are considered valid when the child is within the 50-69 month age criteria, and the child completes the full assessment (the assessment is not exited prematurely, is assessed in their home language, does not score zero on two or more domains and the child does not fail the World Health Organization-embedded screening questionnaire (for more information, see the [ELOM 2020 technical manual](#)).

⁹ It is for this reason that there are large patterns of "missingness" within the data, indicating different uses of various tools and measurements across subgroups.

DATA SOURCES

The data used in the analyses include multiple sources.

- The most prominent source is the **Thrive by Five Index**, which is a nationally representative survey conducted at the end of 2021.¹⁰ The Index includes child outcomes data from 5,222 children sampled from 1,247 ELPs or early childhood development (ECD) sites across the country. The data were collected through direct child assessments (ELOM 4&5 tool) and through interviews with the child's teacher (SEF rating scales).
- Additional interviews (**2021 Baseline audit**) with principals and practitioners and observations of the learning program's quality (using the LPQ tool) were conducted in a random sample of 571 of these sites.
- The data also include other sources such as the **Grade R ELOM Data from 2019**,¹¹ which assessed 1,678 Grade R children across four provinces (Western Cape, KwaZulu-Natal, Eastern Cape, and North West) using the ELOM 4&5 tool and SEF rating scales.
- The **Early Learning Programme Outcomes (ELPO) Study**¹² from 2018 focused on the effectiveness of different early learning programs for low-income children. The study used a quasi-experimental design and assessed 420 children using the ELOM 4&5 tool and SEF

rating scales. It also had data on the HLE for 294 children.

- The **ELOM Age Validation study** from 2016¹³ was conducted as part of the development process for the ELOM 4&5 tool. The study assessed 1,329 children from different income quintiles across three provinces and collected data on age, home language, height, and child performance scores.
- The **Grade R Roots and Shoots baseline** from 2022 collected data on 587 children from Afrikaans and IsiXhosa schools as part of an existing randomised control trial in the Western Cape, using the ELOM 4&5 tool.

In addition to these larger datasets, the analyses incorporated anonymised data from smaller studies and programs. These datasets included observations from 26 studies and programs (ranging from 30 to about 600 observations each), totalling 3,483 children.

Additionally, within this dataset, the geo-locations for 2,991 children across 316 facilities were captured. Data from the 2021 ECD Census^[30] were merged for 2,150 of these children, enabling an analysis of facility-level factors such as environmental observations and practitioner interviews. The 2021 ECD Census used similar tools to the 2021 Baseline audit, with the exception of the LPQ tool assessment.

THE FINAL DATASET

We conclude that the data available is adequate for the intended use. The final merged dataset consisted of **12,719 children across 1,974 facilities** (ELPs or Grade R classrooms). Table 1 on the next page provides a summary of the data, the first column indicates the data source and the remainder of the columns show the different

types of tools or data collected and the number of children we have data for across these sets of variables. A "–" indicates where the data were not intended to be collected at all. We conclude that the data is rich enough to explore the factors associated with PD.

10 Please see [here](#) for a link to the data.

11 Please see [here](#) for a link to the data.

12 Please see [here](#) for a link to the data.

13 Please see [here](#) for a link to the data.

TABLE 1: SUMMARY OF DATA INCLUDED IN THE METADATA

Source	Type of data collected by the number of children							
	Number of children assessed	Fee level data	Social-emotional functioning	Learning Programme Quality	Home Learning Environment	Height (cm)	Practitioner or principal interview data	Environment Observation
Thrive by Five Index (2021)	5,222	5,009	4,849	2,332	–	5,215	4,992	5,047
Grade R ELOM Data (2019)	1,678	–	1,678	–	–	1,678	–	–
ELPO (2018)	420	193	352	–	294	408	403	–
ELOM Age Validation (2016)	1,329	–	–	–	–	1,329	–	–
Roots & Shoots (2022)	587	587	586	–	–	587	587	587
Other studies (2020-2022)	3,483	2,228	809	–	–	1,548	2,228	2,228
TOTAL	12,719	8,017	8,274	2,332	294	10,765	8,210	7,862

Notes: Practitioner or principal interview data varies across the datasets. Environmental observations largely relate to access to facilities at the programme (i.e. running water, electricity).

DESCRIPTIVE CHARACTERISTICS OF THE META-DATASET INCLUDED IN ANALYSES

The final sample was limited to children at facilities that charge less than or equal to R750 per month (our target population), totalling 10,936 children. For children where fee information was not available, the Department of Basic Education (DBE) quintile¹⁴ of the nearest primary or combined school was used as a proxy variable for socioeconomic status.

The average age of the children in the sample is 58 months, and approximately 51% of the sample is female. The vast majority of children's caregivers (90%) received the Child Support Grant. In terms of developmental progress, 43% of children were on track for their overall ELOM score. Children

were most likely to be on track for Emergent Literacy and Language (51%) and least likely to be on track for Fine Motor Coordination and Visual Motor Integration (33%) and Early Numeracy and Mathematics (35%). Assessors also rated children on their concentration, interest, diligence, and curiosity (task orientation). Task orientation was measured on a rating scale by the assessor at the end of the assessment. Ratings were based on four questions relating to the child's concentration, diligence, perseverance, and curiosity, and interest. On average, children scored 7.11 out of 12. Finally, 93% of the sample had a normal height for their age according to the World Health Organization Growth Standards.

¹⁴ Every public school in South Africa is assigned a quintile ranking by the Provincial Departments of Basic Education. This ranking is based on the relative poverty levels of the community living within 3 kilometres of the school. Quintile 1 (Q1) is the poorest and Quintile 5 (Q5) is the wealthiest.

CAPABILITIES

The capabilities needed typically include local knowledge, domain expertise, as well as a range of computational and analytical skills. Our approach to analysing the PD data used innovative methods and included competitions, stakeholder groups, and multiple contracted research teams. We adopted this approach in order to encompass the interdisciplinary nature of factors affecting child

development, use multiple statistical methods that may reduce the effect of biases embedded in different techniques, incorporate the voices of the many actors in child development and finally, remain as open-ended as possible. We leveraged both core team members and consultants in this regard. The section that follows provides a brief overview of our approach to analysing the data.

Contracted teams

Five teams with either domain expertise, specific quantitative skills, or both were contracted to perform quantitative data analysis. Four teams each had a specific research question to focus on, and one team had an open-ended research question. All analysts were given the freedom to choose their

own methodological techniques as well as a range of definitions of PD to select from. Additionally, DataDrive2030 conducted its own analysis using all definitions, keeping the research question open-ended.

TABLE 2: TEAMS CONTRACTED TO CONDUCT ANALYSIS OF THE DATA

	Team	Individuals in team	Research Question
A	Prof. Draper, Wits University, South Africa*	Associate Professor, affiliated with the Wits Developmental Pathways to Health Research Unit	What characteristics (individual, environmental, programme, systemic, etc.) are associated with children from low socioeconomic circumstances who score exceptionally well (positive deviants) in the following domains: Gross Motor Development, Fine Motor Coordination and Visual Motor Integration, and Cognitive and Executive Functioning?
B	Grace Bridgeman, Stellenbosch University, South Africa**	Economics PhD student	Q1: What characteristics relating to health and nutrition are associated with stunted children (mild, moderate, and severe) who perform at par with their peers/outperform their peers, across all domains? Q2: What factors are associated with exceptionally low rates of stunting e.g. the average stunting in the ELP is lower (-1SD or -2SD) than the ward or district average?
C	Frankie Mattes, University of Cape Town, South Africa	Psychology Masters student	What characteristics of ELPs or the home, or combinations thereof, are associated with children who outperform their peers, across all child outcomes?
D	Percept Management Consultants, South Africa	Actuarial analyst, anthropologist, and public health consultant	What ELP characteristics (including programme quality), and broader environmental factors are associated with positive deviants? Includes funding/facility access, administration (i.e. registration), grant support, and access to other support/services.
E	Juliatt McCann, Harvard University, USA	Public Health Masters student, supervised by Dr. Joshua Jeong and Lily Bliznashka	Open-ended – the team was given the freedom to explore the question as they wished

*Descriptive analysis

**Due to the difference in scope of the research received and scope provided, DataDrive2030 sought to amend the analysis. The amended analyses are reported here.

Wild card competition

To broaden our insights, we also leveraged the quantitative skills from non-traditional scientists by hosting a data analytics hackathon competition. We advertised the hackathon in collaboration with partners including DataFirst at the University of Cape Town, the Department of Commerce at Wits University, ExploreAI, and individuals with student networks.

The research question remained open-ended. First, second, and third prizes were awarded. The first-

prize winners' results are included in the current report. ExploreAI played a key role in organising the competition and facilitating communication among participants. A total of 74 individuals expressed interest, and a third of the participants made submissions using various methodologies. These were evaluated based on predetermined criteria by a panel of judges.

Engagement with ECD practitioners

We conducted structured conversations with ECD practitioners working in low-income contexts via telephone calls, at two different time points to complement the quantitative analysis. The first round of conversations, where open-ended questions were asked of practitioners, took place while teams were analysing the data. In the first round, interviews and focus groups were conducted with practitioners from 10 ECD sites

across various provinces, with varying fee levels and class sizes.

The second round of interviews involved sharing preliminary findings with practitioners for their perspectives. The main focus was on identifying exceptional child traits and environmental factors associated with these children. We spoke to seven practitioners from different sites to validate key findings from the quantitative analysis.



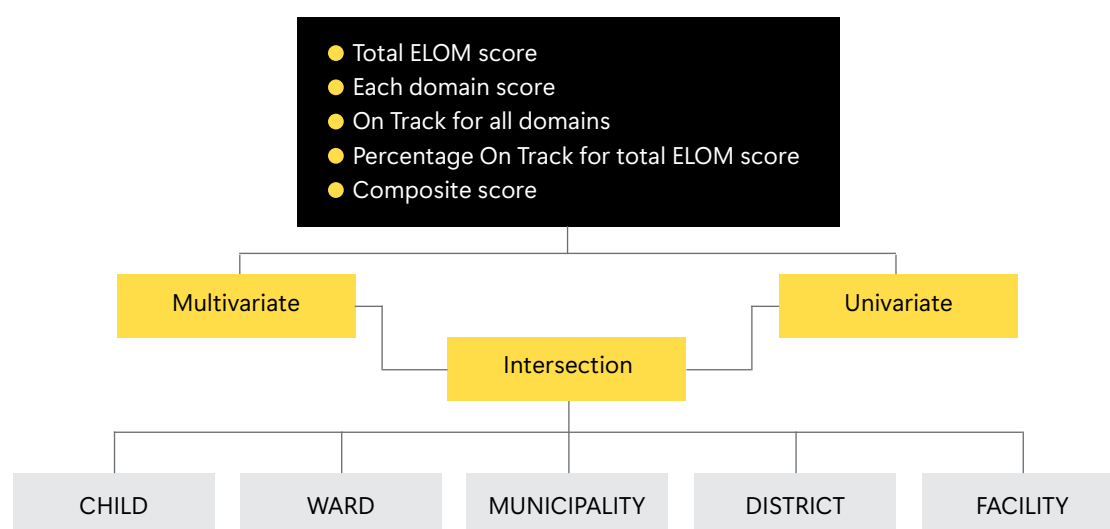
STAGE 2: DEFINE AND DETERMINE POSITIVE DEVIANTS

We employed multiple units of analysis in determining our definitions of positive deviants.

PERFORMANCE MEASUREMENT: Outcome variables (shown in the black box in Figure 3) included the total ELOM score, each ELOM domain, a composite score,¹⁵ whether a child is on track for all domains, and the percentage of children assessed who are on track for the total ELOM (cluster level).

HOMOGENOUS GROUPING: Our units of analysis (which refer to the level at which we expect to find positive deviants) include the child, facility, ward, municipal and district levels (shown as grey boxes in Figure 3). Positive deviants were predominantly defined in relation to the full sample (socioeconomic status fee bands 1-5) but analyses were also conducted on a restricted sample (socioeconomic status fee bands 1-3).

FIGURE 3: SUMMARY OF POSITIVE DEVIANT DEFINITIONS



Positive Deviant Identification:

Univariate analyses were defined for each outcome as 2 standard deviations (SDs) above the standardised mean where normally distributed and above the 90th percentile where distributions were skewed. All univariate scores were standardised by age group (50-59 months or 60-69 months) and socioeconomic status.

Multivariate analyses were defined as standardised residuals for each outcome above the expected score of 2 SDs. The regression controlled for age in months, gender, SES fixed effects, year fixed effects, use of the quintile indicator to proxy

for SES, and provincial fixed effects. We used robust standard errors clustered at the facility level. In addition to the binary indicator provided, a continuous measurement using the residuals from the multivariate regression was used as the outcome variable in some analyses (see Figure 4 on page 12 for more details).

In consultation with an expert in the DPPD network, it was determined that the most appropriate way forward for further analyses was to select deviants that intersected at both the univariate and multivariate levels.¹⁶

15 The composite score was calculated using a Principal Components Analysis (PCA) on Fine Motor and Visual Motor Integration (Domain 2), Emergent Literacy (Domain 3), Cognitive Executive Functioning (Domain 4), and Emergent Numeracy (Domain 5). The first domain (Gross Motor Development) was excluded since the KMO factor test and explained variance was higher without it. This method reduces data to a single component. The first component explained 78% of the variation in scores.

16 The definition of positive deviance varied for Teams B and D. Team B's definition excluded the stunted indicator since the stunted population was the target population of interest. For Team B, residuals were modelled on the same controls used as the multivariate approach described above, except stunting and an urban indicator were included and a data year fixed effect was excluded. The reason for their exclusion in the former definition is that the urban indicator was not well populated (missing for more than a third of cases) and whether a child is stunted could be both targeted in an intervention and was an intended outcome in our initial research questions. Team D modelled their first stage residuals on the constrained sample (SES 1-3) whereas other analyses modelled PDs on the full sample in order to identify positive deviants who are performing on par with their higher SES counterparts.

BOX 2: DEFINITION OF POSITIVE DEVIANTS

Definition of positive deviants:

We used a range of definitions based on various ELOM outcomes (i.e. domain score, total score, composite score), at various levels (i.e. individual, facility, ward).

We controlled for structural factors in order to identify children who perform beyond their expected score. To do this, we either used a binary indicator (above 2 SDs or the 90th percentile) or a continuous measure (residuals from the regression).

IDENTIFICATION OF POSITIVE DEVIANTS

The table below gives the number of children identified as positive deviants at each cluster and outcome, using the above definitions. Positive deviants ranged between 81 and 760 children in

their respective definitions, the number of PD facilities ranged from 29-85 and the number of PD wards ranged from 18-40.

TABLE 3: NUMBER OF POSITIVE DEVIANTS PER OUTCOME AND CLUSTER

	Number of PD Children	Number of PD facilities	Number of children attending PD facilities	Number of wards*	Number of children in PD wards
Total ELOM score	163	37	211	40	276
Domain 1	356	49	312	30	265
Domain 2	200	29	243	18	256
Domain 3	282	37	320	21	254
Domain 4	354	46	251	20	176
Domain 5	81	38	279	31	239
Children on track for all domains	760	85	420	37	294
High percentage children on track for total ELOM	–	35	166	35	208
High composite score (4 domains combined, excluding GMD)	208	29	154	22	192

*Limited to data with geolocations

STAGE 3: UNCOVERING THE UNDERLYING DETERMINANTS OF POSITIVE DEVIANTS

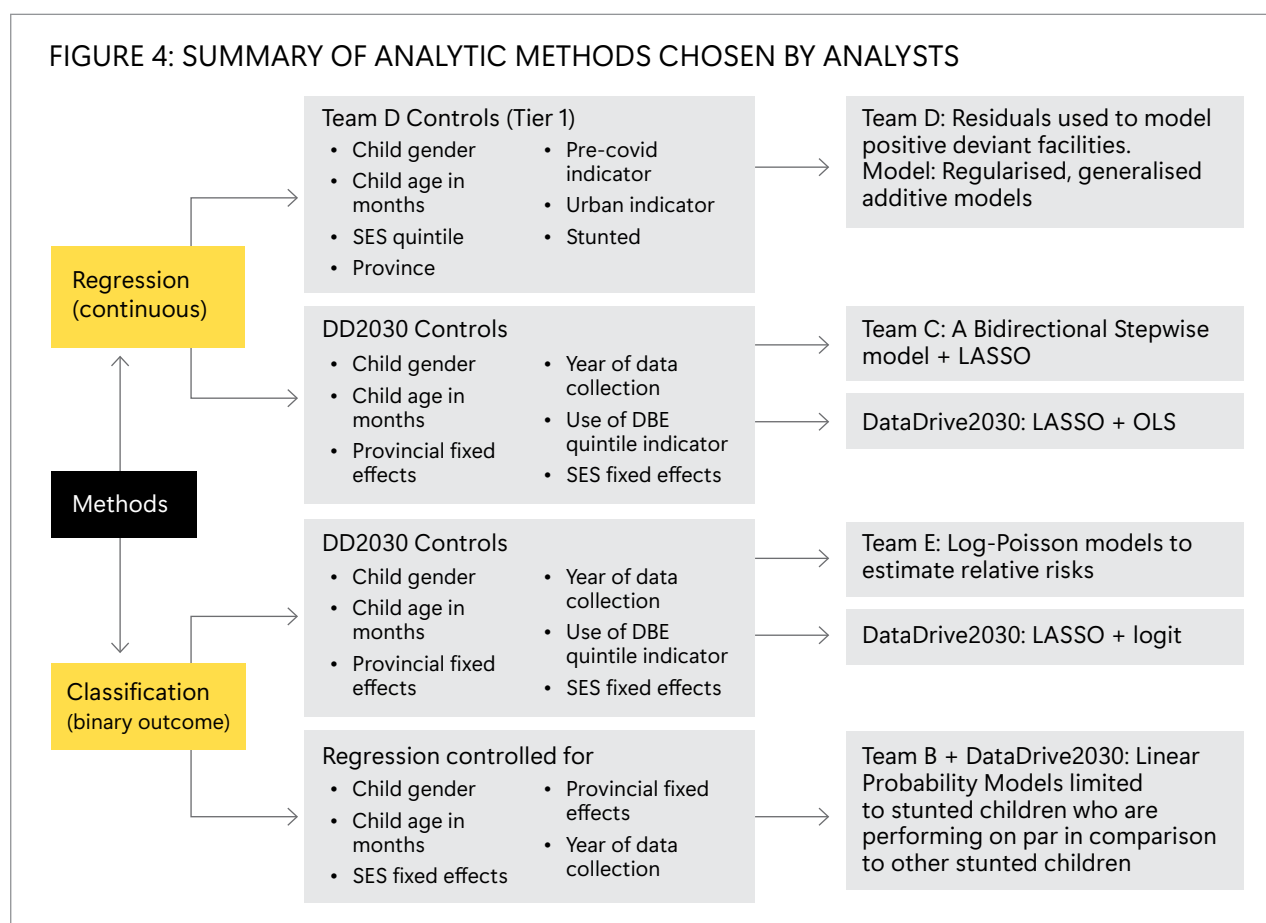
We used three approaches to validate and uncover the underlying determinants of positive deviances
1) Quantitative analysis of the metadata 2) Engagement with ELP practitioners, and 3) Qualitative-ethnographic research at selected ELPs.

APPROACH TO QUANTITATIVE ANALYSES

Figure 4 below provides a brief overview of the analytical methods taken by each team in the quantitative analysis (excluding Team A, which adopted a purely descriptive approach).

All remaining teams, except for Team B, used a two-stage approach that first modelled residuals based on a set of controls.

FIGURE 4: SUMMARY OF ANALYTIC METHODS CHOSEN BY ANALYSTS



The most popular method used by analysts included a least absolute shrinkage and selection operator (LASSO). In light of the large number of variables included in the dataset, this method enables both variable selection and regularisation in order to enhance the prediction accuracy and interpretability of the model. In conjunction, analysts sometimes used stepwise regression or list deletion methods. Other methods included linear probability models, logistic regression, log-Poisson models, and Generalised Additive Models. Most

analysts used the total ELOM score and domain score PD definitions as outcomes at the child and facility levels. Only two teams (Team E and DataDrive2030) explored all definitions. Significance was defined at the 5% level, with the exception of Team D.¹⁷ Analyses were refined with input from both an external expert group as well as through a peer review process. Dr. Gabrielle Wills, Stellenbosch University, reviewed reports for Teams B and D, and Dr. Dieter von Vintel, also at Stellenbosch University, reviewed reports for Team C.

¹⁷ The team relied on the LASSO model structure (which forces coefficients without strong predictive power to zero) and model selection (the final model chosen is the one that minimises Root Mean Squared Error).

FINDINGS FROM QUANTITATIVE ANALYSES

In this section, we summarise the high-level findings from the quantitative results. We provide this descriptively due to the variable nature of the models and methods used across analyses, and the inability to directly compare coefficients across them.¹⁸ Figure 5 on the next page provides a summary graphic of our overall findings.

Child level

All child-level variables that indicated strong associations were related to better **socio-emotional functioning and task orientation**. A possible limitation of these measures, however, is that because the socio-emotional measure is teacher-reported, and the task orientation measure is assessor reported, they may contain a bias where teachers/assessors upwardly rate children's socioemotional functioning based on their academic performance.

Household level

At the household level, we find that higher levels of mother engagement is positively associated with positive deviant children. Engagement with siblings was found to have negative effects but we do not know the age of the siblings, and it is important to note that this is a small sample.

Facility-level characteristics

● DOSAGE

We find that the **number of years a child is in the programme** is positively associated with PD when it comes to overall development (total ELOM score). We also find evidence to indicate that older children are more likely to be positive deviants. This may be correlated with dosage, where older children are more likely to have been exposed to an ELP for a longer period of time.

We also find that children that are in facilities that are **open for longer hours and during the school holidays** are associated with PD. However, there is some indication that opening a programme earlier than 7 am may be negatively associated with PD. This may be confounded by socioeconomic and home-level factors; for example, caregivers who work far away and may not be sufficiently present.

● STRUCTURAL QUALITY

Learning materials: In particular, for PD children and ELPs, learning materials were accessible and at least 10 books were available. We found strong associations for cognitive materials such as LEGO or similar products, puzzles, and educational toys. We also find that fantasy materials, such as dress-up clothes, masks and

pretend food, pots, and pans are associated with PD.

Management and supportive conditions of service: Additionally, we find that being an ECD centre, being school-based (may be confounded by the fact that these are likely to be older children), receiving the government subsidy, being part of a professional network, and being partially or fully registered with government or as a non-profit organisation are positively associated with PD. There is some evidence indicating that organisational practices, such as keeping records of child information and displaying the menu, are associated with PD. Parent-practitioner engagement also emerged as important, in particular where practitioners report that parents have reached out to them for information on their children's development. We find mixed evidence on whether having someone check who enters or exits the facility is associated with PD.

Health, nutrition, and sanitation: We find positive associations between using a tippy tap for handwashing and practitioners having first aid training. We find counterintuitive effects for facilities that use solid fuels for lighting, although this finding may be confounded by

18 Our approach to collation was to first divide analysis results by the analyst and outcome. We then ranked statistically significant coefficients according to their size and direction within analyses. Ranks were compared across models in order to identify patterns.

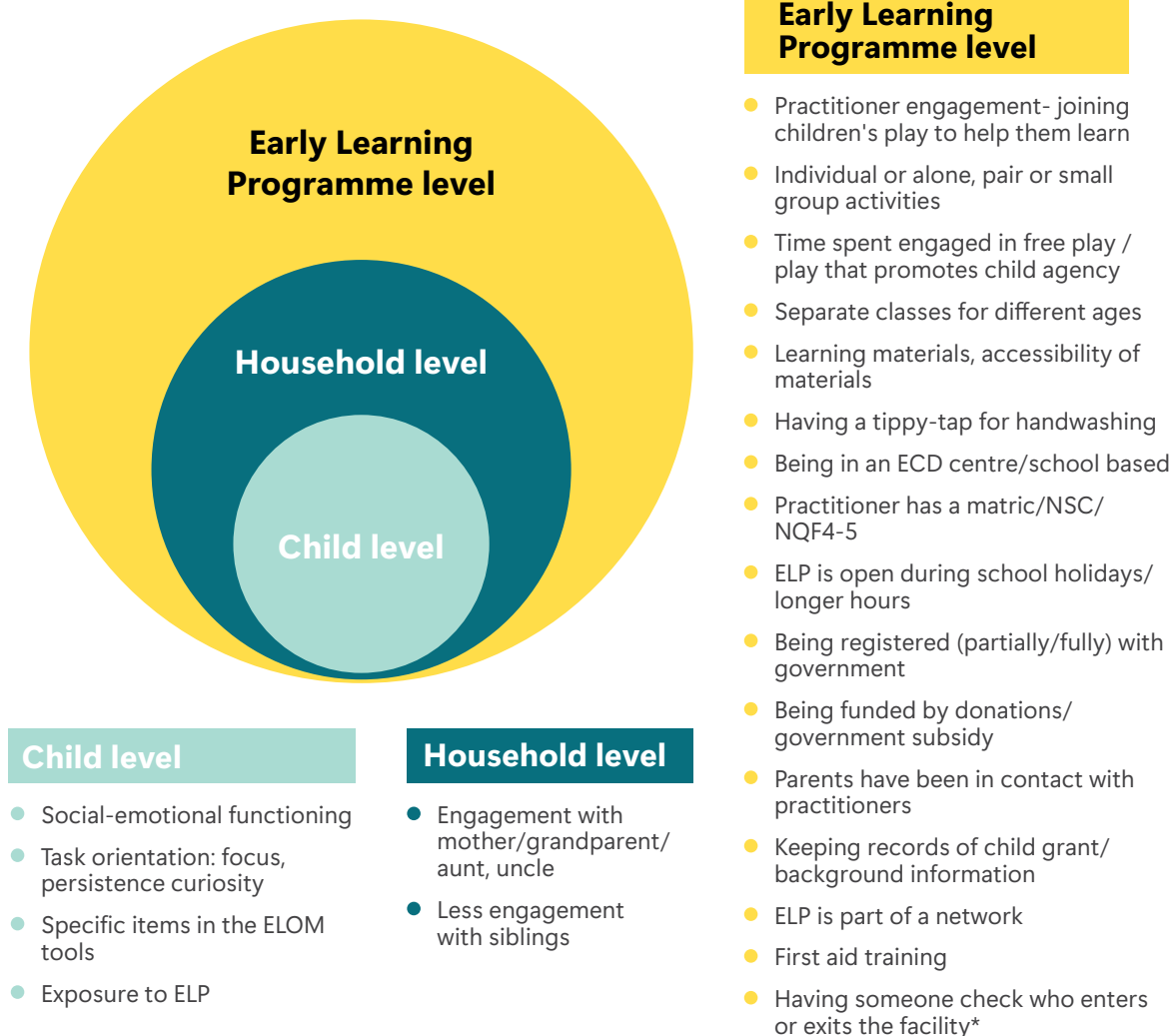
SES. We find that the number of meals served at ELPs is positively associated with PD.

Group size and ratios: We find that having separate classes for different age groups and a greater number of classrooms is positively associated with PD.

Teacher qualifications and pedagogy: We find that having at least a matric (national senior certificate) or a National Qualifications Framework (NQF) level 4-5 is positively

associated with PD. We do not find strong associations between ELP curriculum type and PD. In addition, the wildcard competition winners found that teaching strategies were positively associated with PD. This score was composed of a sum of several variables: allowing children to choose materials for engagement, levels of practitioner engagement during play, child participation, and use of open-ended questions to create opportunities for autonomy.

FIGURE 5: SUMMARY OF RESULTS FROM TEAMS



*Mixed findings, but mostly positive

FINDINGS FROM ENGAGEMENT WITH ECD PRACTITIONERS

This section summarises topics covered and insights generated from conversations with ECD practitioners about the characteristics and circumstances that distinguish exceptional children. Conversations took place at two time points – during and after quantitative analysis. These results provide preliminary insights into both the validation of the quantitative findings, as well as possible mechanisms driving these results.

Round 1 conversations: September 2022

Practitioners were asked to think about the children in their programmes that stood out for them as being exceptional, and to describe the observed characteristics of these children and their circumstances. Practitioners emphasised the importance of parental involvement and love in the development of exceptional children. Positive affirmation from teachers was also recognized as crucial for these children. They highlighted the socioemotional skills of exceptional children, such as sharing, emotional regulation, and social competence. Exceptional children were described as effective communicators, good listeners, confident, and independent. Practical learning,

including small groups and outdoor activities, was found to be effective for fostering exceptional children, and their cognitive abilities, curiosity, and leadership qualities were noted.

Factors associated with exceptional children included more program exposure and regular attendance, adults/practitioners being aware about what interests them, bringing healthier snacks from home, having structured routines at home and at the ELP, and teaching Grade 1 curriculum skills in advance (i.e. at preschool). Practitioners emphasised that exceptional children could also include those who are shy or withdrawn, and those from disadvantaged homes.

Round 2 conversations: January 2023

For the second round of conversations, practitioners were invited to share their thoughts on the preliminary findings emerging from the quantitative analysis. They reflected on the importance of good socio-emotional functioning (SEF). At the child level, practitioners noted that this is demonstrated through sharing, cooperation, confidence, and communication skills. Children with good SEF are curious, manage emotions, and follow class rules. Practitioners support SEF by encouraging questions, instilling confidence, and emphasising morning routines. They promote connectedness through individual interactions and value drawing/painting for emotional expression. Learning materials should be chosen based on child interests, and fantasy play aids SEF development.

Puzzles and LEGO support problem-solving and cognitive growth. Practitioners believed that children should choose their own materials, ensuring safety and diversity. They noted that both child-led and practitioner-led learning approaches are beneficial. Practitioners reported that observing and joining in play as needed fosters cooperation. The support provided for practitioners included provision of learning materials, emotional encouragement, guidance, professional development, and a structured curriculum. Practitioners reflected that having someone at the gate helps observe children's well-being, promoting physical and emotional security, while tippy taps conserve water and foster independence.

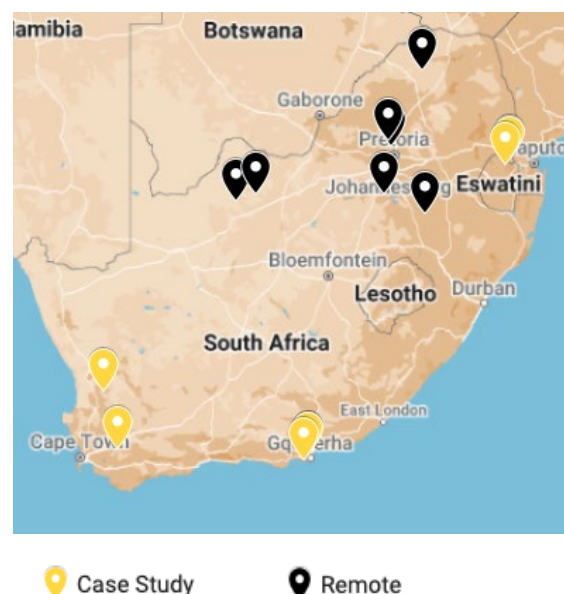
Case studies

Using the results from our quantitative analysis and engagement with practitioners, we conducted a qualitative inquiry. The purpose of the case studies was to provide a deeper understanding of the quantitative findings by exploring the mechanisms and connections behind them, as well as the social contexts in which they occur. Fieldwork and analysis during this phase were led by Percept (Team D from the quantitative phase).

This approach focused on practitioners, principals, and caregivers at six selected PD facilities across three provinces. Two facilities per province (Western Cape, Eastern Cape, and Mpumalanga) were selected. For each province, we aimed to include one PD facility located in a PD ward and one PD facility located in a ward that was not a PD, although this case mix was not always achieved. These sites were observed for 3 days at two-time points. An additional eight sites were remotely interviewed across multiple provinces (Northern Cape, Free State, Gauteng, Limpopo, and the North West). Data collection involved semi-structured interviews, observations, and remote interviews with a total of 14 PD facilities. Figure 6 shows the geographical spread of the six case study sites (yellow markers) and the remote interview sites (black markers).

- **SAMPLING:** Quantitative analyses produced lists of top-performing PD centres that were used to sample sites. PD centres were prioritised if 1) they had a higher PD ranking, 2) they were contactable (outdated contact information often contributed to centres being excluded), and 3) were proximal to other selected centres, to ease fieldwork logistics and expenses. Grade R programs were excluded from the site selection.
- **FIELDWORK TRAINING AND SUPPORT:** Prior to conducting fieldwork, fieldworkers underwent two online training sessions on research methods and ethics. Fieldworkers received ongoing guidance and support while the research team built rapport and engaged with ECD centres and staff through a WhatsApp-based Community of Practice. There were three fieldwork teams (one per province), consisting of two fieldworkers at each observed site.
- **FIELDWORK AND DATA COLLECTION:** The fieldwork spanned three days. During the first two days, one fieldworker focused on observing and documenting the interactions of the children, while the other conducted interviews with practitioners, caregivers, and community members. On the third day (one week after the

FIGURE 6: MAP OF DEVIANT FACILITIES VISITED



initial two-day visit), the same two fieldworkers returned to the site, with one dedicated to observation and the other asking follow-up or validation questions from prior observations. The questions were guided by the research team.

Remote interviews were conducted over a six-week period using telephone communication. If interviews were conducted in a language other than English, in-situ translation was employed. Formal interviews were recorded, while informal conversations were recorded in field notes.

The study employed various methods to collect qualitative data, including interviews, observations, and WhatsApp interactions. Multiple methods were used to ensure participant engagement, reduce bias, validate data, evaluate method effectiveness, and balance participant involvement.

- **DATA ANALYSIS:** The data analysis approach was loosely based on grounded theory, where concepts are derived from the data in an iterative process. Existing theory and quantitative findings were used to guide the analysis, and analytic codes were developed from the data. Stakeholder interviews served as a connection between the quantitative and qualitative phases of the study.
- **ETHICS:** Informed, voluntary consent was sought from all interviewees. All ECD centres and participants were anonymised and stored in a password-protected folder accessible only

to the research team. No names or images of children were captured and where children's faces did unintentionally appear in images, these were edited out. Fieldworkers did not engage with children unless other ELP staff were present. Fieldworkers committed to, as

far as possible, not interrupting the usual ELP routine during their visits. Before commencing fieldwork, every fieldworker read, signed, and committed to a 'Code of Conduct for Working with Children.'

DESCRIPTIVE OVERVIEW OF CASE STUDY SITES

Case Study Centres

Three (half) of the case study sites are situated in informal settlements, two are rural sites, and one is situated in a farming community. Five of the six sites are formally registered with the relevant government department as partial care facilities, with one waiting for infrastructural improvements before registration is approved. This site is also the newest site, while the other sites have been open for at least 18 years, two for more than 25 years and one for 33 years. In addition to five sites benefiting from the government's ECD subsidy, all leverage additional support from NGOs, local businesses, and their surrounding communities. Still, maintaining financial viability was noted as an ongoing challenge across sites. Further details can be found in the full qualitative report.



CENTRE BK, situated in the Western Cape, caters specifically to the children of farm workers and maintains a strong sense of community. The centre is funded by the farm, ensuring some income stability. The staff, who are also caregivers and part of the community, have built long-lasting relationships with the families they serve.



CENTRE LK, also located in the Western Cape, is known for its multilingual and supportive environment. The centre shares resources with the community and has a good reputation among caregivers, who appreciate the principal's caring nature and community leadership. Although this centre has fewer learning materials than others, it emphasises shared responsibilities among staff.



CENTRE S, situated in the Eastern Cape, was started in response to the need for a safe place for children in a rapidly growing informal settlement. The centre, established in the founder's home, radiates warmth and homeliness. Staff members value teamwork and good communication, and accommodate working caregivers by opening early.



CENTRE L, also located in the Eastern Cape, was initiated by Calabash Trust and focuses on consistent programming while remaining responsive to children's needs. The principal plays a key role in understanding and addressing the socio-emotional well-being of the children. The centre emphasises adaptability to the cultural context.



CENTRE M, in rural Mpumalanga, serves a community with limited resources and high levels of unemployment. The centre, established by the principal after obtaining land from community leaders, is highly organised and driven by passion and faith. It prioritises high-quality teaching and learning, with a focus on English language preparation. Caregivers are actively involved, and the centre is seen as an asset to the community.



CENTRE E, also situated in rural Mpumalanga, operates in an area with similar unemployment challenges. The centre, initially founded by two grandmothers and revived with community support, emphasises shared responsibility among the staff. It has a collaborative problem-solving approach, strong teamwork, and effective communication between practitioners and caregivers.

Remote Interview Centres

Among our remote interview centres, 3 are in rural areas, 3 in informal settlements, 1 in an urban area, and 1 in a peri-urban area. All sites except for the Limpopo site, were registered with government. Centre SC and Centre K in Gauteng have been operating for 23 and 19 years respectively,

Centre R in the Free State for 18 years, while Centre BP and Centre T in the Northern Cape have been open for 36 and 15 years respectively. These long-standing ECD centres appear to be well respected within their communities.

FINDINGS FROM QUALITATIVE CASE STUDY SITES

We present a high-level summary of the key themes identified in the qualitative data below. These themes included community embeddedness, leadership, organisational culture and pedagogy. Many elements of these themes are cross-cutting. We summarise these findings in Table 5 on page 22.

Community Embeddedness

Community embeddedness is a common characteristic of PD centres. Long-established relationships between centres and families contribute to their embeddedness and longevity. Centres provide essential services to the community, acting as educational resource hubs, sources of childcare support, and even job creators.

- **BIDIRECTIONALITY BETWEEN CAREGIVERS AND THE CENTRE:** The relationships between caregivers and centres are reciprocal, with caregivers supporting centres through fees and centres supporting caregivers by providing reliable and trusted childcare, enabling them to seek and retain jobs.

Many centres extend their operating hours to accommodate working caregivers, recognising

their economic hardships. Some centres also offer additional support, such as training courses for caregivers and providing food and clothing assistance to children and families in need. Strong communication and involvement of caregivers in their children's learning, facilitated through channels like WhatsApp groups and regular check-ins, fosters trusting and supportive relationships. Continuity in pedagogy and socio-emotional development is achieved by involving caregivers and finding teachable moments in children's everyday lives and activities.

- **COMMUNITY ASSETS:** PD centres were viewed as community assets, with principals considering themselves community leaders rather than business owners. These centres

were seen as avenues for community upliftment, breaking cycles of poverty, and promoting educational attainment. Caregivers and community members highly valued academic excellence in centres and actively participated in their governance, maintenance, and support, including volunteering, fundraising, and involvement in parent governing bodies.

- **STRONG LOCAL ECD FORUMS** played a significant role in the community involvement and support of PD centres. These forums facilitated regular meetings, resource sharing,

planning, and training for ECD centres. They also helped centres access funding, meet eligibility requirements, and advocate for subsidies and payments. Local inter-sectoral collaboration was fostered through relationships with businesses, NGOs, social services, clinics, and public institutions, enhancing centres' access to resources and support.

ECD centres' well-established networks and community engagement contributed to their longevity and potentially impacted child outcomes.

Leadership

- **PASSION AND DEEP CONTEXTUAL UNDERSTANDING OF THE COMMUNITY:** The principals of the case study centres exhibited strong leadership qualities that played a crucial role in PD of their centres. They displayed a passion for children and a deep understanding of the challenges faced by caregivers in their communities. Principals saw themselves as community resources, providing support to caregivers and addressing issues such as education and unemployment.
- **FLEXIBLE, AWARE, AND WEARING MULTIPLE HATS:** These principals fulfilled multiple roles, including attentive supervisors, and joint guardians working in partnership with caregivers, community leaders, collaborators,

and networkers. They provided oversight, monitored standards, and ensured the well-being of the children in their care. They built trust with caregivers and maintained close communication, often undertaking home visits and assisting with children's health and safety. Additionally, they took on leadership positions within their communities and fostered collaboration among staff, promoting knowledge sharing, problem-solving, and staff well-being.

- **NETWORKERS:** Principals also exhibited strong networking skills, connecting with government officials, donors, and community members to address challenges and mobilise resources for their centres.

Organisational culture

- **PROFESSIONAL DEVELOPMENT OPPORTUNITIES:** Staff at PD sites attend regular training and are encouraged to share knowledge with their peers through facilitated peer-to-peer learning opportunities. This continuous improvement supports the quality of teaching and learning and may promote staff retention.
- **STAFF COLLABORATION:** Principals are critical to facilitating staff collaboration and supporting their well-being. Open and honest communication among staff members is encouraged, and collective problem-solving is emphasised. Each staff member has a unique role but also shares responsibilities – fostering a sense of shared ownership. Staff well-being is prioritised at PD sites, and attention is given to their professional development and socio-emotional needs.

- **ESTABLISHING A ROUTINE:** Routines provide structure, reliability, and consistency, promoting children's sense of safety and their ability to learn and explore. Routines also support practitioners in being responsive to children's needs while allowing flexibility to cater to individual learning requirements. Most PD centres follow a daily program, including morning rituals, toilet routines, mealtimes, and nap times, with some incorporating morning rings for routine and thematic introductions.
- **ATTENTIVENESS:** Attentiveness emerged as a theme in a variety of ways, including staff attentiveness to child safety, meeting children's physical needs, and good record-keeping. Safety is prioritised by having dedicated personnel for monitoring children. Basic needs like food, hygiene, and handwashing are diligently addressed. Centres also

maintain detailed records, promoting self-reflection amongst staff and identifying areas for individual and programme improvement. Attention to record-keeping at PD sites is considered essential for professional development, reflecting a core principle emphasised within the National Curriculum Framework.¹⁹ Attentiveness to children's socio-emotional cues is also emphasised, with

practitioners paying attention to child-child interactions, children's behaviour within and beyond the classroom, and providing timely support when needed. Proximity (remaining close to children during structured and free play) and attentiveness appear to play a crucial role in facilitating learning and engagement at PD sites.

Pedagogy

The study found both variations and similarities in the teaching and learning activities of PD facilities. While access to learning materials varied, there were some notable similarities across the centres.

- **HAVING A ROUTINE** was a key aspect in most centres, with a predictable daily program. Morning greetings involved welcoming children and checking in with parents or other caregivers. Morning rings were common, providing opportunities for children to express their feelings and reflect on their home life. The rest of the day revolved around mealtimes, toileting, and periods for indoor and outdoor play. Many centres displayed their daily program on the centre walls.
- **LEARNING MATERIALS:** The availability of learning resources varied across centres. Storytime was scheduled in almost all centres, even if the books were handwritten by

practitioners. The use of recycled materials as toys and the accessibility of learning materials were also characteristics of PD sites, which creatively use blocks and books, story-based learning, and theme tables for enhancing learning experiences.

Blocks were the most common learning material, followed by fantasy toys, art materials, books, and puzzles. Outdoor toys included plastic motorbikes, balls, spades, buckets, and tires.

- **TRANSITION SIGNALS** were observed as strategies to signal the transition between activities. These signals help to create a predictable learning environment for children and are considered a form of positive behaviour support. See Table 4 below for examples of transition signals.

TABLE 4: OBSERVED OR REPORTED EXAMPLES OF TRANSITION SIGNALS

Signal	Observed/ reported practices and techniques ranked in order of prevalence
Auditory signals	Songs: • Songs about hand washing at the start of hygiene routines • Singing 'It's time for breakfast' to signal meal time • Singing a song about 'collecting' while tidying up • Singing songs in the toilet queue
	Ringling a bell for mealtimes
Visual signals	Displaying the daily programme on the wall of the classroom
	Bringing all the children together
	Coming into a circle for morning ring
	Laying out lunch bags to signal snack time

SOURCE: THE EARLY LEARNING POSITIVE DEVIANCE INITIATIVE QUALITATIVE REPORT

¹⁹ <https://www.unicef.org/southafrica/media/911/file/SAF-national-curriculum-framework-0-4-En.pdf>



Caption: (from left) Practitioner at Centre E demonstrates the horse jumping game, Free play at Centre S, Practitioner with Persona Doll.

- **PROGRAM IMPLEMENTATION:** Some centres prioritised children's physical sustenance and psychosocial safety over a structured teaching program. Gross motor and fine motor activities were emphasised, with outdoor activities being less guided than indoor ones. Activity stations were utilised by some, including fantasy play, art-making, books, and puzzles or building blocks.

Most centres had a mix of practitioner-led and child-led activities in their daily programming. Practitioners actively participated in activities alongside children, such as horse jumping or sack races. Child-led activities were also encouraged, with practitioners offering support and guidance. This combination of approaches aligns with the National Curriculum Framework, which recommends both child-led and adult-led activities, as well as incidental learning that arises from other activities.

Implementing child-led play can present challenges due to its lack of structure, making it difficult to integrate academic skills or plan for learning opportunities. However, practitioners at PD sites demonstrated high levels of attentiveness during child-led play, allowing them to identify learning moments within play, and to prompt children accordingly.

Attentiveness was a prominent teaching and learning practice, involving practitioners being physically close to children, observing child-to-child interactions, identifying learning opportunities, providing specific praise and affirmation, and offering targeted support

based on individual needs. Practitioners in these centres create a conducive environment for children's free play while remaining watchful and offering occasional guidance.

- **EMBEDDED LEARNING**, which focuses on teaching through everyday activities, is identified as an important pedagogical approach in PD sites. It involves utilising the surrounding environment to facilitate learning moments and encouraging children to learn while doing. The adaptation of learning content to the social and environmental context is emphasised, including teaching social norms and sustainability practices. Practitioners prompt children to identify colours, count, and express emotions during various activities. They also make use of the local environment and resources, teaching about local culture, weather, and seasonal vegetables. The embedded learning approach requires skilled practitioners who can adapt to children's needs, respond to opportunities as they arise and create a safe and supportive learning environment.
- **SOCIO-EMOTIONAL DEVELOPMENT** is a key focus cross-cutting multiple themes within PD sites, with practitioners aiming to promote positive interactions between children and between adults and children, encourage emotional expression, and develop children's understanding of positive social norms (or 'manners'). The qualitative findings emphasise the importance of child engagement, clear routines, specific praise, and guided play in supporting socio-emotional development.

TABLE 5: SUMMARY OF THE QUALITATIVE FINDINGS

Theme	Behaviour	Examples from our data
Community embeddedness	Involve caregivers in learning and engagement	Designing activities for children to take home and do with caregivers; Inviting caregivers to come to the ELP to observe their children; Holding meetings and gatherings at the ELP; Communicating regularly with caregivers regarding their child's progress or wellbeing*
Community embeddedness + Organisational culture	Involve caregivers in governance and upkeep of the ELP	Caregivers assisting with the pooling of funds, undertaking fundraising during financial stress, and are involved in staff appointments. Caregivers volunteering at the ELP (e.g. assist with cleaning)
Community embeddedness	Have a deep understanding of home context	Practitioners or principals conducting home visits; Using Persona Dolls to role play emotions and behaviours
Community embeddedness	Cater to child needs external to the facility	Supplementing household food by sending food (e.g. a packet of maize meal) home with children on Fridays; Distributing second-hand clothes to the centre's children/homes/community; Absorbing no-fee paying learners; Taking children to the clinic as needed
Leadership + Community embeddedness + Organisational Culture	Strong leadership qualities: Promote staff collaboration and support	Principals self-identifying as community leaders; Encouraging staff participation in training and professional development opportunities, encouraging a cascaded training at the facility to promote shared peer-peer learning; Encouraging check-ins with staff (attentive to staff wellbeing and interpersonal dynamics); Encouraging role-sharing and joint problem solving; Promoting open and honest communication within staff
Leadership + Community embeddedness + Organisational Culture	Use networks and forums	Participating in local forums and networks such as local NGOs and businesses and their subsequent support*; Attending meetings, training, and church events
Organisational Culture + Pedagogy	Promote and implement daily routines	Regular and consistent mealtimes, nap times, morning rings, toilet times; Visual programme on the wall as a nudge; Work stations to delineate activities; Clear allocation of daily duties (incorporates role-sharing and collaboration)
Organisational Culture + Pedagogy + Community Embeddedness	Directly and actively promote SEF*	Morning ring (check in, set theme, pray); Arrival / greeting; Offering specific praise and affirmation (i.e. being specific about what the child did well); Promoting child agency; Using Persona Dolls (linked to "Having a good understanding of child home contexts" above). Facilitated by smaller groups*
Pedagogy	Remain attentive to child behaviour and activities	Joining in on free play vs observing while children play*; Monitoring safety and hygiene*; Remaining proximate to the child; Offering specific praise and affirmation; Offering targeted support; Identifying opportunities to extend learning during child-led play and practitioner-led activities
Pedagogy	Practice embedded learning	Encouraging children to count as they jump between hoops; Encouraging children to identify colours as they build with blocks; Encouraging children to identify colours as they run through the garden; Asking children to name shapes in the pictures of storybooks Using the environment as a learning resource: Teaching local rhymes and songs, the weather and the seasons and locally-grown or sourced vegetables and re-using waste materials for toys; Teaching prayers and hymns, having multilingual interactions, teaching cultural norms around manners and greetings and the use of clan names

*Includes quantitative findings

DISCUSSION

Together, the study's findings suggest that PD is influenced by a set of interconnected behaviours, practices, and relationships. These practices create an environment conducive to holistic socio-emotional development and psycho-social safety, leading to positive engagement between practitioners, children and their caregivers, and are associated with better learning outcomes.

Key practices identified include attentiveness at the pedagogical level, nurturing relationships and collaboration, attentiveness at the organisational level, community embeddedness, strong leadership and caregiver engagement. We discuss the main cross-cutting behaviours below and briefly touch on sub-themes.

Teachers' belief that children had better Socio-emotional development was significantly associated with PD in the quantitative study and was unarguably one of its most emphasised findings. The engagement with practitioners and the qualitative study unearthed what socio-emotional development meant to principals, caregivers, and practitioners.

Common articulations of socio-emotional development included positive child-child interactions in the form of sharing, praising their peers, and restoring relationships after conflict; children identifying and expressing their own feelings; as well as children understanding good manners, traditional greetings, and practices of social respect.

We find that SEF cross-cut many of the results, either indirectly or directly.

Direct examples included:

1. Check-ins during the morning or upon arrival, emphasising the importance of the first interpersonal interactions of the day,
2. Specific praise and affirmation that promote child agency,
3. Remaining proximate and attentive to child behaviours,
4. Predictable routines with clear transitions, and
5. Using props such as Persona Dolls to gain a deeper understanding of household circumstances or to teach SEF skills directly.

These factors are also facilitated by separated classes or smaller group activities, which were found to be positively associated with PD in the quantitative analysis. It is also worth noting that staff other than practitioners (such as cooks and gardeners) were part of this process as well.

Establishing routines provided structure and

consistency, promoting children's sense of safety and their ability to learn and explore. Transition signals were a key facilitator in implementing routines. Practitioners also demonstrated attentiveness by closely observing children's play to identify opportunities for learning and praise or correction. They engaged in responsive and timely interactions, combining child-initiated and practitioner-initiated engagement.

The quantitative study also found a positive, unexpected, association between having a tippy tap and PD. This is likely because the use of tippy taps often happens under practitioners' guidance and monitoring (attentiveness). Additionally, safety measures, such as having someone at the gate when children arrive or leave the facility, contribute to the physical and emotional security of children and provide opportunities for interaction with caregivers at drop off or collection.

Indirect relations to SEF include gaining a deeper understanding of home contexts through caregiver engagement. All three analyses (quantitative, practitioner engagement and qualitative) support the finding that regular communication between caregivers and practitioners about children's learning, development, well-being, and home circumstances is crucial for the continuity of learning and building trust between practitioners and parents.

Support for caregivers and their ability to work (and therefore pay fees) emerged as a common feature of PD centres in this sample, for which variables identified in the quantitative analysis like extended school hours and remaining open during holidays might be proxies. In addition to collaborating on child development, many centres involved caregivers in the governance and management of the centres. This created a sense of shared ownership which fosters greater community embeddedness and buy-in.

The findings illustrate the importance of networks and resources, community and parental engagement, as well as local intersectoral collaboration. These features also enhance the community embeddedness of the centres, facilitating long-term relationships with families or partners. This corroborates quantitative findings that being part of an ECD network, and receiving funding or donations are positively associated with PD. This type of organisational culture is often spear-headed by a dynamic principal.

Leadership acted as a facilitator to build strong relationships with local stakeholders, such as forums, NGOs, businesses, community leaders, clinics, and public services, which further enabled

resource access and support for the centre and practitioners through professional development opportunities. Collaborative leadership was essential, and attention to staff well-being fostered healthy relationships. However, the importance

of leadership was not adequately captured in quantitative findings due to measurement limitations, highlighting the need to incorporate leadership-related data in routine quantitative data collection practices.

LIMITATIONS OF THIS STUDY

This study is not without its limitations. While the use of multiple definitions in the quantitative analysis sought to enhance the rigour and robustness of the findings, they are prone to measurement error and bias. Firstly, socio-emotional and task orientation measures may be upward biased based on the child's performance. Secondly, the organisational data included in the final dataset may be prone to selection bias, since it is not guaranteed that children were always selected at random for assessment. Third, the use of quintiles to proxy socioeconomic status may not be accurate, since these are typically more robust for use in school settings.

For the qualitative component, limitations include the vulnerability of self-reported bias of remote interviews, and therefore the inability to observe and confirm their practices. Second, the potential misinterpretations or over-simplifications of data during interviews. Third, the brevity of the observational period – longer durations of observation would result in a larger picture. Fourth, since there were no non-PD sites in this study, the researchers were unable to compare practices between PD and non-PD sites. Therefore, we do not know what practices are more pronounced at PD sites relative to non-PD sites, as we did not have a point of comparison.

CONCLUSION AND NEXT STEPS

This study sought to identify the factors associated with pre-schoolers (children aged 50–69 months) attending no-fee or low-fee facilities (a proxy for poverty) who significantly outperform their peers in key areas of development as measured on the ELOM 4–5 Years Assessment tool. The study utilised an asset-based, PD approach, employing multiple independent teams, engaging with stakeholders, and conducting an open data competition.

The research included secondary analyses of outcomes data from over 12,000 children in nearly 2,000 ELPs and Grade R classes across South Africa. Additionally, primary analyses involved on-the-ground conversations with practitioners, observational and interview data from six case study sites, and interviews with seven additional sites.

The findings underscore the multifaceted nature of PD in ELPs. The factors associated with PD

encompass children's socio-emotional functioning, organisational practices, pedagogical strategies, community embeddedness, strong leadership, and attentiveness of practitioners. Understanding and implementing these interconnected factors may significantly enhance the effectiveness and success of ELPs, ultimately reducing disparities in outcomes.

Moving forward, DataDrive2030 plans to utilise the study findings to design and test pilot interventions in low-income settings. This will involve engaging behavioural experts to select and customise a behavioural framework, leveraging communities of practice, domain experts, and partners to identify key behaviours with high impact and scalability potential, designing innovative interventions, conducting micro-experiments, and monitoring and evaluating the outcomes. A forthcoming report will provide further details on these stages.

REFERENCES

1. Henry, J., & Giese, S. (2022). *Reviewing the Socio-Economic Gradient In Learning Outcomes For Children Who Participated In The Thrive By Five Index*. DataDrive2030. https://datadrive2030.co.za/wp-content/uploads/2022/09/SES_Problem_statement-for-website.docx-2-1.pdf
2. Brown, T. E., & Landgraf, J. M. (2010). Improvements in Executive Function Correlate with Enhanced Performance and Functioning and Health-Related Quality of Life: Evidence from 2 Large, Double-Blind, Randomized, Placebo-Controlled Trials in ADHD. *Postgraduate Medicine*, 122(5), 42–51. <https://doi.org/10.3810/pgm.2010.09.2200>
3. Bailey, C. E. (2007). Cognitive Accuracy and Intelligent Executive Function in the Brain and in Business. *Annals of the New York Academy of Sciences*, 1118(1), 122–141. <https://doi.org/10.1196/annals.1412.011>
4. Blair, C., & Razza, R. P. (2007). Relating Effortful Control, Executive Function, and False Belief Understanding to Emerging Math and Literacy Ability in Kindergarten. *Child Development*, 78(2), 647–663. <https://doi.org/10.1111/j.1467-8624.2007.01019.x>
5. Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446. <https://doi.org/10.1037/0012-1649.43.6.1428>
6. Morrison, F. J., Ponitz, C. C., & McClelland, M. M. (2010). Self-regulation and academic achievement in the transition to school. In S. D. Calkins & M. A. Bell (Eds.), *Child development at the intersection of emotion and cognition*. (pp. 203–224). American Psychological Association. <https://doi.org/10.1037/12059-011>
7. Davis, J. C., Marra, C. A., Najafzadeh, M., & Liu-Ambrose, T. (2010). The independent contribution of executive functions to health related quality of life in older women. *BMC Geriatrics*, 10(1), 16. <https://doi.org/10.1186/1471-2318-10-16>
8. Borella, E., Carretti, B., & Pelegrina, S. (2010). The Specific Role of Inhibition in Reading Comprehension in Good and Poor Comprehenders. *Journal of Learning Disabilities*, 43(6), 541–552. <https://doi.org/10.1177/0022219410371676>
9. Micalizzi, L., Brick, L. A., Flom, M., Ganiban, J. M., & Saudino, K. J. (2019). Effects of socioeconomic status and executive function on school readiness across levels of household chaos. *Early Childhood Research Quarterly*, 47, 331–340. <https://doi.org/10.1016/j.ecresq.2019.01.007>
10. Pascale, R., Sternin, J., & Sternin, M. (2010). *The Power of Positive Deviance: How Unlikely Innovators Solve the World's Toughest Problems*. Harvard Business Review.
11. Ma, P., & Magnus, J. H. (2012). Exploring the Concept of Positive Deviance Related to Breastfeeding Initiation in Black and White WIC Enrolled First Time Mothers. *Maternal and Child Health Journal*, 16(8), 1583–1593. <https://doi.org/10.1007/s10995-011-0852-3>
12. Klaiman, T., Pantazis, A., Chainani, A., & Bekemeier, B. (2016). Using a positive deviance framework to identify Local Health Departments in Communities with exceptional maternal and child health outcomes: A cross sectional study. *BMC Public Health*, 16(1), 602. <https://doi.org/10.1186/s12889-016-3259-7>
13. Ousman, S. K., Magnus, J. H., Sundby, J., & Gebremariam, M. K. (2020). Uptake of Skilled Maternal Healthcare in Ethiopia: A Positive Deviance Approach. *International Journal of Environmental Research and Public Health*, 17(5), 1712. <https://doi.org/10.3390/ijerph17051712>
14. Levin, A., Sokal-Gutierrez, K., Hargrave, A., Funsch, E., & Hoeft, K. (2017). Maintaining Traditions: A Qualitative Study of Early Childhood Caries Risk and Protective Factors in an Indigenous Community. *International Journal of Environmental Research and Public Health*, 14(8), 907. <https://doi.org/10.3390/ijerph14080907>
15. Lapping, K., Schroeder, D., Marsh, D., Albalak, R., & Jabarkhil, M. Z. (2002). Comparison of a Positive Deviant Inquiry with a Case-Control Study to Identify Factors Associated with Nutritional Status among Afghan Refugee Children in Pakistan. *Food and Nutrition Bulletin*, 23(4_suppl2), 26–33. <https://doi.org/10.1177/15648265020234S205>
16. Levinson, F. J., Barney, J., Bassett, L., & Schultink, W. (2007). Utilization of Positive Deviance Analysis in Evaluating Community-Based Nutrition Programs: An Application to the Dular Program in Bihar, India. *Food and Nutrition Bulletin*, 28(3), 259–265. <https://doi.org/10.1177/156482650702800301>
17. Foster, B. A., Farragher, J., Parker, P., & Hale, D. E. (2015). A Positive Deviance Approach to Early Childhood Obesity: Cross-Sectional Characterization of Positive Outliers. *Childhood Obesity*, 11(3), 281–288. <https://doi.org/10.1089/chi.2014.0098>
18. Kanani, S., & Popat, K. (2012). Growing Normally in an Urban Environment: Positive Deviance among Slum Children of Vadodara, India. *The Indian Journal of Pediatrics*, 79(5), 606–611. <https://doi.org/10.1007/s12098-011-0612-9>

19. Bisits Bullen, P. A. (2011). The positive deviance/hearth approach to reducing child malnutrition: Systematic review: Systematic review of the positive deviance/hearth approach. *Tropical Medicine & International Health*, 16(11), 1354–1366. <https://doi.org/10.1111/j.1365-3156.2011.02839.x>
20. Herington, M. J., & van de Fliert, E. (2018). Positive Deviance in Theory and Practice: A Conceptual Review. *Deviant Behavior*, 39(5), 664–678. <https://doi.org/10.1080/01639625.2017.1286194>
21. D'Alimonte, M. R., Deshmukh, D., Jayaraman, A., Chanani, S., & Humphries, D. L. (2016). Using Positive Deviance to Understand the Uptake of Optimal Infant and Young Child Feeding Practices by Mothers in an Urban Slum of Mumbai. *Maternal and Child Health Journal*, 20(6), 1133–1142. <https://doi.org/10.1007/s10995-015-1899-3>
22. Crivello, G., & Morrow, V. (2020). Against the Odds: Why Some Children Fare Well in the Face of Adversity. *The Journal of Development Studies*, 56(5), 999–1016. <https://doi.org/10.1080/00220388.2019.1626837>
23. Cheang, C.J.Y & Goh, E.C.L. (2018). *Why some children from poor families do well—An in-depth analysis of positive deviance cases in Singapore*. International Journal of Qualitative Studies on Health and Well-being, 13, 1563431.
24. Crivello, G., Tiemelissan, A., & Heissler, K. (2021). 'The challenges made me stronger': What contributes to young people's resilience in Ethiopia? (Working Paper No. 197). <https://www.younglives.org.uk/sites/default/files/migrated/YL-WP197-Proof04.pdf>.
25. Seeley, K. M. L., Foster, B. A., Zuckerman, K. E., & Peterson, J. W. (2023). Positive deviance in the Oregon kindergarten assessment: Identifying schools and communities that are beating the odds. *Early Childhood Research Quarterly*, 62, 360–368. <https://doi.org/10.1016/j.ecresq.2022.10.003>
26. Marsh, D. R., Schroeder, D. G., Dearden, K. A., Sternin, J., & Sternin, M. (2004). The power of positive deviance. *BMJ*, 329(7475), 1177–1179. <https://doi.org/10.1136/bmj.329.7475.1177>
27. Albanna, B., & Heeks, R. (2019). Positive deviance, big data, and development: A systematic literature review. *The Electronic Journal of Information Systems in Developing Countries*, 85(1), e12063. <https://doi.org/10.1002/isd2.12063>
28. Lee, J., & Zuilkowski, S. S. (2015). 'Making do': Teachers' coping strategies for dealing with textbook shortages in urban Zambia. *Teaching and Teacher Education*, 48, 117–128. <https://doi.org/10.1016/j.tate.2015.02.008>
29. Hazell, E. (2019). *A meta-evaluation and synthesis of evaluations of South African education programmes: 2013–2018 (Unpublished master's report)*. Stellenbosch University.
30. Department of Basic Education. (2022). *ECD Census 2021: Report*. Department of Basic Education.

