



REPORT TO THE UNITED NATIONS CHILDREN'S FUND

(UNICEF ZIMBABWE)

From the Ministry of Primary and Secondary
Education (MoPSE) and the Zimbabwe School
Examinations Council (ZIMSEC)



*Evaluation of the Education Development Fund Program
Zimbabwe Early Learning Assessment (ZELA) 2016 Report*

ABSTRACT

The Zimbabwe Education Development Fund (EDF) program was a four-year project undertaken by the United Nations Children’s Fund (UNICEF). The EDF program provided essential material resources and support for the systems and structures designed to increase access to quality education for all Zimbabwean children. The EDF gave special attention to the most vulnerable children.

The Zimbabwe Early Learning Assessment (ZELA) project aimed to improve Zimbabwe’s system of pupil learning assessment. This was done by introducing an early-grades learning assessment to determine whether the EDF program (2010-2015) has achieved its goals in producing positive outcomes for children, their care-givers, schools, and the education sector in general. In 2012, the tools developed for ZELA provided a means of monitoring and evaluating the EDF program across the programme’s life cycle. The key measure is the extent of improvement in pupil learning outcomes. The extent of this improvement is measured in scores on tests of language and Mathematics in the early years of schooling.

The baseline study developed a measure of pupil performance in language and Mathematics. Information was also collected during ZELA via pupil and school head questionnaires in order to develop an understanding of pupils’ education backgrounds and learning outcomes. Data gathered from the questionnaires included pupil background characteristics, the availability of teaching resources, and the level of funding and facilities.

UNICEF contracted the Australian Council for Educational Research (ACER) to undertake a baseline study in 2011, in collaboration with ZIMSEC. After the baseline study was completed in 2012, ACER was contracted to undertake two monitoring cycles (2013 and 2014) and an impact evaluation (2015), in collaboration with ZIMSEC. After the expiry of ACER contract, a decision was made to continue the ZELA programme with the Ministry of Primary and Secondary Education (MoPSE) playing a coordinating role and ZIMSEC conducting the day to day activities of the program. A local consultant (Mr. Munyaradzi Damson) was hired to provide technical support to the MoPSE and ZimSEC to ensure quality assurance of aspects of the 2016 ZELA, support multivariate analysis and support preparation for 2017 ZELA.

This report was prepared by Mr. M. Damson, Miss A. Muropa, Mrs. E. C. Machingaidze, Dr. T. Chiwiye, Mr. F. Chirume, Mrs. G. Charumbira, Mr. B. Solomon, Mr. F. Mwale, Mr. K. Manokore, Mr. T. Kupfumira and Mr. J. Juru. In the build up to this report (Between December 2016 and March 2017), several workshops on data management were conducted by Mr. M. Damson as part of ZELA Capacity Building activities. Topics included data cleaning and formatting, Item Response Theory (IRT), creation of plausible values, creation of weights, sampling for ZELA 2017, data analysis and report writing. ZIMSEC staff and the consultant conducted the analyses included in this report. These tasks included calculating the mean performance of population subgroups and determining if differences between subgroups or assessment years are statistically significant; developing graphs and tables; creating proficiency levels and calculating the percentage of pupils within each level and analysing pupil performance against pupil and school characteristics and the calculation of the 2015-2016 shift based on 2015-2016 link items.

ACRONYMS AND ABBREVIATIONS

| | |
|----------------|--|
| ACER | Australian Council for Educational Research |
| BEGE | Basic Education and Gender Equality |
| ECD | Early Childhood Development |
| EDF | Education Development Fund |
| ETF | Education Transition Fund |
| IRT | Item response theory |
| MDG | Millennium Development Goal |
| MoPSE | Ministry of Primary and Secondary Education |
| OECD | Organisation for Economic Co-operation and Development |
| PISA | Programme for International Student Assessment |
| PSU | Primary Sampling Units |
| SACMEQ | Southern Africa Consortium for Monitoring Educational Quality |
| SDG | Sustainable Development Goal |
| SES | Socio-Economic Status |
| SPSS | Statistical Product and Service Solutions |
| SSU | Secondary Sampling Units |
| TMO | Test Monitoring Officers |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| UNICEF | United Nations Children's Fund |
| ZELA | Zimbabwe Early Learning Assessment |
| ZIMSEC | Zimbabwe School Examinations Council |
| ZIMSTAT | Zimbabwe National Statistics Agency |

EXECUTIVE SUMMARY

The Zimbabwe Early Learning Assessment (ZELA) program was a four-year project commissioned by the United Nations Childrens Fund (UNICEF) to support and enhance national capacity to carry-out national assessment at early grades in Zimbabwe. The program also established a baseline for determining whether the EDF program (2010 - 2015) had the desired effects on children, their care-givers, schools, and the education sector in general, as well as to identify the extent to which changes are attributable to the EDF program interventions.

In 2010 as part of the EDF, UNICEF and its partners supplied all Zimbabwean primary schools with resources aimed at attaining quality education and access for all. The intervention included the provision of textbooks (English, Mathematics, Shona, Ndebele and Environmental Science) and the establishment of supporting resources related to the use of these books in schools. After the completion of the impact evaluation by ACER in 2015, it was decided that ZELA must proceed with MoPSE and ZIMSEC in charge. MoPSE and ZIMSEC rode on the systems and structures set by ACER. A local consultant was engaged to provide technical support.

This report relates to ZELA 2016 monitoring cycle built on the baseline data collected in 2012 for the evaluation of the EDF program. The major research questions for this monitoring cycle are:

1. How do the Zimbabwe pupils perform in the language and Mathematics tests? Is there a noticeable pattern of change over time?
2. What are the relationships of the following groups of variables with performance on tests of languages and Mathematics at the beginning of Grade three in Zimbabwe?
 - (a) Pupil background characteristics
 - (b) Teachers and teaching resources
 - (c) School funding and facilities
3. To what extent can improvement in test performance be attributed to the Education Development Fund?

Sample and Data Collection

The target population was pupils in Grade 3 in Zimbabwe. A representative sample was drawn which yielded approximately 17500 pupils in about 500 schools across the 10 provinces of Zimbabwe. Four sets of ZELA tests were set and administered to measure literacy (English and either Ndebele or Shona) and numeracy (Mathematics). Home and school background information was collected through a Pupil Questionnaire, which contained 20 questions and a School Head Questionnaire, which contained 39 questions.

ZELA Tests

A single scale was developed to align the abilities of pupils and difficulties of the items was constructed for each ZELA test after test-by-test analyses. For each subject scale, the distribution of pupil abilities in ZELA 2016 was transformed to a scale with a mean of 300 and a standard deviation of 25. Link items from the 2015 and 2016 tests were used in the analysis to ensure that 2015-2016 test results were comparable.

Key findings

1. How do the Zimbabwe pupils perform in the language and Mathematics tests? Is there a noticeable pattern of change over time?

The study explored how Zimbabwe pupils performed in assessments of languages and Mathematics over time. The overall mean English performance increased significantly by 3.1 per cent between 2015 and 2016, however Mathematics performance remained fairly stable between 2015 and 2016. Although the results for Mathematics performance do not show a significant improvement between 2015 and 2016, they indicate a significant improvement in pupil's performance between 2012 and 2016. English performance also indicate a significant improvement in pupil's performance between 2012 and 2016.

The 2012 baseline study found that for English, 49 per cent of Grade 3 pupils were achieving at or above the grade level benchmark, and that for Mathematics, 46 per cent of pupils were achieving at or above the grade appropriate level.

In 2015, 53 per cent of Grade 3 pupils were performing at or above the grade level benchmark in English, and that for Mathematics, 66 per cent of pupils were achieving at or above the grade appropriate level.

In 2016, 71 per cent of Grade 3 pupils were performing at or above the grade level benchmark in English, and that for Mathematics, 65 per cent of pupils were achieving at or above the grade appropriate level.

2. Relationships of pupil, teaching and school characteristics with performance on tests of language and Mathematics at the beginning of grade three in Zimbabwe.

The research explored the relationships of pupil, teaching and school variables with performance on tests of language and Mathematics at the beginning of Grade 3 in Zimbabwe. Girls outperformed boys in English, however there was no significant difference in their Mathematics performance in 2016. As has been the case for the previous ZELA cycles, the 2016 results indicate that pupils from urban schools outperformed pupils from rural schools by 24.59 score points in English and 10.38 score points in Mathematics. We also observed a significant decrease in Mathematics performance for urban schools from 2015 to 2016.

Analyses by age-group showed significant increases in both English and Mathematics performance between 2012 and 2016 for all age groups except the group aged 7 years which showed no significant change. Further analysis revealed the existence of a strong relationship between pupil's performance and their socio-economic status. Socio-economic equity in education is defined as providing all students, regardless of socio-economic status with similar opportunities to benefit from education (OECD, 2013a). For English, the gap in performance between pupils from low and high socio-economic backgrounds increased between 2015 and 2016, whilst Mathematics experienced a decrease over the same period.

Similar to the results of 2012 and 2015, the 2016 results show that pupils from Bulawayo and Harare performed better than pupils from other provinces in both Mathematics and English. Pupils who speak English at home outperformed pupils who speak other languages at home in both English and Mathematics. However, there was a significant decrease in Mathematics performance for pupils who speak English at home between 2015 and 2016.

Pupils that worked less than an hour per day for their family performed better than those that worked one hour or more in both English and Mathematics over the years from 2012 to 2016. The difference was small but appeared to be increasing with time.

For 2016, pupils eating three or more meals per day outperformed pupils eating two meals per day, however there was no significant difference in performance between pupils eating two meals per day and pupils eating one meal per day in both English and Mathematics.

The study also explored how the effect of home possessions such as electricity, piped water, television and radio effected performance. The 2016 results indicate that pupils with four home possessions outperformed those with two or three who in-turn outperformed those with one or less in both English and Mathematics. The difference was however small in Mathematics.

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Pupils attending schools with water and electricity performed better in English and Mathematics than pupils from schools without either water or electricity. Pupils from schools with large budgets performed better than pupils from schools with medium budgets in both urban and rural schools, however there was no sufficient evidence to conclude that pupils from schools with median budgets outperformed pupils from schools with small budgets. Pupils who had not been absent from school performed better than pupils who had been absent for one or two days in a term.

3. To what extent can improvement in test performance be attributed to the Education Transition Fund (ETF)?

The study explored the extent to which textbooks and resources distributed under the ETF had an effect on pupil performance. The results from the multiple regression analysis revealed

that possible changes in location (urban versus rural and distance between the school and the district centre) only accounted for 21% of the amount of variation in English performance. Addition of socio-economic variables (number of home possessions, number of meals per day, highest parental education and home educational resources) to the model increased the variation explained to 25%. Two background variables (gender and the number of hours working for the family per day) were then added to the model and the amount of variation in English explained by all these variables increased to 26%. Finally, teaching and learning variables (number of satellite schools, the budget per pupil, the number of days a pupil was absent and the proportion of teachers with a teaching qualification) were added to the model and the total amount of variation in English performance explained was 29%. The fact that all these variables explained only 29% of the increase in English performance in 2016, imply that 71% of the increase is explained by other factors. An obvious and plausible factor is the distribution of textbooks and resources under the ETF.

In Mathematics, the location variables, socio-economic variables, background variables and teaching and learning variable cumulatively explain 10% of the amount of variation in Mathematics performance. This also suggests that 90% of the increase in Mathematics performance is explained by ETF textbooks.

Contents

| | |
|---|-----------|
| Abstract | 1 |
| Acronyms and abbreviations | 3 |
| Executive Summary | 4 |
| 1 Education Development Fund and Context of the ZELA Program | 12 |
| 1.1 Introduction | 12 |
| 1.2 Background to the study | 12 |
| 1.2.1 Scope of the study | 14 |
| 1.2.2 The implementation of the study over time | 16 |
| 1.3 Literature Review | 16 |
| 1.4 Methodological Framework | 18 |
| 1.5 Sample and Data Collection | 20 |
| 1.5.1 Interpreting reported statistics | 22 |
| 1.6 Questionnaires | 24 |
| 1.7 Limitation of the study | 25 |
| 1.8 Structure of the report | 25 |
| 2 Performance in Languages and Mathematics overall and by pupil demographics and family background variables | 27 |
| 2.1 Introduction | 27 |
| 2.2 Sample Characteristics | 27 |
| 2.3 Item response theory | 31 |
| 2.4 Performance in English 2016 | 34 |
| 2.5 Performance in Mathematics 2016 | 35 |
| 2.6 Overall results in English and Mathematics since 2012 | 36 |
| 2.7 Differences in performance by demographic and family background | 38 |

| | | |
|----------|---|------------|
| 2.7.1 | Gender | 39 |
| 2.7.2 | School Location | 41 |
| 2.7.3 | Province | 43 |
| 2.7.4 | Age group | 46 |
| 2.7.5 | Language spoken at home | 47 |
| 2.7.6 | Time per day working for the family | 50 |
| 2.7.7 | Meals per day | 55 |
| 2.7.8 | Number of home possessions | 57 |
| 2.7.9 | Number of home educational resources | 61 |
| 2.7.10 | Highest parental education | 65 |
| 2.8 | Pupil Performance in Shona and Ndebele 2016 | 68 |
| 3 | Socio-Economic Equity in Education in Zimbabwe | 70 |
| 3.1 | Performance and Socio-economic status | 70 |
| 3.2 | Socio-economic equity since 2012 | 72 |
| 3.3 | Differences between and within schools | 74 |
| 3.4 | Conclusion | 78 |
| 4 | Performance in English and Mathematics within the Zimbabwe Educational Context | 79 |
| 4.1 | School Characteristics | 79 |
| 4.1.1 | School type | 79 |
| 4.1.2 | School facilities | 82 |
| 4.1.3 | School Budget | 86 |
| 4.1.4 | Distance to district centre | 89 |
| 4.2 | Teaching and learning opportunities | 91 |
| 4.2.1 | EDF Textbook-pupil ratio | 91 |
| 4.2.2 | Days absent by pupils | 93 |
| 4.3 | Explaining variance and change in performance | 94 |
| 5 | Conclusion, Policy implications and Future Programming | 101 |
| 5.1 | Summary | 101 |
| 5.2 | Key findings | 101 |

| | |
|-----------------------------------|------------|
| 5.3 Policy Implications | 106 |
| 5.4 Lessons Learnt | 107 |
| 5.5 Future Programming | 108 |
| Bibliography | 109 |
| A PUPIL QUESTIONNAIRE | 111 |
| B HEAD QUESTIONNAIRE | 118 |
| List of Figures | 130 |
| List of Tables | 132 |

Chapter 1

Education Development Fund and Context of the ZELA Program

1.1 Introduction

The term assessment, in its widest meaning, denotes a process of collecting and interpreting information about learning and achievement of pupils ([Saklofske and Janzen, 1990](#)). This assessment which is an integral part of teaching and learning provides information to students and their parents about the progress in acquiring knowledge, skills and attitudes. It also provides support to teachers to modify their instruction and the learning activities of their students. Most importantly, assessments provide information to various stakeholders that make decisions about educational policy related to pupils and this is the primary focus of Zimbabwe Early Learning Assessment (ZELA).

1.2 Background to the study

After gaining independence in 1980, Zimbabwe expanded access to primary school education. This resulted in the number of primary school enrolments more than doubling in seven years. By 1982, primary school enrolment rates were reported at almost 100% ([Nyanguru and Peil, 1991](#)). However, the deterioration of the country's economy beginning in 2000 had serious negative impacts on the delivery of education services ([Government of Zimbabwe, 2009](#)). A high unemployment rate and hyperinflation peaked in Zimbabwe in 2008. This created an unstable environment that led to the loss of substantial investments in education and an exodus of skilled workers, including teachers ([Kwenda and Ntuli, 2014](#)). [UNICEF \(2009\)](#)

reported that between 2008 and 2009, school attendance fell from 80% to 20%. It was also estimated that only about 40% of the country's teachers were attending lessons ([UNICEF, 2008](#)).

The sector slowly began to recover in 2009, with education taken as a priority in the new government's Short Term Emergency Recovery Programme ([Government of Zimbabwe, 2009](#)). By 2012, international education data indicated increases in enrolments and improvements in the education system. The UNESCO Institute for Statistics (UIS) reported a total net enrolment rate of 93.9% in primary education ([UNESCO, 2015b](#)).

While enrolment and teacher numbers have recovered from 2008-2009, there continued to be significant achievement lags in the education system ([UNICEF, 2013](#)). Given the high variation in pupil achievement in rural and urban areas and funding for programmes that support children with disabilities, there was therefore need to focus on resolving systemic equity issues ([UNICEF, 2014](#)).

After all these considerations and in line with the Basic Education and Gender Equality (BEGE)'s key focus within UNICEF's Medium-Term Strategic Plan, educational resources were given to primary schools in Zimbabwe. The focus was in line with UNICEF's contribution to the Sustainable Development Goals (SDGs) number four. After educational resources were given to schools, the ZELA program was instituted as a four-year program to monitor and evaluate the impact of educational resources which were given to schools across the country through the then Education Transition Fund (ETF). In 2012, the Australian Council for Educational Research (ACER) was engaged and a ZELA baseline study was carried out to determine change in pupil performance from 2012-2015; to explore the relationships of pupil, teacher and school-level variables on pupil learning outcomes; and to explore the extent to which tests performance can be attributed to the EDF educational resources. Also one of the terms of reference of the ZELA programme was to support and enhance national capacity in student assessment through capacity building in areas to do with test development, data analysis and report writing.

After conducting four cycles of ZELA, the contract of ACER expired and a decision was made to continue with ZELA with the Ministry of Primary and Secondary

Education (MoPSE) coordinating the activities in collaboration with the Zimbabwe School Examinations Council (ZIMSEC). To that end, a local consultant was also engaged to offer technical support to MoPSE and ZIMSEC. For 2016, the same model and structures which were set up by ACER were adopted in totality to allow for comparability of 2016 results to previous years. The 2016 ZELA cycle was transformed from a research project to a sample-based National Assessment at grade 3 level testing grade two and below content. ZELA 2016 is conceptualised as the first cycle of the Zimbabwe Early Learning National Assessment.

1.2.1 Scope of the study

The 2016 Zimbabwe Early Learning National Assessment sought to answer the following questions:

- (1) How do the Zimbabwe pupils perform in the language and Mathematics tests? Closely related to this is the question: Is there a noticeable pattern of change over time?
- (2) What are the relationships of the following groups of variables with performance on tests of language and Mathematics at the beginning of Grade 3 in Zimbabwe?
 - (a) Pupil background characteristics
 - (b) Teacher and teaching resources
 - (c) School funding and facilities
- (3) To what extent can improvement in test performance be attributed to the Education Development Fund?

Other sub-questions which were pursued as a follow up to the above-mentioned question were as follows:

- How do early-grade Zimbabwe pupils perform in tests of language and Mathematics?
- Is it possible to identify pupil-level and school-level variables that influence test performance?

Following the same structure that was set by ACER, MoPSE and ZIMSEC did the following in order to answer these questions:

-
- This reported rode on the already reviewed literature on international experience in national assessment with particular emphasis on the Africa context contained in the 2012 baseline study. This was done in order to ensure that the project worked with the latest and best information for implementing the project.
 - A representative sample of Grade 3 pupils from schools across the 10 provinces of Zimbabwe was drawn in 2016 based on the 2015 sample that was drawn by ACER. On that 2015, schools which were meant for first choice replacement r_1 were used as sampled s and in rare cases second choice schools for replacement r_2 were used. This sampling strategy allowed the study to generalise to the population of all Grade 3 pupils in Zimbabwe.
 - Tests of Mathematics, English, Ndebele and Shona were developed and administered.
 - Security procedures surrounding test development, printing, administration and marking were developed and implemented.
 - Pupil and Head Questionnaires were developed by MoPSE and administered. This was designed to collect information about pupil background, school and teachers.
 - A manual for school administrators and for grade 3 teachers were developed as advance information to ensure the tests were administered consistently and appropriately.
 - Test administrators and Test Monitors (TMO) were trained to ensure that they fully understood test protocols and the reasons for them. TMOs were important for ensuring that the quality of the data was protected at key stages during their collection and processing.
 - Training manuals were developed and published for test administrators and TMOs. These manuals provided guidelines for quality assurance practices as well as being the basis for their feedback to ZIMSEC on the conduct of the tests.
 - Visits to schools by ZIMSEC and MoPSE officials were conducted as part of the quality assurance for the study.
 - Procedures were designed for data capture that is, moving the information from the completed test forms and questionnaires to an electronic format.

- Data entry was done by ZIMSEC and data cleaning was done by ZIMSEC with support from the consultant.
- Data analysis and report writing was done by ZIMSEC with support from the Consultant.

Students were sampled from registered and satellite schools. Satellite schools are not registered schools but are attached to a registered school referred to as a 'mother' school. Questionnaires were distributed to pupils and to heads of schools (or their representatives) during the ZELA administration. These questionnaires are included in Appendices 2 and 3 of this report. Pupil questionnaires were designed to collect contextual information while head of school questionnaires were designed to gather information on school-level variables.

Questionnaires were printed in English, but teachers were allowed to assist students in their local language and in filling out the questionnaire, if necessary.

1.2.2 The implementation of the study over time

The progression of cohorts of pupils being surveyed is summarised in [Table 1.1](#) The number in parenthesis refers to the order of the test cycles over the duration of the evaluation. This report addresses the 2016 cycle. 2016 is the first cycle of ZELA conceptualised as sample-based national assessment.

Table 1.1: Location of the 2016 cycle within the wider evaluation

| 2010 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------|-----------|------------|------------|------------|----------------------------------|
| EGLALN | 1st cycle | 2nd cycle | 3rd cycle | 4th cycle | 1st cycle |
| NA | Baseline | Monitoring | Monitoring | Evaluation | Sample-based National Assessment |

1.3 Literature Review

A significant number of researchers have offered a wide range of perspectives and advice pertaining to the issues of early learning assessment and how to integrate these elements into their practices. Research by ([UNESCO, 2015a](#)) indicates that there is improved preparation of children for primary education especially in the development of basic skills such as reading,

writing, numeracy and language learning. The main purpose of linking early childhood development and primary education is to ensure that there is a smooth transition for children from one level of learning to another. [Bukaliya and Mubika \(2012\)](#) indicated that toddlers were more competent than those who went straight into Grade 1 without having gone through Early Childhood Development (ECD). Their results indicate that children's positive attitudes toward school are reinforced; they feel competent and their teachers identify them as competent and treat them as such. Zimbabwe's education system has registered significant progress in terms of quality and participation between 2012 and 2015, with pass rates at the pre-primary, primary and secondary level all showing a steady upward trend over the past four years ([UNICEF, 2015](#)).

According to [UNESCO \(2007\)](#), the academic performance of boys and girls globally is moving towards convergence. In the sub-Saharan region challenges regarding gender differences in learning outcomes remain. These vary by country, grade and subject. Out of the southern and eastern African countries that participated in Southern Africa Consortium for Monitoring Educational Quality II (SACMEQ II), Seychelles faces the greatest challenges with gender differences favouring girls in all school subjects. In language subjects, Botswana, Burkina Faso, Madagascar, Mali, Seychelles and South Africa are among those countries with the largest gender differences in learning outcomes, often favouring girls. In Mathematics, Burkina Faso, Chad, Kenya, Mali, Niger, Senegal, Seychelles and the United Republic of Tanzania are among those with the largest gender differences, often favouring boys.

Equity remains a big challenge in Africa ([Sharpe, 2007](#)). Large disparities in access to education exist between children from different socio-economic backgrounds, between children living in different locations and between boys and girls. Children born into poorer households, especially in rural areas, are exceedingly unlikely to reach or progress in secondary school, no matter their aptitude for learning. In Mozambique, for instance, girls are much less likely to attend school than boys. In Angola the secondary enrolment rate in urban areas is more than six times higher than in rural areas and fewer than one child in ten aged 12 to 18 years from the poorest households are in secondary school. According to [Donald and Sondergaard \(2008\)](#), most girls throughout Uganda continue to face more obstacles in completing a quality basic education than their male counterparts.

Some pupils who live in rural areas attend schools where there are teacher shortages and inadequate teaching resources and that can be a barrier to learning. In the United Republic of Tanzania, where average performance in Mathematics is better than elsewhere in southern and eastern Africa, only 25% of poor children living in rural areas are in school and learning, compared with 63% of rich children living in urban areas (UNESCO, 2015a). In Angola, Malawi and Zimbabwe prolonged drought and reduced rainfall caused a major food crisis, putting millions of people at risk. As a result, the education system is burdened by large classes, teacher shortages, inadequate school supplies and damaged infrastructure. In addition, the food crisis affecting the entire Sahel-region caused some 50,000 children in the most exposed areas in Niger to temporarily quit school.

1.4 Methodological Framework

The overall framework for the ZELA study is an adaptation of the input-process-output (3P) model of learning and teaching developed by Biggs (1993). This model portrays learning as an interactive system that examines three points in time where learning takes place. These points include:

- (i) The point before learning takes place (presage)
- (ii) The process of learning
- (iii) The outcome of learning

The model for data in the pupil learning environment is represented in Figure 1.1. The framework portrays learning as an interactive system, identifying three points of time at which learning-related factors are placed: presage, before learning takes place; process, during learning; and product, the outcome of learning (Biggs, 1993).

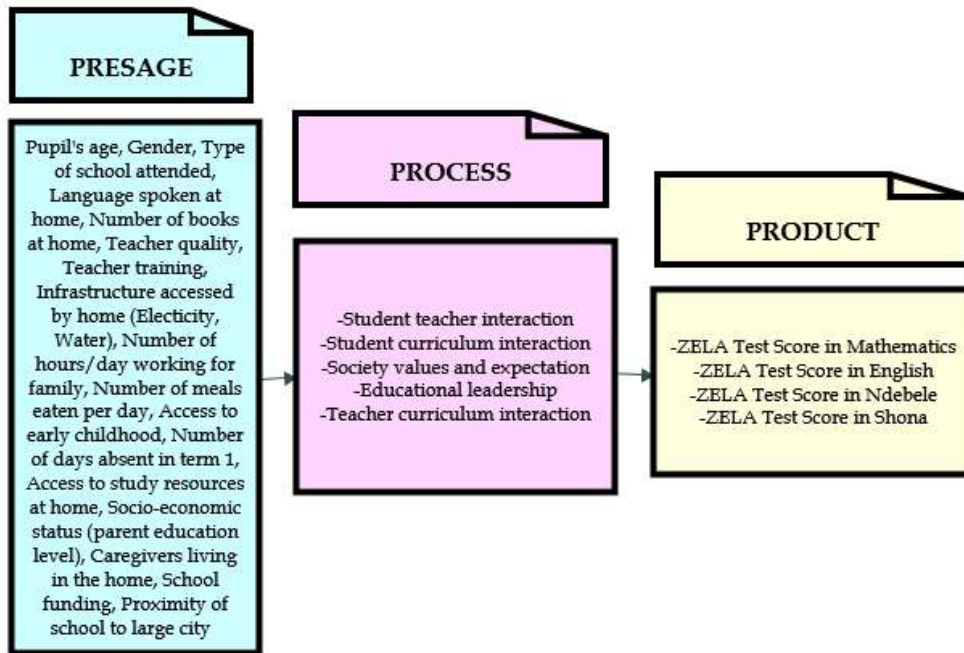


Figure 1.1: The 3P Model of Teaching and Learning (Biggs, 1985)

Biggs' model draws attention to two sets of presage factors: meta-contextual factors and those factors specific to the learner. In the adaptation of this model to datasets, the presage components are data about pupils, teachers, and school organisation and resourcing. The Biggs model provides a structure to analyse influences upon learning opportunities where the purpose is to promote collaborative working; and as such, critical analysis of possibilities for better-targeted management of educational process (Biggs, 1993). This model is capable of generating predictions and associations that are relevant to this study and potential policy implications. Reading from top to bottom, from input through process to output, the diagram portrays the storyline for an individual pupil or pupil cohort.

Figure 1.1 provides an organisational framework to locate the data used in the ZELA research. The Background section of this report outlined the context of education in Zimbabwe. ZELA has gathered data about funding, facilities and resources, teacher quality and teacher training, and pupil backgrounds. Table 1.2 lists the data that were gathered as input for the input-process-output model described in Figure 1.1

Table 1.2: Datasets - input for ZELA

| Pupil level (background characteristics) | Teacher level (teacher quality & training) | School level (Funding & facilities) |
|--|--|--|
| ✓Type of school attended | ✓No. of teachers | ✓Province |
| ✓Age | ✓Qualification of teachers | ✓School type |
| ✓Gender | ✓Professional development (teachers) | ✓District |
| ✓Language spoken at home | ✓Teacher absentee rate | ✓Language of instruction in early years |
| ✓No. of books in the home | ✓Professional development attendance | ✓Years of operation |
| ✓Infrastructure accessed at home | ✓Qualification of Head teacher | ✓Proximity to a large city |
| ✓No. of hours working for family | | ✓Student population - enrolled |
| ✓No. of meals eaten per day | | ✓Grade 3 pupil population-enrolled |
| ✓Access to ECD class | | ✓Average class size |
| ✓No. of days absent in term 1 | | ✓Minutes per lesson |
| ✓Access to resources to study at home | | ✓Sessions per day |
| ✓Socio-economic status (parents) | | ✓No. of days of closure of school operations |
| ✓Religion | | ✓School infrastructure |
| ✓Caregivers living in the home | | ✓WASH Facilities |
| | | ✓Orphans and vulnerable children (%) |
| | | ✓Funding |
| | | ✓Pupils with chairs (%) |
| | | ✓Textbook Supply |
| | | ✓Textbook use |
| | | ✓Students in fee arrears (%) |
| | | ✓No. of students with disability |
| | | ✓School days lost (caring responsibility) |
| | | ✓Head Teacher professional development |

1.5 Sample and Data Collection

A representative sample based on the first replacement schools r_1 from the 2015 sample was used. The sample yielded approximately 17500 pupils in 495 primary schools across the 10 provinces of Zimbabwe. The target population was pupils in term 1 of Grade 3. Students were sampled from registered and satellite schools. While Zimbabwe’s land reform program has been implemented in phases since independence in 1980, there was a large increase in the number of satellite schools after the fast track phase of the land reform program in 2000 for children whose parents migrated to those areas (Mutema, 2014). Satellite schools are constructed through community and Government partnership (Munjanganja and Machwira, 2014). Satellite schools were established rapidly in order to provide access to children whose families had moved to redistributed farms. Registered schools are formally recognised by

government as meeting nationally approved standards. These standards were established by Zimbabwe's Ministry of Education and Culture in 1991 and remain as the key reference for school registration in 2015. A school can only become registered when it has established the following: "one administration block and toilets; a minimum of seven classrooms; a minimum of five teachers' houses; adequate toilet facilities as prescribed by official regulations; and a source of clean, portable water" (Ministry of Education and Culture, 1991). Satellite schools are formally attached to a registered school commonly referred to as a mother school. Satellite schools do not meet infrastructure and maintenance standards as defined by MoPSE (Munjanganja and Machwira, 2014).

Data collection included both cognitive and questionnaire instruments. Four ZELA tests were administered in English, Mathematics, Ndebele and Shona over two days. A single scale aligning the abilities of pupils with the difficulties of the items was constructed for each ZELA test (namely English, Ndebele, Shona and Mathematics) after thorough test-by-test analyses. For each scale (English, Ndebele, Shona and Mathematics), the distribution abilities in ZELA 2012 was transformed to a scale with a mean of 300 and a standard deviation of 25. Link items from the 2012, 2013, 2014 and 2015 tests were used in the 2015 tests to ensure the 2012-2016 test results were comparable.

ZELA used Item Response Theory (IRT) scaling methodology for creating proficiency scales for all subjects along which student performance was measured. The scales were divided into proficiency levels to report what students typically know and can do to each level. More technical details about the scaling process are included in the ZELA 2016 Technical report. ZELA reports general results for the population of Grade 3 students, rather than results of individuals. The main statistics in this report include average performance of groups of grade 3 pupils and percentages of pupils within grade levels (proficiency levels). Standard errors are used and reported to evaluate if differences between those averages or percentages are statistically significant. More information on interpreting statistical results included in this report is presented in the next section.

1.5.1 Interpreting reported statistics

Statistical significance, standard errors and effect sizes

When reporting and interpreting results the notion of statistical significance is essential. All reported statistics are estimated for the full population of Grade 3 pupils in Zimbabwe. Not all, but only a selection of Grade 3 pupils was tested to provide these estimates. Testing all pupils would be too expensive and inefficient for the purpose of the survey. Basing population estimates on a sample of pupils causes uncertainty in the estimates. Large samples that represent the population will result in smaller uncertainties than small samples.

In a similar way, it is not possible to assess pupils' achievement with test items that cover all possible skills within a domain. Only a representative set of items is used to test pupils' performance in English and Mathematics. If a different set of items had been chosen, pupils' performance would be slightly different, again leading to slightly different population estimates.

These two sources of uncertainty, the sampling of pupils and selection of items in a test, are expressed as standard errors. These standard errors are taken into account when mean performance or percentages at or above grade levels are compared across time or between groups of pupils. Differences in mean scores or percentage could be caused by real differences in the population or by chance due to the two sources of uncertainties. Standard errors tell us the likelihood that the differences are just caused by chance due to sampling of students and selection of test items. The usual acceptable level of uncertainty in reporting significant results that are actually just caused by chance is five per cent. If the likelihood is more than five per cent, it is concluded that the two means or percentages do not differ from each other. If the likelihood is less than five percent, it is concluded that the two means or percentages are (significantly) different from each other. Throughout the report, standard errors are included in the tables and presented between brackets.

In other words, even two values that look different from each other are regarded as not different if we are five percent or more uncertain that this difference was caused by real differences in the population. Apparent differences are only interpreted as differenced if they are statistically significant from each other; that is, if we are less than five per cent certain

that the difference was caused by chance. Consider, for example, a hypothetical case where the average performance of girls is 324 and the average performance of boys is 322. While the mathematical difference is equal to score points, it is in a statistical sense equal to zero (no difference) if we are more than five per cent certain that this difference was caused by chance. In this case the conclusion would be that there is no difference in performance between girls and boys. Only if we are less than five per cent of this it is concluded that girls perform better than boys. In summary,

a statistically significant difference = a difference
a statistically non-significant difference = no difference

If differences are significant, the size of the difference can be described by dividing the difference by the standard deviation (25 score points). Effect sizes between 0.1 and 0.3 are labelled in this report as small, between 0.3 and 0.5 as moderate, greater than 0.5 as large and greater than 1 as very large.

Nature of reported relationships

Most of the analyses conducted for this report involved comparisons of average achievement scores between groups of pupils, for example, the difference in performance between pupils in urban and rural areas. Whenever such a difference was statistically significant, it was concluded that the group variable was related to performance. However, this does not mean the relationship was necessary casual. That is, living in urban areas does not necessarily help students learn. This is because the relationship could be explained by other variables that were not taken into account when doing the comparison. For example, it is possible that a difference in socio-economic status explained the difference in performance between urban and rural areas, or to other student background or school characteristics. Hence, when describing these relationships, no direction of the effects was assumed.

The end of the report describes a multivariate model which includes several important pupil background and school characteristics. In such a model, the net effect is tested of each individual predictor while controlling for - or taking into account - differences in other predictors. If the predictors are carefully chosen, such a model allows for cautious

interpretation of the direction of the effects; cautious, because it is not possible to take all other (measured and unmeasured) factors into account. For example, it was found that pupils in schools that are further removed from the district centre performed on average less well than pupils in schools closer to the district centre. Of course, this effect is confounded with the effect of living in urban or rural areas and could also be explained by differences in family socio-economic status. Including all three variables in one model would show the net effect of each of the three variables, while taking differences in the other variables into account. If the effect of the distance to the district centre is in the other two controlling for urban and rural locations and for socio-economic status, it can be concluded that additional factors, in excess of urban versus rural locations and family socio-economic status, negatively affect student performance in remote areas.

1.6 Questionnaires

Questionnaires were distributed to pupils and to heads of schools (or their representative) during the annual ZELA administration. Pupil questionnaires were designed to collect family background information while head of school questionnaires were designed to gather information on school context. Questionnaires were printed in English, but teachers were allowed to assist students in their local language and in filling out the questionnaire, if necessary. Information guides were developed and dispatched to District Education Officers (DEOs), school heads, teachers and parents.

For the purpose of comparability, participation in a national research program required standardization of the assessment procedure across all schools. For this reason, a Directions for Administration manual was developed and used to train test administrators regarding the specific details of the two-day administration of all questionnaires and tests. In addition, Test Monitoring Officers (TMOs) were trained to observe the test administration process in a random selection of 30 schools. The TMOs submitted reports on their field observations.

Test administrators adhered to strict security protocols. Test and questionnaire responses were returned to ZIMSEC and the Ministry of Primary and Secondary Education (MoPSE) district and provincial offices. Both completed and non-completed instruments were couriered

to a central location in Zimbabwe where test forms and questionnaires were manually entered into an electronic format for analysis. Data analysis and report writing was conducted by ZIMSEC and ACER.

1.7 Limitation of the study

Pupils that were selected for the English and Mathematics assessments could choose to respond to the Shona or Ndebele language tests, but schools were not obliged to have students take the tests. The consequence of this self-selecting process is that the samples for Shona and Ndebele languages were not comparable across the assessment years. Therefore, trends are not reported for achievement in Shona and Ndebele.

1.8 Structure of the report

This report is divided into several chapters and these are organised as follows:

- (a) **Chapter 1 - The Education Development Fund and Context of the ZELA program:** This chapter introduces the ZELA programme, the background of the educational context in Zimbabwe and the problem statement.
- (b) **Chapter 2 - Performance in Languages and Mathematics overall and by pupil demographics and family background variables:** Chapter two is focused on the performance in languages and Mathematics overall and by pupil demographics and family background variables. The chapter describes trends in performance of Grade three pupils in English and Mathematics from 2012 to 2016.
- (c) **Chapter 3 - Socio-Economic Equity in Education in Zimbabwe:** In the context of socio-economic equity, this chapter explores how Zimbabwe is providing education opportunities and achieving educational outcomes, which are an indication of equity in society as a whole.
- (d) **Chapter 4 - Performance in English and Mathematics within the Zimbabwe Educational Context:** Chapter four describes relationships found in the full population between pupil performance, characteristics of the school and learning environment.

(e) **Chapter 5 - Conclusion, Policy implications and Future programming:**

Chapter five presents the Conclusion, Policy implications and Future programming.

Chapter 2

Performance in Languages and Mathematics overall and by pupil demographics and family background variables

2.1 Introduction

This chapter presents the results of the ZELA 2016 analysis and makes comparisons to 2015 and 2012. Firstly, it describes the sample descriptives and secondly the trends in performance of grade 3 pupils in English and Mathematics in Zimbabwe. This is achieved by analysing differences in performance between demographic and family background such as location, province, age, language spoken at home, time per day working for the family, meals per day, number of home possessions, number of home educational resources and highest parental education. Furthermore, the chapter presents the ZELA 2016 scale for English and Mathematics showing the proportion of pupils below grade level, at grade level and above grade level.

2.2 Sample Characteristics

Pupils that were selected for the English and Mathematics assessments could choose to respond to either Ndebele or Shona tests, but were not obliged to. As a result, these two language tests were not comparable across the assessment years. Therefore, trends are not reported for achievement in Ndebele and Shona, however some results for 2016 are presented at the end of this chapter. In total 17581 pupils were assessed from 495 schools. The results in

this chapter are reported overall and by pupil demographic and family background variables. Population descriptives based on the full samples from 2012, 2015 and 2016 are included in [Table 2.1](#) and [Table 2.2](#). In 2016 the number of urban schools sampled was higher than the number urban schools sampled in 2015. As shown in [Table 2.1](#), urban schools constituted 22% of the sample in 2015 as compared to 29% in 2016. According to [ACER \(2015\)](#), pupils in urban areas outperformed pupils in rural areas in English and Mathematics in all assessment years from 2012 to 2015. Based on this finding, the increase in the number of urban school sampled in 2016 has had an effect of increasing the overall 2016 pupil performance particularly English. This is discussed later in this chapter.

Bulawayo province recorded the maximum increase in the number of sampled schools in 2016. [Table 2.1](#) shows that 11% of the sampled schools in 2016 were from Bulawayo as compared to 4% in 2015. Manicaland and Masvingo provinces recorded the largest decrease in the number of sampled schools between 2015 and 2016. It important to note that Bulawayo is predominantly a metropolitan province while Manicaland and Masvingo are predominantly rural. In terms of age, [Table 2.1](#) shows a shift in age by the time the pupils took the ZELA tests in 2016. In 2012 and 2015, the majority of pupils were aged 8 years by the time the ZELA tests were administered. In 2016, the results show that the majority of pupils were aged 9 years. A shift in ages could be attributed to the fact that the 2016 ZELA tests were administered in the second term. This was a departure from the norm as the previous ZELA tests were administered in the first term of each year.

The percentage of pupils having 3 or more meals per day decreased from 57% in 2015 to 54% in 2016, whilst the percentage of pupils having 2 meals per day increased from 33% in 2015 to 37% over the same period. These changes could be attributed to the drought conditions that affected Zimbabwe in the 2015-2016 agricultural season. Consistent with the increase in the number of schools sampled in Bulawayo province, [Table 2.2](#) shows an increase in the number of pupils who speak Ndebele at home. The percentage of pupils who worked 1 or more hours but less than 2 hours a day increased from 27% in 2015 to 36% in 2016.

Number of home possessions, number of educational resources and the highest parental education are believed to influence pupil performance. Descriptive statistics shown in [Table 2.2](#) show that the percentage of pupils with exactly one home possession (electricity,

piped water, television and radio) decreased from 35% in 2015 to 28% in 2016. Pupils with none of the home possessions increased from 3% in 2015 to 7% in 2016. There were no major changes among pupils who had two, three and four home possessions between 2015 and 2016.

The educational resources that were under study are pencil, school bag, pen, desk, computer and calculator. In 2012 and 2015 the majority of the pupils (39% and 38% respectively) had one educational resource. In 2016, the majority of the pupils (34%) had four to six of these educational resources. For the highest parental education, [Table 2.2](#) shows that there has not been much difference between 2015 and 2016. However, the percentage of pupils with parents who completed secondary school decrease from 50% in 2012 to 39% in 2016.

Table 2.1: Population descriptives in 2012, 2015 and 2016

| Variable | Options | 2012 | 2015 | 2016 | |
|-------------------|---------------------|--------------|-------------|-------------|-----|
| Gender | Boys | 50% | 50% | 50% | |
| | Girls | 50% | 50% | 50 % | |
| Location | Urban | 20% | 22% | 29% | |
| | Rural | 80% | 78% | 71% | |
| Province | Bulawayo | 4% | 4% | 11% | |
| | Harare | 9% | 10% | 12% | |
| | Manicaland | 15% | 16% | 10% | |
| | Mashonaland Central | 10% | 10% | 10% | |
| | Mashonaland East | 11% | 11% | 9% | |
| | Mashonaland West | 12% | 11% | 9% | |
| | Masvingo | 13% | 14% | 9% | |
| | Matabeleland North | 7% | 7% | 10% | |
| | Matabeleland South | 6% | 5% | 10% | |
| | Midlands | 13% | 13% | 10% | |
| | Age(in years) | Aged below 7 | 1% | 2% | 0% |
| | | Aged 7 | 13% | 13% | 2% |
| | | Aged 8 | 39% | 37% | 22% |
| Aged 9 | | 28% | 27% | 39% | |
| Aged 10 | | 12% | 12% | 25% | |
| Aged 11 | | 5% | 4% | 7% | |
| Aged 12 | | 2% | 2% | 3% | |
| Aged 13 | | 0% | 2% | 1% | |
| Aged 14 and above | | 0% | 1% | 1% | |
| Meals per day | | 1 meal | 11% | 10% | 9% |
| | 2 meals | 31% | 33% | 37% | |
| | 3 or more meals | 58% | 57% | 54% | |

Table 2.2: Population descriptives in 2012, 2015 and 2016

| Variable | Option | 2012 | 2015 | 2016 |
|--|---|------|------|------|
| Language spoken at home | Shona | 67% | 73% | 68% |
| | Ndebele | 14% | 14% | 20% |
| | English | 2% | 4% | 3% |
| | Other | 17% | 9% | 9% |
| Time spend working for family | Less than 1 hour a day | 33% | 33% | 32% |
| | 1 or more but less than 2 hours a day | 26% | 27% | 36% |
| | 2 or more but less than 3 hours a day | 19% | 19% | 16% |
| | 3 hours or more a day | 21% | 20% | 16% |
| Number of home possessions | Zero | 12% | 3% | 7% |
| | One | 29% | 35% | 28% |
| | Two | 23% | 24% | 24% |
| | Three | 18% | 20% | 22% |
| | Four | 18% | 17% | 19% |
| Number of educational resources | Zero | 3% | 1% | 0% |
| | One | 39% | 38% | 17% |
| | Two | 23% | 22% | 21% |
| | Three | 14% | 16% | 28% |
| | Four to six | 12% | 20% | 34% |
| Highest parental education | Did not go to school | 3% | 3% | 3% |
| | Started some grades of primary school | 6% | 5% | 5% |
| | Completed primary school | 10% | 11% | 10% |
| | Started some grades of secondary school | 21% | 16% | 17% |
| | Completed secondary school | 50% | 44% | 39% |
| | Started some tertiary study | 2% | 6% | 5% |
| | Completed a tertiary course | 8% | 15% | 14% |

2.3 Item response theory

In Item response theory, student achievement is not directly measurable or observable by a single question such as a person's height or gender. Instead, tests are used to measure such unobservable attributes and a measurement scale needs to be constructed. Item response theory methodology is used to create such a scale. The responses of pupils to the test

CHAPTER 2. PERFORMANCE IN LANGUAGES AND MATHEMATICS OVERALL
AND BY PUPIL DEMOGRAPHICS AND FAMILY BACKGROUND VARIABLES

items are used to place both the pupils' achievements and the item difficulties on the same measurement scale. The English and Mathematics scales that were constructed for ZELA 2016 are presented in Figure 2.1 and Figure 2.2.

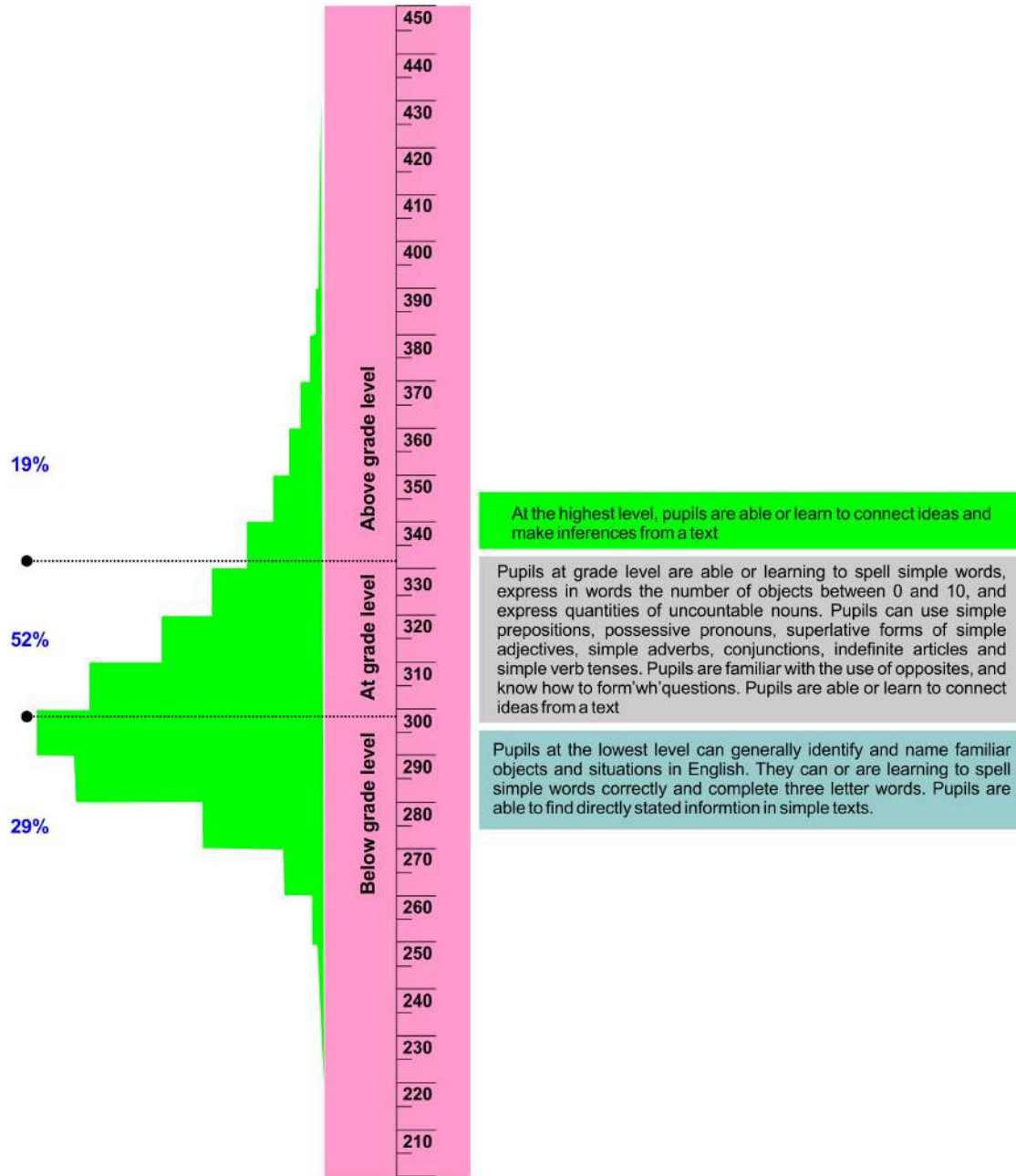


Figure 2.1: English Scale for 2016

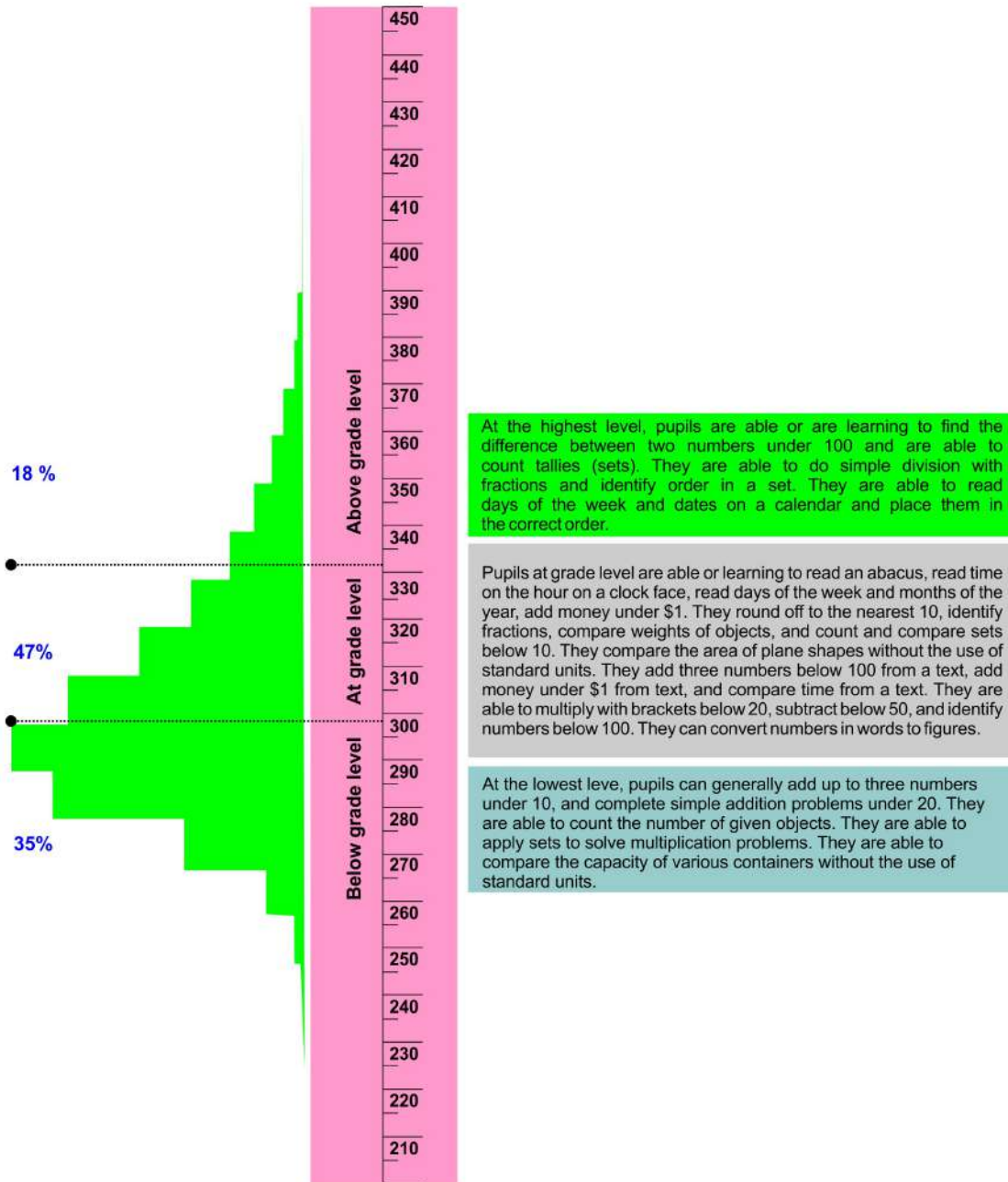


Figure 2.2: Mathematics Scale for 2016

The pink bars in the middle of the figures represent the scales and the units of measurement. In 2012 the mean performance in English and Mathematics was fixed at 300 and the standard deviation to 25. The horizontal bars on the left are frequencies of pupils at each location in this scale. Pupils at the top of the scale are high achievers; pupils at the bottom of the scale are low achievers. Items are placed on the same scale by their

difficulty with difficult items at the top of the scale and easy items at the bottom of the scale. Pupil achievement and item difficulty are matched on the scale in such a way that a pupil with the same achievement score as the difficulty of item has 50 per cent chance of responding correctly to this item. Consequently, pupils with an achievement score higher than an item difficulty have more than 50 per cent of responding correctly and similarly, pupils with an achievement score lower than the difficulty of an item have less than 50 percent chance of responding correctly.

Placing items on the same scale as pupils enables describing the skills of pupils at each location on the scale and defining meaningful cut points such as below, at and above grade proficiency levels. Cut points between the proficiency levels are drawn in [Figure 2.1](#) and [Figure 2.2](#) on the left of the pink bar and descriptions of the skills that pupils are learning to master at each level are included on the right of the pink bar. [Figure 2.1](#) shows that in English, 19% of grade three population performed above grade level in 2016, 52% at grade level and 29% below grade level. The percentages for Mathematics were 18% above grade level, 47% at grade level and 35% below grade level.

2.4 Performance in English 2016

[Figure 2.3](#) shows the performance distribution of grade two pupils in English in Zimbabwe. The results show that 19% pupils are above grade level, 52% at grade level and 29% below grade level.

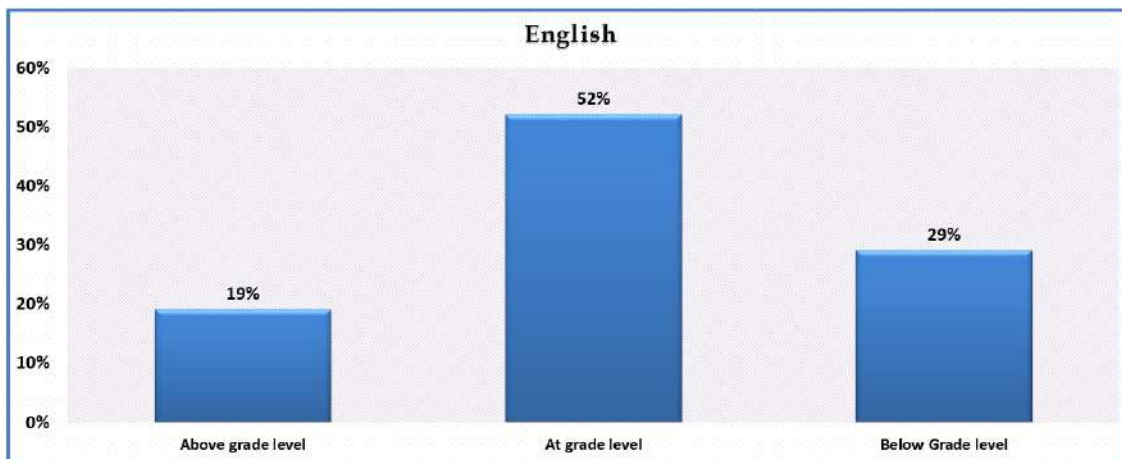


Figure 2.3: English Proficiency levels

At the highest level (above grade level), pupils are able or learn to connect ideas and make inference from text. Pupils at grade level are able or learning to spell simple words, express in words the number of objects between 0 and 10, and express quantities of uncountable nouns. Pupils can use simple prepositions, possessives pronouns, superlative forms of simple adjectives, simple adverbs, conjunctions, indefinite articles and simple verb tenses. Pupils are familiar with use of opposites, and know how to form 'wh' questions. Pupils are able or learn to connect ideas from a text. Pupils at the lowest level (below grade level) can generally identify and name familiar objects and situations in English. They can or are learning to spell simple words correctly and complete three letter words. Pupils are able to find directly stated information in simple texts.

2.5 Performance in Mathematics 2016

Figure 2.4 shows the performance distribution of grade two pupils in Mathematics in Zimbabwe. The results show that 18% pupils are above grade level, 47% at grade level and 35% below grade level.

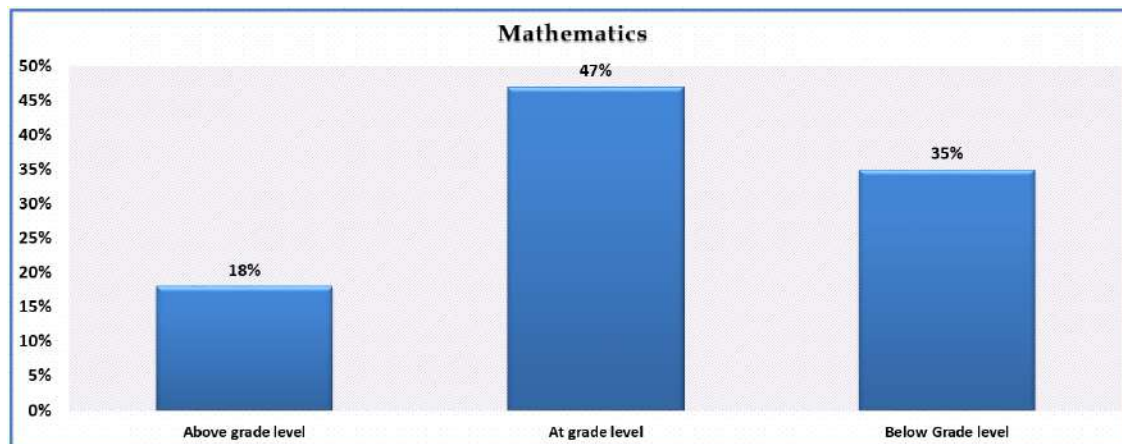


Figure 2.4: Mathematics Proficiency levels

At the highest level (above grade level), pupils are able or are learning to find the difference between two numbers under 100 and are able to count tallies (sets). They are able to do simple division with fractions and identify order in a set. They are able to read days of the week and dates on a calendar and place them in the correct order.

Pupils at grade level are able or learning to read an abacus, read time on the hour on a

clock face, read days of the week and months of the year, add money under \$1. They round off to the nearest 10, identify fractions, compare weights of objects and count and compare sets below 10. They compare the area of the plane shapes without the use of standard units. They add three numbers below 100 from a text, add money under \$1 from text and compare time from a text. They are able to multiply with brackets below 20, subtract below 50, and identify numbers below 100. They can convert numbers in words to figures. At the lowest level (below grade level), pupils can generally add up to three numbers under 10, and complete simple addition problems under 20. They are able to count the number of given objects. They are able to apply sets to solve multiplication problems. They are able to compare the capacity of various containers without the use of standard units.

2.6 Overall results in English and Mathematics since 2012

Table 2.3 shows the overall performance in English and Mathematics of grade two pupils in 2012, 2015 and 2016. Performance in both English and Mathematics increased significantly between 2012 and 2016. An increase in English performance from 304.2 in 2015 to 313.56 in 2016 resulted in 71% of students falling at and above grade level. For Mathematics, the average mean performance increased slightly from 312.2 in 2015 to 313.85 in 2016. This increase was not statistically significant. However, for Mathematics, the percentage of pupils at and above grade level decreased from 66% in 2015 to 65% in 2016.

Table 2.3: Overall performance in English and Mathematics in 2012, 2015 and 2016

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Mean Performance | 300(1.00) | ↑ | 304.2(0.78) | ↑ | 313.56(0.19) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Mean Performance | 300(0.97) | ↑ | 312.2(0.59) | ↔ | 313.85(0.16) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

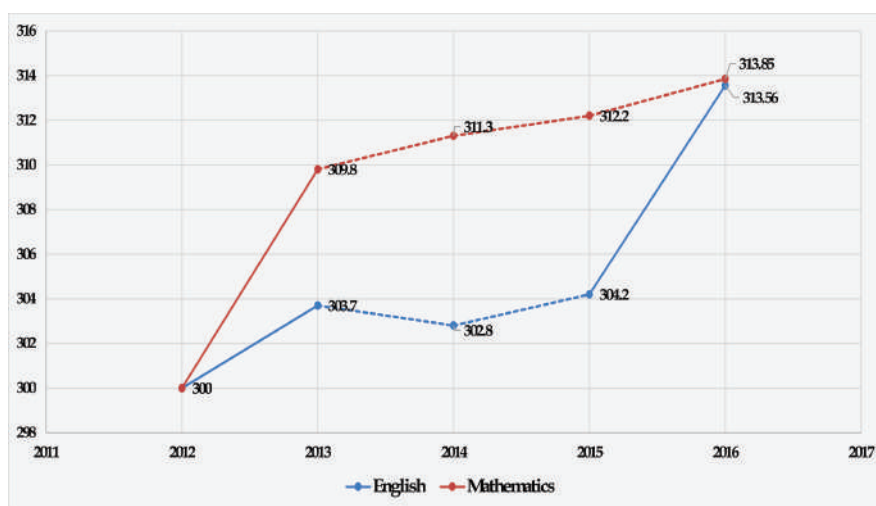


Figure 2.5: Mean performance in English and Mathematics since 2012

Figure 2.5 graphically presents the change in average performance in English and Mathematics from 2012 to 2016. A solid line indicates significant change while a dotted line indicates no significant change. The graph shows a significant increase in English performance from 2015 to 2016. Mathematics performance was fairly stable between 2015 and 2016. Although there is a significant improvement in English and Mathematics performance between 2012 and 2016 as shown by the arrows in Table 2.3, Mathematics performance did not change significantly between 2013 and 2014, between 2014 and 2015 and between 2015 and 2016. English recorded a significant improvement between 2012 and 2013 and between 2015 and 2016.

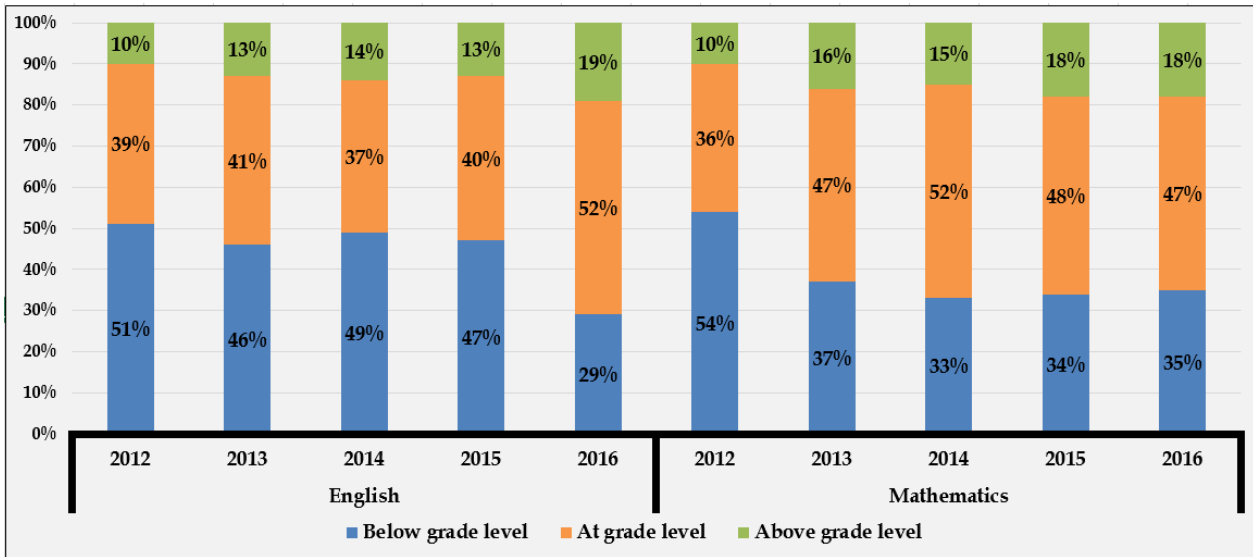


Figure 2.6: Percentages below, at and above grade level in English and Mathematics since 2012

Figure 2.6 shows the percentage of pupils in each proficiency level from 2012 to 2016 for both English and Mathematics. While the change in these percentages cannot be tested for statistical significance for technical reasons, the results indicate that the percentage of pupils in both the middle and the top proficiency levels has increased over this period of time. In 2012, 39% of the pupils in English were at grade level while in 2016 this percentage increased to 52%. For Mathematics there was an increase from 36% in 2012 to 47% in 2016 for pupils performing at grade level. There was general increase in performance with English performance higher than that of Mathematics and shown in Figure 2.6.

2.7 Differences in performance by demographic and family background

Results in English and Mathematics are presented by the following demographic and family background variables: gender, location, province, age group, language spoken at home, time spent working for the family per day, number of home possessions, number of educational resources and highest parental education. Performance is presented as mean scale scores.

2.7.1 Gender

Mean performance was calculated for English and Mathematics with respect to gender. According to Table 2.4 and Figure 2.7, girls outperformed boys in English in 2012, 2015 and 2016. In 2016, the mean performance of English was 311.34 for boys and 315.72 for girls. This difference is statistically significant at 5% level of significance. For Mathematics, the mean performance was 312.76 and 314.92 for boys and girls respectively. This difference is statistically insignificant at 5% level of significance. The difference in performance between boys and girls was small, although somewhat larger in English than in Mathematics and stable across time. Between 2012 and 2015 boys performance did not improve significantly in English whilst girls improved significantly over the same period. In Mathematics boys improved significantly between 2015 and 2016 from a mean of 310.8 to 312.76 whilst girls' performance remained stable over the same period.

Table 2.4: Performance in English and Mathematics by Gender since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|-------------------------|-------------|---|-------------|---|--------------|------------------|
| Boys | 297.5(0.95) | ⇔ | 301.4(0.76) | ↑ | 311.34(0.28) | ↑ |
| Girls | 302.6(1.12) | ↑ | 307.1(0.91) | ↑ | 315.72(0.29) | ↑ |
| <i>Difference (G-B)</i> | ↑ | | ↑ | | ↑ | |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Boys | 298.3(0.97) | ↑ | 310.8(0.58) | ↑ | 312.76(0.24) | ↑ |
| Girls | 301.8(1.03) | ↑ | 314.2(0.70) | ⇔ | 314.92(0.24) | ↑ |
| <i>Difference (G-B)</i> | ↑ | | ↑ | | ⇔ | |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

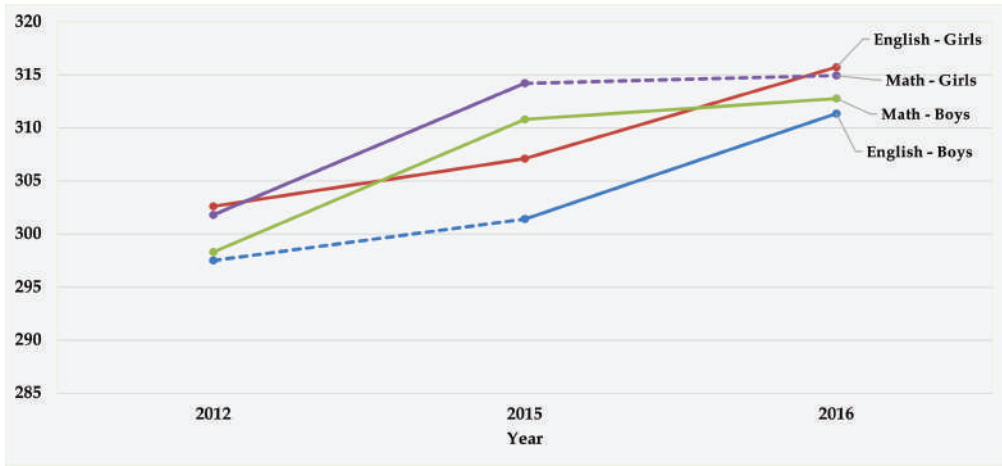


Figure 2.7: Mean performance in English and Mathematics by gender since 2012

Table 2.5 is a cross-tabulation of English and Mathematics proficiency levels and gender for 2016. The results indicate that 16.6% of the boys and 22.3% of the girls performed above grade level in English. At grade level, there isn't much difference in the percentage distribution of boys (51.7%) and girls (52.3%). In Mathematics 17.1% of the boys and 19.5% of the girls performed above grade level while 46% and 48.1% of boys and girls respectively performed at grade level. Overall, the percentage of boys at or above grade level is 68.3% and 74.6% for girls. The rest of the information is shown in Table 2.5 below.

Table 2.5: Cross-tabulation of Proficiency level and gender for 2016

| Subject | Proficiency Level | Boy | Girl | Total |
|-------------|-------------------|-------------|-------------|-------------|
| English | Above grade level | 16.6%(1456) | 22.3%(1963) | 19.4%(3419) |
| | At grade level | 51.7%(4540) | 52.3%(4602) | 52.0%(9142) |
| | Below grade level | 31.7%(2778) | 25.5%(2242) | 28.6%(5020) |
| | Total | 100%(8774) | 100%(8807) | 100%(17581) |
| Mathematics | Above grade level | 17.1%(1500) | 19.5%(1721) | 18.3%(3221) |
| | At grade level | 46.0%(4037) | 48.1%(4237) | 47.1%(8606) |
| | Below grade level | 36.9%(3236) | 32.3%(2848) | 34.6%(6084) |
| | Total | 100%(8773) | 100%(8806) | 100%(17579) |

2.7.2 School Location

According to [Table 2.6](#), pupils from urban areas outperformed pupils from rural areas in both English and Mathematics in 2012 and 2015 and results of ZELA 2016 are no different. In 2016, students in urban areas outperformed students in rural areas in both English and Mathematics. [Table 2.6](#) below shows the English and Mathematics performance of pupils from urban and rural schools.

Table 2.6: Performance in English and Mathematics by school location since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Urban | 313.5(2.77) | ↑ | 324.4(1.83) | ↑ | 330.93(0.40) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| Rural | 296.4(1.04) | ⇔ | 298.5(0.85) | ↑ | 306.34(0.19) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Urban | 311.2(2.14) | ↑ | 325.5(1.36) | ↓ | 321.18(0.32) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| Rural | 297.1(1.08) | ⇔ | 308.5(0.63) | ↑ | 310.80(0.20) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

In English, pupils from urban areas had a mean score of 330.93 as compared to pupils from rural schools who had a mean score of 306.34 in 2016. This represents a difference of 24.59 score points. In Mathematics the difference in performance between pupils from urban areas and pupils from rural areas in 2016 was 10.38 score points. These results indicate that the difference in mean performance was large, especially in English. Of importance to note is the significant decrease in Mathematics performance of pupils from urban schools between 2015 and 2016. [Figure 2.8](#) below show that the difference in mean English performance between urban and rural areas grew larger over time whilst that of Mathematics diminished.

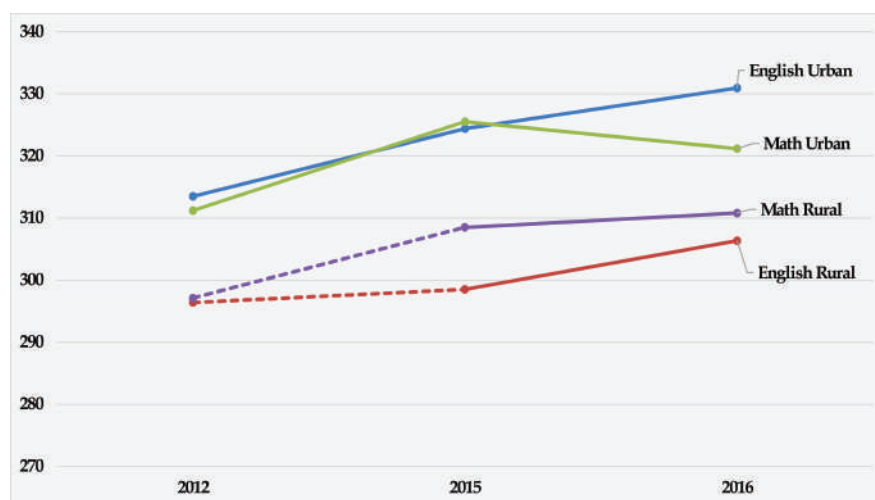


Figure 2.8: Mean performance in English and Mathematics by location since 2012

Figure 2.8 above shows a larger performance difference between English Urban and English Rural as compared to the difference between Mathematics Urban and Mathematics Rural. The rather small difference between Mathematics Urban and Mathematics Rural is attributed to the fact that pupils from urban schools experienced a significant decrease in Mathematics performance between 2015 and 2016.

Table 2.7: Cross-tabulation of Proficiency level and location for 2016

| Subject | Proficiency Level | Urban | Rural | Total |
|-------------|-------------------|-------------|-------------|-------------|
| English | Above grade level | 46.1%(2378) | 8.4%(1041) | 19.4%(3419) |
| | At grade level | 43.2%(2231) | 55.6%(6910) | 52.0%(9141) |
| | Below grade level | 10.7%(551) | 36.0%(4469) | 28.6%(5020) |
| | Total | 100%(5160) | 100%(12420) | 100%(17580) |
| Mathematics | Above grade level | 28.9%(1490) | 13.9%(1731) | 18.3%(3221) |
| | At grade level | 52.1%(2689) | 45.0%(5586) | 47.1%(8275) |
| | Below grade level | 19.0%(981) | 41.1%(5104) | 34.6%(6085) |
| | Total | 100%(5160) | 100%(12421) | 100%(17581) |

Consistent with the reported trends in mean English performance, Table 2.7 shows that the percentage of pupils at or above grade level was 89.3% for pupils from urban areas whilst the corresponding percentage for pupils from rural areas was 64%. For Mathematics performance, this percentage decreased slightly by 8.3 percentage points for urban schools

while it remained stable for rural schools.

2.7.3 Province

Table 2.8: Performance in English by province since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|---------------------|-------------|---|-------------|---|--------------|-----------|
| Bulawayo | 316.0(2.66) | ↑ | 324.7(2.25) | ↑ | 333.34(0.68) | ↑ |
| Harare | 321.1(5.24) | ↔ | 325.8(1.97) | ↔ | 328.68(0.60) | ↔ |
| Manicaland | 297.5(1.23) | ↔ | 302.9(2.46) | ↑ | 314.80(0.61) | ↑ |
| Mashonaland Central | 295.5(1.31) | ↔ | 297.3(1.6) | ↑ | 304.18(0.49) | ↑ |
| Mashonaland East | 296.9(2.27) | ↑ | 303.8(1.88) | ↑ | 312.94(0.63) | ↑ |
| Mashonaland West | 299.1(3.52) | ↔ | 300.8(3.6) | ↔ | 301.49(0.47) | ↔ |
| Masvingo | 299.3(1.03) | ↔ | 302.9(2.57) | ↔ | 307.23(0.57) | ↑ |
| Matabeleland North | 290.6(2.35) | ↔ | 295.1(2.58) | ↑ | 304.9(0.52) | ↑ |
| Matabeleland South | 294.0(5.66) | ↔ | 300.5(1.70) | ↑ | 310.11(0.58) | ↑ |
| Midlands | 297.1(4.05) | ↔ | 300.0(1.76) | ↑ | 311.47(0.60) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Mean performances in English and Mathematics were compared over time and provinces were compared with each other. In achievement, Bulawayo and Harare outperformed all the other provinces in 2016 with higher mean performances in English and Mathematics whereas Mashonaland West, Mashonaland Central and Matabeleland North had the lowest mean performance. It needs to be noted that, between 2012 to 2016, all provinces except Harare and Mashonaland West recorded significant improvement in English and Mathematics as shown in [Table 2.8](#) and [Table 2.9](#).

Table 2.9: Performance in Mathematics by province since 2012

| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
|---------------------|-------------|---|-------------|---|---------------|------------------|
| Bulawayo | 314.8(1.69) | ↑ | 325.6(1.80) | ⇔ | 321.35(0.54) | ↑ |
| Harare | 316.8(4.01) | ↑ | 328.5(1.52) | ↓ | 320.96(0.49) | ⇔ |
| Manicaland | 297.4(1.24) | ↑ | 311.9(1.79) | ⇔ | 314.76(0.59) | ↑ |
| Mashonaland Central | 296.4(1.13) | ↑ | 307.8(1.62) | ⇔ | 309.04(0.49) | ↑ |
| Mashonaland East | 298.3(2.42) | ↑ | 313.2(1.66) | ⇔ | 314.47(0.56) | ↑ |
| Mashonaland West | 300.9(4.25) | ⇔ | 309.2(2.85) | ⇔ | 305.66(0.43) | ⇔ |
| Masvingo | 300.1(1.45) | ↑ | 311.8(1.58) | ⇔ | 311.68(0.55) | ↑ |
| Matabeleland North | 290.6(2.71) | ↑ | 305.1(1.9) | ⇔ | 307.25(0.47) | ↑ |
| Matabeleland South | 294.0(4.78) | ↑ | 310.4(1.39) | ⇔ | 314.38(0.57) | ↑ |
| Midlands | 296.5(3.74) | ↑ | 307.3(1.31) | ↑ | 316.242(0.60) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Between 2015 and 2016, only Harare, Mashonaland West and Masvingo showed no significant change in English. In Mathematics, there was no significant change between 2015 and 2016 in mean performance for all provinces except Harare and Midlands. Harare experienced a significant decrease from a mean of 328.5 score points in 2015 to a mean of 320.96 score points in 2016 whilst Midlands was the only province that improved significantly from a mean of 307.3 score points in 2015 to a mean 316.24 score points in 2016.

Table 2.10: Cross-tabulation of Proficiency level and province for 2016

| | Above grade level | At grade level | Below grade level | Total |
|---------------------|--------------------------|-----------------------|--------------------------|--------------|
| English | | | | |
| Bulawayo | 51.6%(1019) | 37.6%(743) | 10.7%(212) | 100%(1974) |
| Harare | 41.9%(872) | 47.4%(986) | 10.7%(223) | 100%(2081) |
| Manicaland | 19.1%(331) | 58.3%(1012) | 22.6%(392) | 100%(1735) |
| Mashonaland Central | 6.7%(122) | 54.3%(993) | 39.1%(715) | 100%(1830) |
| Mashonaland East | 17.2%(277) | 55.3%(888) | 27.5%(441) | 100%(1606) |
| Mashonaland West | 3.7%(64) | 50.1%(868) | 46.2%(800) | 100%(1732) |
| Masvingo | 8.1%(126) | 58.2%(902) | 33.7%(523) | 100%(1551) |
| Matabeleland North | 6.9%(115) | 52.7%(879) | 40.4%(675) | 100%(1669) |
| Matabeleland South | 13.7%(229) | 55.6%(928) | 30.7%(512) | 100%(1669) |
| Midlands | 15.2%(264) | 54.4%(944) | 30.4%(528) | 100%(1736) |
| Total | 19.4%(3419) | 52.0%(9143) | 28.6%(5021) | 100%(17583) |
| Mathematics | Above grade level | At grade level | Below grade level | Total |
| Bulawayo | 28.2%(556) | 53.5%(1056) | 18.3%(362) | 100%(1974) |
| Harare | 28.0%(583) | 52.0%(1082) | 20.0%(416) | 100%(2081) |
| Manicaland | 19.8%(344) | 47.9%(831) | 32.3%(560) | 100%(1735) |
| Mashonaland Central | 12.8%(234) | 44.9%(822) | 42.3%(774) | 100%(1830) |
| Mashonaland East | 19.9%(319) | 48.2%(774) | 31.9%(513) | 100%(1606) |
| Mashonaland West | 6.2%(107) | 41.6%(720) | 52.3%(905) | 100%(1732) |
| Masvingo | 14.7%(228) | 46.8%(726) | 38.5%(597) | 100%(1551) |
| Matabeleland North | 8.7%(146) | 42.0%(701) | 49.3%(822) | 100%(1669) |
| Matabeleland South | 18.3%(305) | 49.0%(818) | 32.7%(546) | 100%(1669) |
| Midlands | 23.0%(399) | 43.0%(746) | 34.0%(591) | 100%(1736) |
| Total | 18.3%(3221) | 47.1%(8276) | 34.6%(6086) | 100%(17583) |

Percentages at or above grade level were computed for each of the 10 provinces and the results are shown in [Table 2.10](#) above. The results indicate that Bulawayo and Harare had the highest percentages of students performing above grade level in both English and Mathematics. Bulawayo had 51.6% of their pupils above grade level in English and 28.2% in Mathematics above grade level. Harare had 41.9% and 28% of their pupils performing above grade level in English and Mathematics respectively. Mashonaland West, Mashonaland Central and Matabeleland North had the largest percentages of students performing below

grade level. Mashonaland West province had 46.2% and 52.3% of pupils in English and Mathematics respectively performing below grade level. The trend of Matabeleland North and Mashonaland Central is somewhat similar to that of Mashonaland West.

2.7.4 Age group

Mean performances for pupils' age groups were computed and compared over time. In English, there was a significant increase in mean performance from 2015 to 2016 for all age groups except the 'Age 7' and 'Age 14 or above' age groups. While there was no significant increase in English performance between 2012 and 2015, most of the age groups recorded significant improvement between 2015 and 2016 and between 2012 and 2016 as shown in [Table 2.11](#).

Table 2.11: Performance in English and Mathematics by age-group since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|------------------|-------------|---|-------------|---|---------------|-----------|
| Aged 6 and below | 298.2(3.08) | ⇔ | 299.2(1.73) | ↑ | 320.81(5.34) | ↑ |
| Age 7 | 305.7(1.90) | ⇔ | 311.3(1.89) | ⇔ | 308.46(1.54) | ⇔ |
| Age 8 | 303.0(1.32) | ⇔ | 307.6(1.03) | ↑ | 319.64(0.45) | ↑ |
| Age 9 | 296.7(0.92) | ⇔ | 300.0(0.85) | ↑ | 316.92(0.32) | ↑ |
| Age 10 | 294.7(1.00) | ⇔ | 298.5(0.86) | ↑ | 306.94(0.38) | ↑ |
| Age 11 | 295.3(1.03) | ⇔ | 297.1(1.00) | ↑ | 305.935(0.61) | ↑ |
| Age 12 | 293.9(1.52) | ⇔ | 298.1(1.57) | ↑ | 306.69(1.04) | ↑ |
| Age 13 | 292.7(3.68) | ⇔ | 299.0(1.65) | ↑ | 306.59(1.33) | ↑ |
| Age 14 or above | 298.7(1.90) | ⇔ | 299.6(3.65) | ⇔ | 305.32(1.57) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

The Mathematics performance by age group is shown in [Table 2.12](#). There was a significant decrease in performance from a mean of 316.9% score points in 2015 to 306.87% score points in 2016. Overall, there was a general increase in Mathematics performance between 2012 and 2016 except for the 'age 7' age group which did not show a significant increase in performance in the same period.

Table 2.12: Performance in Mathematics by age-group since 2012

| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
|------------------|-------------|---|-------------|---|---------------|-----------|
| Aged 6 and below | 295.8(3.22) | ↑ | 308.6(1.30) | ⇔ | 316.14(4.79) | ↑ |
| Age 7 | 303.5(1.49) | ↑ | 316.9(1.12) | ↓ | 306.87(1.21) | ⇔ |
| Age 8 | 302.2(1.23) | ↑ | 314.4(0.75) | ⇔ | 315.60(0.36) | ↑ |
| Age 9 | 297.7(1.01) | ↑ | 309.7(0.71) | ↑ | 315.97(0.27) | ↑ |
| Age 10 | 296.0(1.07) | ↑ | 308.3(0.84) | ↑ | 310.77(0.36) | ↑ |
| Age 11 | 297.2(1.19) | ↑ | 308.1(0.89) | ↑ | 310.57(0.57) | ↑ |
| Age 12 | 297.0(1.73) | ↑ | 309.3(1.47) | ⇔ | 312.50(1.06) | ↑ |
| Age 13 | 297.0(4.02) | ↑ | 309.1(1.55) | ⇔ | 309.83(1.46) | ↑ |
| Age 14 or above | 304.6(2.26) | ⇔ | 311.6(4.70) | ⇔ | 312.332(1.49) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

2.7.5 Language spoken at home

Language spoken at home had four groups; Shona, Ndebele, English and Others. The other languages included Venda, Tonga, Shangani, Kalanga, Sotho, Ndau and Nambya. Descriptive statistics shown in [Table 2.2](#) indicate that in 2016, 68% of the pupils spoke Shona at home, 20% spoke Ndebele, 3% spoke English and 9% spoke other languages. Mean performances for pupils' by languages spoken at home where computed and compared over time. The results in [Table 2.13](#) show the performance in English and Mathematics by language spoken at home since 2012.

Table 2.13: Performance in English and Mathematics by language spoken at home since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Shona | 300.8(0.99) | ⇔ | 304.0(0.90) | ↑ | 312.95(0.24) | ↑ |
| Ndebele | 297.2(1.73) | ↑ | 303.2(1.15) | ↑ | 317.41(0.46) | ↑ |
| English | 331.5(7.30) | ⇔ | 330.1(2.36) | ⇔ | 329.46(1.51) | ⇔ |
| Other | 291.4(1.70) | ↑ | 298.9(1.55) | ↑ | 304.49(0.62) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Shona | 300.8(1.00) | ↑ | 312.4(0.73) | ⇔ | 313.67(0.21) | ⇔ |
| Ndebele | 297.4(1.73) | ↑ | 311.0(1.01) | ↑ | 315.21(0.38) | ↑ |
| English | 322.1(5.36) | ⇔ | 329.0(1.75) | ↓ | 320.99(1.13) | ⇔ |
| Other | 292.3(2.17) | ↑ | 306.7(1.23) | ↑ | 309.8(0.57) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Long term improvements in the mean English performance were observed for pupils who speak Ndebele and those who speak other languages at home (Long term improvements are indicated by long solid lines in [Figure 2.9](#). In English, pupils who speak Ndebele had a mean of 297.2 score points in 2012, 303.2 score points in 2015 and 317.41 score points in 2016. Pupils who speak Other languages had a mean of 291.4 score points in 2012, 298.9 score points in 2015 and 304.49 score points in 2016. Those who speak Shona had a stable performance between 2012 and 2015, but improved significantly between 2015 and 2016. In achievement, pupils that speak English at home achieved the highest scores in English and Mathematics, whereas those speaking Other languages obtained the lowest scores in both subjects.

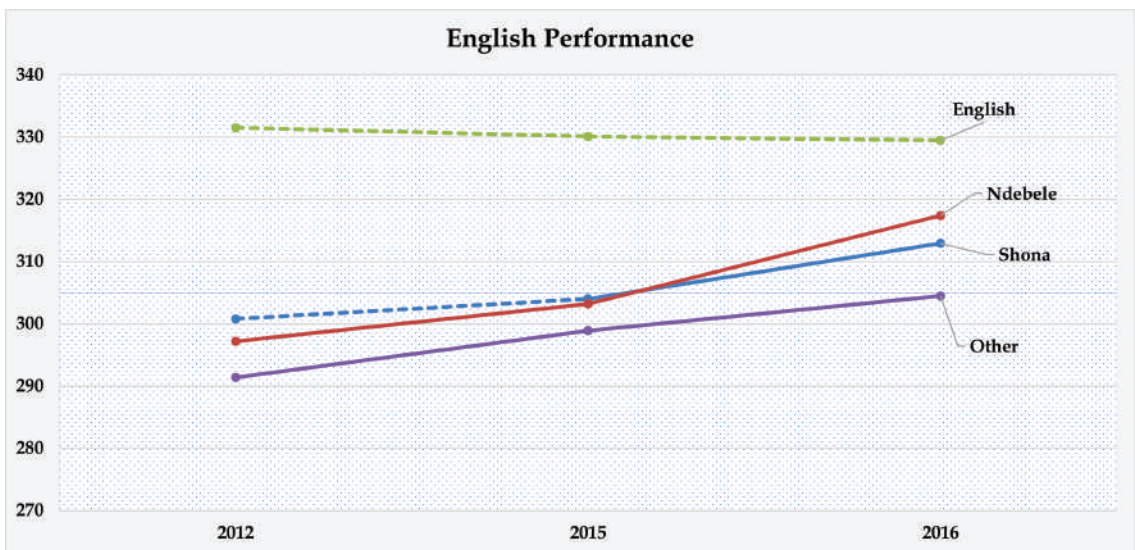


Figure 2.9: Mean performance in English by language spoken at home since 2012

Figure 2.9 above shows that the English performance of pupils who speak English at home is generally higher than that of those who speak indigenous languages. However, this performance is stable over time. The performance of those who speak Ndebele and Other languages at home has increased significantly since 2012, while for those who speak Shona at home did not change significantly between 2012 and 2015 but later improved significantly between 2015 and 2016.

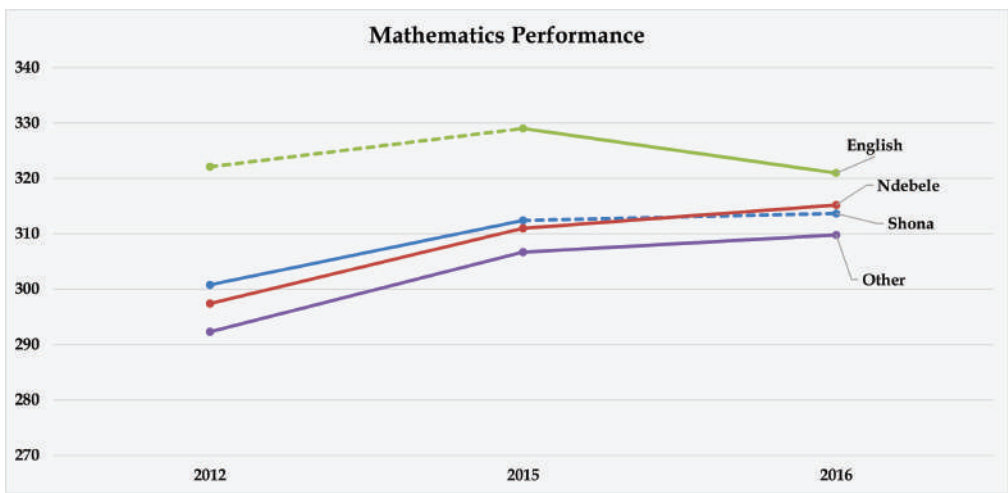


Figure 2.10: Mean performance in Mathematics by language spoken at home since 2012

Figure 2.10 and Figure 2.9 are similar in that pupils who speak Ndebele and Other languages at home have shown long term significant improvement in English and Mathematics. In Mathematics performance, pupils who speak English at home have always

outperformed those who speak indigenous languages, however ever this performance appears to be decreasing. Table 2.14 is a cross-tabulation of proficiency level and language spoken at home for 2016. The majority (42.3%) of pupils who speak English at home performed above grade level in English test whilst 30.7% of pupils who speak English at home performed above grade level in Mathematics test. Pupils who speak other languages at home had the highest representation in the 'below grade level' category, contributing 38.5% and 42.9% in English and Mathematics respectively.

Table 2.14: Cross-tabulation of Proficiency level and language spoken at home for 2016

| Proficiency Level | Shona | Ndebele | English | Other | Total |
|--------------------|-------------|-------------|------------|------------|-------------|
| English | | | | | |
| Above grade level | 18.3%(2203) | 25.3%(886) | 42.3%(207) | 8%(123) | 19.4%(3419) |
| At grade level | 53.1%(6394) | 49.1%(1722) | 40.7%(199) | 53.6%(827) | 52.0%(9142) |
| Below grade level | 28.6%(3445) | 25.6%(898) | 17.0%(83) | 38.5%(594) | 28.6%(5020) |
| Total | 100%(12042) | 100%(3506) | 100%(489) | 100%(1544) | 100%(17581) |
| Mathematics | | | | | |
| Above grade level | 18.3%(2201) | 19.6%(688) | 30.7%(150) | 11.8%(182) | 18.3%(3221) |
| At grade level | 46.9%(5648) | 49.0%(1717) | 42.9%(210) | 45.3%(700) | 47.1%(8275) |
| Below grade level | 34.8%(4193) | 31.4%(1101) | 26.4%(129) | 42.9%(662) | 34.6%(6085) |
| Total | 100%(12042) | 100%(3506) | 100%(489) | 100%(1544) | 100%(17581) |

2.7.6 Time per day working for the family

According to Table 2.15, pupils that worked less than an hour per day for their family performed better than those that worked one hour or more in both English and Mathematics over the years from 2012 to 2016. The difference was small but appeared to be increasing with time. In 2015, pupils that worked less than an hour per day for their family had a mean of 306.8 score points in English as compared to 317.66 score points in 2016 and this difference of 10.86 score points was statistically significant. For Mathematics, there was no significant difference in performance between 2015 and 2016.

Table 2.15: Performance in English and Mathematics by time spent per day working for the family since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Less than 1 hour | 302.1(1.30) | ↑ | 306.8(1.12) | ↑ | 317.66(0.36) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| 1 hour or more | 299.7(1.07) | ⇔ | 303.7(0.81) | ↑ | 311.64(0.24) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Less than 1 hour | 301.3(1.22) | ↑ | 314.3(0.90) | ⇔ | 315.84(0.30) | ↑ |
| <i>Difference</i> | ⇔ | | ↑ | | ↑ | |
| 1 hour or more | 299.9(1.03) | ↑ | 312.4(0.58) | ⇔ | 312.91(0.21) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. $Difference(\Phi) = \text{Less than 1 hour} - \text{1 hour or more}$. Standard errors are reported between brackets.

The differences in performance between pupils that worked less than an hour per day for their family and pupils that worked one hour or more was small in Mathematics than in English. These small differences in Mathematics performance were significant in 2015 and 2016 while in English the difference were significant in 2012, 2015 and 2016. [Figure 2.11](#) shows the mean performance in English and Mathematics by time per day spent working for the family since 2012. The results indicate a long term significant increase in English performance from 2012 to 2016 for pupils that worked less than an hour per day. For Mathematics, the performance for pupils that worked less than an hour per day increased significantly between 2012 and 2015 but remained stable between 2015 and 2016.

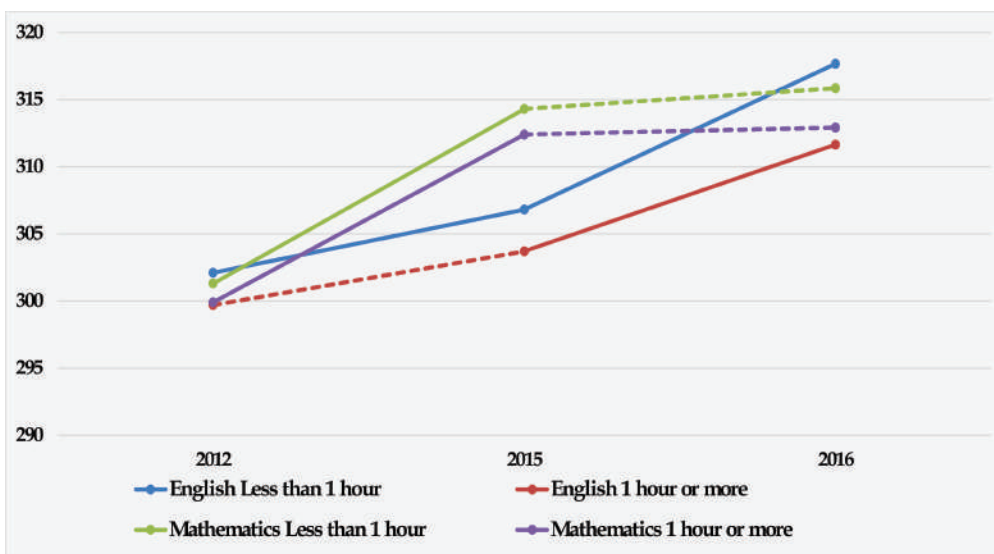


Figure 2.11: Mean performance in English and Mathematics by time per day spent working for the family since 2012

Table 2.16 is a cross-tabulation of proficiency level and time spend working for the family for 2016. The results show that 74.5% of the pupils that worked less than an hour per day performed at or above grade level in English whilst for pupils that worked for one hour or more the same percentage was 70.0%. In Mathematics the percentage of pupils that worked less than an hour per day and performed at or above grade level was 68.6% and 63.8% for those that worked for one hour or more. These differences could be attributed to the fact that pupils who spent less time working for the family have more time to study as compared to those work for more hours.

Table 2.16: Cross-tabulation of Proficiency level and Time spend working for family for 2016

| Proficiency Level | Less than 1 hour | 1 hour or more | Total |
|--------------------------|-------------------------|-----------------------|--------------|
| English | | | |
| Above grade level | 25.5%(1425) | 16.6%(1994) | 19.4%(3419) |
| At grade level | 49.0%(2740) | 53.4%(6401) | 52.0%(9141) |
| Below grade level | 25.5%(1424) | 30.0%(3596) | 28.6%(5020) |
| Total | 100%(5589) | 100%(11991) | 100%(17580) |
| Mathematics | | | |
| Above grade level | 21.7%(1213) | 16.7%(2008) | 18.3%(3221) |
| At grade level | 46.9%(2624) | 47.1%(5650) | 47.1%(8274) |
| Below grade level | 31.3%(1752) | 36.1%(4333) | 34.6%(6085) |
| Total | 100%(5589) | 100%(11991) | 100%(17580) |

Table 2.17 below shows the differences in pupil performance by time spent working for the family in both English and Mathematics. The results presented in Table 2.17 are different from the results presented in Table 2.15 in that the results presented below (Table 2.17) have been further split into four groups. This was done in order to improve variability and comparability. However, these results shown in Table 2.17 are not comparable to the previous years since they were not split in the same manner.

Table 2.17: Performance in English and Mathematics by time spent per day working for the family for 2016

| | Category | 2016 |
|--------------------|--|--------------|
| English | Less than 1 hour | 317.66(0.36) |
| | <i>Difference</i> | ↑ |
| | 1 hour and more but less than 2 hours | 310.84(0.32) |
| | <i>Difference</i> | ↓ |
| | 2 hours and more but less than 3 hours | 312.16(0.41) |
| | <i>Difference</i> | ↔ |
| Mathematics | Less than 1 hour | 315.83(0.28) |
| | <i>Difference</i> | ↑ |
| | 1 hour and more but less than 2 hours | 312.28(0.28) |
| | <i>Difference</i> | ↔ |
| | 2 hours and more but less than 3 hours | 313.14(0.35) |
| | <i>Difference</i> | ↔ |
| | 3 hours or more | 314.15(0.40) |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease.

Table 2.17 show that pupils who worked less than 1 hour for their families outperformed pupils who worked for 1 hour and more but less than 2 hours in English and the difference between these two groups was statistically significant. Surprisingly, the results also show that pupils who worked for 2 hours and more but less than 3 hours performed better in English than pupils who worked for 1 hour and more but less than 2 hours. However, there was no significant difference in English performance between pupils who worked for 2 hours and more but less than 3 hours and pupils who worked for 3 hours or more. For Mathematics, significant difference in performance was only recorded between pupils that worked for Less than 1 hour and pupils that worked for 1 hour and more but less than 2 hours.

2.7.7 Meals per day

Pupils were asked how many meals per day they usually had. A meal referred to eating meat, vegetables and/or starch. Descriptive statistics for 2016 indicate that 9.2% had one meal per day, 36.8% had two meals per day and 54% had three or more meals per day. As shown in Table 2.18, pupils eating three or more meals per day outperformed pupils eating two meals per day in both English and Mathematics in 2012, 2015 and 2016. The differences in performance between these two groups was statistically significant over the same period. The results also indicate no significant difference in English performance between pupils eating two meals and pupils eating one meal in 2012, 2015 and 2016. In Mathematics, significant differences in performance between pupils eating two meals and pupils eating one meal were observed in 2012 and 2015, no significant difference was recorded in 2016.

Table 2.18: Performance in English and Mathematics by meals per day since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|---------------------|-------------|---|-------------|---|--------------|------------------|
| Three or more meals | 303.5(1.28) | ↔ | 307.6(1.11) | ↑ | 318.43(0.28) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Two meals | 296.3(1.06) | ↑ | 301.0(0.81) | ↑ | 307.57(0.31) | ↑ |
| <i>Difference</i> | ↔ | | ↔ | | ↔ | |
| One meal | 294.8(1.34) | ↔ | 298.8(1.22) | ↑ | 308.91(0.57) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Three or more meals | 303.3(1.12) | ↑ | 315.4(0.76) | ↑ | 316.24(0.23) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Two meals | 296.9(1.06) | ↑ | 310.3(0.74) | ↔ | 310.99(0.29) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↔ | |
| One meal | 293.3(1.58) | ↑ | 307.3(1.20) | ↑ | 311.19(0.56) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Across the years, there was no significant difference in English performance between 2012 and 2015 for pupils eating three or more meals. The same applies for pupils eating one meal. However, pupils eating three or more meals and pupils eating one meal showed short-term

improvements in English between 2015 and 2016 as shown in Figure 2.12. Pupils eating two meals showed long term improvement in English performance between 2012 and 2016. In 2016 pupils eating one meal outperformed pupils eating two meals by 1.34 score points in English. This difference was small and not significant.

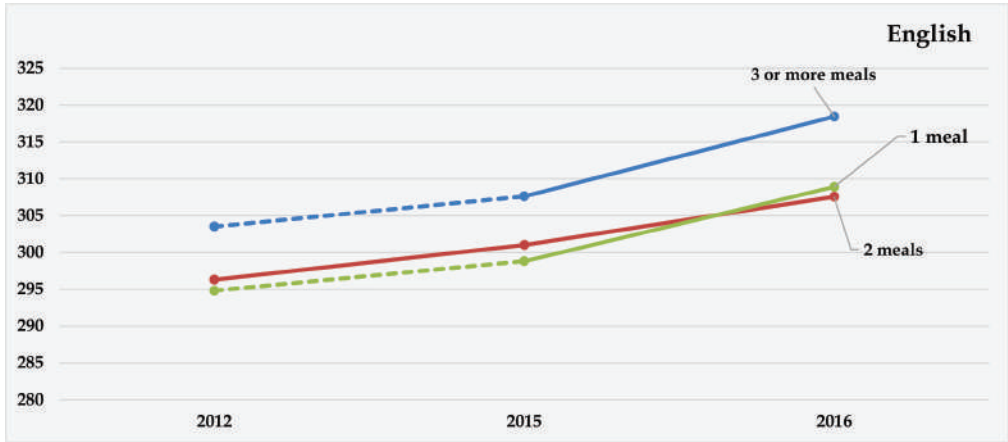


Figure 2.12: Mean performance in English by number of meals per day since 2012

Figure 2.13 shows the mean performance in Mathematics by number of meals per day since 2012. Similar to the results for English above, pupils eating three or more meals per day outperformed pupils eating two meals in Mathematics in 2012, 2015 and 2016. The difference between pupils eating three or more meals per day and pupils eating two meals was moderate and stable over time. Pupils eating three or more meals per day and pupils eating only one meal per day showed long term improvements in Mathematics. This long term improvement is indicated by a solid line between 2012 and 2016.

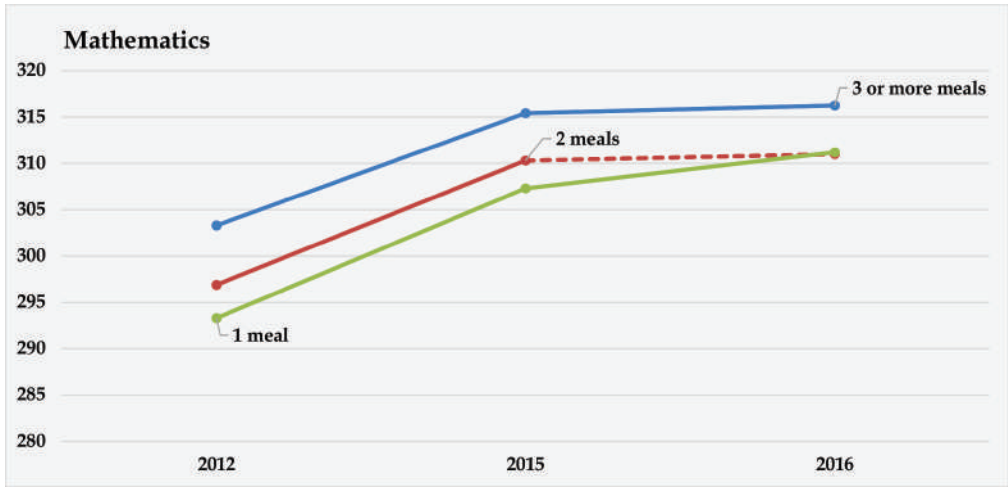


Figure 2.13: Mean performance in Mathematics by number of meals per day since 2012

As shown in [Table 2.19](#), 77.3% of the pupils eating 3 or meals performed at or above grade level in English. The percentages of pupils performing at or above grade level for pupils eating two meals was 64.8% whilst that for pupils eating one meal was 63.9%. These results indicate that as the number of meals per day increase, the number of pupils performing at or above grade level increases. For Mathematics, the percentages of pupils performing at or above grade level for pupils eating 3 or more meals was 70.4%, 60% for pupils eating 2 meals and 57.4% for pupils eating one meal.

Table 2.19: Cross-tabulation of Proficiency level and number of meals per day for 2016

| Proficiency Level | One meal | Two meals | 3 or more meals | Total |
|--------------------|------------|-------------|-----------------|-------------|
| English | | | | |
| Above grade level | 12.2%(198) | 12.4%(805) | 25.5%(2416) | 19.4%(3419) |
| At grade level | 51.7%(836) | 52.4%(3388) | 51.8%(4918) | 52.0%(9142) |
| Below grade level | 36.1%(584) | 35.2%(2277) | 22.7%(2159) | 28.6%(5020) |
| Total | 100%(1618) | 100%(6470) | 100%(9493) | 100%(17581) |
| Mathematics | | | | |
| Above grade level | 15.9%(258) | 14.8%(955) | 21.2%(2008) | 18.3%(3221) |
| At grade level | 41.5%(672) | 45.2%(2927) | 49.2%(4675) | 47.1%(8274) |
| Below grade level | 42.5%(688) | 40.0%(2587) | 29.6%(2810) | 34.6%(6085) |
| Total | 100%(1618) | 100%(6469) | 16.6%(9493) | 100%(17580) |

2.7.8 Number of home possessions

Pupils were asked which of the following home possessions they had at their home: electricity, piped water, television and radio. Descriptive statistics were computed on the total number of items, in the list, they had at their home. 7% had none of the items, 28% had one, 24% had two, 22% had three whilst 19% had four home possessions. Results with combined groups are shown in [Table 2.20](#) and results with split groups are shown in [Table 2.22](#). In 2016, pupils with four home possessions outperformed those with two or three home possessions who in-turn outperformed pupils with one or less home possession in English as shown [Table 2.20](#). The differences are significant as shown by the arrows. In 2016, there was no significant difference in Mathematics performance between pupils with two or three home possessions and pupils

with one or less home possessions.

Table 2.20: Performance in English and Mathematics by number of home possessions since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Four | 316.6(2.32) | ⇔ | 320.4(1.71) | ↑ | 330.70(0.51) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Two or three | 298.8(0.92) | ⇔ | 301.4(0.84) | ↑ | 311.23(0.29) | ↑ |
| <i>Difference</i> | ↑ | | ⇔ | | ↑ | |
| One or less | 294.4(1.02) | ↑ | 300.3(0.83) | ↑ | 307.45(0.28) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Four | 314.2(1.98) | ↑ | 323.5(1.25) | ⇔ | 321.19(0.40) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Two or three | 299.5(0.92) | ↑ | 310.4(0.68) | ↑ | 312.83(0.25) | ↑ |
| <i>Difference</i> | ↑ | | ⇔ | | ⇔ | |
| One or less | 294.3(0.99) | ↑ | 309.9(0.67) | ⇔ | 311.25(0.28) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

The difference in English performance between pupils with four possessions and pupils with two or three possessions was consistently large across all the assessment years and shown in [Figure 2.14](#). On the other hand, the difference in English performance between pupils with two or three possessions and pupils with one or less possession was small. Pupils with one or less possession at home showed a long term improvement in English between 2012 and 2016. In comparison, other groups showed short-term improvement between 2015 and 2016 in English performance.

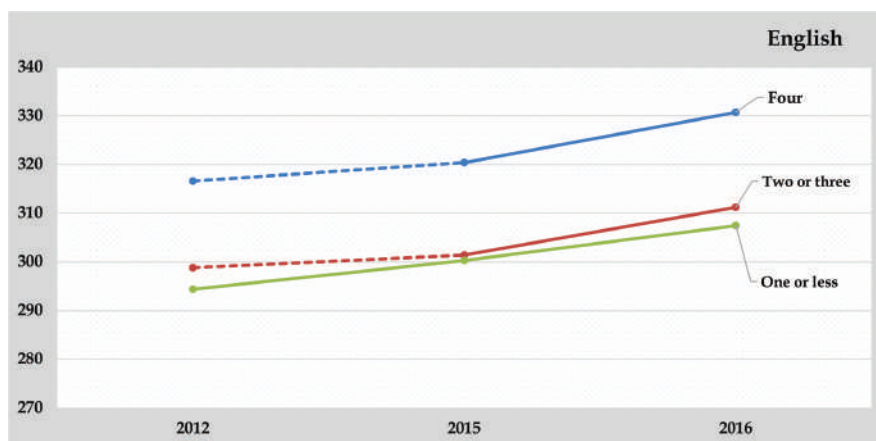


Figure 2.14: Mean performance in English by number of home possessions since 2012

For Mathematics, pupils with two or three home possessions showed long-term improvement between 2012 and 2016. The other groups showed significant between 2012 and 2015 as shown in [Figure 2.15](#) below.

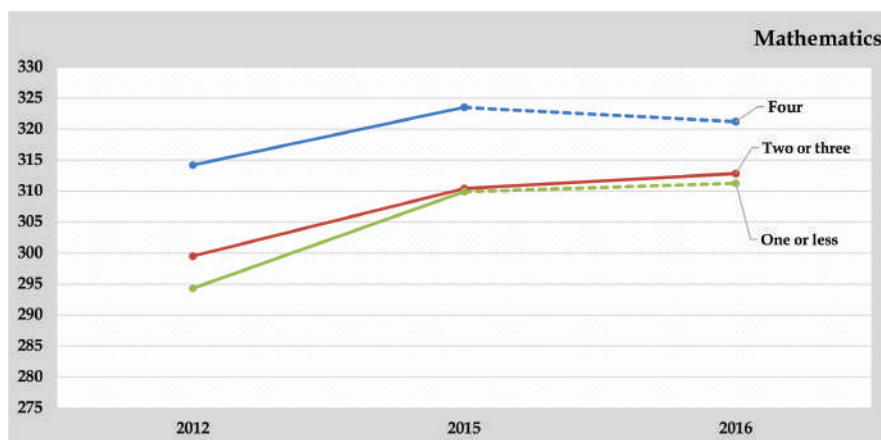


Figure 2.15: Mean performance in Mathematics by number of home possessions since 2012

[Table 2.21](#) is a cross-tabulation of proficiency level and number of home possessions for 2016. All home possession groups increased greatly in mean performance of English and Mathematics between 2012 and 2016. The majority (45.5%) of pupils with four home possessions performed above grade level in English and 29.5% in Mathematics. Pupils with a higher number of home possessions outperformed those with a lower number of home possessions.

Table 2.21: Cross-tabulation of Proficiency level and number of home possessions for 2016

| Proficiency Level | One or less | Two or three | Four | Total |
|--------------------------|--------------------|---------------------|-------------|--------------|
| English | | | | |
| Above grade level | 9.8%(612) | 16.2%(1297) | 45.5%(1510) | 19.4%(3419) |
| At grade level | 55.7%(3489) | 53.1%(4245) | 42.4%(1408) | 52.0%(9142) |
| Below grade level | 34.5%(2160) | 30.7%(2459) | 12.1%(401) | 28.6%(5020) |
| Total | 100%(6261) | 100%(8001) | 100%(3319) | 100%(17581) |
| Mathematics | | | | |
| Above grade level | 14.6%(912) | 16.6%(1330) | 29.5%(979) | 18.3%(3221) |
| At grade level | 44.8%(2804) | 47.4%(3795) | 50.5%(1676) | 47.1%(8275) |
| Below grade level | 40.6%(2545) | 35.9%(2876) | 20.0%(664) | 34.6%(6085) |
| Total | 100%(6261) | 100%(8001) | 100%(3319) | 100%(17581) |

Table 2.22 below is similar to Table 2.20 above. The only difference is that in 2016, pupils with none of the home possessions were separated from the 'one or less' group as shown in Table 2.22. Also, pupils with two home possessions were separated from the 'two or three' group. This was done to improve comparability among individual groups. However, splitting the groups this way rendered the results in Table 2.22 incomparable to the previous years' results because the groups are different.

Results in Table 2.22 indicate that pupils with all four home possessions (electricity, piped water, television and radio) outperformed pupils with any three of the home possessions and the difference was statistically significant in both English and Mathematics. In turn pupils with three home possessions outperformed pupils with two home possessions and the difference was also statistically significant. There was however no significant difference in performance between pupils with two and pupils with one home possessions. Pupils with one home possession significantly outperformed pupils with none. The results of English have similar pattern to that of Mathematics.

Table 2.22: Performance in English and Mathematics by number of home possessions for 2016 only

| | Category | 2016 |
|-------------------|--------------------|--------------|
| English | None | 304.19(0.53) |
| | <i>Difference</i> | ↓ |
| | One | 308.29(0.29) |
| | <i>Difference</i> | ↔ |
| | Two | 308.05(0.33) |
| | <i>Difference</i> | ↓ |
| | Three | 314.73(0.42) |
| | <i>Difference</i> | ↓ |
| | Four | 330.70(0.48) |
| | Mathematics | None |
| <i>Difference</i> | | ↓ |
| One | | 311.93(0.29) |
| <i>Difference</i> | | ↔ |
| Two | | 311.60(0.33) |
| <i>Difference</i> | | ↓ |
| Three | | 314.18(0.34) |
| <i>Difference</i> | | ↓ |
| Four | | 321.19(0.35) |

Where {↑↑} indicate a significant increase, {↔} no change and {↓↓} significant decrease.

2.7.9 Number of home educational resources

Pupils were asked which of the following home educational resources they had at their home; pencil, school bag, pen, desk, computer and calculator. Descriptive statistics were computed on the total number of items in the list they had at their home. 0.4% of the pupils had none, 16.7% had one, 20.7% had two, 28.6% had three, 17.0% had four, 10.1% had five and 6.7% had six home educational resources. Pupils were classified into three groups which are: One or less, Two or three and Four or more.

Table 2.23: Performance in English and Mathematics by number of home educational resources since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Four or more | 315.7(2.38) | ⇔ | 316.8(1.83) | ↑ | 323.36(0.38) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Two or three | 303.3(1.10) | ⇔ | 303.1(0.88) | ↑ | 308.87(0.25) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ⇔ | |
| One or less | 292.9(1.02) | ↑ | 298.7(0.79) | ↑ | 307.69(0.42) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Four or more | 313.1(1.83) | ↑ | 321.4(1.12) | ↓ | 318.38(0.30) | ⇔ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Two or three | 303.6(1.12) | ↑ | 312.0(0.72) | ⇔ | 311.79(0.24) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ⇔ | |
| One or less | 293.0(1.02) | ↑ | 308.1(0.67) | ↑ | 310.79(0.41) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

As shown in Table 2.23, there has been a significant improvement in English performance for all the three groups between 2012 and 2016. In 2016, pupils possessing four or more home educational resources had a significantly higher mean performance than pupils with two or three educational resources in both English and Mathematics. However, there was no significant difference in English and Mathematics performance between pupils possessing two or three home educational resources and pupils possessing one or less home educational resources in 2016. In Mathematics, there was a significant decrease in performance from a mean of 321.4 in 2015 to a mean of 318.38 in 2016 for the group possessing four or more home educational resources. All the groups improved significantly in Mathematics between 2012 and 2016 except for the possessing four or more home educational resources.

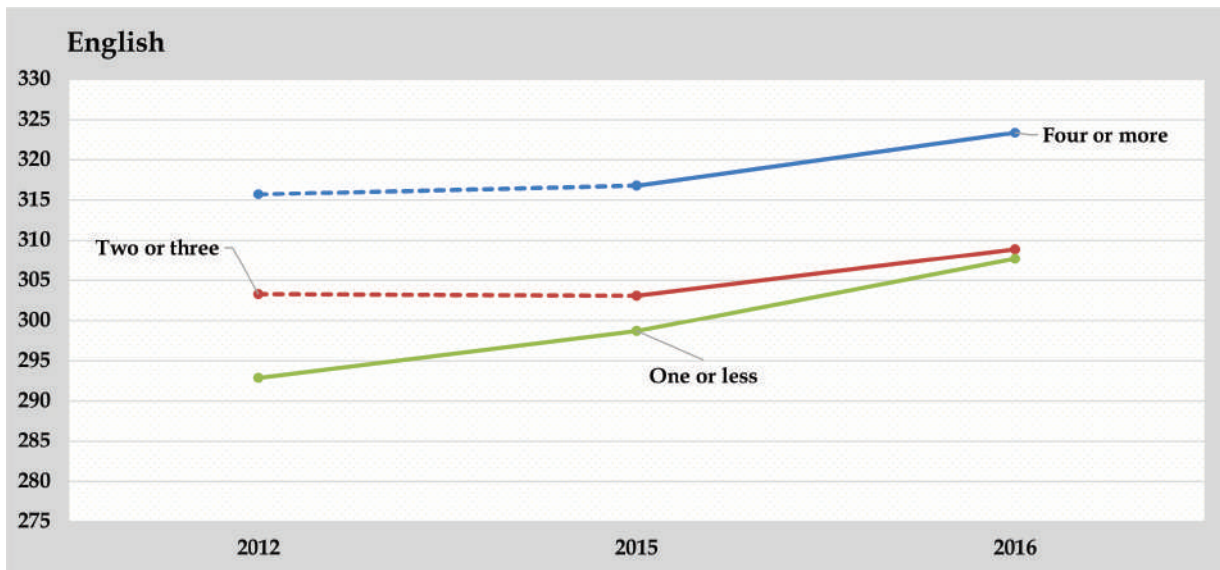


Figure 2.16: Mean performance in English by number of home educational resources since 2012

Figure 2.16 above is a line graph showing mean performance in English by number of home educational resources since 2012. The pattern of findings shown for the number of home educational resources is somewhat similar to those for the number of home possession. Pupils possessing one or less home educational resources showed a long term improvement in English performance. In 2012, these pupils had mean score of 292.9, which increased significantly to 298.7 in 2015 and finally increased to 307.69 In 2016. The other groups experienced short term improvement 2015 and 2016. Figure 2.17 is showing the mean performance in Mathematics by number of home educational resources since 2012. The results have a similar to pattern to those of number of home possessions. Pupils possessing four or more of home educational resources performed better than the other groups. The difference in performance appeared to be decreasing with time.

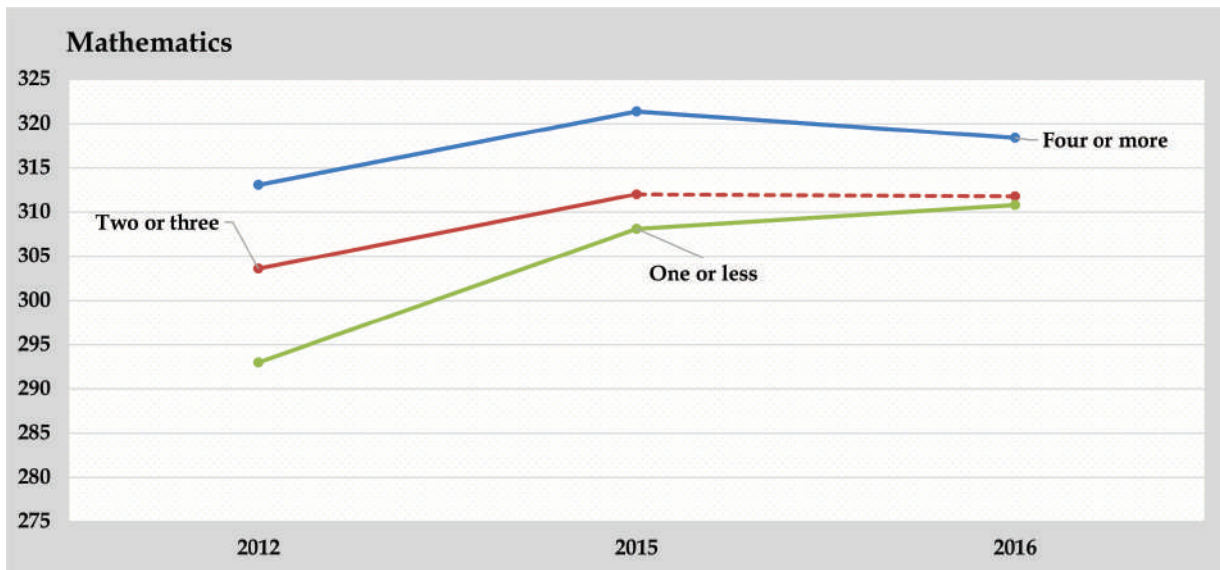


Figure 2.17: Mean performance in Mathematics by number of home educational resources since 2012

The proficiency levels for the number of home educational resources for 2016 are shown in Table 2.24. For both English and Mathematics, the results indicate that as the number of home educational resources per pupil increases, the percentage of students performing at or above grade level also increases. Put differently, as the number of home educational resources per pupil increases, the percentage of students performing below grade level decreases.

Table 2.24: Cross-tabulation of Proficiency level and number of home educational resources for 2016

| Proficiency Level | One or less | Two or three | Four or more | Total |
|--------------------|-------------|--------------|--------------|-------------|
| English | | | | |
| Above grade level | 10.5%(315) | 12.7%(1095) | 33.9%(2009) | 19.4%(3419) |
| At grade level | 53.7%(1611) | 54.3%(4695) | 47.8%(2835) | 52.0%(9141) |
| Below grade level | 35.8%(1073) | 33.1%(2862) | 18.3%(1085) | 28.6%(5020) |
| Total | 100%(2999) | 100%(8652) | 100%(5929) | 100%(17580) |
| Mathematics | | | | |
| Above grade level | 14.2%(425) | 14.8%(1283) | 25.5%(1513) | 18.3%(3221) |
| At grade level | 45.1%(1353) | 46.5%(4022) | 48.9%(2899) | 47.1%(8274) |
| Below grade level | 40.7%(1221) | 38.7%(3348) | 25.6%(1517) | 34.6%(6086) |
| Total | 100%(2999) | 100%(8653) | 100%(5929) | 100%(17581) |

In [Table 2.24](#), pupils with four or more educational resources had the highest percentage of pupils performing above grade level with 33.9% and 25.5% in English and Mathematics respectively. Pupils with higher home educational resources outperformed those with lower home educational resources. The obvious reason for this difference is that pupils with higher home educational resources have an opportunity to use those resources for study purposes at home than those without.

2.7.10 Highest parental education

Pupils were asked to record the highest level of education completed by each of their parents. The variable used for the analysis was the higher education of the two parents. As shown in [Table 2.25](#), pupils with a parent or guardian who completed a tertiary education outperformed pupils with a parent or guardian who completed secondary school in both English and Mathematics in 2012, 2015 and 2016. In 2016, the mean score for pupils with a parent or guardian who completed a tertiary education was 327.98 in English while the corresponding score for pupils with a parent or guardian who completed secondary school was 314.20. The difference was large and statistically significant, but appeared to be decreasing over time. Overall, all the groups except one (pupils in Mathematics with a parent or guardian who completed a tertiary education) experienced significant increases in both English and Mathematics performance between 2012 and 2016. It is important to note that pupils with a parent or guardian who completed a tertiary education experienced a significant decrease in Mathematics performance between 2015 and 2016.

Table 2.25: Performance in English and Mathematics by highest parental education since 2012

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|-----------------------------|-------------|---|-------------|---|--------------|------------------|
| Completed a tertiary course | 325.8(2.93) | ↔ | 322.3(2.16) | ↑ | 327.98(0.62) | ↔ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Completed secondary school | 300.5(0.94) | ↔ | 303.8(0.82) | ↑ | 314.20(0.28) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Completed primary school | 296.0(1.02) | ↔ | 298.2(0.88) | ↑ | 308.13(0.33) | ↑ |
| <i>Difference</i> | ↑ | | ↔ | | ↑ | |
| Did not complete a school | 293.2(1.52) | ↔ | 296.0(1.32) | ↑ | 305.81(0.63) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Completed a tertiary course | 321.4(2.02) | ↔ | 326.1(1.40) | ↓ | 321.81(0.48) | ↔ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Completed secondary school | 301.0(0.90) | ↑ | 312.8(0.66) | ↑ | 314.23(0.25) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Completed primary school | 296.3(1.13) | ↑ | 307.8(0.66) | ↑ | 311.17(0.32) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Did not complete a school | 292.7(1.67) | ↑ | 305.0(1.30) | ↑ | 308.43(0.64) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

For all the groups, [Figure 2.18](#) shows that there were no significant changes in English performance between 2012 and 2015. However, all groups improved significantly between 2015 and 2016 as shown by the solid lines. [Figure 2.18](#) is also showing a positive correlation between pupils' performance and highest parental education.

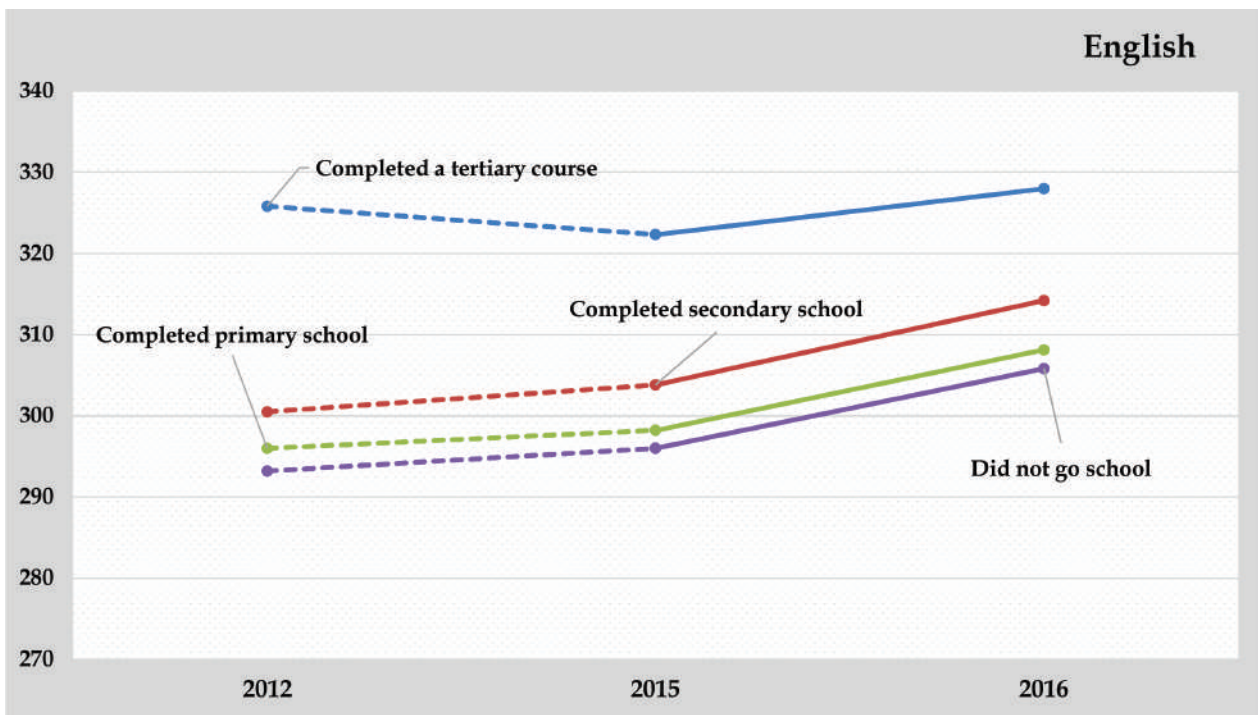


Figure 2.18: Mean performance in English by highest parental education since 2012

As shown in [Figure 2.19](#), pupils with a parent or guardian who completed a tertiary education outperformed all other groups in Mathematics. The difference was large between pupils with parents who completed a tertiary course and pupils with parents who completed secondary school. This difference appeared to be decreasing over time. Pupils with parents who completed secondary school, pupils with parents who completed primary school and pupils with parents who did not go to school showed long term improvement in Mathematics between 2012 and 2016.

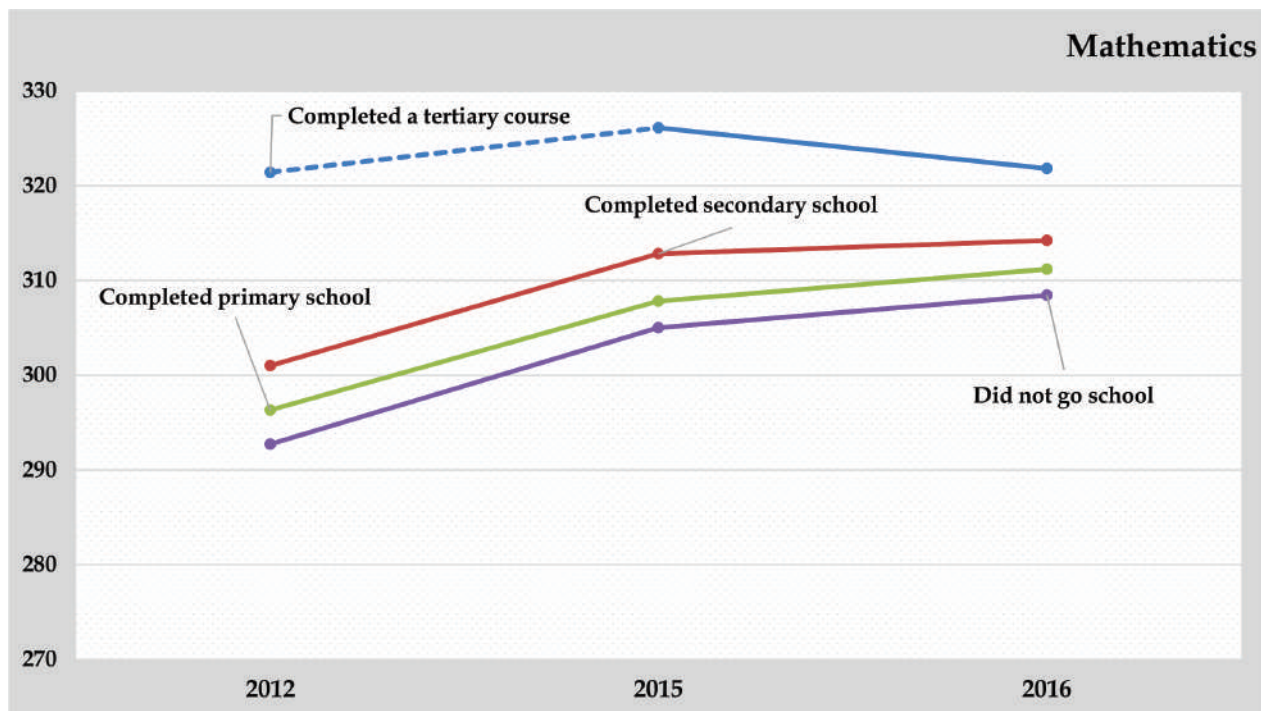


Figure 2.19: Mean performance in English by highest parental education since 2012

2.8 Pupil Performance in Shona and Ndebele 2016

Schools and pupils were given the opportunity to select an African language test to respond to between Shona and Ndebele. In 2016, 65.7% responded to the Shona test, 23.4% responded to the Ndebele test whilst 10.9% did not respond to any African language test. No weights were applied in analyzing these language tests since these tests were self-selected by the schools and pupils. In addition, these results are also not comparable over time meaning no comparable analysis were done from all the assessment years but just for 2016.

Table 2.26: Mean performance of pupils responding to Shona and Ndebele tests

| Variable | Options | Shona | Ndebele |
|----------------|---------------------|------------|------------|
| Gender | Boy | 298.16 | 299.33 |
| | Girl | 301.82 | 300.67 |
| School type | Registered | 302.41 | 300.11 |
| | Satellite | 293.31 | 299.68 |
| Location | Urban | 305.89 | 302.52 |
| | Rural | 297.55 | 298.95 |
| Province | Bulawayo | | 306.68 |
| | Harare | 309.23 | |
| | Manicaland | 302.86 | |
| | Mashonaland Central | 294.42 | |
| | Mashonaland East | 301.78 | |
| | Mashonaland West | 291.78 | |
| | Masvingo | 297.49 | |
| | Matabeleland North | | 295.1 |
| | Matabeleland South | | 299.18 |
| | Midlands | 300.54 | 299.49 |
| Overall | | 300 | 300 |

The mean performance of pupils that responded to the Shona and Ndebele tests for 2016 are recorded in [Table 2.26](#) for each of the subgroups of gender, school type, school location and province. Girls performed better than boys in both Shona and Ndebele. The differences in mean performance were very small in both languages. Pupils learning at registered schools performed better than those at satellite schools in both languages. The difference in the mean performance was moderate in Shona but very small in Ndebele. Pupils from urban schools outperformed those from rural areas in both languages as shown in [Table 2.26](#) with moderate difference between urban and rural pupils in Shona and small difference in Ndebele. Harare and Bulawayo provinces were the best performers in Shona and Ndebele tests respectively. Mashonaland West and Matabeleland North performed the worst in Shona and Ndebele respectively.

Chapter 3

Socio-Economic Equity in Education in Zimbabwe

Equity in education means that personal or social circumstances such as gender, location, ethnic origin or family background, are not obstacles to achieving educational potential (fairness) and that all individuals reach at least a basic minimum level of skills (inclusion). In these education systems, the vast majority of students have the opportunity to attain high level skills, regardless of their own personal and socio-economic circumstances. According to [OECD \(2013b\)](#), the highest performing education systems are those that combine equity with quality and they give all children opportunities for a good quality education.

In analysing the ZELA 2016 results, we explore how Zimbabwe is providing education opportunities and achieving educational outcomes, which are an indication of equity in society as a whole. The index of Socio-Economic Status (SES) was estimated for each student from highest parental education, number of books at home, home possessions (electricity, piped water, television and radio), number of meals per day and number of educational resources. Students were classified into three main categories (High SES, Medium SES and Low SES) depending on these five components. The rationale for using these five components was that socio-economic status is usually seen as based on education, occupational status and income.

3.1 Performance and Socio-economic status

One instinctive way to analyse the relationship between pupils' performance and SES is to estimate the percentage of pupils achieving at, above and below grade level of SES. [Figure 3.1](#)

is a bar graph showing percentages of pupils below, at and above grade level for English by SES in 2012, 2015 and 2016. In 2012, 2% of the pupils in the Low SES category achieved above grade level while 5% in the Low SES achieved above grade level in 2015. In 2016 the percentage of pupils in the Low SES category achieving above grade level rose to 6%. The results are similar for Medium SES and High SES categories for English performance. These results indicate that there is general improvement in performance between 2012 and 2016 for pupils in all SES groups.

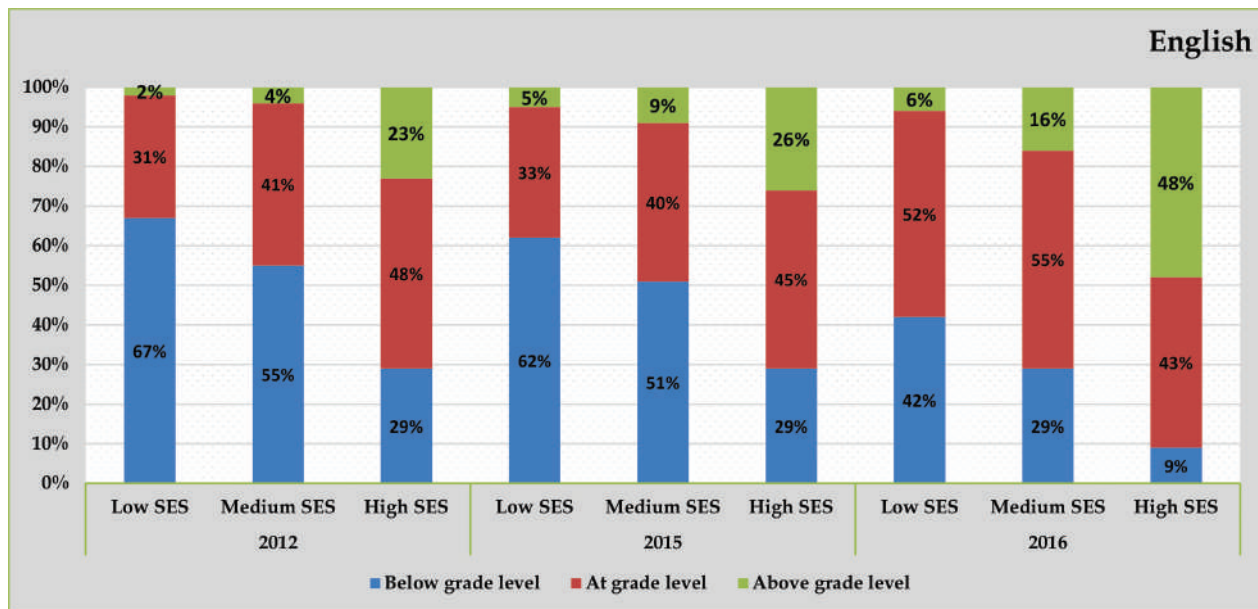


Figure 3.1: Percentage of pupils below, at and above grade level for English by SES in 2012, 2015 and 2016

The percentage of pupils achieving at or above grade level increases with increasing SES and the percentage of pupils achieving below grade level decreases with increasing SES in both English and Mathematics. Figure 3.2 show the percentage of pupils below, at and above grade level for Mathematics by SES in 2012, 2015 and 2016. These Mathematics results portray a similar pattern to those of English. For Mathematics, the percentage of pupils performing below grade level in 2016 was 46% in the Low SES group, 35% in the medium SES group and 17% in the High SES group. Simultaneously, the percentage of pupils above grade level was 12% in the low SES group, 16% in the medium SES group and 33% in the high SES group.

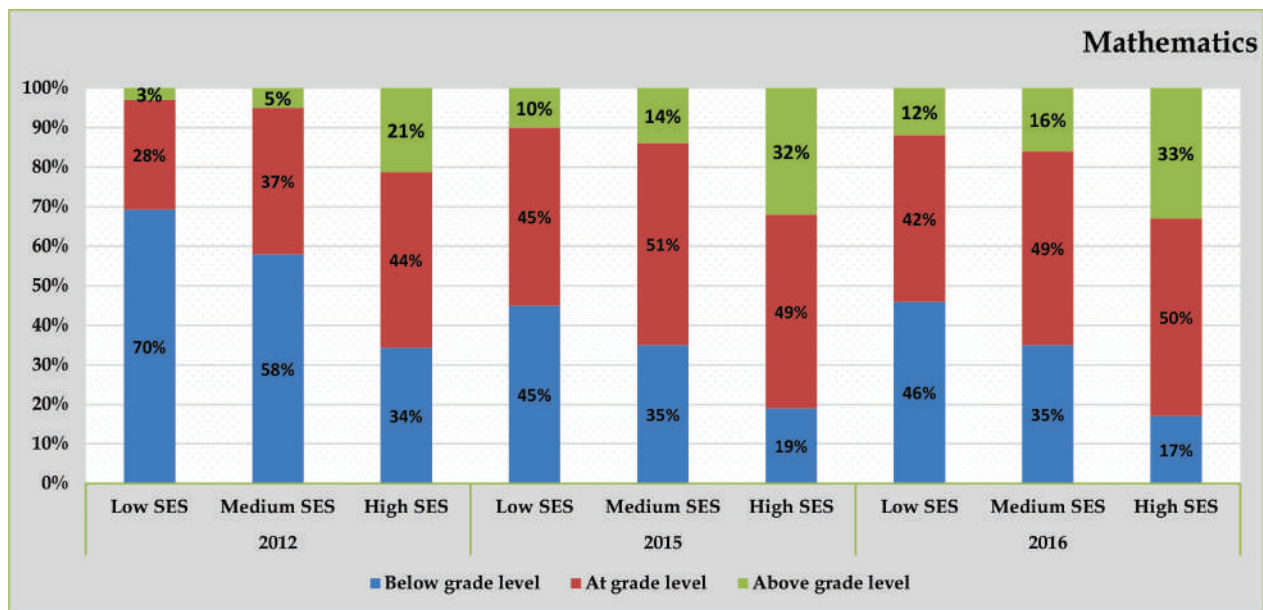


Figure 3.2: Percentage of pupils below, at and above grade level for Mathematics by SES in 2012, 2015 and 2016

3.2 Socio-economic equity since 2012

Comparison of equity levels between assessments was done through comparisons of mean performance scores of SES groups. There has been a positive trend in pupils' performance since 2012 in both English and Mathematics as shown in [Table 3.1](#). Although the ZELA 2016 results indicate a significant improvement in performance across the years, socio-economic status (SES) is still a strong predictor of performance and is associated with large differences in performance. Results shown in [Table 3.1](#) below indicate that on average, pupils with High SES outperform those with medium SES who in-turn outperform pupils with low SES.

Table 3.1: Performance in English and Mathematics by socio-economic equity in 2012, 2015 and 2016

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Low SES | 290.4(0.84) | ↑ | 296.1(0.84) | ↑ | 303.58(0.31) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| Medium SES | 296.7(0.77) | ↑ | 301.4(0.76) | ↑ | 311.37(0.25) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| High SES | 313.5(1.83) | ⇔ | 316.2(1.44) | ↑ | 332.94(0.49) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Low SES | 290.4(0.98) | ↑ | 306.1(0.74) | ↑ | 309.09(0.33) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| Medium SES | 297.6(0.79) | ↑ | 310.9(0.6) | ↑ | 312.84(0.23) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| High SES | 312.1(1.52) | ↑ | 321.7(0.95) | ⇔ | 322.97(0.38) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

For 2016, students from low socio-economic status (Low SES) had a mean performance of 303.58 score points, whilst those from medium socio-economic status (Medium SES) and high socio-economic status (High SES) had 311.37 and 332.94 score points respectively in English. For Mathematics, students from Low SES had a mean of 309.09, those from medium SES had 312.84 and those from High SES had 322.97 score points. These statistically significant differences suggest that pupils' personal or social circumstances are obstacles to achieving their educational potential. The results indicate lack of fairness and lack of inclusion. Performance differences between socio-economically advantaged and disadvantaged pupils indicate the degree to which an education system is equitable and disparities in education based on socio-economic status can create a significant drag on economic growth and development. Table 3.2 below is a cross tabulation for proficiency level and socio-economic status for 2016.

Table 3.2: Cross-tabulation of Proficiency level and socio-economic status for 2016

| Proficiency Level | Low SES | Medium SES | High SES | Total |
|--------------------|-------------|-------------|-------------|-------------|
| English | | | | |
| Above grade level | 6.0%(292) | 15.6%(1434) | 47.9%(1693) | 19.4%(3419) |
| At grade level | 52.3%(2541) | 55.4%(5086) | 42.8%(1515) | 52.0%(9142) |
| Below grade level | 41.7%(2027) | 29.0%(2663) | 9.3%(330) | 28.6%(5020) |
| Total | 100%(4860) | 100%(9183) | 100%(3538) | 100%(17581) |
| Mathematics | | | | |
| Above grade level | 12.4%(603) | 15.7%(1441) | 33.3%(1177) | 18.3%(3221) |
| At grade level | 41.6%(2021) | 49.0%(4503) | 49.5%(1751) | 47.1%(8275) |
| Below grade level | 46.0%(2236) | 35.3%(3239) | 17.2%(610) | 34.6%(6085) |
| Total | 100%(4860) | 100%(9183) | 100%(3538) | 100%(17581) |

For English, results in Table 3.2 show that 58.3% (6.0%+52.3%) of the students from low SES achieved at or above grade level, whilst 71.0% (15.6%+55.4%) of the students from medium SES achieved at or above grade level. 90.7% (47.9%+42.8%) of students from high SES achieved at or above the grade level. This means the percentage of pupils achieving at or above grade level increases with increasing SES and the percentage of achieving below grade average decreases with decreasing SES. Although the performance in English was higher than that of Mathematics in 2016, both subjects have a similar pattern or trend. For Mathematics, the results are showing that 54% of the students from low SES achieved at or above grade level whilst 64.7% from medium SES and 82.8% from high SES achieved at or above the grade level. The results presented in this chapter indicate an improvement in pupils' performance in both English and Mathematics between 2012 and 2016. What is more clear is the increase in performance with increasing socio-economic status.

3.3 Differences between and within schools

A different method for analysing socio-economic equity is to focus on the degree in which schools vary from each other in performance relative to the degree in which pupils vary from each other within schools and to relate these disparities with SES at the school and pupil

level. Average performance differs between educational systems or countries. Similarly, the performance scores of individual pupils within an educational system differ from the average. In some educational systems, these differences between pupils are larger than in other ones. A mathematical way to describe this amount of dispersion or variation is the variance. Both the average and variance in performance differ between educational systems and can change over time. In a similar way, schools differ from each other in average performance and pupils perform differently from each other within each school. The balance of these two forms of variation differs between educational systems. In some countries, schools are on average quite similar to each other in performance but pupils within those schools vary considerably. In other words, the total variance can be delineated into between school variance and within-school variance so that the sum of the between-school variance and the within-school variance is equal to the total variance.

In Zimbabwe, the total variance was 622.39 in English performance in 2016, where the between school variance was 47% and the within school variance, 53%. From 2012 to 2016, there was an increase in the between school variance from 41% to 47%. However, for the within school variance, it decreased from 59% in 2012 to 53% in 2016. From 2015 to 2016, the between school variance decreased from 50% to 47% whilst the within school variance increased from 50% to 53%. In 2012 and 2015, the unexplained variance was larger than the explained variance. In 2016, the same trend is observed as the unexplained variance is larger in both between school and within school variances as shown in [Figure 3.3](#) below.

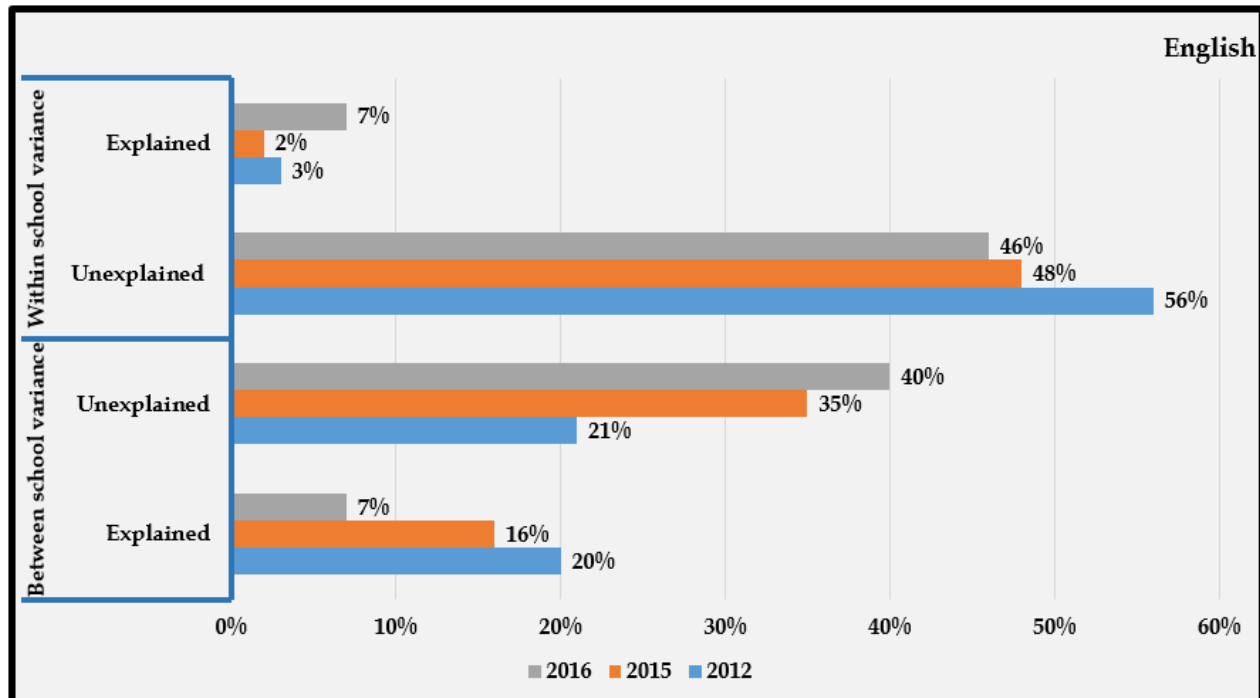


Figure 3.3: Between and within school variance in English performance, explained and unexplained by SES in 2012, 2015 and 2016

For Mathematics performance, in 2016, the total variance was 445.93 where the between school variance was 38% and the within school variance 62%. From 2012 to 2016, there was an increase in the between school variance from 35% to 38%. However, for the within school variance, it decreased slightly from 65% in 2012 to 62% in 2016. From 2015 to 2016, the between school variance increased slightly from 37% to 38% whilst the within school variance decreased slightly from 63% to 62%. In 2012 and 2015, the unexplained variance was larger than the explained variance. In 2016, the same trend was observed as the unexplained variance was larger in both the between school and within school variances.

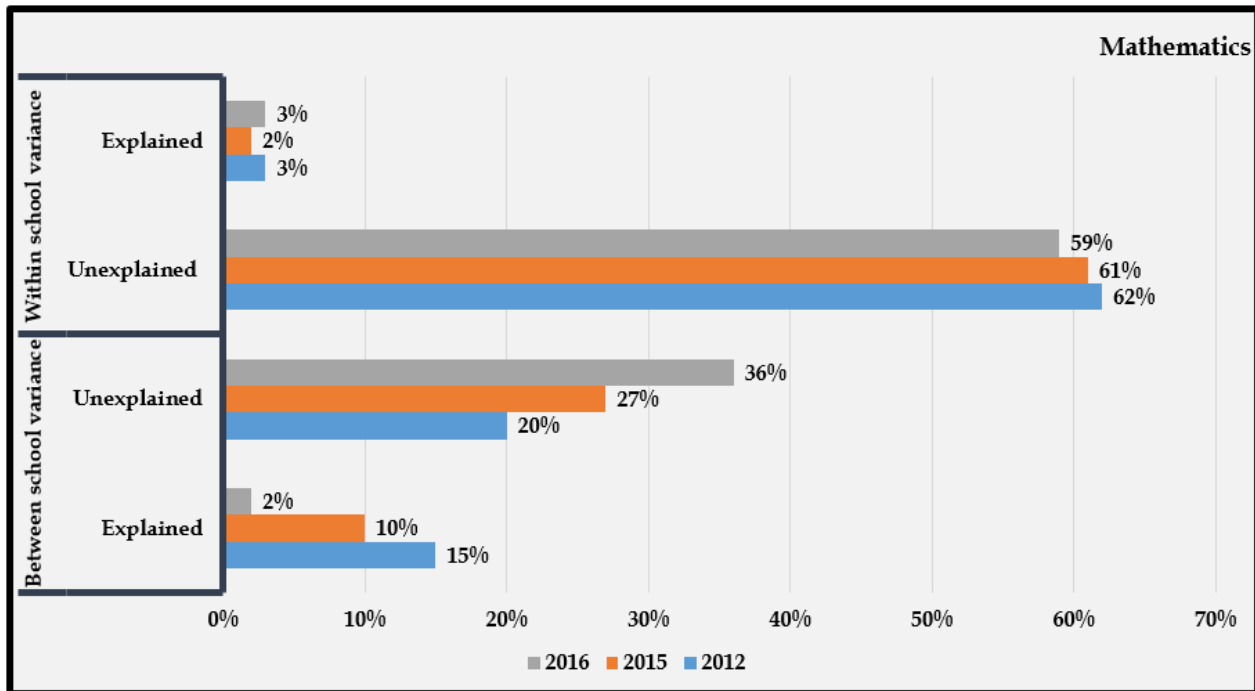


Figure 3.4: Between and within school variance in Mathematics performance, explained and unexplained by SES in 2012, 2015 and 2016

Since the SES of a pupil is a strong predictor of performance, SES explains a relatively large percentage of the total variance in performance. SES can also be used to explain variance between and within schools. The figures above show how much of the total variance was between schools and within schools and how much of these variance components were explained by the school's average SES and a student's personal family SES since 2012.

The between variance is split by explained and not explained by school mean SES. The within schools variance is split by explained and not explained by family SES and the between schools was explained by difference in mean school SES. This means that the average socio-economic background of the families attending a school largely determined the level of performance in the school. This finding suggests a low level of equity. However, when comparing over time, the percentage explained by school level SES decreased somewhat from 20 in 2012 to 7 in 2016 and the percentage not explained by SES increased from 21 to 39. This result suggests an increase in equity, because the degree in which schools differ in performance, has become less strongly associated with SES. However, as also observed in

English performance when comparing over time, in Mathematics, the percentage explained by school level SES decreased somewhat from 15 in 2012 to 2 in 2016 and the percentage not explained by SES increased from 20 to 36. These findings suggest an increase in socio-economic equity in education.

3.4 Conclusion

Socio-economic equity in education is defined as providing all students, regardless of SES, with similar opportunities to benefit from education. Less equitable educational systems show stronger relationships between performance and SES. The first section in this chapter confirmed that there is a strong relationship between pupils' performance and their socio-economic background. These results also align with the Biggs model used as the methodological framework for this study by highlighting the input-process-output model of interactive learning.

Generally, educational systems with lower socio-economic equity consist of schools that differ more from each other in average performance than educational systems with higher socio-economic equity. In other words, in educational systems, higher performing students attend similar schools together, while lower performing students attend other schools. In addition, the variation in average school performance is associated with the average SES of the families attending the schools. The divide can be caused by factors such as urban versus rural areas, locations of schools within expensive living areas versus cheaper areas and differences in school fees.

The disparity between high and low performing schools was for a large part explained by the average socio-economic background of the families attending the schools. However, the proportion of this disparity that was explained by SES appeared to decrease from 2012 to 2016, indicating growing socio-economic equity in education.

Chapter 4

Performance in English and Mathematics within the Zimbabwe Educational Context

This chapter describes relationships found in the full population between pupil performance, characteristics of the school and learning environment. The way in which statistics are presented are pretty much similar to the presentation in chapter three. All reported results in this chapter are based on pupil-level analysis. That is, pupils were the unit of analysis, even for variables that were collected at school-level.

4.1 School Characteristics

Some descriptions of school characteristics were collected in the school head questionnaire. The characteristics that were collected and related to performance for this chapter are:

- (i) School type (Registered versus Satellite)
- (i) School facilities (Electricity and Water)
- (i) School budget (The total budget divided by school size)
- (i) Distance (Distance between the school and the district centre)

4.1.1 School type

In Zimbabwe, there are two school types; registered and satellite schools. These school types differ in school facilities, infrastructure and resources. Satellite schools do not have the adequate school facilities, infrastructure and resources as registered schools. [Table 4.1](#)

shows the performance in English and Mathematics by school type in 2012, 2015 and 2016. Across the years, the results indicate a significant improvement in English and Mathematics performance from 2012 to 2016 for both Registered and Satellite schools. Between the groups, the results indicate that Registered schools outperformed Satellite schools in both English and Mathematics in 2012, 2015 and 2016. The difference in 2016 performance between registered and satellite school was 14.59 (317.43-302.84) score points for English and 9.17 (316.28-307.11) score points for Mathematics. This shows that the difference in English performance between Registered and Satellite schools was larger than that of Mathematics.

Table 4.1: Performance in English and Mathematics by school type in 2012, 2015 and 2016

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Registered | 300.8(1.09) | ↑ | 305.6(0.87) | ↑ | 317.43(0.24) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Satellite | 291.4(0.85) | ↔ | 293.3(0.97) | ↑ | 302.84(0.30) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Registered | 300.6(1.06) | ↑ | 313.3(0.65) | ↑ | 316.28(0.21) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Satellite | 293.4(1.05) | ↑ | 304.3(0.91) | ↑ | 307.11(0.28) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

As shown in [Figure 4.1](#) there was a significant gap between the performances of pupils in registered schools compared to satellite schools in both English and Mathematics. Pupils in registered schools outperformed pupils in satellite schools.

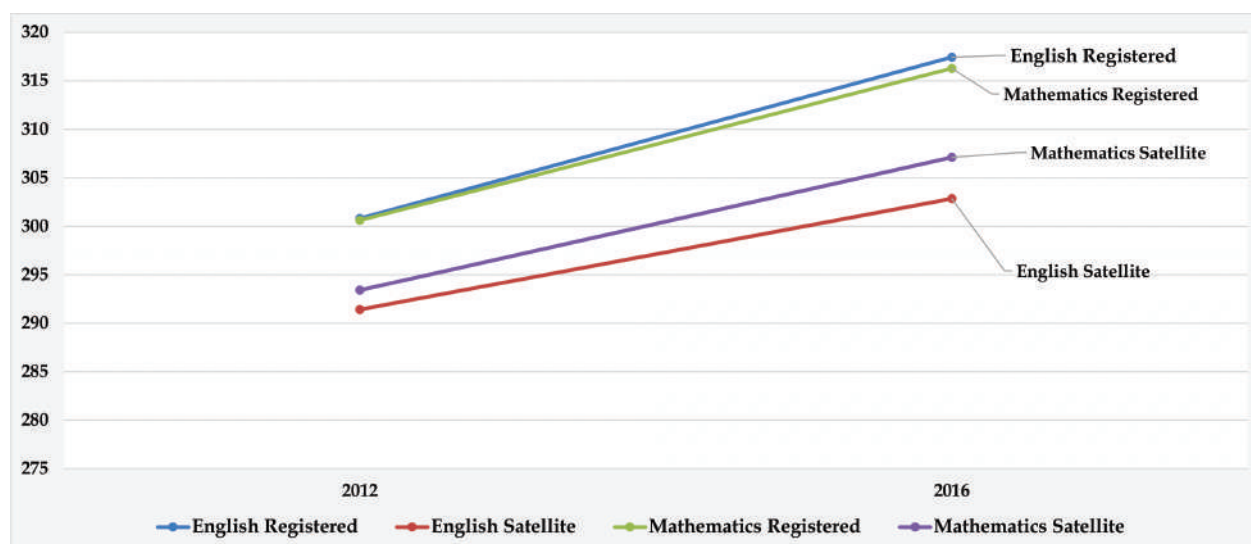


Figure 4.1: Mean performance in English and Mathematics by school type since 2012

Table 4.2 is a cross-tabulation of proficiency level and school type for 2016. The results indicate that 76.7% of pupils from registered schools performed at or above grade level in English whilst 56.8% of pupils from satellite schools performed at or above grade level in 2016. For Mathematics, 70.1% of pupils from registered schools performed at or above grade level whilst 52.3% of pupils from Satellite schools performed at or above grade level in 2016. These results indicate that pupils from registered schools performed better than pupils from satellite schools. A plausible explanation is that registered schools have better school facilities, infrastructure and resources, therefore, are more likely to afford educational resources for pupils and attract better qualified teachers and hence produce better test results.

Table 4.2: Cross-tabulation of Proficiency level and school type for 2016

| Proficiency Level | Registered | Satellite | Total |
|--------------------------|-------------------|------------------|--------------|
| English | | | |
| Above grade level | 24.6%(3180) | 5.1%(238) | 19.4%(3418) |
| At grade level | 52.1%(6728) | 51.7%(2413) | 52.0%(9141) |
| Below grade level | 23.3%(3006) | 43.2%(2014) | 28.6%(5020) |
| Total | 100%(12914) | 100%(4665) | 100%(17579) |
| Mathematics | | | |
| Above grade level | 22.0%(2844) | 8.1%(377) | 18.3%(3221) |
| At grade level | 48.1%(6215) | 44.2%(2060) | 47.1%(8275) |
| Below grade level | 29.9%(3857) | 47.8%(2228) | 34.6%(6085) |
| Total | 100%(12916) | 100%(4665) | 100%(17581) |

4.1.2 School facilities

Electricity and Water

School heads were asked if their schools had the following items; water (piped, tank or spring) and electricity (mains, generator or solar). Descriptive statistics were computed on the total number of items, in the list, they had at the school, on whether they had both electricity and water, either of the two, or none. The results indicate that 31.1% had neither electricity nor water, 29.2% had either electricity or water (but not both) and 39.7% had both electricity and water. English and Mathematics performance in based on these three groups are presented in [Table 4.3](#) below.

Table 4.3: Performance in English and Mathematics in schools with and without electricity and water in 2012, 2015 and 2016

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|-----------------------------|-------------|---|-------------|---|--------------|------------------|
| Electricity and water | 308.1(2.64) | ↑ | 316.2(1.49) | ↑ | 324.38(0.35) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Either electricity or water | 295.0(1.18) | ⇔ | 298.0(1.31) | ↑ | 308.81(0.33) | ↑ |
| <i>Difference</i> | ↑ | | ⇔ | | ↑ | |
| No electricity and no water | 291.3(1.33) | ⇔ | 295.4(1.18) | ↑ | 304.18(0.28) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| Electricity and water | 306.6(2.27) | ↑ | 320.8(1.03) | ↓ | 317.83(0.27) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ↑ | |
| Either electricity or water | 296.2(1.45) | ↑ | 308.0(1.16) | ↑ | 313.08(0.32) | ↑ |
| <i>Difference</i> | ⇔ | | ⇔ | | ↑ | |
| No electricity and no water | 292.6(1.68) | ↑ | 306.0(0.95) | ↑ | 309.47(0.31) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

In Table 4.3, results show a significant increase in performance in both English and Mathematics since 2012. Pupils in schools with access to both electricity and water performed better than pupils attending schools with access to only one of the two. Furthermore, pupils attending schools with water and electricity showed significant improvement in English performance between 2012 and 2016. For Mathematics, there was a significant decrease in performance between 2015 and 2016 for pupils attending schools with water and electricity.

Figure 4.2 below is a bar graph showing that pupils performed better in 2016 than 2012 in both English and Mathematics. The graph also shows that pupils from schools with both water and electricity performed better than pupils from schools with either electricity or water who in-turn performed better than pupils from school without electricity and water in both English and Mathematics. The difference in performance between pupils from schools with both (electricity and water) and pupils from schools with either (electricity or water) is greater than the performance difference between pupils from schools with either (electricity

or water) and pupils from schools without both (electricity and water).

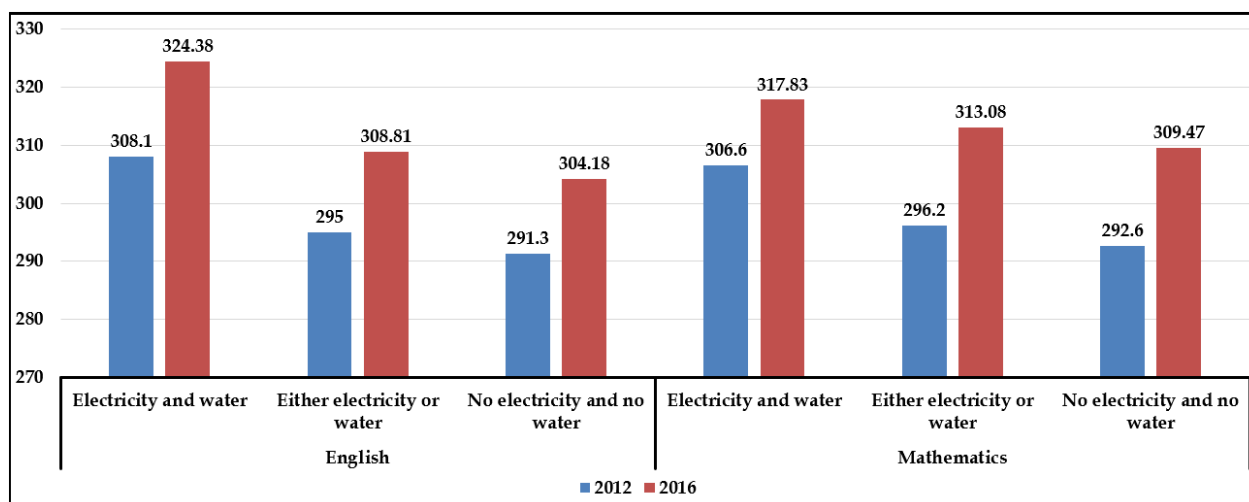


Figure 4.2: Mean performance in English and Mathematics by availability of water and electricity since 2012

Consistent with the results above, 83.1% of pupils from schools with water and electricity performed at or above grade level in English as shown [Table 4.4](#) below. For Mathematics, 74.5% of pupils from schools with water and electricity performed at or above grade level. Schools without water and electricity have the highest percentages of pupils who performed below grade level.

Table 4.4: Cross-tabulation of Proficiency level and availability of water and electricity for 2016

| Proficiency Level | No electricity and no water | Either electricity or water | Electricity and water | Total |
|--------------------|--------------------------------|--------------------------------|--------------------------|-------------|
| English | | | | |
| Above grade level | 5.9%(321) | 12.6%(644) | 35.1%(2454) | 19.4%(3419) |
| At grade level | 54.3%(2968) | 55.0%(2821) | 48.0%(3353) | 52.0%(9142) |
| Below grade level | 39.9%(2180) | 32.4%(1663) | 16.9%(1177) | 28.6%(5020) |
| Total | 100%(5469) | 100%(5128) | 100%(6984) | 100%(17581) |
| Mathematics | | | | |
| Above grade level | 12.9%(703) | 16.2%(830) | 24.2%(1688) | 18.3%(3221) |
| At grade level | 41.8%(2284) | 48.3%(2474) | 50.3%(3516) | 47.1%(8274) |
| Below grade level | 45.4%(2482) | 35.6%(1823) | 25.5%(1780) | 34.6%(6085) |
| Total | 100%(5469) | 100%(5127) | 100%(6984) | 100%(17580) |

Permanent Classrooms

Table 4.5 shows the relationship between pupil performance and proportion of permanent classrooms in schools in 2012, 2015 and 2016. Although the results indicate a significant increase in performance between 2012 and 2016, there was no significant difference in performance within the groups. For example, in 2016, pupils' performance from schools with all permanent classrooms did not differ significantly from pupils' performance from schools with at least two thirds but not all permanent classrooms in both English and Mathematics.

Table 4.5: Relationship between pupil performance and proportion of permanent classrooms in schools in 2012, 2015 and 2016

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|---------------------------------|-------------|---|-------------|---|--------------|------------------|
| All permanent classrooms | 302.2(2.62) | ↔ | 306.8(1.98) | ↑ | 318.53(0.44) | ↑ |
| <i>Difference</i> | ↔ | | ↔ | | ↔ | |
| At least two-thirds but not all | 298.6(2.31) | ↑ | 306.1(1.10) | ↑ | 317.10(0.33) | ↑ |
| <i>Difference</i> | ↔ | | ↑ | | ↑ | |
| Less than two thirds | 295.5(1.30) | ↔ | 299.6(1.59) | ↑ | 306.72(0.28) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| All permanent classrooms | 302.1(2.18) | ↑ | 313.6(1.51) | ↔ | 316.86(0.37) | ↑ |
| <i>Difference</i> | ↔ | | ↔ | | ↔ | |
| At least two-thirds but not all | 298.1(2.24) | ↑ | 313.8(0.83) | ↔ | 315.41(0.28) | ↑ |
| <i>Difference</i> | ↔ | | ↑ | | ↑ | |
| Less than two thirds | 296.7(1.6) | ↑ | 309.4(1.22) | ↔ | 310.28(0.27) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

4.1.3 School Budget

One question in the school head questionnaire asked for the total annual budget for the school for the current financial year. The instruction was included that the total annual budget referred to all of the funds received by the school throughout the financial year, including government funding, grants, school fees and any other funds received to fund the operation of the school. In order to make the budget comparable across schools, the total budget was divided by the school size to create an index for the size of the budget per pupil.

By exploring the distribution of this index and consulting with the ZIMSEC research team, three groups were created: schools with more than US\$60 per pupil (large budget), schools with US\$30 to US\$60 per pupil (medium budget) and schools with less than US\$30 per pupil (small budget). Table 4.6 shows the relationship between mean performance and budget per pupil within urban and rural areas in 2012, 2015 and 2016.

Table 4.6: Relationship between mean performance and budget per pupil within urban and rural areas in 2012, 2015 and 2016

| URBAN AREAS | 2012 | | 2015 | | 2016 | 2012-2016 |
|-----------------------|-------------|---|-------------|---|--------------|------------------|
| English | | | | | | |
| Less than \$30 | 308.4(3.7) | ↑ | 322.0(2.02) | ⇔ | 319.08(0.93) | ↑ |
| <i>Difference</i> | ↑ | | ⇔ | | ↓ | |
| Between \$30 and \$60 | 296.5(4.61) | ↑ | 320.0(3.55) | ↑ | 327.97(0.68) | ↑ |
| <i>Difference</i> | ↓ | | ⇔ | | ↓ | |
| More than \$60 | 318.2(4.81) | ⇔ | 325.6(2.39) | ↑ | 336.46(0.56) | ↑ |
| Mathematics | | | | | | |
| Less than \$30 | 306.9(4.46) | ↑ | 324.7(1.48) | ↓ | 316.30(0.75) | ⇔ |
| <i>Difference</i> | ⇔ | | ⇔ | | ↓ | |
| Between \$30 and \$60 | 298.3(4.93) | ↑ | 323.2(2.53) | ⇔ | 320.56(0.58) | ↑ |
| <i>Difference</i> | ↓ | | ⇔ | | ⇔ | |
| More than \$60 | 315.7(3.55) | ↑ | 326.2(1.74) | ⇔ | 323.12(0.44) | ⇔ |
| RURAL AREAS | 2012 | | 2015 | | 2016 | 2012-2016 |
| English | | | | | | |
| Less than \$30 | 293.2(1.27) | ⇔ | 296.7(1.37) | ↑ | 304.47(0.30) | ↑ |
| <i>Difference</i> | ⇔ | | ⇔ | | ⇔ | |
| Between \$30 and \$60 | 293.6(1.68) | ⇔ | 297.3(0.79) | ↑ | 306.17(0.26) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| More than \$60 | 305.2(3.15) | ⇔ | 305.7(3.64) | ⇔ | 312.78(0.69) | ↑ |
| Mathematics | | | | | | |
| Less than \$30 | 293.7(1.71) | ⇔ | 307.8(1.12) | ⇔ | 309.71(0.34) | ↑ |
| <i>Difference</i> | ⇔ | | ⇔ | | ⇔ | |
| Between \$30 and \$60 | 294.8(1.37) | ↑ | 307.4(0.76) | ↑ | 310.67(0.27) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| More than \$60 | 306.0(2.62) | ↑ | 313.3(2.57) | ⇔ | 314.65(0.60) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Pupils from schools with large budgets performed better than pupils from schools with medium budgets who in-turn outperformed pupils from schools with small budgets in both English and Mathematics. Pupils from urban schools within the same budget group outperformed pupils from rural schools. From 2012 to 2016, there was a statistically significant increase in the mean performance of pupils in most of the budget groups. In urban areas, there was no significant change in Mathematics performance between 2012 and 2016 for pupils from schools with a budget of less than \$30 per pupil as well as for pupils from schools with budget that were more than \$60 per pupil. [Figure 4.3](#) and [Figure 4.4](#) are graphically displaying the average performance in English and Mathematics for each of the groups in 2012 and 2016.

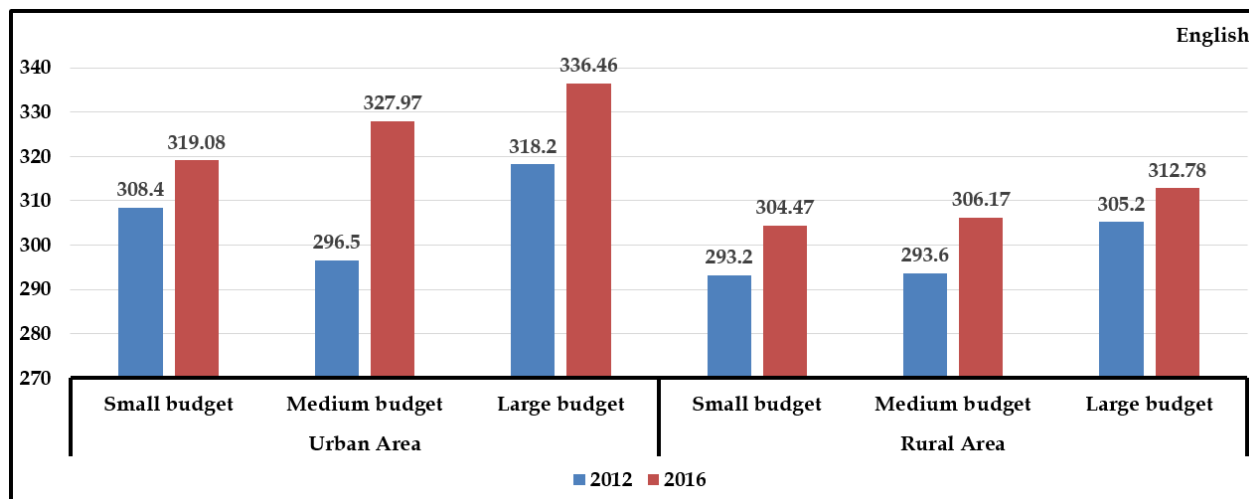


Figure 4.3: Relationship between mean English performance and budget per pupil within urban and rural areas in 2012 and 2016

[Figure 4.3](#) above shows that pupils from urban schools performed better than pupils from rural schools at every budget level in 2016. The irregular pattern for the relationship between performance and budget in rural areas in 2012 suggest that the data may have some inaccuracies. Both the question for school budget and school size were open ended questions and the school head had to write down the values. These question types are generally prone to typos and data entry errors.

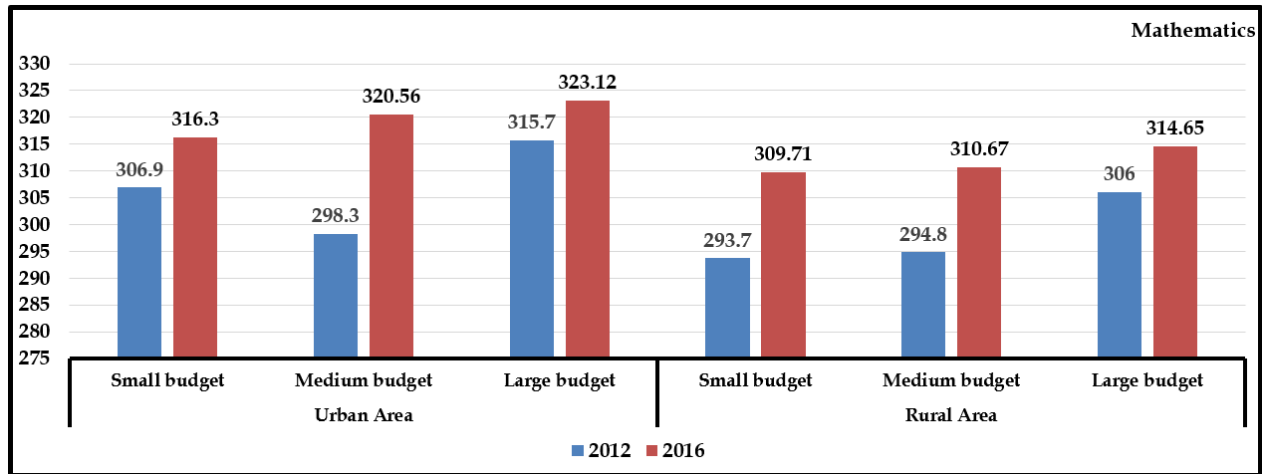


Figure 4.4: Relationship between mean Mathematics performance and budget per pupil within urban and rural areas in 2012 and 2016

4.1.4 Distance to district centre

Three groups were created for distance to the district centre for a school and these were; 20km or less, between 20 and 60km and more than 60km. Since the distance to the district centre is often larger in rural areas than in urban areas and because performance is strongly related to these locations, the analyses were performed for urban and rural areas separately.

Table 4.7: Relationship between mean performance and distance to the district centre within urban and rural areas in 2012, 2015 and 2016

| URBAN AREAS | 2012 | | 2015 | | 2016 | 2012-2016 |
|---------------------|-------------|---|--------------|---|--------------|------------------|
| English | | | | | | |
| 20 km or less | 317.8(5.26) | ↔ | 325.9(2.53) | ↑ | 333.46(0.46) | ↑ |
| <i>Difference</i> | ↔ | | ↔ | | ↓ | |
| Between 20 and 60km | 312.2(5.48) | ↔ | 311.6(6.13) | ↑ | 324.1(0.87) | ↑ |
| <i>Difference</i> | ↔ | | ↔ | | ↓ | |
| More than 60km | 297.4(4.40) | ↔ | 326.3(15.22) | ↓ | 312.38(1.85) | ↑ |
| Mathematics | | | | | | |
| 20 km or less | 314.6(3.75) | ↑ | 326.8(1.75) | ↓ | 322.24(0.36) | ↔ |
| <i>Difference</i> | ↔ | | ↔ | | ↓ | |
| Between 20 and 60km | 310.9(5.51) | ↔ | 315.7(5.18) | ↔ | 317.54(0.76) | ↔ |
| <i>Difference</i> | ↔ | | ↔ | | ↔ | |
| More than 60km | 298.0(4.95) | ↑ | 325(10.80) | ↑ | 318.66(1.68) | ↑ |
| RURAL AREAS | 2012 | | 2015 | | 2016 | 2012-2016 |
| English | | | | | | |
| 20 km or less | 306.4(4.41) | ↔ | 303.6(2.72) | ↑ | 310.03(0.51) | ↔ |
| <i>Difference</i> | ↓ | | ↔ | | ↓ | |
| Between 20 and 60km | 294.3(1.06) | ↑ | 299.7(1.54) | ↑ | 306.79(0.28) | ↑ |
| <i>Difference</i> | ↔ | | ↓ | | ↓ | |
| More than 60km | 291.6(1.08) | ↔ | 294.7(0.98) | ↑ | 303.75(0.32) | ↑ |
| Mathematics | | | | | | |
| 20 km or less | 305.8(4.96) | ↔ | 311.9(2.3) | ↔ | 313.54(0.48) | ↔ |
| <i>Difference</i> | ↓ | | ↔ | | ↓ | |
| Between 20 and 60km | 295.5(1.35) | ↑ | 310(1.08) | ↔ | 310.55(0.28) | ↑ |
| <i>Difference</i> | ↔ | | ↓ | | ↔ | |
| More than 60km | 292.6(1.07) | ↑ | 305.2(0.9) | ↑ | 309.71(0.34) | ↑ |

Where {↑} indicate a significant increase, {↔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Table 4.7 shows that there was a significant increase in mean English performance across all groups from 2012 to 2016 in urban areas. For rural areas, pupils from schools located 20 km or less from the district centre did not show any significant improvement in both English and Mathematics between 2012 and 2016. Figure 4.5 graphically presents the relationship between mean performance and distance to the district centre within rural areas in 2012 and 2016. The graph shows that generally, pupils from schools located 20 km or less from the district centre perform better than the other groups. However, in 2016, there seemed to be small performance differences between pupils from schools located between 20 and 60 km and pupils from schools that are located more than 60 km from the district centre in both English and Mathematics.

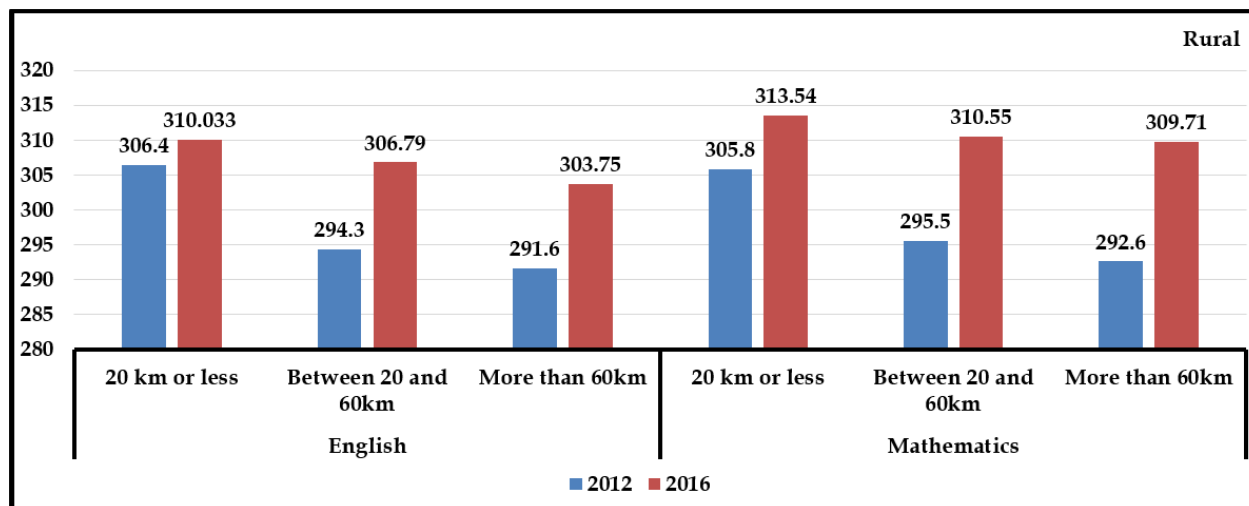


Figure 4.5: Relationship between mean performance and distance to the district centre within rural areas in 2012 and 2016

4.2 Teaching and learning opportunities

4.2.1 EDF Textbook-pupil ratio

According to ACER (2015), school heads were asked (in 2015) how many of their textbooks were distributed as part of the EDF. The qualitative study revealed that this question was difficult to answer for some head teachers. They could not always remember well how many books they received five years ago and some of the textbooks had disappeared over the

years. This question was only included in the school head questionnaire since 2013, so this information was not available for the baseline 2012. To test if the pupils in schools with larger number of EDF textbooks per pupil show more improvement than pupils in schools with less EDF textbooks, the results of 2016 were compared to the results of 2015 and 2013.

The number of textbooks were divided by the number of pupils attending the school. Three groups were created for pupils with high, medium and low ratio of textbooks per pupil. The group with a high ratio had above 5 textbooks per pupil, medium ratio had from 3 to 5 textbooks per pupil and low ratio had less than 3 textbooks per pupil. This question was only included in the 2013 questionnaire, therefore there is information from 2013 onwards.

Table 4.8: Relationship between pupil performance and EDF textbook-pupil ratio in 2013, 2015 and 2016

| English | 2013 | | 2015 | | 2016 | 2013-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| Low ratio | 307.4(2.25) | ⇔ | 306.7(1.70) | ↑ | 314.21(0.26) | ↑ |
| <i>Difference</i> | ⇔ | | ⇔ | | ⇔ | |
| Medium ratio | 305.8(1.51) | ↑ | 307.6(1.71) | ↑ | 312.37(0.37) | ↑ |
| <i>Difference</i> | ↑ | | ↑ | | ⇔ | |
| High ratio | 296.7(1.27) | ⇔ | 299.4(1.28) | ↑ | 313.21(0.67) | ↑ |
| Mathematics | 2013 | | 2015 | | 2016 | 2013-2016 |
| Low ratio | 312.0(1.59) | ↑ | 314.2(1.21) | ⇔ | 315.04(0.23) | ↑ |
| <i>Difference</i> | ⇔ | | ⇔ | | ↑ | |
| Medium ratio | 312.0(1.49) | ↑ | 314.8(1.28) | ↓ | 311.93(0.31) | ⇔ |
| <i>Difference</i> | ↑ | | ↑ | | ⇔ | |
| High ratio | 304.6(1.18) | ↑ | 308.9(1.06) | ↑ | 312.46(0.54) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

As shown in Table 4.8, there has been a significant increase in English performance between 2013 and 2016 for all the groups (Low ratio, medium ratio and high ratio). For Mathematics, results also show a significant improvement between 2013 and 2016 except for the group of pupils with medium ratio. However, between the groups, the results of 2016 do not show any

significant difference in English performance between pupils with low ratio and pupils with medium ratio, neither do they show any significant performance difference between pupils with medium ratio and pupils with high ratio. Although small, Mathematics recorded a significant performance difference between pupils with low ratio and pupils with medium ratio.

4.2.2 Days absent by pupils

Pupils were asked to respond on the number of days they had been absent in the first term of the year in which the assessment took place. The results shown in Table 4.9, show a significant increase in performance in both English and Mathematics between 2012 and 2016. Pupils with no days absent outperformed all other pupils who had been absent for at least one day.

Table 4.9: Relationship between pupil performance and number of days absent by pupil in 2012, 2015 and 2016

| English | 2012 | | 2015 | | 2016 | 2012-2016 |
|--------------------|-------------|---|-------------|---|--------------|------------------|
| No days | 306.6(1.41) | ⇔ | 309.9(1.28) | ↑ | 317.98(0.28) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| 1-2 days | 298.0(0.99) | ↑ | 302.2(0.69) | ↑ | 310.19(0.32) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| 3 or more days | 294.2(0.94) | ⇔ | 297.4(0.78) | ↑ | 306.86(0.54) | ↑ |
| Mathematics | 2012 | | 2015 | | 2016 | 2012-2016 |
| No days | 305.3(1.28) | ↑ | 316.9(0.93) | ⇔ | 316.28(0.24) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ↓ | |
| 1-2 days | 298.4(0.95) | ↑ | 310.9(0.61) | ⇔ | 311.95(0.28) | ↑ |
| <i>Difference</i> | ↓ | | ↓ | | ⇔ | |
| 3 or more days | 294.8(1.04) | ↑ | 306.9(0.69) | ↑ | 310.25(0.47) | ↑ |

Where {↑} indicate a significant increase, {⇔} no change and {↓} significant decrease. Standard errors are reported between brackets.

Pupils who had not been absent from school performed better than pupils who had been absent for one or two days. In turn, pupils who had been absent for one or two days performed

better than pupils who had been absent for three days or more. However, there was no significant difference in Mathematics performance between pupils who had been absent for one to two days and pupils who had been absent for three or more days in the first term of 2016. Table 4.10 is a cross-tabulation of proficiency level and number of days absent by pupil for 2016. In English, 76.6% of pupils who had no days absent performed at or above grade level. In Mathematics, 69.9% of pupils who had no days absent performed at or above grade level. In general, pupils who attend school more often have more opportunities to learn. Absenteeism is a strong predictor of undesirable outcomes in pupils and many factors can contribute to pupil absenteeism.

Table 4.10: Cross-tabulation of Proficiency level and number of days absent by pupil for 2016

| Proficiency Level | No days | One - two days | Three or more days | Total |
|--------------------|-------------|----------------|--------------------|-------------|
| English | | | | |
| Above grade level | 24.6%(2110) | 15.5%(1049) | 11.5%(260) | 19.4%(3419) |
| At grade level | 52.0%(4453) | 51.9%(3511) | 52.2%(1177) | 52.0%(9141) |
| Below grade level | 23.4%(2000) | 32.6%(2201) | 36.3%(818) | 28.6%(5019) |
| Total | 100%(8563) | 100%(6761) | 100%(2255) | 100%(17579) |
| Mathematics | | | | |
| Above grade level | 21.7%(1856) | 15.7%(1061) | 13.5%(304) | 18.3%(3221) |
| At grade level | 48.2%(4125) | 46.3%(3133) | 45.1%(1016) | 47.1%(8274) |
| Below grade level | 30.2%(2582) | 38.0%(2567) | 41.5%(935) | 34.6%(6084) |
| Total | 100%(8563) | 100%(6761) | 100%(2255) | 100%(17579) |

4.3 Explaining variance and change in performance

Multivariate analyses were undertaken to examine the combined effects of most important pupil and school variables on performance and, in addition, to test if any changes in these variables in 2016 could explain the change in performance. As explained in Chapter 1, section 1.51, statistical relationships in this report cannot be interpreted as causal relationships, however, if we analyse multiple variables at the same time, we take the effect of other important variables into account when testing the relationship between one variable and performance. Therefore, relationships analysed within a multivariate model are more likely

to reflect causal effects.

A multiple regression model was chosen to explain variance in English and Mathematics performance. The English and Mathematics performances were used as dependent variables separately. Four variables were included as indicators for socio-economic status (home possessions, number of meals per day, parental education, number of home educational resources); two for other pupil background variables (gender and number of hours of work for the family per day); location variables (urban versus rural and distance of the school to the district centre); teaching and learning variables (satellite versus registered schools, budget per pupil per year, number of days absent in the current term, percentage of teachers with a teaching qualification).

Table 4.11: Results of multiple regression analysis explaining variance and trend in English performance

| | | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|--------------------------------|------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | R-SQUARE | 0.20 | 0.21 | 0.25 | 0.26 | 0.29 |
| | CONSTANT | 355.51(0.65) | 357.10(0.65) | 325.93(1.30) | 324.56(1.49) | 323.77(1.69) |
| Location | URBAN | -24.59(0.37) | -20.72(0.43) | -17.48(0.45) | -17.20(0.45) | -14.1(0.46) |
| | DISTANCE | | -4.32(0.26) | -3.41(0.25) | -3.42(0.25) | -2.58(0.25) |
| Socio-economic | HOMEPOS | | | 1.78(0.28) | 1.79(0.28) | 1.58(0.28) |
| | MEALS | | | 3.53(0.25) | 3.43(0.25) | 3.17(0.25) |
| | PARED | | | 2.72(0.16) | 2.68(0.16) | 2.26(0.15) |
| | HEDRES | | | 2.42(0.27) | 2.31(0.27) | 1.70(0.27) |
| Background | GENDER | | | | 3.95(0.32) | 3.91(0.32) |
| | WORK | | | | -2.66(0.35) | -2.02(0.34) |
| Teaching & learning | SATELLITE | | | | | -5.50(0.38) |
| | BUDGET | | | | | 4.33(0.24) |
| | ABSENT | | | | | -3.15(0.23) |
| | TEACHQUAL | | | | | <i>0.01(0.12)</i> |

Note: Statistically significant effects are in **bold** and non-significant effects are in *italics*

Table 4.11 above shows the results of a multiple regression analysis explaining variance and trends in English performance. In the first model, only one component of the location variable (URBAN) was included as the predictor. The URBAN variable predicts English performance significantly. The results indicate that in 2016, pupils in urban areas performed on average 24.59 score points higher than pupils in rural areas. The R-square was 20%,

meaning that the URBAN variable is only explaining 20% of the amount of variation in English performance. In model 2, distance (DISTANCE) was added as the second component of the location variable. For every ten kilometres that a school is further removed from the district centre, pupils achieve on average 4.32 scale points lower in English. When adding the distance to the model, the difference in performance between urban and rural areas decreased from 24.59 to 20.72. Together the location variables (URBAN and DISTANCE) in model 2 explain 21% of the amount of variation in English performance.

In model 3, the socio-economic background variables (HOMEPOS, MEALS, PARED, HEDRES) were added to the model. The results indicate that all socio-economic variables significantly predict English performance. Every additional home possession item is associated with 1.78 score points increase in English performance, every additional meal with 3.53 score points, every additional parental school level (no school, primary school, secondary school and tertiary education) with 2.72 score points and every additional home education resources with 2.42 score points. When adding the socio-economic variables to the model, the difference in performance between urban and rural areas decreased from 20.72 to 17.48 score points and every additional 10 kilometre distance of the school from the district centre was now associated with a 3.41 score points decrease in English performance. Together, the location variables and the socio-economic variables explain 25% of the amount of variation in English performance.

In model 4, two background variables are included that are not components of socio-economic status: gender (GENDER) and the number of hours working for the family per day (WORK). The results indicate that these two variables did not change the effects of the variables that were added in the previous models, meaning that they do not explain any of the previously described relationships. Together, the location variables, the socio-economic variables and the two background variables (GENDER and WORK) explain 26% of the amount of variation in English performance. The results also indicate that girls perform better in English than boys by 3.95 score points. Every additional hour that pupils worked for their families was associated with a decrease of 2.66 score points in English. These findings are consistent with those shown in [Table 2.15](#). In 2016, [Table 2.15](#) shows that there was a significant difference of 6.02 score points in English performance between pupils working

more than one hour a day for their family and pupils who worked less. This difference decreased from 6.06 to 2.66 score points after taking into account the differences in family socio-economic status and school location.

In model 5, variables related to teaching and learning (SATELLITE, BUDGET, ABSENT and TEACHQUAL) were included. Adding these variables to the model decreased the difference in performance between urban and rural areas from 17.20 to 14.10 score points. It also decreases the effect of distance of a school from the district centre from 3.42 to 2.58 score points in English performance. In other words, when taking the number of satellite schools, the budget per pupil and the number of days a pupil was absent into account, the difference in English performance between urban and rural areas and the effect of distance from the district centre decreased significantly. Of all the teaching and learning variables, the proportion of teachers with a teaching qualification (TEACHQUAL) did not predict English performance significantly. Taking the effects of teaching and learning variables into account slightly reduced the effects of socio-economic status in the model. Together, the location variables, the socio-economic variables, the background variables and the teaching and learning variables explain 29% of the amount of variation in English performance.

Pupils in satellite schools performed 5.50 score points lower than pupils in registered schools. In 2016, the unadjusted English performance difference between registered and satellite schools was 14.49 score points as shown in [Table 4.1](#). The multiple regression results show that the performance difference between registered and satellite schools decreased after taking into account the location, socio-economic and background variables. [Table 4.11](#) also show that pupils performed on average 4.33 score points higher with every additional \$10 per student per year; pupils performed 3.15 score points lower for every additional day they had been absent from school.

Table 4.12: Results of multiple regression analysis explaining variance and trend in Mathematics performance

| | | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|--------------------------------|------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | R-SQUARE | 0.05 | 0.05 | 0.07 | 0.08 | 0.10 |
| | CONSTANT | 331.55(0.60) | 332.31(0.61) | 315.43(1.22) | 314.93(1.41) | 317.88(1.62) |
| Location | URBAN | -10.38(0.34) | -8.54(0.40) | -6.95(0.43) | -6.80(0.43) | -4.81(0.44) |
| | DISTANCE | | -2.06(0.24) | -1.60(0.24) | -1.60(0.24) | -1.02(0.24) |
| Socio-economic | HOMEPOS | | | <i>0.40(0.27)</i> | <i>0.39(0.27)</i> | <i>0.33(0.26)</i> |
| | MEALS | | | 1.93(0.24) | 1.88(0.24) | 1.71(0.24) |
| | PARED | | | 1.87(0.15) | 1.85(0.15) | 1.58(0.15) |
| | HEDRES | | | 1.46(0.26) | 1.41(0.26) | 1.00(0.26) |
| Background | GENDER | | | | 1.97(0.31) | 1.91(0.30) |
| | WORK | | | | -1.43(0.33) | -1.01(0.33) |
| Teaching & learning | SATELLITE | | | | | -5.39(0.37) |
| | BUDGET | | | | | 1.91(0.23) |
| | ABSENT | | | | | -1.77(0.22) |
| | TEACHQUAL | | | | | <i>0.02(0.01)</i> |

Note: Statistically significant effects are in **bold** and non-significant effects are in *italics*

Table 4.12 above shows the results of a multiple regression analysis explaining variance and trends in Mathematics performance. In the first model, only one component of the location variable (URBAN) was included as the predictor. The urban variable predicts Mathematics performance significantly. The results indicate that in 2016, pupils in urban areas performed on average 10.38 score points higher than pupils in rural areas in Mathematics. The R-square was 5%, meaning that the URBAN variable is only explaining 5% of the amount of variation in Mathematics performance. In model 2, distance (DISTANCE) was added as the second component of the location variable. For every ten kilometres that a school was further removed from the district centre, pupils achieved on average 2.06 scale points lower in Mathematics. When adding the distance to the model, the difference in performance between urban and rural areas decreased from 10.38 to 8.54. Together the location variables (URBAN and DISTANCE) in model 2 explain 5% of the amount of variation in Mathematics performance.

In model 3, the socio-economic background variables (HOMEPOS, MEALS, PARED, HEDRES) were added to the model. The results indicate that all socio-economic variables

except the number home possessions (HOMEPOS) significantly predict Mathematics performance. Every additional meal is associated with 1.93 score points increase in Mathematics performance, every additional parental school level (no school, primary school, secondary school and tertiary education) with 1.87 score points and every additional home education resources with 1.46 score points. When adding the socio-economic variables to the model, the difference in performance between urban and rural areas decreased from 8.54 to 6.95 score points and every additional 10 kilometre distance of the school from the district centre was now associated with a 1.60 score points decrease in Mathematics performance. Together, the location variables and the socio-economic variables explain 7% of the amount of variation in Mathematics performance.

In model 4, two background variables are included that are not components of socio-economic status: gender (GENDER) and the number of hours working for the family per day (WORK). Similar to the English results, the Mathematics results indicate that the background variables did not change significantly the effects of the variables that were added in the previous models, meaning that they do not explain much of the previously described relationships. Together, the location variables, the socio-economic variables and the two background variables (GENDER and WORK) explain 8% of the amount of variation in Mathematics performance. The results also indicate that girls perform better in Mathematics than boys by 1.97 score points. Every additional hour that pupils worked for their families was associated with a decrease of 1.43 score points in Mathematics.

In model 5, variables related to teaching and learning (SATELLITE, BUDGET, ABSENT and TEACHQUAL) were included. Adding these variables to the model decreased the difference in performance between urban and rural areas from 6.80 to 4.81 score points. It also decreases the effect of distance of a school from the district centre from 1.60 to 1.02 score points in Mathematics performance. In other words, when taking the number of satellite schools, the budget per pupil and the number of days a pupil was absent into account, the difference in Mathematics performance between urban and rural areas and the effect of distance from the district centre decreased significantly. Of all the teaching and learning variables, the proportion of teachers with a teaching qualification (TEACHQUAL) did not predict Mathematics performance significantly. Together, the location variables, the

socio-economic variables, the background variables and the teaching and learning variables explain 10% of the amount of variation in Mathematics performance.

Pupils in satellite schools performed 5.39 score points lower than pupils in registered schools. In 2016, the unadjusted Mathematics performance difference between registered and satellite schools was 9.17 score points as shown in [Table 4.1](#). The multiple regression results show that the performance difference between registered and satellite schools decreased after taking into account the location, socio-economic and background variables. [Table 4.11](#) also show that pupils performed on average 1.91 score points higher with every additional \$10 per student per year; pupils performed 1.77 score points lower for every additional day they had been absent from school.

Chapter 5

Conclusion, Policy implications and Future Programming

5.1 Summary

The 2016 Zimbabwe Early Learning Assessment was the first cycle to be conducted by MOPSE and ZIMSEC after the expiry of ACER contract and provides an in-depth analysis of three major research questions. These include analysis of how Grade 3 Zimbabwean pupils performed in 2016 on literacy and numeracy tests. Another question explored the relationships of a range of variables that may impact on pupils' performance on literacy and numeracy. The last question was on the extent to which improvement in literacy and numeracy performance can be attributed to EDF resources which were given to schools. Presented in the next section are the key findings of the 2016 research questions.

5.2 Key findings

Early learning assessments provides keystone indicators for assessing system performance. This study presents the following key findings.

1. There has been a significant increase in the number of students achieving at or above grade level in English. In 2015 the percentage of pupils achieving at or above grade level was 53% for English whilst in 2016 it rose to 71%. For Mathematics the percentage was 66% in 2015 and decreased to 65% in 2016.
2. The overall mean performance for English increased significantly between 2015 and

2016 while for Mathematics it remained fairly stable. English had a mean of 304.2 score points in 2015 and 313.56 score points in 2016 and this represents a 3.08% increase. On the other hand, Mathematics had a mean of 312.2 score points in 2015 and 313.85 score points in 2016 and this represents a 0.53% increase.

3. Analysis by gender reveal that in 2016, girls out-performed their male counterparts in English. In 2016, boys had a mean of 311.34 in English and girls 315.72 while in 2015 they had means of 301.44 and 307.1 respectively. In 2016, boys had a mean of 312.76 in Mathematics and girls 314.92 while in 2015 they had means of 310.8 and 314.2 respectively. The difference between boys and girls in English was significant whilst in Mathematics it was not.
4. The 2016 results indicate that urban schools outperformed rural schools by 24.59 score points in English and 10.38 score points in Mathematics. Results show a significant decrease in Mathematics performance for urban schools from 2015 to 2016.
5. In 2016, Bulawayo and Harare pupils outperformed pupils from all other provinces in both English and Mathematics. The results further show that there was a significant increase in mean performance for all provinces except Harare and Mashonaland West in both English and Mathematics between 2012 and 2016.
6. Analyses by age-group also showed significant increases in both English and Mathematics between 2012 and 2016. However, the group aged 7 showed no significant change in both English and Mathematics between 2012 and 2016.
7. Descriptive statistics show that most of the pupils speak Shona (68%) at home, followed by Ndebele (20%), other languages (9%) and English (3%). Results show that pupils who speak English at home outperformed those who speak other languages in both English and Mathematics.
8. There are notable performance variations associated to the number of hours pupils spent working for their families. The results indicate that those who work less than one hour per day outperformed those who work for one hour or more. The results for these two groups are indicating a significant increase in performance in both English and Mathematics between 2012 and 2016.

9. The number of meals the pupils had per day had a bearing on their performance in English and Mathematics. Pupils who had three or more meals per day outperformed those with two or less. The difference in performance between pupils with three or more meals and those with two was statistically significant in both English and Mathematics. This trend was similar to that of 2012 and 2015. However, the difference in performance of pupils with two meals and those with one was not statistically significant in both English and Mathematics.
- 10 Home possessions such as electricity, piped water, television and radio have an effect on pupils' performance in English and Mathematics. In 2016, pupils who had four home possessions outperformed those with three or less. The difference in performance between pupils with four home possessions and those with two or three was statistically significant in both English and Mathematics. In English, the same can be said between pupils with two or three and those with one or less. However, Mathematics results do not show a significant difference in performance between pupils with two or three home possessions and those with one or less.
- 11 Home educational resources such as pencil, school bag, pen, desk, computer and calculator have been observed to have an effect on pupils' performance in English and Mathematics. In 2016, pupils who had four or more educational resources outperformed those with three or less. The difference in performance between pupils with four or more educational resources and those with two or three was statistically significant in both English and Mathematics. However, the performance between pupils with two or three educational resources and those with one or less was not statistically significant in both English and Mathematics. Between 2012 and 2016, the performance increases of all groups were statistically significant except the performance of pupils with four or more educational resources in Mathematics.
- 12 Parental education was found to predict performance significantly. Pupils with a parent or guardian who completed a tertiary education outperformed those with a parent who completed secondary school. The difference was large but appeared to be decreasing over time. In 2016, the differences in performances between pupils with parents in different educational levels were statistically significant in both English and

Mathematics.

- 13 For 2016, mean performances for Shona and Ndebele tests were computed for each of the subgroups of gender, school type, school location and province. The results indicate that girls performed better than boys in both Shona and Ndebele tests. Pupils in registered schools performed better than those in satellite schools in both languages. Furthermore, pupils in urban areas outperformed those in rural areas. The differences in performance are large in Shona as compared to Ndebele.
- 14 Results of 2016 have shown a significant increase in the mean performance of pupils in different socio economic status since 2012 in English and Mathematics. Pupils from high socio-economic status (SES) outperformed those from medium and low SES. This difference in performance seems to be increasing with time particularly in English. In 2016, the performance differences between different SES groups were statistically significant in both English and Mathematics. A similar trend was also observed in 2012 and 2015. Between 2012 and 2016 all SES groups recorded statistically significant performance increases in both English and Mathematics.
- 15 Notable differences in performance was observed between registered and satellite schools. The 2016 results indicate that registered schools outperformed satellite schools in both English and Mathematics and the differences were statistically significant. Both registered and satellite schools showed significant improvement in English and Mathematics performance between 2012 and 2016.
- 16 Facilities such as water and electricity had a bearing in pupil performance. In 2016, pupils from schools with water and electricity performed better than those from schools with either water, electricity or none. The differences in performance between these categories were statistically significant in 2016 and between 2012 and 2016 in both English and Mathematics.
- 17 In 2012, 2015 and 2016, results show no significant difference in performance between pupils from schools with all permanent classrooms and those from schools with at least two-thirds but not all in both English and Mathematics. However, significant differences were observed between the performance of pupils from schools with at least two-thirds but not all and those from schools with less than two thirds permanent

classrooms in 2015 and 2016 in both English and Mathematics. For all groups, significant differences in performance were also observed between 2012 and 2016 in both English and Mathematics.

- 18 School budget was found to predict performance. In 2016, urban and rural schools with a budget of more \$60 per pupil outperformed those from schools with a budget of less than \$60 in both English and Mathematics. All groups experienced significant increases in performance between 2012 and 2016 except the Mathematics performance of pupils from urban schools with a budget of less than \$30 and more than \$60.
- 19 Distance of a school from the district centre had an effect on pupils' performance. In 2016, urban and rural schools located within a 20km distance from the district centre outperformed those from schools located outside the 20km radius from the district centre in both English and Mathematics. In urban areas, all groups experienced significant increases in performance between 2012 and 2016 except Mathematics performance of schools located less than 60km from the district centre. In rural areas, all groups experienced significant increases in performance between 2012 and 2016 except English and Mathematics performances of schools located within 20km distance from the district centre.
- 20 In 2016, pupils who did not absent themselves in term the assessment was administered, outperformed those who were absent for one or more days in both English and Mathematics. In English, the performance increases between the groups were statistically significant. However, performance in Mathematics did not show a significant change between pupils absent for 1-2 days and those absent for 3 or more days. In both English and Mathematics, all groups showed a significant increase in performances between 2012 and 2016.
- 21 Results from multiple regression analysis reveal that possible changes in location, socio-economic variables, background variables and teaching and learning variables explain 29% and 10% of the amount of variation in English and Mathematics performances respectively. 71% and 90% of the increase in English performance and Mathematics performance respectively is accounted by other factors. An obvious and plausible factor is the distribution of textbooks and resources under the ETF.

5.3 Policy Implications

The analysis of the performance of grade three learners who participated in ZELA 2016 raises to the fore policy issues which are worth discussing. These policy issues emanated from the cognitive data when it was linked to the school and home environment as collected using the School Head and the pupil questionnaires.

1. **The effect of resources on pupil performance** - Pupils from urban areas significantly outperformed their rural counterparts in both English and Mathematics. Results of the multivariate analysis reveal that location variables such as urban, rural and distance of a school from the district centres have significant relationship to pupil performance. This pattern has been observed since 2012 through to 2016. This difference in performance between rural and urban learners signals the need for differentiated policy on funding and distribution of resources in favour of rural and satellite schools.
2. **The effect of number of meals on performance of pupils** - There is a pronounced undesirable performance of learners who have one meal per day. There is need to implement sustained feeding schemes across the primary level. This is to enable learners to at least have two meals per day, one for the time they are at schools.
3. **Develop systems that minimise the impact of socio-economic status (SES) on pupils performance** - In this study, the index of Socio-Economic Status (SES) was estimated for each student from highest parental education, number of books at home, number of home possessions (electricity, piped water, television and radio), number of meals per day and number of educational resources (pencil, school bag, pen, desk, computer and calculator). The policy implication is to create study times or periods per day after school and allow pupils to access school textbooks, library and other learning facilities within the school premises so that those without texts books, desks, or electricity at home are not disadvantaged. This will reduce the impact of number books at home, number of home possessions and number of educational resources on pupils performance. The impact of highest parental education on pupils performance can be reduced by creating incentives for teachers to do remedial education for under-performing pupils. Incentives for teachers include providing them with affordable

houses with access to water and electricity, better salaries and rural allowances.

4. **School budget and facilities** - Pupils from schools with high budget achieved higher than pupils from schools medium budgets. There is need to strengthen resources mobilisation skills of school managers in order to be able to upgrade school facilities. Also policies should be put in place that facilitates School-Parent Partnership (SPP). Such partnership should to strengthen School Development Committees (SDCs), school boards and trustees.

5.4 Lessons Learnt

In the period 2012 to 2016, ZELA data has given huge insight into the dynamics of learning at grade three and the interaction of school and home variables with cognitive variables. One lesson learnt over that period of time is that pupils can be assessed effectively at a tender age to determine if they are making progress, if they are meeting proficiency benchmarks and what factors influence their performances. Findings from ZELA can then be used for planning and decision making in educational activities.

The second lesson learnt is that ZELA provides a basis for comparison. Factors such location, gender, age and socio-economic status that influence pupils' performance at grade 3 can be compared to those that influence pupils performances at grade 5 and grade 7. Guided by the evidence from ZELA, MoPSE, ZIMSEC, UNICEF and other stakeholders can ask critical questions about primary education in Zimbabwe. How can equity in primary education in Zimbabwe be enhanced? How can the urban-rural performance differenced be addressed?

Another lesson learnt is the need to engage parents more in the assessment of pupils. Due to influence of socio-economic status on pupils' performance as evidenced by ZELA (2012 - 2016), parents are a valued source of assessment information, as well as an audience for assessment. Because of the fallibility of direct measures of pupils, assessments should include multiple sources of evidence, especially reports from parents and teachers. Assessment results should be shared with parents as part of an ongoing process that involves parents in their child's education.

The fourth lesson learnt is that assessment of pupils can be done in many ways and the best way is to use Item Response Theory (IRT). Some of the ways of assessing pupils' performances such as the Classical Test Theory (CTT) have drawbacks that render results unusable. One of the principal drawbacks of the classical test theory is that the evaluation of a pupil's performance is strongly influenced by the sample analysed. The IRT allows us to evaluate the pupil's ability, the question difficulty and the capability of the item to distinguish between examinees with different ability. These properties do not depend on the sample considered. The use of IRT enabled ZIMSEC to map performance and items on cognitive instruments. This method enables education providers and policy makers to know what students know and this information can inform the teaching and learning process.

5.5 Future Programming

Given the insights arising from the data, it is the recommendation of this evaluation that ZELA should continue every year and that its name be adopted as Zimbabwe Early Learning National Assessment (ZELNA). The need to expand the ZELA model to students in grade 5 and form 2 cannot be overemphasised. Expanding the programme will strengthen a shift from the monitoring and evaluation programme to the development of a national assessment framework. A national assessment programme provides data important for policy reform, including how to target resources given evidence generated on student equity. The potential for the ZELA model to be used as a long term monitoring program has been acknowledged by MoPSE and ZIMSEC. With the introduction of the new curriculum in Zimbabwe, the expanded ZELA model will provide evidence for improving teacher preparation and professionalism, informing the curriculum review process and developing local community support programmes.

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Appendix A

PUPIL QUESTIONNAIRE

APPENDIX A: PUPIL QUESTIONNAIRE

Zimbabwe Early Learning 2016 Study Pupil Questionnaire

| | | | | |
|-----------|----------------------|----------------------|----------------------|----------------------|
| School ID | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Pupil ID | <input type="text"/> | <input type="text"/> | <input type="text"/> | |

ZELA 2016 Pupil Questionnaire

Q1 What is the name of your school?
(Please do not abbreviate it. Write it out in full.)

Q2 What is the name of the district your school is located in?

Q3 What is your date of birth?
(Please write numbers in the boxes below.)

| | | |
|----------------------|----------------------|----------------------|
| Day | Month | Year |
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

Q4 Are you a boy or a girl?
(Please tick only one box.)

| | |
|--------------------------|------|
| <input type="checkbox"/> | Boy |
| <input type="checkbox"/> | Girl |

Q5 Which language do you speak at home most of the time?

(Please tick only one box.)

- (1) Shona
- (2) Ndebele
- (3) English
- (4) Venda
- (5) Tsonga
- (6) Shangaan
- (7) Kalanga
- (8) Sotho
- (9) Ndau
- (10) Nambya
- (11) Other

Q6 What is your religion?

(Please tick only one box.)

- (1) Traditional African religion
- (2) Apostolic
- (3) Christianity
- (4) Jewish
- (5) Muslim
- (6) No religion

Q7 How many books are in your home?

(Please tick only one box. Do NOT count newspapers, magazines or school textbooks.)

- (1) There are no books at home
- (2) 1 book
- (3) 2 to 5 books
- (4) 6 to 10 books

Q8 Which of the following things are found in your home?

(Please tick all that apply. If an item is broken at present but can be mended, tick the box.)

- a) Electricity (mains, generator or solar)
- b) Piped water
- c) Television
- d) Radio
- e) none

Q9 What study materials do you have in your home?

(Please tick all that apply. If an item is broken at present but can be mended, tick the box.)

- a) Pencil
- b) School bag
- c) Pen
- d) Desk at home
- e) Computer
- f) Calculator

Q10 How much time do you spend each day doing work for your family?

Work is paid or unpaid help you provide for your family. It could be chores at home or working in the family business.

(Please tick only one box.)

- ₍₁₎ Less than 1 hour
- ₍₂₎ 1 and more but less than 2 hours
- ₍₃₎ 2 hours and more but less than 3 hours
- ₍₄₎ 3 hours or more

Q11 How many meals a day do you usually have?

A meal refers to eating meat, vegetables and/or starch

(Please tick only one box.)

- ₍₁₎ 1 meal
- ₍₂₎ 2 meals
- ₍₃₎ 3 meals or more

Q12 What Early Childhood Development (ECD) class did you attend?

(Please tick only one box.)

- | | |
|--------------------------|----------------------|
| <input type="checkbox"/> | ECD A |
| <input type="checkbox"/> | ECD B |
| <input type="checkbox"/> | Both ECD A and ECD B |
| <input type="checkbox"/> | None |

Q13 Who lives in your house?

(Please tick all that apply.)

- | | | |
|----|--------------------------|-------------|
| a) | <input type="checkbox"/> | Father |
| b) | <input type="checkbox"/> | Mother |
| c) | <input type="checkbox"/> | Grandparent |
| d) | <input type="checkbox"/> | Auntv/Uncle |
| e) | <input type="checkbox"/> | Other |

Q14 What is the highest level of education of your mother (or female guardian)?

(Please tick only one box.)

- | | |
|--------------------------|---|
| <input type="checkbox"/> | Did <u>not</u> go to school |
| <input type="checkbox"/> | Completed some grades of primary school |
| <input type="checkbox"/> | Completed primary school |
| <input type="checkbox"/> | Completed some grades of secondary school |
| <input type="checkbox"/> | Completed secondary school |
| <input type="checkbox"/> | Started some tertiary study |
| <input type="checkbox"/> | Completed a tertiary course |
| <input type="checkbox"/> | I do not know |
| <input type="checkbox"/> | I do not have a mother or female guardian |

Q15 What is the highest level of education of your father (or male guardian)?
 (Please tick only one box.)

- (1) Did not go to school
- (2) Completed some grades of primary school
- (3) Completed primary school
- (4) Completed some grades of secondary school
- (5) Completed secondary school
- (6) Started some tertiary study
- (7) Completed a tertiary course
- (8) I do not know
- (9) I do not have a father or male guardian

Q16 How many days have you been absent from school this term?

days

Q17 How many days have you been absent from school because you were caring for a sick family member?

days

Q18 Have you ever stopped going to school for more than a term?

(1) Yes

(2) No

Q19 Where do you use the textbooks available to you at school?
 (Please tick as many boxes as apply.)

- a) (1) In the classroom
- b) (2) In the library
- c) (3) At home
- d) (4) I do not use the school textbooks

Q20 Who assist you with homework?

| | |
|-----|---------|
| (1) | Father |
| (2) | Mother |
| (3) | Maid |
| (4) | Brother |

YOU HAVE COMPLETED ALL THE QUESTIONS.
THANK YOU VERY MUCH FOR YOUR TIME.

Appendix B

HEAD QUESTIONNAIRE

SCHOOL HEAD QUESTIONNAIRE**Zimbabwe Early Learning Assessment 2016 School Head
Questionnaire**

| | |
|--|--|
| School ID <input style="width: 30px; height: 25px;" type="text"/> <input style="width: 30px; height: 25px;" type="text"/> <input style="width: 30px; height: 25px;" type="text"/> <input style="width: 30px; height: 25px;" type="text"/> | ZELA 2016 School Head Questionnaire |
| <p>The information provided in this questionnaire should refer to the School Head, or the person taking on the Head's role (e.g. a Deputy School Head or Senior Teacher) if the Head is absent. Your answers will be kept confidential. They will be combined with answers from other principals to calculate totals and averages. No one school will be identified.</p> <p>Position: School Head. If not, please specify your position:</p> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div> | |

SOME QUESTIONS ABOUT YOU

Q1 What is the name of your school?
Please do not abbreviate it but write it out in full

Q2 What is your school type?

| | |
|--------------------------|----|
| <input type="checkbox"/> | P1 |
| <input type="checkbox"/> | P2 |
| <input type="checkbox"/> | P3 |

Q3 What is the name of the district your school is located in?

Q4 What is the highest professional qualification in Education you have attained?

(Please tick only one box)

- (1) Diploma or certificate in Education
- (2) Bachelor of Education degree
- (3) Masters of Education degree
- (4) Other

Q5 How many of the teachers in your school have the following levels of education as their highest professional qualifications?

(Insert the number in the box.)

- Diploma or certificate
- Bachelor degree
- Masters degree
- Other

QUESTIONS ABOUT YOUR SCHOOL

Q6 Which languages are used for **classroom instruction** in the first three grades at your school?

(Tick all that apply.)

- a) Shona
- b) Ndebele
- c) English
- d) Venda
- e) Tonga
- f) Shangani
- g) Kalanga
- h) Sotho
- i) Ndau
- j) Nambya
- k) Other

Q7 In what year was your school established? (When was it opened?)

(Please write the number in the boxes below. Estimate the year if you do not know the actual year.)

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

Q8 How many kilometres is it by road from your school to the district centre (office)?

| | | |
|--|--|--|
| | | |
|--|--|--|

 kilometres

Q9 Which of the following best describes your school?
(Please tick only one box.)

- (1) Rural day
- (2) Urban Day
- (3) Farm/Resettlement
- (4) Mine
- (5) Other

QUESTIONS ABOUT YOUR TEACHERS

Q10 How many teachers are present in your school during this week?
Please write '0' for a particular category if there are no teachers in it

- a) **Male** permanent teachers teachers
- b) **Female** permanent teachers teachers
- c) **Male** contract teachers Teachers
- d) **Female** contract teachers teachers

Q11 How many of the teachers in your school have the following levels of formal education as their highest qualification?

*Please write the number in the boxes for each category. Please count each teacher in terms of his/her highest qualification.
Please write '0' for a particular category if there are no teachers in it.*

- a) O-level only teachers
- b) A-level only teachers
- c) Tertiary education teachers

Q12 How many of the teachers in your school have completed a **teaching** qualification?

Please write '0' if there are no teachers with a teaching qualification

teachers

QUESTIONS ABOUT ENROLMENT

Q13 What is the total number of boys and girls enrolled in your school?
(Please write the number in the boxes for each category. Include all children who are enrolled, even if absent this week.)
Please write '0' if there are no boys or no girls at your school.

| Bovs | Girls | |
|------|-------|-----------|
| | | ECD A |
| | | ECD B |
| | | GRADE 1 |
| | | GRADE 2 |
| | | GRADE 3-7 |

Q14 Of those boys and girls who are enrolled, how many attend school regularly?

Attendance should be considered regular when a pupil attends school the majority of school days (more than 50 per cent)
Please write '0' if none of the boys or none of the girls attend regularly

a) Boys

b) Girls

Q15 What is the total number of boys and girls in **Grade 3** in your school?

(Please write the number in the boxes for each category. Include all children who are enrolled, even if absent this week.)
Please write '0' if there are no Grade 3 boys or no Grade 3 girls at your school.

a) Grade 3 boys

b) Grade 3 girls

Q16 What is the total number of classes in your school?
(Please write the number in the boxes below.)

classes

Q17 What is the total number of **Grade 3** class groups (or classes) (e.g. 3a, 3b, 3c...) in your school?

(Please write the number in the boxes below.)

Year 3 class groups (or classes)

Q18 How many pupils in your school are orphans or vulnerable children?

(Please write the number in the boxes below.)

Please write '0' if there are no orphans or vulnerable children at your school.

pupils

Q19 How many pupils in your school have a disability?

A disabled person is a person with a physical, mental or sensory disability, including a visual, hearing or speech functional disability, which gives rise to physical, cultural or social barriers inhibiting him or her from participation at an equal level with other members of society.

(Please write the number in the boxes below.)

a) Boy pupils

b) Girl pupils

SOME QUESTIONS ABOUT SCHOOL OPERATION

Q20 How many sessions per day operate in your school?

(Please Tick one box only.)

(1) One session

(2) Two sessions

Q21 What was the total number of teacher days lost through teacher absence in first term of this year?

*(Please write the number in the boxes below. Please write '0' if there were no teachers absent on **any** days this term. If two teachers were absent on the same day, this should be counted as two teacher days lost)*

days

Q22 In your school last term, how many days were lost as a result of late start of term, organization of examinations, school festivals, national celebrations, etc?

(Please Tick one box only.)

- (1) No days were lost
- (2) 1 day
- (3) 2 days
- (4) 3 days
- (5) 4 days
- (6) 5 days
- (7) 6 to 10 days
- (8) 11 to 20 days
- (9) More than 20 days were lost

QUESTIONS ABOUT SCHOOL FACILITIES

Q23 How many permanent classrooms, temporary classrooms, and open-air teaching areas does your school have?

(Please write the number in the boxes for each type of teaching environment.)

- Permanent classrooms are completed classrooms that have been built using materials in compliance with approved specifications;
- Temporary classrooms include, for example, temporary/thatch roof, roof only, walls only;
- Open-air teaching areas are areas that have no floors, walls, or roofs and are usually located under a tree.

(Please write the number in the boxes for each category. Please write '0' if there are none).

- a) **Permanent** classrooms
- b) **Temporary** classrooms
- c) **Open-air** teaching areas

Q24 How many textbooks does your school have for the following subjects?

(Please write the number in the boxes below. Please write '0' if there were no textbooks.)

| | |
|--|-------------|
| | Mathematics |
| | English |
| | Shona |
| | Ndebele |

Q25 How many of these textbooks were distributed by UNICEF as part of the Education Development Fund Programme?

| | | | | | | |
|--|--|--|--|--|--|-----------|
| | | | | | | Textbooks |
|--|--|--|--|--|--|-----------|

Q26 For which of the following activities does your school use textbooks?

(Tick all that apply)

- a) Classroom instruction
- b) Library work
- c) Homework (allowing pupils to carry books home)

Q27 How many of each of the following types of sanitation facilities does your school have?

(Please put the number of each type of facility in the boxes. If your school has no flush toilets write '0')

| | | | | |
|----|----------------------------|--|--|--|
| a) | Flush toilets | | | |
| b) | Squat holes or pit toilets | | | |
| c) | Other toilets | | | |
| d) | ECD toilets | | | |

Q28 How many of these toilets are disability appropriate?

(Disability appropriate facilities are designed for use by learners with a disability)

| | | | |
|--|--|--|--------------------------------|
| | | | Disability appropriate toilets |
|--|--|--|--------------------------------|

Q29 Does your school have...

(Please tick appropriate box for each item. Only tick if the item is in a usable condition.)

- | | Yes |
|--|--------------------------|
| a) Piped water, water tank or spring | <input type="checkbox"/> |
| b) Electricity (mains, generator or solar) | <input type="checkbox"/> |
| c) Landline telephone | <input type="checkbox"/> |

QUESTIONS ABOUT THE RUNNING OF THE SCHOOL

Q30 During the last three months, how many teaching staff in your school attended a programme of professional development?

(A programme of professional development here is a formal programme designed to enhance teaching skills or pedagogical practices. It may or may not lead to a recognised qualification. The programme must last for at least one day in total and have a focus on teaching or education.)

teachers at your school

Q31 How many of the teaching staff attending professional development in the last three months, are Early Childhood Development, Grade 1 or Grade 2 teaching staff?

- a) ECD teaching staff attended professional development
- b) Grade 1 teaching staff attended professional development
- c) Grade 2 teaching staff attended professional development
- d) Early Reading Initiative

Q32 How many ECD qualified teachers do you have?

Q33 How many of your teaching staff have attended the Para-professional Teaching Upgrade Program?

The Upgrade Program is for para professional teaching staff who have not completed their O Level qualification.

Para-professionals have been upgraded

Q38 Have you (or another Education manager at your school) attended financial management training as part of the School Improvement Grants program?

(1) No

(2) Yes

Q39 Which of the following mechanisms exist in your school?

SDC

SDA

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

List of Figures

| | | |
|------|---|----|
| 1.1 | The 3P Model of Teaching and Learning (Biggs, 1985) | 19 |
| 2.1 | English Scale for 2016 | 32 |
| 2.2 | Mathematics Scale for 2016 | 33 |
| 2.3 | English Proficiency levels | 34 |
| 2.4 | Mathematics Proficiency levels | 35 |
| 2.5 | Mean performance in English and Mathematics since 2012 | 37 |
| 2.6 | Percentages below, at and above grade level in English and Mathematics since 2012 | 38 |
| 2.7 | Mean performance in English and Mathematics by gender since 2012 | 40 |
| 2.8 | Mean performance in English and Mathematics by location since 2012 | 42 |
| 2.9 | Mean performance in English by language spoken at home since 2012 | 49 |
| 2.10 | Mean performance in Mathematics by language spoken at home since 2012 | 49 |
| 2.11 | Mean performance in English and Mathematics by time per day spent working for the family since 2012 | 52 |
| 2.12 | Mean performance in English by number of meals per day since 2012 | 56 |
| 2.13 | Mean performance in Mathematics by number of meals per day since 2012 | 56 |
| 2.14 | Mean performance in English by number of home possessions since 2012 | 59 |
| 2.15 | Mean performance in Mathematics by number of home possessions since 2012 | 59 |
| 2.16 | Mean performance in English by number of home educational resources since 2012 | 63 |
| 2.17 | Mean performance in Mathematics by number of home educational resources since 2012 | 64 |
| 2.18 | Mean performance in English by highest parental education since 2012 | 67 |
| 2.19 | Mean performance in English by highest parental education since 2012 | 68 |

| | | |
|-----|--|----|
| 3.1 | Percentage of pupils below, at and above grade level for English by SES in 2012, 2015 and 2016 | 71 |
| 3.2 | Percentage of pupils below, at and above grade level for Mathematics by SES in 2012, 2015 and 2016 | 72 |
| 3.3 | Between and within school variance in English performance, explained and unexplained by SES in 2012, 2015 and 2016 | 76 |
| 3.4 | Between and within school variance in Mathematics performance, explained and unexplained by SES in 2012, 2015 and 2016 | 77 |
| 4.1 | Mean performance in English and Mathematics by school type since 2012 . . | 81 |
| 4.2 | Mean performance in English and Mathematics by availability of water and electricity since 2012 | 84 |
| 4.3 | Relationship between mean English performance and budget per pupil within urban and rural areas in 2012 and 2016 | 88 |
| 4.4 | Relationship between mean Mathematics performance and budget per pupil within urban and rural areas in 2012 and 2016 | 89 |
| 4.5 | Relationship between mean performance and distance to the district centre within rural areas in 2012 and 2016 | 91 |

List of Tables

| | | |
|------|---|----|
| 1.1 | Location of the 2016 cycle within the wider evaluation | 16 |
| 1.2 | Datasets - input for ZELA | 20 |
| 2.1 | Population descriptives in 2012, 2015 and 2016 | 30 |
| 2.2 | Population descriptives in 2012, 2015 and 2016 | 31 |
| 2.3 | Overall performance in English and Mathematics in 2012, 2015 and 2016 | 36 |
| 2.4 | Performance in English and Mathematics by Gender since 2012 | 39 |
| 2.5 | Cross-tabulation of Proficiency level and gender for 2016 | 40 |
| 2.6 | Performance in English and Mathematics by school location since 2012 | 41 |
| 2.7 | Cross-tabulation of Proficiency level and location for 2016 | 42 |
| 2.8 | Performance in English by province since 2012 | 43 |
| 2.9 | Performance in Mathematics by province since 2012 | 44 |
| 2.10 | Cross-tabulation of Proficiency level and province for 2016 | 45 |
| 2.11 | Performance in English and Mathematics by age-group since 2012 | 46 |
| 2.12 | Performance in Mathematics by age-group since 2012 | 47 |
| 2.13 | Performance in English and Mathematics by language spoken at home since 2012 | 48 |
| 2.14 | Cross-tabulation of Proficiency level and language spoken at home for 2016 | 50 |
| 2.15 | Performance in English and Mathematics by time spent per day working for the family since 2012 | 51 |
| 2.16 | Cross-tabulation of Proficiency level and Time spend working for family for 2016 | 53 |
| 2.17 | Performance in English and Mathematics by time spent per day working for the family for 2016 | 54 |
| 2.18 | Performance in English and Mathematics by meals per day since 2012 | 55 |

| | | |
|------|---|----|
| 2.19 | Cross-tabulation of Proficiency level and number of meals per day for 2016 | 57 |
| 2.20 | Performance in English and Mathematics by number of home possessions since 2012 | 58 |
| 2.21 | Cross-tabulation of Proficiency level and number of home possessions for 2016 | 60 |
| 2.22 | Performance in English and Mathematics by number of home possessions for 2016 only | 61 |
| 2.23 | Performance in English and Mathematics by number of home educational resources since 2012 | 62 |
| 2.24 | Cross-tabulation of Proficiency level and number of home educational resources for 2016 | 64 |
| 2.25 | Performance in English and Mathematics by highest parental education since 2012 | 66 |
| 2.26 | Mean performance of pupils responding to Shona and Ndebele tests | 69 |
| 3.1 | Performance in English and Mathematics by socio-economic equity in 2012, 2015 and 2016 | 73 |
| 3.2 | Cross-tabulation of Proficiency level and socio-economic status for 2016 | 74 |
| 4.1 | Performance in English and Mathematics by school type in 2012, 2015 and 2016 | 80 |
| 4.2 | Cross-tabulation of Proficiency level and school type for 2016 | 82 |
| 4.3 | Performance in English and Mathematics in schools with and without electricity and water in 2012, 2015 and 2016 | 83 |
| 4.4 | Cross-tabulation of Proficiency level and availability of water and electricity for 2016 | 85 |
| 4.5 | Relationship between pupil performance and proportion of permanent classrooms in schools in 2012, 2015 and 2016 | 86 |
| 4.6 | Relationship between mean performance and budget per pupil within urban and rural areas in 2012, 2015 and 2016 | 87 |
| 4.7 | Relationship between mean performance and distance to the district centre within urban and rural areas in 2012, 2015 and 2016 | 90 |
| 4.8 | Relationship between pupil performance and EDF textbook-pupil ratio in 2013, 2015 and 2016 | 92 |

| | |
|---|----|
| 4.9 Relationship between pupil performance and number of days absent by pupil in 2012, 2015 and 2016 | 93 |
| 4.10 Cross-tabulation of Proficiency level and number of days absent by pupil for 2016 | 94 |
| 4.11 Results of multiple regression analysis explaining variance and trend in English performance | 95 |
| 4.12 Results of multiple regression analysis explaining variance and trend in Mathematics performance | 98 |