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An Evaluation Report of the 2018 Zimbabwe Early Learning Assessment (ZELA) Cycle

ABSTRACT

The Zimbabwe Education Development Fund (EDF) program is being undertaken by the United Nations Children's Fund (UNICEF). The EDF program provides essential material resources and support for the systems and structures designed to increase access to quality education for all Zimbabwean children. The EDF gives special attention to the most vulnerable children.

The Zimbabwe Early Learning Assessment (ZELA) project is aimed at improving 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. Now ZELA has been transformed into a national assessment under the Ministry of Primary and Secondary Education, with the Zimbabwe School Examinations Council (ZIMSEC) giving technical support to the project. The key measure is the extent of improvement in learner 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 learner performance in language and Mathematics. Information was also collected during ZELA via learner and school head questionnaires in order to develop an understanding of learners' education backgrounds and learning outcomes. Data gathered from the questionnaires included learner 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 was contracted to provide technical support to the MoPSE and ZIMSEC to ensure quality assurance of aspects of the 2016, 2017 and 2018 ZELA and support multivariate analysis.

This report was prepared by Mr. M. Damson,Mr. F. Chirume,Mr. T. Kupfumira, Dr. T. Chiwiye, Mrs. G. Charumbira, and Mr. K. Manokore. In the build up to this report, 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 2018, 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 learners within each level and analysing learner performance against learner and school characteristics and the calculation of the 2017-2018 shift based on 2017-2018 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 Children's 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 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 2018 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 learners 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) Learner 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 learners in Grade 3 in Zimbabwe. A representative sample was drawn which yielded approximately 16152learners in approximately 500 schools across the 10 provinces of Zimbabwe. Five sets of ZELA tests were set and administered to measure literacy (English and either one of the local languages) and numeracy (Mathematics). Home and school background information was collected through a Learner Questionnaire, which contained 20 questions and a School Head Questionnaire, which contained 39 questions respectively.

ZELA Tests

A single scale was developed to align the abilities of learners and difficulties of the items was constructed for each ZELA test after test-by-test analyses. For each subject scale, the distribution of learner abilities in ZELA 2018was transformed to a scale with a mean of 300 and a standard deviation of 25. Link items from the 2017 and 2018 tests were used in the analysis to ensure that 2017-2018 test results were comparable.

Key findings

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

The study explored how Zimbabwe learners performed in assessments of languages and Mathematics over time. The overall mean English performance increased by 0.77 score point from a mean of 314.70 in 2017 to 315.47 in 2018, whilst Mathematics performance also increased by 7.18 score points from 309.49 to 316.67 over the same period. The change in English was not significant while that of Mathematics was statistically significant. Over time, both English and Mathematics exhibit a significant improvement between 2012 and 2018.

The 2012 baseline study found that for English, 49 per cent of Grade 3 learners were achieving at or above the grade level benchmark and that for Mathematics, 46 per cent of learners were achieving at or above the grade appropriate level. In 2015, 53 per cent of Grade 3 learners were performing at or above the grade level benchmark in English, and that for Mathematics, 66 per cent of learners were achieving at or above the grade appropriate level. In 2016, 71 per cent of Grade 3 learners were performing at or above the grade level benchmark in English, and that for Mathematics, 65 per cent of learners were achieving at or above the grade appropriate level. In 2017, 68 per cent of Grade 3 learners were performing at or above the grade level benchmark in English, and that for Mathematics, 55 per cent of learners were achieving at or above the grade appropriate level. In 2018, 76.4% and 72.2% of the learners performed at or above grade level in English and Mathematics respectively.

2. Relationships of learner, 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 learner, teaching and school variables with performance on tests of language and Mathematics at the beginning of Grade 3 in Zimbabwe. Analysis by gender showed that girls outperformed boys in both English and Mathematics in 2018. As has been the case for the previous ZELA cycles, the 2018 results indicated that learners from urban schools outperformed learners from rural schools. In 2018, the difference in mean performance between learners from urban and rural schools was 28.50 score points in English and 18.75 score points in Mathematics. There was an improvement in performance in both English and Mathematics in rural schools from 2017 to 2018.

Analysis by age group showed significant increases in both English and Mathematics performance between 2012 and 2018 for all age groups. Between 2017 and 2018, all age groups recorded no significant change in English except for those aged 6 and below and aged 9 who recorded a significant decrease in performance. For Mathematics, all age groups recorded a significant increase in performance, with the exception of those aged 6 and below, aged 9 and 10 who recorded no significant change in performance. Further

analysis revealed the existence of a strong relationship between learner's performance and their socio-economic status (SES). The 2018 results have shown a significant increase in the mean performance of learners in all classes of socio economic status between 2017 and 2018 in English and Mathematics. There has been a significant increase in mean performance in both English and Mathematics from 2012 to 2018.

Analysis by province revealed that Bulawayo and Harare learners outperformed learners from all other provinces in both English and Mathematics in 2018. The results also show that learners who speak English at home outperformed those who speak local languages at home in both English and Mathematics.

There are notable performance variations associated to the number of hours that learners spend working for their families. The 2018 results indicate that learners who work for less hours at home outperformed those who work for more hours at home in both English and Mathematics. Learners who had three or more meals per day outperformed those with two meals who in-turn outperformed those who take one meal per day. The difference in performance between learners with three or more meals and those with two meals and the difference between those with two meals and one meal were statistically significant in both English and Mathematics. This trend was similar to that of 2012 and 2017.

Learners who had four or more home possessions outperformed those with two or three, who in-turn outperformed those with one or less home possessions. The differences in learner performance among all the groups were statistically significant in both English and Mathematics. The 2018 results also show that 85.4% of learners with four or more home possessions performed at or above grade level in English, while 75.2% and 73.8% of learners with two or three and those with one or less respectively performed at or above grade level. In Mathematics 82.4%, 71.2% and 68.9% of learners with four or more, two or three and one or less home possessions respectively performed at or above grade level.

In 2018, learners who had four or more home educational resources outperformed those with two or three and those with one or less in both English and Mathematics. However,

there was no significant difference between learners with two or three and those with one or less home educational resources in English but the difference in Mathematics was significant. In addition, the 2018 English and Mathematics results showed that learners with a parent or guardian who completed a tertiary course outperformed those with a parent who completed secondary education who in-turn outperformed learners with a parent or guardian who completed primary education. Furthermore, learners with a parent or guardian who completed primary education outperformed those with a parent who did not go to school.

Prior to 2018, school budget was found to predict performance significantly. However, in 2017 and 2018, result from multiple regression show that school budget did not predict learners' performance significantly. Learners who were never absent in the term the assessment was administered, outperformed those who were absent for one or two days who in-turn outperformed learners who were absent for three or more days in both English and Mathematics. In English, the performance increases between the groups were not statistically significant but were significant in Mathematics. In both English and Mathematics, all groups showed a significant increase in performances between 2012 and 2018.

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

The results from the multiple regression analysis revealed that possible changes in location (urban versus rural) only accounted for 15% 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 20%. 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 21%. Finally, teaching and learning variables (number of satellite schools, the budget per learner, the number of days a learner was absent and the number of reading materials) were added to the model and the total amount of variation in English performance

explained was 24%. The fact that all these variables explained only 24% of the increase in English performance in 2018, imply that 76% of the increase is explained by other factors. A plausible factor is the distribution of textbooks and resources under the EDF.

In Mathematics, the location variables, socio-economic variables, background variables and teaching and learning variable cumulatively explain 18% of the amount of variation in Mathematics performance. This also suggests that 82% of the Mathematics performance could be explained by EDF textbooks.

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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 learners (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 learners 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 learner 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 UNICEFs Medium-Term Strategic Plan, educational resources were given to primary schools in Zimbabwe. The focus was in line with UNICEFs 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 Development Fund (EDF). In 2012, the Australian Council for Educational Research (ACER) was engaged and a ZELA baseline study was carried out to determine change in learner performance from 2012-2015; to explore the relationships of learner, teacher and school-level variables on learner 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 2018, the same model and structures which were set up by ACER were adopted in totality to allow for comparability of 2018 results

to previous years. The 2017 and 2018 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 2018 Zimbabwe Early Learning National Assessment sought to answer the following questions:

a) How do the Zimbabwe learners perform in the language and Mathematics tests? Closely related to this is the question: Is there a noticeable pattern of change over time?

b) 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?

- Learner background characteristics
- Teacher and teaching resources
- School funding and facilities

c) 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:

i. How do early-grade Zimbabwe learners perform in tests of language and Mathematics?

ii. Is it possible to identify learner-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 report rode on the already reviewed literature on international experience in national assessment with particular emphasis on the African 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 learners from schools across the 10 provinces of Zimbabwe was drawn in 2018 based on the model developed by ACER. The sample was structured as; the first choice schools were the ***s***, then the first replacement schools were r_1 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 learners in Zimbabwe.

Tests of Mathematics, English and all local languages examined at Grade 7 level, were developed and administered at Grade 2. Security procedures surrounding test development, printing, administration and marking were developed and implemented. Learner and School Head Questionnaires were developed by MoPSE and administered. This was designed to collect information about learner 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 Monitoring Officers (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 learners and to heads of schools (or their representatives) during the ZELA administration. These questionnaires are included in Appendices 2 and 3 of this report. Learner questionnaires were designed to collect contextual information relating to learner-level variables, 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 learners 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 2018 cycle. 2018 is the third cycle of ZELA conceptualised as sample-based national assessment.

Table 1.1: Location of the 2018 cycle within the wider evaluation

2012	2013	2014	2015	2016	2017	2018
1st cycle	2nd cycle	3rd cycle	4th cycle	1st cycle	2nd cycle	3rd cycle
Sample-based Baseline	Sample-based Monitoring	Sample-based Monitoring	Sample-based Evaluation	Sample-based National Assessment	Sample-based National Assessment	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 with ECD background 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 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 poor 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 learners 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, and 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 learner 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).

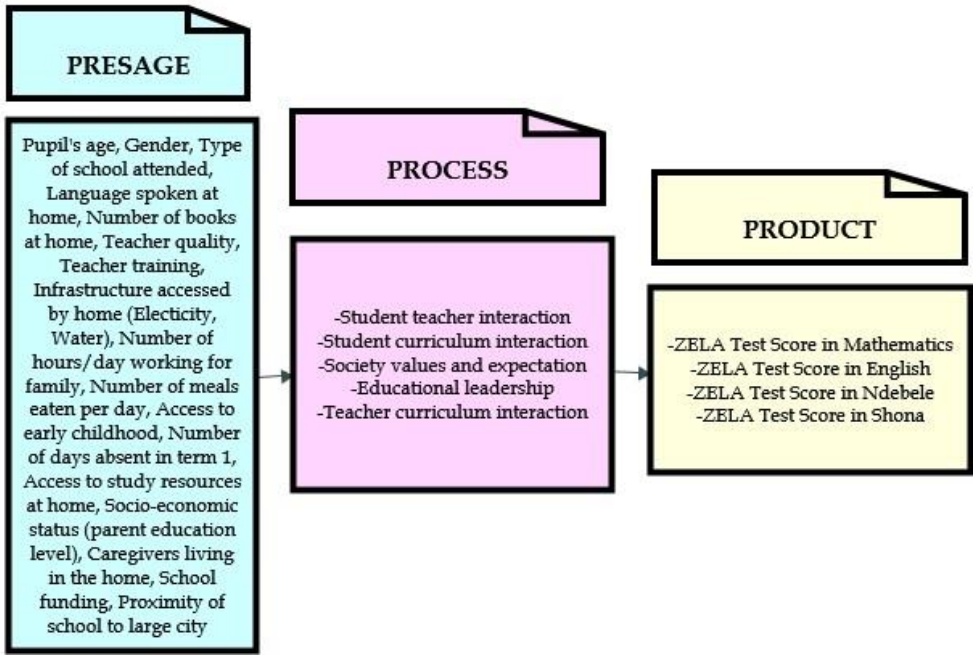

Figure 1.1: The 3P Model of Teaching and Learning (Biggs, 1985)

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 learners, 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 learner or learner 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 learner 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

Learner 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 learner 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

Learner level (background characteristics)	Teacher level (teacher quality & training)	School level (Funding & facilities)
Caregivers living in the home		WASH Facilities Orphans and vulnerable children (%) Funding Learners 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 choice schools from the 2018 sample was used. The sample yielded approximately 16500 learners in 500 primary schools across the 10 provinces of Zimbabwe. The target population was learners 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 Machawira, 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 2018. 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 Machawira, 2014).

Data collection included both cognitive and questionnaire instruments. ZELA tests were administered in English, Mathematics and either one of the local languages over two days. A single scale aligning the abilities of learners with the difficulties of the items was constructed for each ZELA test after thorough test-by-test analyses. For each scale, 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, 2015, 2016 and 2017 tests were used in the 2018 tests to ensure the 2012-2018 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 learners and percentages of learners 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 learners in Zimbabwe. Not all, but only a selection of Grade 3 learners was tested to provide these estimates. Testing all learners would be too expensive and inefficient for the purpose of the survey. Basing population estimates on a sample of learners 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 learners' achievement with test items that cover all possible skills within a domain. Only a representative set of items is used to test learners' performance in English and Mathematics. If a different set of items had been chosen, learners' performance would be slightly different, again leading to slightly different population estimates.

These two sources of uncertainty, the sampling of learners 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 learners. 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 differences 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 four 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 learners, for example, the difference in performance between learners 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 learner 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 learners in schools that are further removed from the district centre performed on average less well than learners 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 learners and to heads of schools (or their representative) during the annual ZELA administration. Learner 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 Schools Inspectors (DSIs), 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 the lead consultant.

1.7 Limitation of the study

Learners that were selected for the English and Mathematics assessments could choose to respond to their local 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 local languages were not comparable across the assessment years. Therefore, trends are not reported for achievement in the local languages

1.8 Structure of the report

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

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.

Chapter 2 - Performance in Languages and Mathematics overall and by learner demographics and family background variables: Chapter two is focused on the performance in languages and Mathematics overall and by learner demographics and family background variables. The chapter describes trends in performance of Grade three learners in English and Mathematics from 2012 to 2018.

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.

Chapter 4 - Performance in English and Mathematics within the Zimbabwe Educational Context: Chapter four describes relationships found in the full population between learner performance, characteristics of the school and learning environment.

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 & BY LEARNER DEMOGRAPHICS & FAMILY BACKGROUND VARIABLES

2.1 Introduction

This chapter presents the results of the ZELA 2018 analysis and makes comparisons to 2017 and 2018. Firstly, it describes the sample descriptives and secondly the trends in performance of grade 3learners 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 2018 scale for English and Mathematics showing the proportion of learners below grade level, at grade level and above grade level.

2.2 Sample Characteristics

Learners that were selected for the English and Mathematics assessments could choose to respond to one of the local language tests, but were not obliged to. As a result, these language tests were not comparable across the assessment years. Therefore, trends are not reported for achievement in these tests; however, some results for 2018 are presented at the end of this chapter. In total 16500 learners were assessed from 500 primary schools in Zimbabwe. The results in this chapter are reported overall and by learner demographic and family background variables.

Population descriptives based on the full samples from 2012, 2015, 2016, 2017 and 2018 are included in Table 2.1 and Table 2.2. As shown in Table 2.1, urban schools constituted 13% of the sample in 2017 as compared to 14% in 2018. There was a slight increase in the

number of urban schools as a result of the stratified random sampling with proportional allocation technique used in sample selection. This resulted in 86% of the sampled schools being rural schools. Stratified random sampling with proportional allocation technique was used because of its ability to reduce selection bias by adequately representing the diversity in performance of the learners in each stratum. Furthermore, this technique enabled us to sample even the smallest and most inaccessible subgroups in the population. This meant that provinces with high school population were allocated high sample sizes within the provinces. For example, Manicaland and Masvingo provinces have the highest population of schools as compared to Bulawayo with the lowest population of 133 schools and therefore were allocated 15, 2%, 15, 3% and 2, 5% in the sample respectively.

Masvingo and Manicaland provinces had the highest contribution in the 2018 sample. Table 2.1 shows that Masvingo and Manicaland had 15, 3% and 15, 2% respectively of the sampled schools in the 2018 sample while Harare and Bulawayo had the lowest of 4, 4% and 2, 5% respectively. In terms of age, Table 2.1 shows that 45, 3% of the learners who took the 2018 ZELA tests were aged 9 years. This was a slight decrease from 48% in 2017. There was also a notable increase in the number of learners aged 7 and 8 years between 2017 and 2018, with the reverse being observed for learners aged 10 years, while the other age groups remained fairly stable over the same period.

The percentage of learners having 3 or more meals per day in 2018 was 48,4%, those having two meals per day were 39,9% and 17,7% had one meal per day. These results differ slightly to those obtained in 2017. In 2017 learners who were exposed to 3 or more meals per day were 54% against 48, 4% in 2018. Learners who had one meal or 2 meals per increased in 2018. This generally would call for policy shift in the supplementary feeding programmes.

Table 2.2 shows an increase in the number of learners who speak Shona at home. There was a slight decrease in the learners who speak Ndebele and other languages spoken at home between 2016 and 2018.The percentage of learners who worked less than 1 hour a

day decreased slightly from 32% in 2017 to 28,5% in 2018 while the percentage of learners who worked 1 or more hours but less than 2 hours a day increased from 30% in 2017 to 36,7% in 2018, while the other categories did not change significantly over the same period.

Number of home possessions, number of educational resources and the highest parental education are believed to influence learner performance. Descriptive statistics in Table 2.2 show that the percentage of learners with four or more home possessions (electricity, piped water, television, borehole and radio) increased from 14% in 2017 to 16, 6% in 2018. There were no major changes among learners who had none, one, two and three home possessions between 2017 and 2018.

The educational resources that were under study are pencil, school bag, pen, desk, computer and calculator. In 2012 and 2015, the majority of the learners (39%and38%respectively) had one educational resource and in 2017 and 2018, the majority of the learners (35% and 35, 7% respectively) had three of the cited educational resources. For the highest parental education, Table 2.2 shows that there has not been much difference between 2016 and 2017 on categories, *did not go to school, did primary education* and *did tertiary education*. However, the percentage of learners with parents who completed secondary school decreased slightly from 68% in 2017 to 67, 2% in 2018,while those who did a tertiary course increased from 16% in 2017 to 19% in 2018.

Table 2.1: Sample descriptives in 2012, 2015, 2016, 2017 and 2018

Variable	Options	2012	2015	2016	2017	2018
Gender	Boys	50%	50%	50%	50%	44%
	Girls	50%	50%	50 %	50%	56%
Location	Urban	20%	22%	29%	13%	14%
	Rural	80%	78%	71%	87%	86%
Province	Bulawayo	4%	4%	11%	2%	2.5%
	Harare	9%	10%	12%	5%	4.4%
	Manicaland	15%	16%	10%	16%	15.2%
	Mashonaland Central	10%	10%	10%	10%	8.8%
	Mashonaland East	11%	11%	9%	13%	11.5%
	Mashonaland West	12%	11%	9%	13%	12.2%
	Masvingo	13%	14%	9%	8%	15.3%
	Matabeleland North	7%	7%	10%	9%	8.6%
	Matabeleland South	6%	5%	10%	8%	7.9%
	Midlands	13%	13%	10%	16%	13.6%
Age (in years)	Aged below 7	1%	2%	0%	0%	0.4%
	Aged 7	13%	13%	2%	1%	6.9%
	Aged 8	39%	37%	22%	19%	31.6%
	Aged 9	28%	27%	39%	48%	45.3%
	Aged 10	12%	12%	25%	19%	10.5%
	Aged 11	5%	4%	7%	7%	3.2%

	Aged 12	2%	2%	3%	3%	1.1%
	Aged 13	0%	2%	1%	2%	0.5%
	Aged 14 and above	0%	1%	1%	1%	0.6%
Meals per day	1 meal	11%	10%	9%	10%	11.7%
	2 meals	31%	33%	37%	36%	39.9%
	3 or more meals	58%	57%	54%	54%	48.4%

Table 2.2: Sample descriptives in 2012, 2015, 2016, 2017 and 2018

Variable	**Option**	**2012**	**2015**	**2016**	**2017**	**2018**
Language spoken at home	Shona	67%	73%	68%	73%	76.7%
	Ndebele	14%	14%	20%	16%	14.1%
	English	2%	4%	3%	3%	2.4%
	Other	17%	9%	9%	8%	6.7%
Time spend working for family	Less than 1 hour a day	33%	33%	32%	32%	28.5%
	1 or more but less than 2 hours a day	26%	27%	36%	30%	36.7%
	2 or more but less than 3 hours a day	19%	19%	16%	18%	16.7%
	3 hours or more a day	21%	20%	16%	20%	18.1%
Number of home possessions	Zero	12%	3%	7%	6%	5.7%
	One	29%	35%	28%	31%	29.9%
	Two	23%	24%	24%	30%	28.9%
	Three	18%	20%	22%	19%	19.0%
	Four or more	18%	17%	19%	14%	16.6%
	Zero	3%	1%	0%	1%	1.9%

Number of educational resources	One	39%	38%	17%	19%	20.2%
	Two	23%	22%	21%	19%	15.7%
	Three	14%	16%	28%	35%	35.7%
	Four to six	12%	20%	34%	26%	26.5%
Highest parental education	Did not go to school	3%	3%	3%	3%	2.9%
	Did primary education	16%	16%	15%	13%	10.9%
	Did secondary education	71%	60%	56%	68%	67.2%
	Did a tertiary course	10%	21%	19%	16%	19.0%

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 learners to the test items are used to place both the learners' achievements and the item difficulties on the same measurement scale. The English and Mathematics scales that were constructed for ZELA 2018 are presented in Figure 2.1 and Figure 2.2.

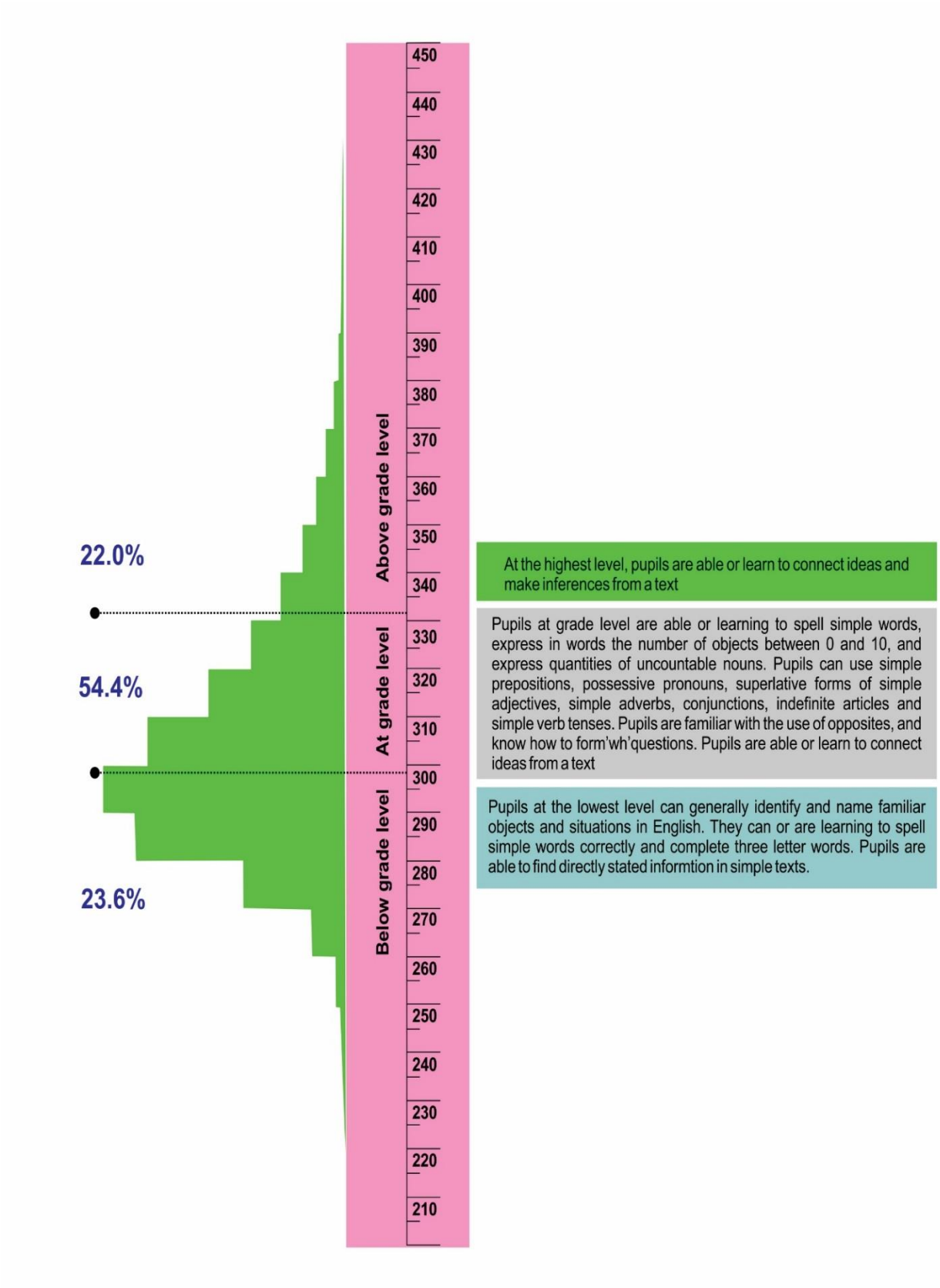

Figure 2.1: English Scale for 2018

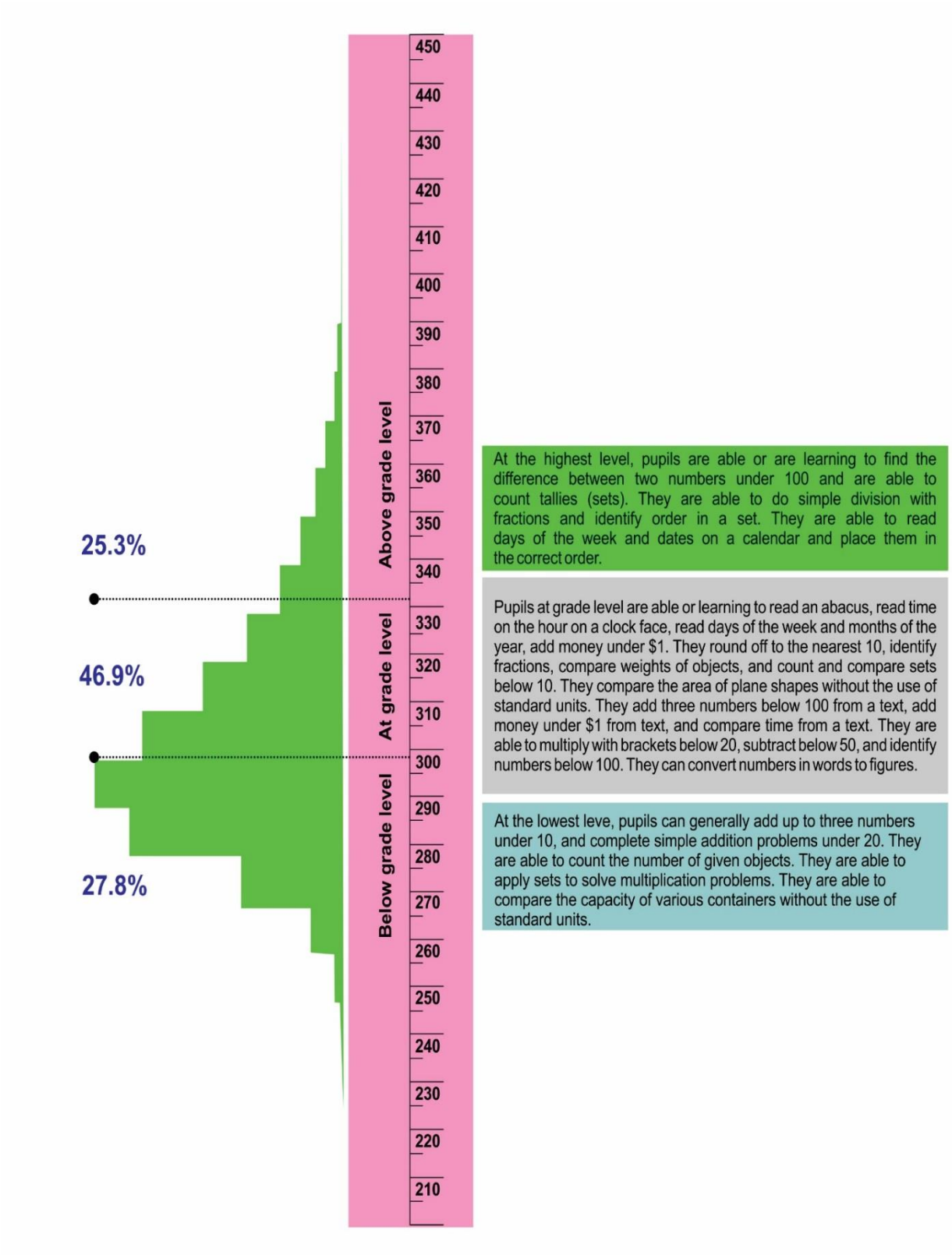

Figure 2.2: Mathematics Scale for 2018

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 learners at each location in this scale. Learners at the top of the scale are high achievers; learners 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. Learner achievement and item difficulty are matched on the scale in such a way that a learner with the same achievement score as the difficulty of item has 50 per cent chance of responding correctly to this item. Consequently, learners with an achievement score higher than an item difficulty have more than 50 per cent of responding correctly and similarly, learners with an achievement score lower that the difficulty of an item have less than 50 percent chance of responding correctly.

Placing items on the same scale as learners enables describing the skills of learners at each location on the scale and defining meaningful cut-off 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 learners are learning to master at each level are included on the right of the pink bar. Figure 2.1 shows that in English, 22% of grade three population performed above grade level in 2018, 54, 4% at grade level and 23, 6% below grade level. The percentages for Mathematics were 25, 3% above grade level, 46, 9% at grade level and 27, 8% below grade level.

2.4 Performance in English in 2018

Figure 2.3 shows the performance distribution of grade two learners in English in Zimbabwe. The results show that 22% of the learners were above grade level, 54.4% at grade level and 26.6% below grade level.

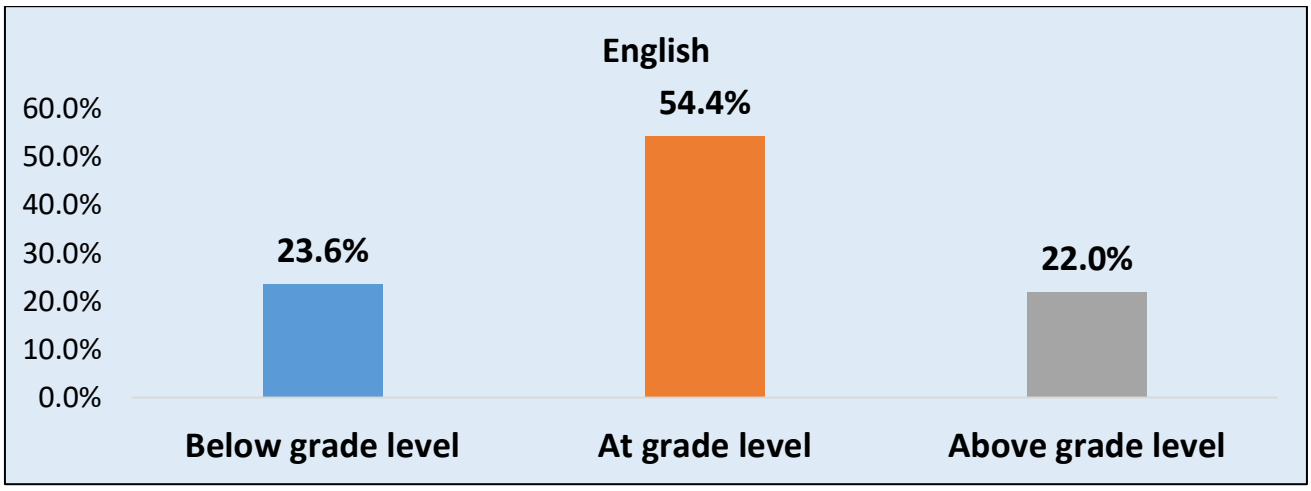

Figure 2.3: English Proficiency levels

At the highest level (above grade level), learners are able or learn to connect ideas and make inferences from text. Learners 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. Learners can use simple prepositions, possessives pronouns, superlative forms of simple adjectives, simple adverbs, conjunctions, indefinite articles and simple verb tenses. Learners are familiar with use of opposites, and know how to form 'who' questions. Learners are able or learn to connect ideas from a text. Learners 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. Learners are able to find directly stated information in simple texts.

2.5 Performance in Mathematics in 2018

Figure 2.4 shows the performance distribution of grade two learners in Mathematics in Zimbabwe. The results show that 25,3% learners are above grade level, 46,9% at grade level and 27,8% below grade level.

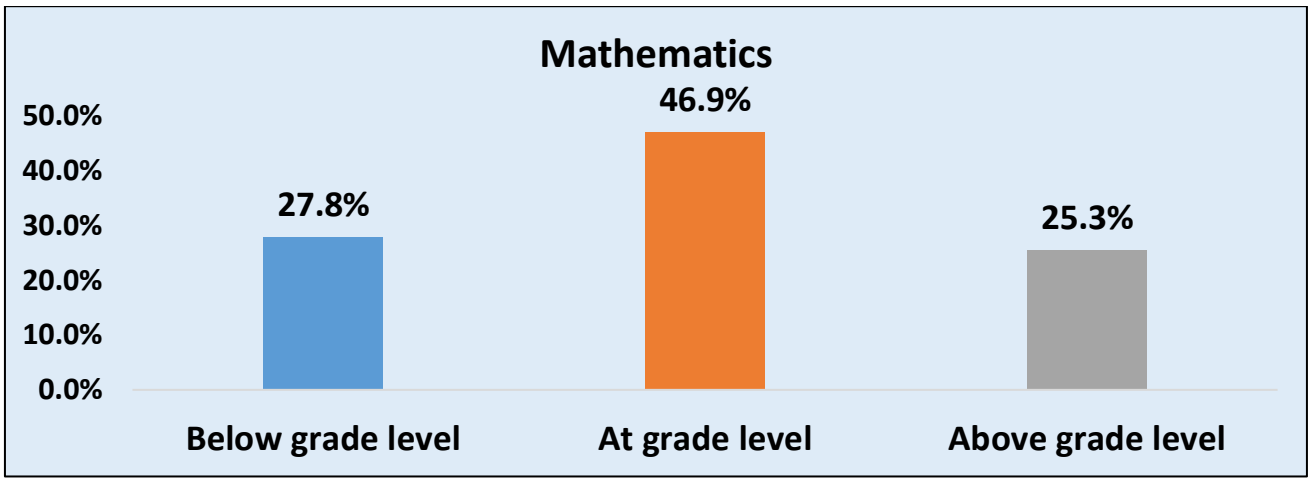

Figure 2.4: Mathematics Proficiency levels

At the highest level (above grade level), learners 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.

Learners 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), learners 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 learners in 2012, 2017 and 2018. Performance in both English and Mathematics increased significantly between 2012 and 2018. English performance increased slightly from 314.7 in 2017 to 315, 47 in 2018. This resulted in 76, 4% of the learners falling at and above grade level. This also resulted in a slight decrease in the number of learners who performed below grade level in 2018. For Mathematics, the average mean performance increased significantly from 309, 49 in 2017 to 316, 67 in 2018. This resulted in 72, 2% of the learners falling at and above grade level and there was an increase in the number of learners who performed below grade level between 2017 and 2018.

Table 2.3: Overall performance in English and Mathematics in 2012, 2017 and 2018

English	**2012**		**2017**		**2018**	**2012-2018**
Mean Performance	300(1.00)	⇑	314.70(0.21)	⇔	315.47(0.21)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Mean Performance	300(0.97)	⇑	309.49(0.18)	⇑	316.67(0.18)	⇑

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

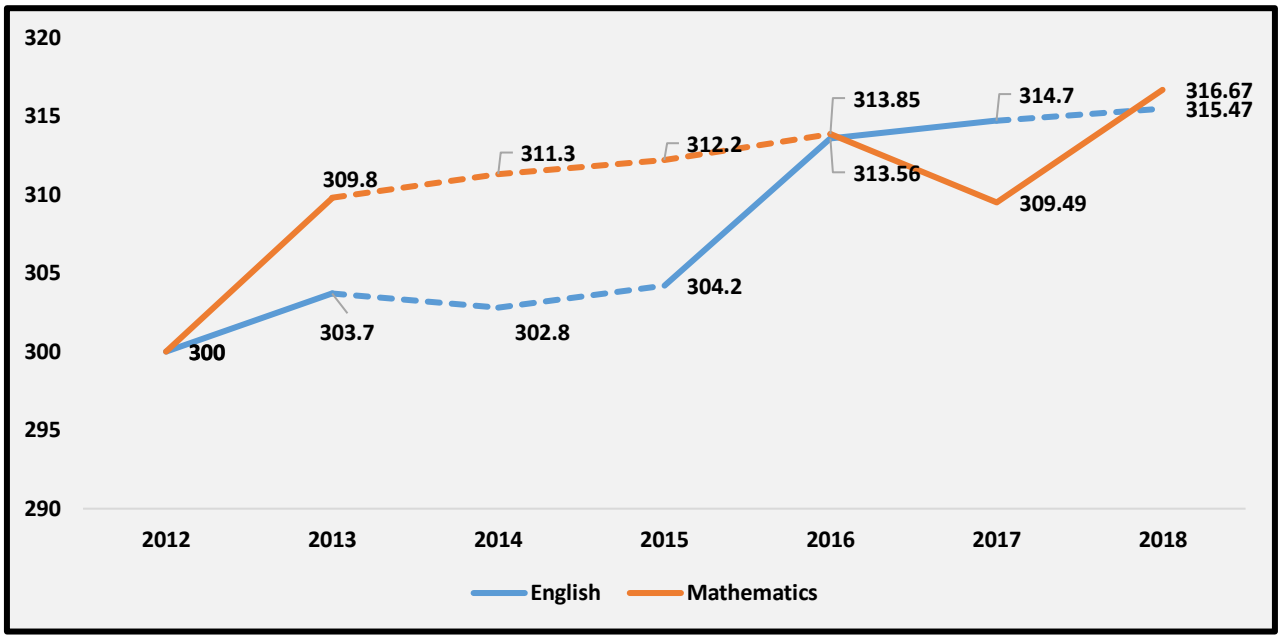

Figure 2.5: Mean performance in English and Mathematics (2012 – 2018)

Figure 2.5 graphically presents the change in average performance in English and Mathematics from 2012 to 2018. A solid line indicates significant change while a dotted line indicates no significant change. The graph shows a significant increase in Mathematics performance from 2017 to 2018 and no significant change in English performance between 2017 and 2018.

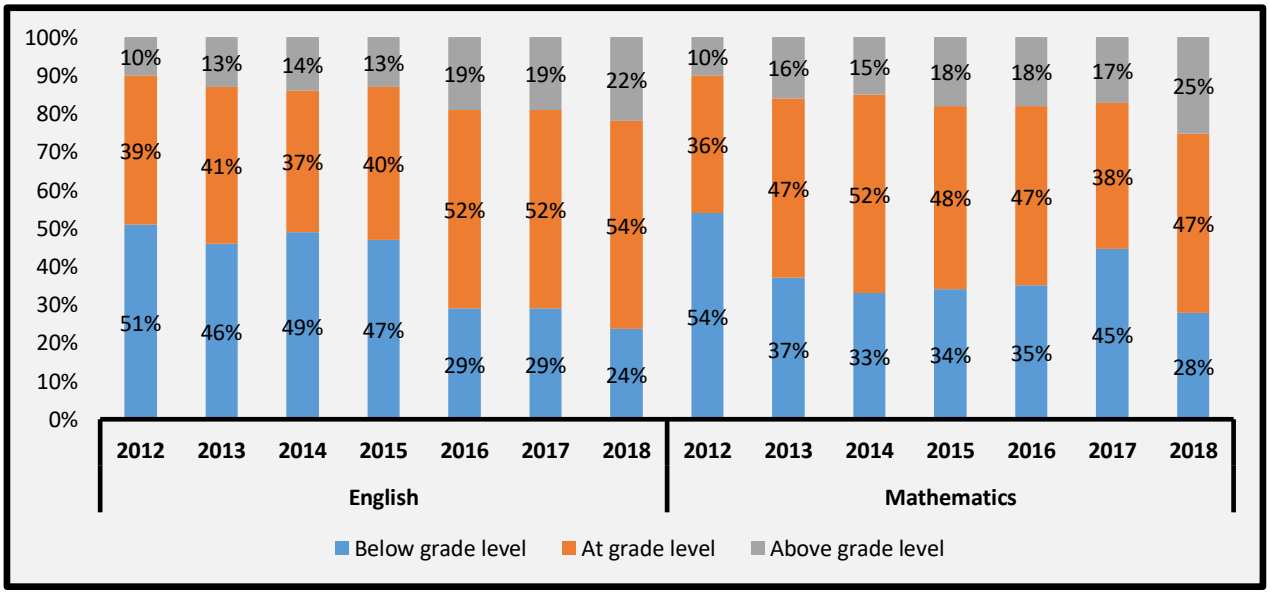

Figure 2.6: Percentages below, at and above grade level in English and Mathematics since 2012

Figure 2.6 shows the percentage of learners in each proficiency level from 2012 to 2018 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 learners in both the middle and the top proficiency levels has been increasing up to 2017. In 2018, the percentage of learners in the middle proficiency level for both English and Mathematics increased and the percentage of learners in the bottom proficiency level decreased.

2.7 Differences in performance by demographic and family background variables

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, 2017 and 2018. In 2018, the mean performance in English was 313, 56 for boys and 316,97 for girls. This difference was statistically significant at 5% level of significance. For Mathematics, the mean performance was 315,31 and 317,74 for boys and girls respectively. The difference was also statistically significant at 5% level. The difference in performance between boys and girls was smaller in Mathematics as compared to English across the cycles.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Boys	297.5(0.95)	⇑	312.33(0.29)	⇔	313.56(0.30)	⇑
Girls	302.6(1.12)	⇑	317.82(0.31)	⇔	316.97(0.29)	⇑
Difference (G-B)	⇑		⇑		⇑	
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Boys	298.3(0.97)	⇑	308.16(0.25)	⇑	315.31(0.26)	⇑
Girls	301.8(1.03)	⇑	311.27(0.26)	⇑	317.74(0.24)	⇑
Difference (G-B)	⇑		⇑		⇑	

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

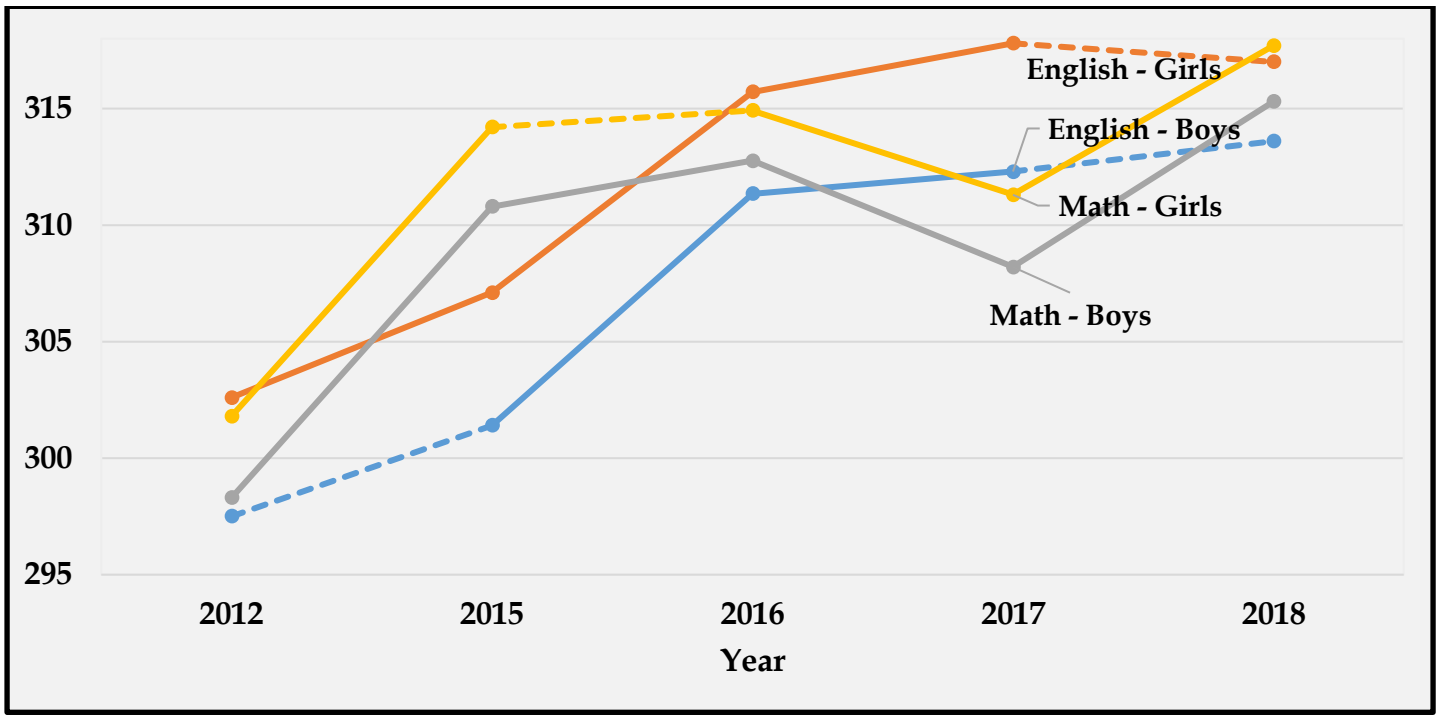

Figure 2.7: Mean performance in English and Mathematics by gender since 2012

Table 2.5 is a cross-tabulation of English and Mathematics proficiency levels and gender for 2018. The results indicate that 19,3% of the boys and 24,2% of the girls performed above grade level in English. At grade level, there isn't much difference in the percentage distribution of boys (54,6%) and girls (54,2%). In Mathematics 23,1% of the boys and 27,1% of the girls performed above grade level while 46,3% and 47.3% of boys and girls respectively performed at grade level. Overall, the percentage of boys performing at or above grade level in English was 73,9% and 78,4% for girls. In Mathematics, 69,4% of the boys performed at or above grade level and 74.4% of the girls also performed at or above grade level. The rest of the information is shown in Table 2.5 below.

Table 2.5: Cross-tabulation of Proficiency level and gender for 2018

Subject	**Proficiency Level**	**Boy**	**Girl**	**Total**
English	Above grade level	19.3%(1376)	24.2%(2183)	22.0%(3559)
	At grade level	54.6%(3886)	54.2%(4898)	54.4%(8784)
	Below grade level	26.0%(1851)	21.7%(1958)	23.6%(3809)
	Total	100%(7113)	100%(9039)	100%(16152)
Mathematics	Above grade level	23.1%(1641)	27.1%(2451)	25.3%(4092)
	At grade level	46.3%(3295)	47.3%(4279)	46.9%(7574)
	Below grade level	30.6%(2177)	25.5%(2309)	27.8%(4486)
	Total	100%(7113)	100%(9039)	100%(16152)

2.7.2 School Location

According to Table 2.6, learners from urban areas outperformed learners from rural areas in both English and Mathematics in 2012, 2017and 2018.In 2018, 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 learners from urban and rural schools.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Urban	313.5(2.77)	⇑	345.42(0.68)	⇓	340.0(0.63)	⇑
Difference	⇓		⇓		⇓	
Rural	296.4(1.04)	⇑	310.19(0.19)	⇔	311.5(0.20)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Urban	311.2(2.14)	⇑	329.71(0.49)	⇑	332.80(0.51)	⇑
Difference	⇓		⇓		⇓	
Rural	297.1(1.08)	⇑	306.52(0.18)	⇑	314.05(0.18)	⇑

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

In English, learners from urban areas had a mean score of 340,0 as compared to learners from rural schools who had a mean score of 311,5in 2018. This represents a difference of 28,5 score points. In Mathematics the difference in performance between learners from urban areas and learners from rural areas in 2018 was 18,75 score points. These results indicate that the difference in mean performance was large, especially in English. Of importance to note is the significant increase in Mathematics performance of learners from rural schools between 2017 and 2018. Figure 2.8 below shows that the difference in mean English performance between urban and rural areas grew larger over time (2012 – 2018) whilst that of Mathematics diminished between 2012 and 2016 and then increased once again in 2017 and 2018.

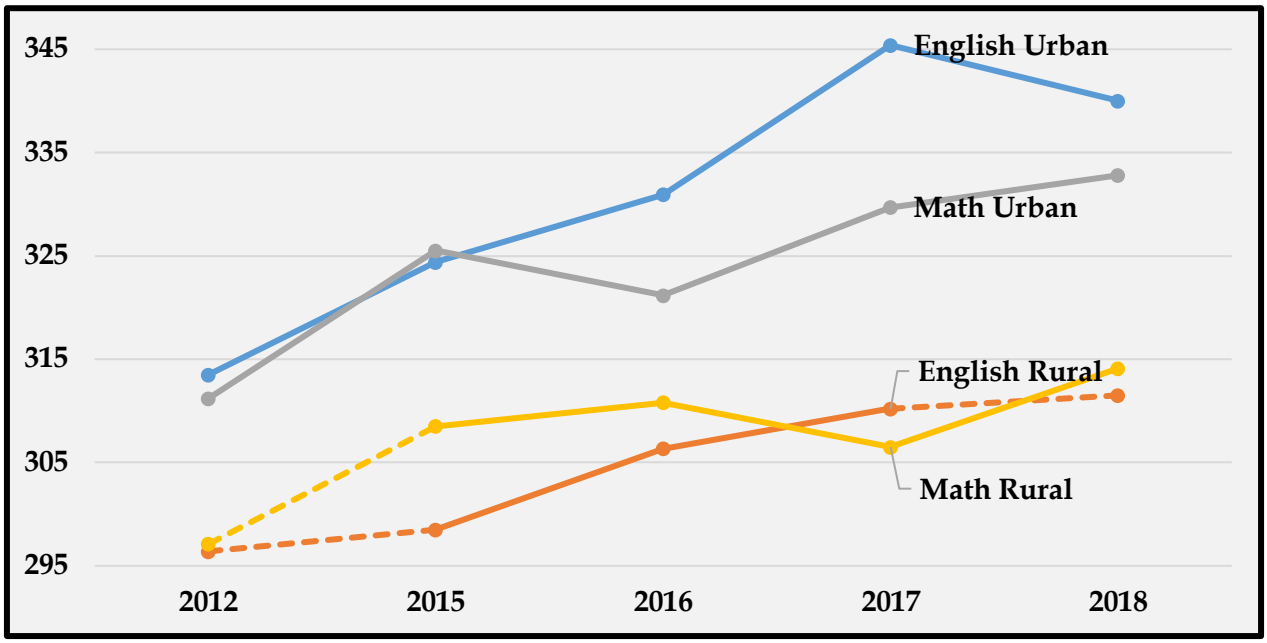

Figure 2.8: Mean performance in English and Mathematics by location since 2012

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. All the line graphs in Figure 2.8 depict an upward trend in both English and Mathematics performance from 2012 to 2018.

Table 2.7: Cross-tabulation of Proficiency level and location for 2018

Subject	Proficiency Level	Rural	Urban	Total
English	Above grade level	15.9%(2205)	60.1%(1354)	22%(3559)
	At grade level	57.7%(8023)	33.8%(761)	54.4%(8784)
	Below grade level	26.4%(3670)	6.2%(139)	23.6%(3809)
	Total	100%(13898)	100%(2254)	100%(16152)
Mathematics	Above grade level	20.4%(2830)	56%(1262)	25.3%(4092)
	At grade level	48.9%(6803)	34.2%(771)	46.9%(7574)

	Below grade level	30.7%(4265)	9.8%(221)	27.8%(4486)
	Total	100%(13898)	100%(2254)	100%(16152)

Consistent with the reported trends in mean English performance, Table 2.7 shows that the percentage of learners at or above grade level was 93.9% for learners from urban areas whilst the corresponding percentage for learners from rural areas was 73,6%.For Mathematics performance, 90,2% and 69,3% of learners from urban and rural schools performed at or above grade level in 2018 respectively.

2.7.3 Province

Table 2.8: Performance in English by province since 2012

English	**2012**		**2017**		**2018**	**2012-2018**
Bulawayo	316.0(2.66)	⇑	343.91(1.64)	⇓	338.8(1.49)	⇑
Harare	321.1(5.24)	⇑	345.00(1.05)	⇔	346.1(1.07)	⇑
Manicaland	297.5(1.23)	⇑	313.54(0.51)	⇔	315.4(0.47)	⇑
Mashonaland Central	295.5(1.31)	⇑	308.50(0.53)	⇔	308.7(0.63)	⇑
Mashonaland East	296.9(2.27)	⇑	315.63(0.56)	⇔	317.9(0.60)	⇑
Mashonaland West	299.1(3.52)	⇑	309.74(0.52)	⇔	306.3(0.60)	⇑
Masvingo	299.3(1.03)	⇑	312.38(0.69)	⇔	315.7(0.47)	⇑
Matabeleland North	290.6(2.35)	⇑	311.02(0.65)	⇔	308.4(0.66)	⇑
Matabeleland South	294.0(5.66)	⇑	309.81(0.62)	⇑	314.6(0.72)	⇑
Midlands	297.1(4.05)	⇑	314.89(0.49)	⇔	316.7(0.56)	⇑

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, learners from Bulawayo and Harare outperformed all the other provinces in 2017 and 2018 with higher mean performances in English and Mathematics whereas Mashonaland West, Mashonaland Central and Matabeleland South had the lowest mean performance. It needs to be noted that, from 2012 to 2018, all provinces recorded significant improvement in English as shown in Table 2.8 above with the exception of Mashonaland West and Central. For Mathematics, Table 2.9 shows that all provinces recorded significant performance increase between 2012 and 2018.

Table 2.9: Performance in Mathematics by province since 2012

Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Bulawayo	314.8(1.69)	⇑	327.59(1.16)	⇑	331.6(1.12)	⇑
Harare	316.8(4.01)	⇑	330.89(0.78)	⇑	337.5(0.88)	⇑
Manicaland	297.4(1.24)	⇑	308.17(0.46)	⇑	318.0(0.43)	⇑
Mashonaland Central	296.4(1.13)	⇑	304.04(0.51)	⇑	312.8(0.56)	⇑
Mashonaland East	298.3(2.42)	⇑	310.24(0.48)	⇑	317.7(0.50)	⇑
Mashonaland West	300.9(4.25)	⇑	305.45(0.45)	⇑	309.1(0.52)	⇑
Masvingo	300.1(1.45)	⇑	308.96(0.65)	⇑	318.1(0.42)	⇑
Matabeleland North	290.6(2.71)	⇑	307.07(0.53)	⇔	309.2(0.57)	⇑
Matabeleland South	294.0(4.78)	⇑	304.80(0.57)	⇑	315.9(0.62)	⇑
Midlands	296.5(3.74)	⇑	311.57(0.42)	⇑	317.6(0.47)	⇑

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

Between 2017 and 2018, all the provinces showed no significant change in English performance, with the exception of Bulawayo and Matabeleland South which recorded a significant decrease and increase in performance respectively. In Mathematics, there were significant performance increases in all provinces except Matabeleland North, where no change was recorded between 2017 and 2018

Table 2.10: Cross-tabulation of Proficiency level and province for 2018

	Above grade level	**At grade level**	**Below grade level**	**Total**
English				
Manicaland	20%(492)	60.1%(1478)	19.9%(489)	100%(2459)
Mashonaland West	13.4%(263)	51%(1003)	35.7%(702)	100%(1968)
Matabeleland South	22.5%(287)	52.6%(672)	25%(319)	100%(1278)
Matabeleland North	12.8%(178)	54.6%(760)	32.7%(455)	100%(1393)
Masvingo	20.8%(514)	58.5%(1445)	20.7%(512)	100%(2471)
Midlands	21.7%(476)	57.1%(1252)	21.2%(464)	100%(2192)
Mashonaland East	24.1%(449)	56.7%(1057)	19.2%(358)	100%(1864)
Mashonaland Central	12.5%(178)	54.9%(779)	32.6%(463)	100%(1420)
Harare	69.1%(489)	27.8%(197)	3.1%(22)	100%(708)
Bulawayo	58.4%(233)	35.3%(141)	6.3%(25)	100%(399)
Total	22%(3559)	54.4%(8784)	23.6%(3809)	100%(16152)
Mathematics	**Above grade level**	**At grade level**	**Below grade level**	**Total**

Manicaland	26.5%(651)	50.7%(1247)	22.8%(561)	100%(2459)
Mashonaland West	15.3%(301)	44.8%(882)	39.9%(785)	100%(1968)
Matabeleland South	27.1%(346)	41.2%(526)	31.8%(406)	100%(1278)
Matabeleland North	14.6%(204)	43.5%(606)	41.9%(583)	100%(1393)
Masvingo	25.9%(640)	51.4%(1269)	22.7%(562)	100%(2471)
Midlands	24%(526)	49.3%(1081)	26.7%(585)	100%(2192)
Mashonaland East	26.7%(497)	49.7%(926)	23.7%(441)	100%(1864)
Mashonaland Central	17%(242)	49.3%(700)	33.7%(478)	100%(1420)
Harare	66%(467)	27.5%(195)	6.5%(46)	100%(708)
Bulawayo	54.6%(218)	35.6%(142)	9.8%(39)	100%(399)
Total	25.3%(4092)	46.9%(7574)	27.8%(4486)	100%(16152)

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 and Harare had 93,7% and 96,9% respectively of their learners performing at or above grade level in English in 2018. In Mathematics, 90,2% and 93,5% of learners from Bulawayo and Harare respectively performed at or above grade level. Mashonaland West, Mashonaland Central, Matabeleland South and Matabeleland North had the largest percentages of students performing below grade level in both English and Mathematics.

2.7.4 Age group

Mean performances for learners' age groups where computed and compared over time. In English, there was a significant increase in mean performance from 2012 to 2018 for all

age groups. While there were no significant increases in English performance between 2017 and 2018 for learners aged 7, aged 8, aged 10, aged up to learners aged 14 or above, the rest of the other age groups experienced significant decreases in performance as shown in Table 2.11 below.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Aged 6 and below	298.2(3.08)	⇑	327.08(5.89)	⇓	315.59(3.43)	⇑
Age 7	305.7(1.90)	⇑	316.41(2.26)	⇔	319.86(0.85)	⇑
Age 8	303.0(1.32)	⇑	319.19(0.53)	⇔	322.01(0.39)	⇑
Age 9	296.7(0.92)	⇑	315.97(0.31)	⇓	311.14(0.31)	⇑
Age 10	294.7(1.00)	⇑	310.28(0.40)	⇔	312.97(0.54)	⇑
Age 11	295.3(1.03)	⇑	309.53(0.66)	⇔	312.85(0.96)	⇑
Age 12	293.9(1.52)	⇑	310.95(0.96)	⇔	313.93(1.6)	⇑
Age 13	292.7(3.68)	⇑	309.19(1.31)	⇔	310.98(2.15)	⇑
Age 14 or above	298.7(1.90)	⇑	309.00(1.48)	⇔	312.15(2.46)	⇑

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. The table shows that there was a significant increase in Mathematics performance for all age groups. However, between 2017 and 2018, most of the age groups experienced significant increases in Mathematics performance, with only learners aged 6 and below, aged 9 and 10 experiencing no significant change in Mathematics performance.

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

Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Aged 6 and below	295.8(3.22)	⇑	315.59(4.12)	⇔	317.96(3.2)	⇑
Age 7	303.5(1.49)	⇑	311.28(1.85)	⇑	319.3(0.69)	⇑
Age 8	302.2(1.23)	⇑	311.16(0.42)	⇑	321.31(0.31)	⇑
Age 9	297.7(1.01)	⇑	310.49(0.26)	⇔	313.23(0.27)	⇑
Age 10	296.0(1.07)	⇑	306.70(0.38)	⇔	315.64(0.47)	⇑
Age 11	297.2(1.19)	⇑	307.41(0.63)	⇑	315.43(0.89)	⇑
Age 12	297.0(1.73)	⇑	306.86(0.90)	⇑	321.02(1.47)	⇑
Age 13	297.0(4.02)	⇑	309.09(1.21)	⇑	316.87(2.28)	⇑
Age 14 or above	304.6(2.26)	⇔	306.41(1.38)	⇑	317.48(2.13)	⇑

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 above indicate that in 2018, 76,3% of the learners spoke Shona at home, 14,1% spoke Ndebele, 2,4% spoke English and 6,7% spoke other languages. Mean performances for learners 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**		**2017**		**2018**	**2012-2018**
Shona	300.8(0.99)	⇑	314.78(0.24)	⇔	314.87(0.24)	⇑
Ndebele	297.2(1.73)	⇑	314.29(0.49)	⇔	316.7(0.55)	⇑
English	331.5(7.30)	⇑	338.74(1.64)	⇔	338.83(1.68)	⇑
Other	291.4(1.70)	⇑	305.96(0.62)	⇑	311.21(0.69)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Shona	300.8(1.00)	⇑	309.69(0.21)	⇑	316.38(0.2)	⇑
Ndebele	297.4(1.73)	⇑	309.41(0.42)	⇑	317.27(0.46)	⇑
English	322.1(5.36)	⇔	323.65(1.14)	⇑	331.53(1.35)	⇑
Other	292.3(2.17)	⇑	302.64(0.57)	⇑	313.3(0.6)	⇑

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

Between 2012 and 2018, results show a significant increase in both English and Mathematics performance for learners who speak Shona, Ndebele and Other Languages at home. Learners who speak English at home have always outperformed learners who do not speak English at home since 2012, as their performance has changed significantly

between 2012 and 2018in both English and Mathematics. Between 2017 and 2018, the results show no significant change in English performance for learners who speak English at home and a significant increase in Mathematics performance for those who speak English at home. Learners who speak Ndebele at home registered no significant change in their English performance from a mean of 314,29 score points in 2017 to 316,7 score points in 2018. In achievement, learners who speak English at home achieved the highest scores in English and Mathematics, whereas those speaking Other languages obtained the lowest scores in both subjects. Long term improvements in the mean English performance were observed for learners who speak Ndebele at home between 2012 and 2018 (Long term improvements are indicated by long solid lines in Figure 2.9.)

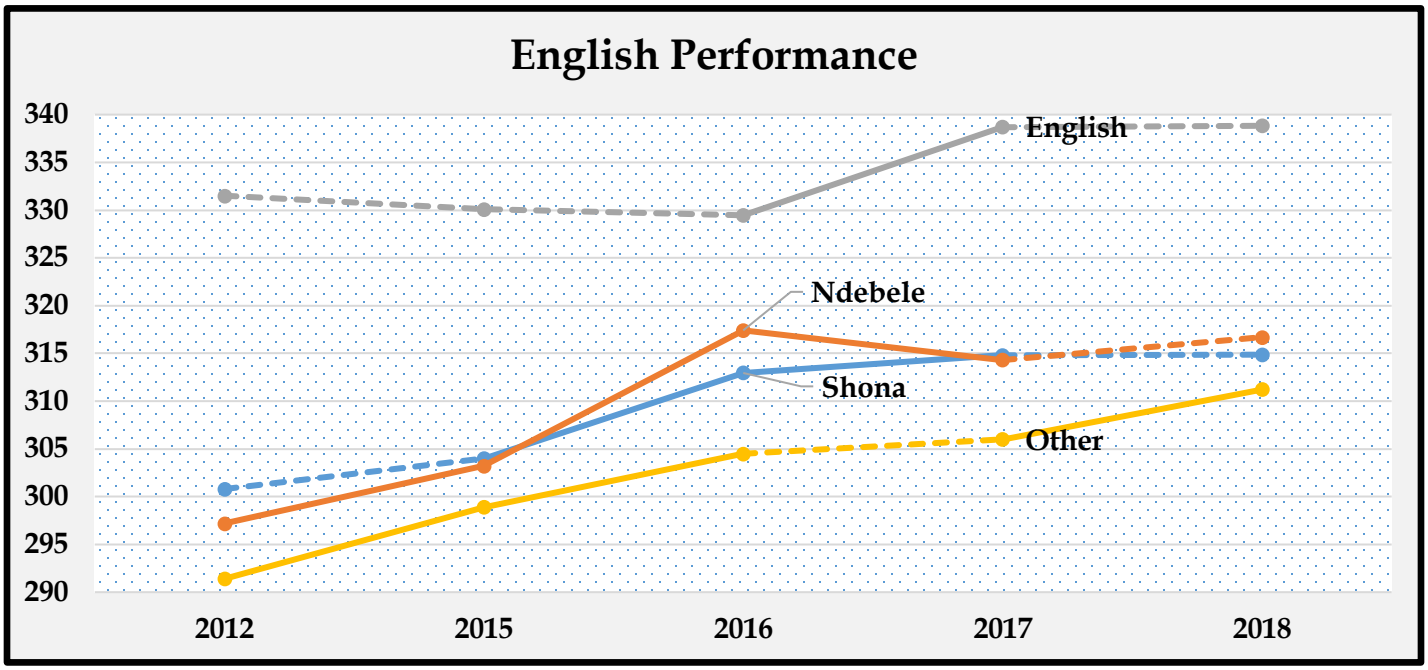

Figure 2.9: Mean performance in English by language spoken at home since 2012

Figure 2.9 above shows that the English performance of learners who speak English at home was generally higher than of those who speak indigenous languages. The graph further shows a significant increase in English performance between 2017 and 2018 for learners who speak English and those who speak Shona at home. The English

performance of learners who speak Ndebele at home increased significantly between 2012 and 2015 and between 2015 and 2016, however it decreased significantly between 2016 and 2017, and increased slightly from 2017 to 2018.

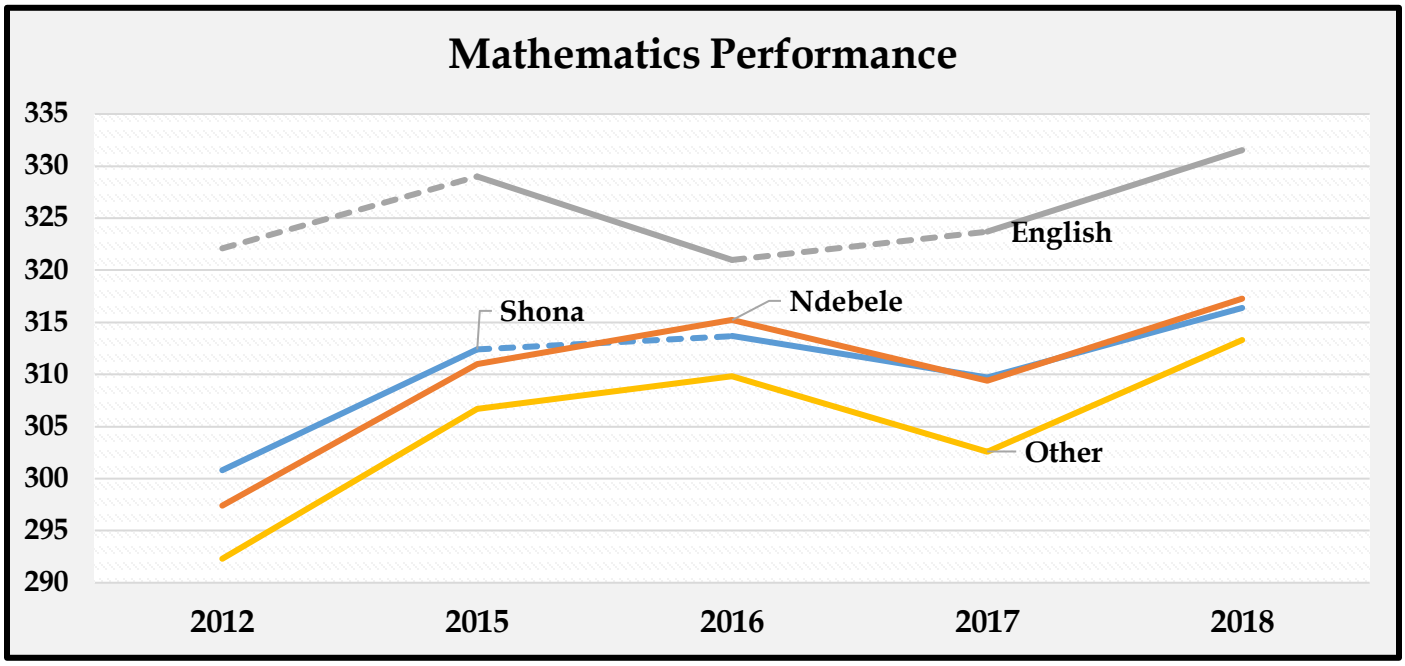

Figure 2.10: Mean performance in Mathematics by language spoken at home since 2012

Figure 2.10 and Figure 2.9 are similar in that learners who speak Ndebele and Other languages at home have shown long term significant improvement in English and Mathematics between 2012 and 2016.However, there has been a decrease in English and Mathematics performance between 2016 and 2017 for learners who speak Ndebele at home.For Mathematics, learners who speak English at home have always outperformed those who speak indigenous languages. Table 2.14 is a cross-tabulation of proficiency levels and language spoken at home for 2018. The majority (54.6%) of learners who speak English at home performed above grade level in English test whilst 52% of learners who speak English at home performed above grade level in Mathematics test. Learners who speak other languages at home had the highest representation in the at grade level category, contributing 57.9% and 48.8% in English and Mathematics respectively.

Table 2.14: Cross-tabulation of Proficiency level and language spoken at home for 2018

Proficiency Level	**Shona**	**Ndebele**	**English**	**Other**	**Total**
English					
Above grade level	21.4%(2655)	23.4%(534)	54.6%(215)	14.4%(155)	22%(3559)
At grade level	54.7%(6776)	54.4%(1242)	35.8%(141)	57.9%(625)	54.4%(8784)
Below grade level	23.9%(2964)	22.2%(507)	9.6%(38)	27.8%(300)	23.6%(3809)
Total	100%(12395)	100%(2283)	100%(394)	100%(1080)	100%(16152)
Mathematics					
Above grade level	24.8%(3076)	26.6%(607)	52%(205)	18.9%(204)	25.3%(4092)
At grade level	47.6%(5898)	44.9%(1025)	31.5%(124)	48.8%(527)	46.9%(7574)
Below grade level	27.6%(3421)	28.5%(651)	16.5%(65)	32.3%(349)	27.8%(4486)
Total	100%(12395)	100%(2283)	100%(394)	100%(1080)	100%(16152)

2.7.6 Time per day working for the family

According to Table 2.15, learners that worked less than an hour per day for their families performed better than those that worked one hour or more in both English and Mathematics over the years from 2012 to 2018, with the exception of Mathematics performance for 2012. In 2017, learners that worked less than an hour per day for their families had a mean of 316.97score points in English as compared to 319.09score points in

2018 and this difference of 2.12 score points was statistically insignificant. For Mathematics, there was a significant increase in performance between 2017 and 2018 for the two categories of the variable.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Less than 1 hour	302.1(1.30)	⇑	316.97(0.38)	⇔	319.09(0.39)	⇑
Difference	⇑		⇑		⇑	
1 hour or more	299.7(1.07)	⇑	313.64(0.25)	⇔	314.03(0.25)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Less than 1 hour	301.3(1.22)	⇑	311.18(0.32)	⇑	319.32(0.33)	⇑
Difference	⇔		⇑		⇑	
1 hour or more	299.9(1.03)	⇑	308.69(0.21)	⇑	315.61(0.21)	⇑

Where {⇑} *indicate a significant increase,* {⇔} *no change and* {⇓} *significant decrease. Difference*(Φ)=*Less than 1 hour - 1 hour or more. Standard errors are reported between brackets.*

In 2017, the differences in performance between learners that worked less than an hour per day for their families and learners that worked one hour or more were 3.33 score points in English and 2.49 score points in Mathematics and these were both statistically significant. In 2018, these differences increased to 15.06 and 3.71 score points respectively for English and Mathematics and the differences were statistically significant. Figure 2.11 shows the mean performance in English and Mathematics by time per day spent working for the family from 2012 to 2018. The results indicate a long term significant increase in English performance from 2012 to 2016 for learners that worked less than an hour per

day. However, between 2016 and 2017 the results show no significant change in performance. For Mathematics, the performance for learners that worked less than an hour per day increased significantly between2012 and 2015 but remained stable between 2015 and 2016. Between 2016 and 2017, the Mathematics performance decreased significantly. In 2018, there were significant increases in performance for both groups in both English and Mathematics, although performance for learners who worked less than an hour was higher than those who worked for 1 hour or more for the family.

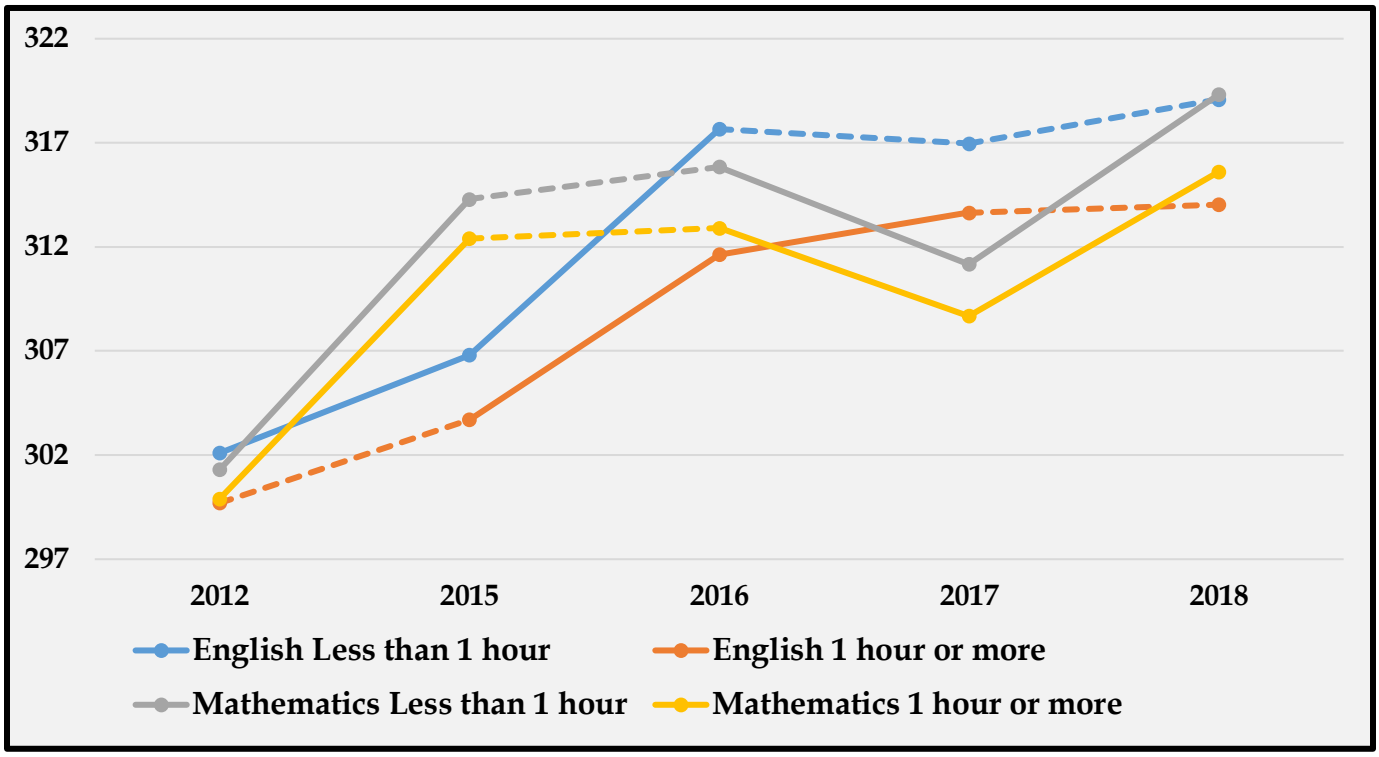

Figure 2.11: Mean performance in English and Mathematics by time per day spent working for the family since 2012

Table 2.16 is a cross-tabulation of proficiency levels and time spend working for the family for 2018. The results show that 79.3% of the learners that worked less than an hour per day performed at or above grade level in English whilst 75.3% oflearners that worked for one hour or more per day performed at or above grade level. In Mathematics, 74.9% of learners that worked less than an hour per day performed at or above grade level and

71.2% of those that worked for one hour or more per day performed at or above grade level. These differences could be attributed to the fact that learners who spent less time working for the family have more time to study as compared to those who work for more hours.

Table 2.16: Cross-tabulation of Proficiency level and Time spent working for family for 2018

Proficiency Level	**Less than 1 hour**	**1 hour or more**	**Total**
English			
Above grade level	26.7%(1230)	20.2%(2329)	22%(3559)
At grade level	52.6%(2423)	55.1%(6361)	54.4%(8784)
Below grade level	20.6%(950)	24.8%(2859)	23.6%(3809)
Total	100%(4603)	100%(11549)	100%(16152)
Mathematics			
Above grade level	30.2%(1392)	23.4%(2700)	25.3%(4092)
At grade level	44.7%(2058)	47.8%(5516)	46.9%(7574)
Below grade level	25%(1153)	28.9%(3333)	27.8%(4486)
Total	100%(4603)	100%(11549)	100%(16152)

Table 2.17 below shows the differences in learner 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 results from 2012 to 2015 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, 2017 and 2018.

Category	**2016**		**2017**		**2018**
English					
Less than 1 hour	317.66(0.36)	⇔	316.97(0.38)	⇔	319.09(0.39)
Difference	⇑		⇑		⇑
1 hour and more but less than 2 hours	310.84(0.32)	⇑	314.14(0.37)	⇔	311.32(0.36)
Difference	⇓		⇔		⇓
2 hours and more but less than 3 hours	312.16(0.41)	⇑	314.40(0.47)	⇔	316.09(0.47)
Difference	⇔		⇑		⇔
3 hours or more	312.93(0.46)	⇔	312.26(0.45)	⇑	317.6(0.48)
Mathematics					
Less than 1 hour	315.83(0.28)	⇓	311.18(0.32)	⇑	319.32(0.33)
Difference	⇑		⇔		⇑
1 hour and more but less than 2 hours	312.28(0.28)	⇓	309.30(0.33)	⇑	313.42(0.31)
Difference	⇔		⇔		⇓
2 hours and more but less than 3 hours	313.14(0.35)	⇓	308.79(0.41)	⇑	317.9(0.4)
Difference	⇔		⇔		⇔
3 hours or more	314.15(0.40)	⇓	307.74(0.38)	⇑	317.94(0.39)

Where {⇑} *indicate a significant increase,* {⇔} *no change and* {⇓} *significant decrease.*

Table 2.17 shows that learners who worked less than 1 hour for their families outperformed learners who worked for 1 hour and more but less than 2 hours in English and the difference between these two groups was statistically significant. However, there was no significant difference in performance between learners who worked for 1 hour and more but less than 2 hours and learners who worked for 2 hours and more but less than 3 hours in English. The 2017 results further show a significant difference in English performance between learners who worked for 2 hours and more but less than 3 hours and learners who worked for 3 hours or more. For Mathematics, the 2017 results show that there were no significant differences in performance among all the groups. Results for 2018 show significant changes in performance among the four groups in both English and Mathematics, with those who work for less than an hour performing better than other groups.

2.7.7 Meals per day

Learners were asked how many meals per day they usually had. A meal referred to eating meat, vegetables and/or starch. Descriptive statistics (Table 2.1) for 2018 indicate that 11.7% had one meal per day, 39.9% had two meals per day and 48.4% had three or more meals per day. As shown in Table 2.18, learners eating three or more meals per day outperformed learners eating two meals per day in both English and Mathematics in 2017 and 2018. The difference in performance between these two groups was statistically significant from 2012 to 2018. The results also indicate no significant difference in English performance between learners eating two meals and learners eating one meal in 2012, but shows a significant difference in 2017. In Mathematics, significant differences in performance between learners eating two meals and learners eating one meal were observed in 2012 and 2017. In 2018 there is no significant difference in performance between learners who had two meals per day and those who had one meal in both English and Mathematics.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Three or more meals	303.5(1.28)	⇑	318.26(0.30)	⇔	321.26(0.3)	⇑
Difference	⇑		⇑		⇑	
Two meals	296.3(1.06)	⇑	310.88(0.32)	⇔	309.56(0.32)	⇑
Difference	⇔		⇑		⇔	
One meal	294.8(1.34)	⇑	308.94(0.59)	⇔	311.69(0.54)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Three or more meals	303.3(1.12)	⇑	312.51(0.24)	⇑	321.58(0.25)	⇑
Difference	⇑		⇑		⇑	
Two meals	296.9(1.06)	⇑	306.46(0.29)	⇑	311.91(0.28)	⇑
Difference	⇑		⇑		⇔	
One meal	293.3(1.58)	⇑	303.82(0.52)	⇑	312.64(0.49)	⇑

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 learners eating three or more meals. The same applies for learners eating one meal. However, learners eating three or more meals and learners eating one meal showed short-term improvements in English between 2015 and 2016 and an insignificant change between 2016 and 2017as shown in Figure 2.12. Learners eating two meals showed long term improvement in English performance between 2012 and 2017. In2017,learners eating two meals outperformed learners eating one meal by 1.94 score points in English. This difference was small but significant. In 2018, although there was an improvement among

the three groups of learners, such improvement was not statistically significant as reflected in table 2.18 and shown in figure 2.12.

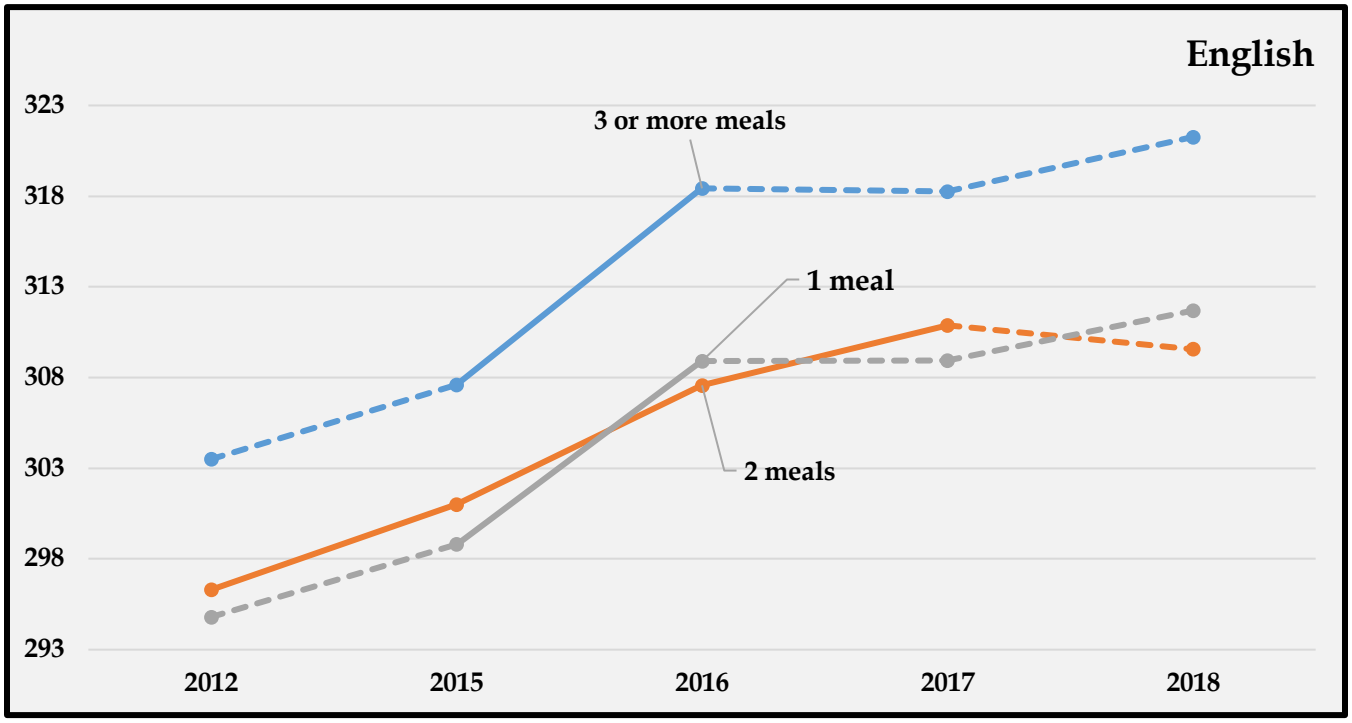

Figure 2.12: Mean performance in English by number of meals per day since 2012

Figure 2.13 shows the mean performance in Mathematics by number of meals per day since 2012. Similar to the results for English above, learners eating three or more meals per day outperformed learners eating two meals in Mathematics in 2012, 2015, 2016, 2017 and 2018. The difference between learners eating three or more meals per day and learners eating two meals was moderate and stable over time. Learners eating three or more meals per day and learners eating only one meal per day showed long term improvements from 2012 to 2016 in Mathematics and a short term decrease between 2016 and 2017. There was however, a significant increase in performance in Mathematics between 2017 and 2018 for the two groups of learners.

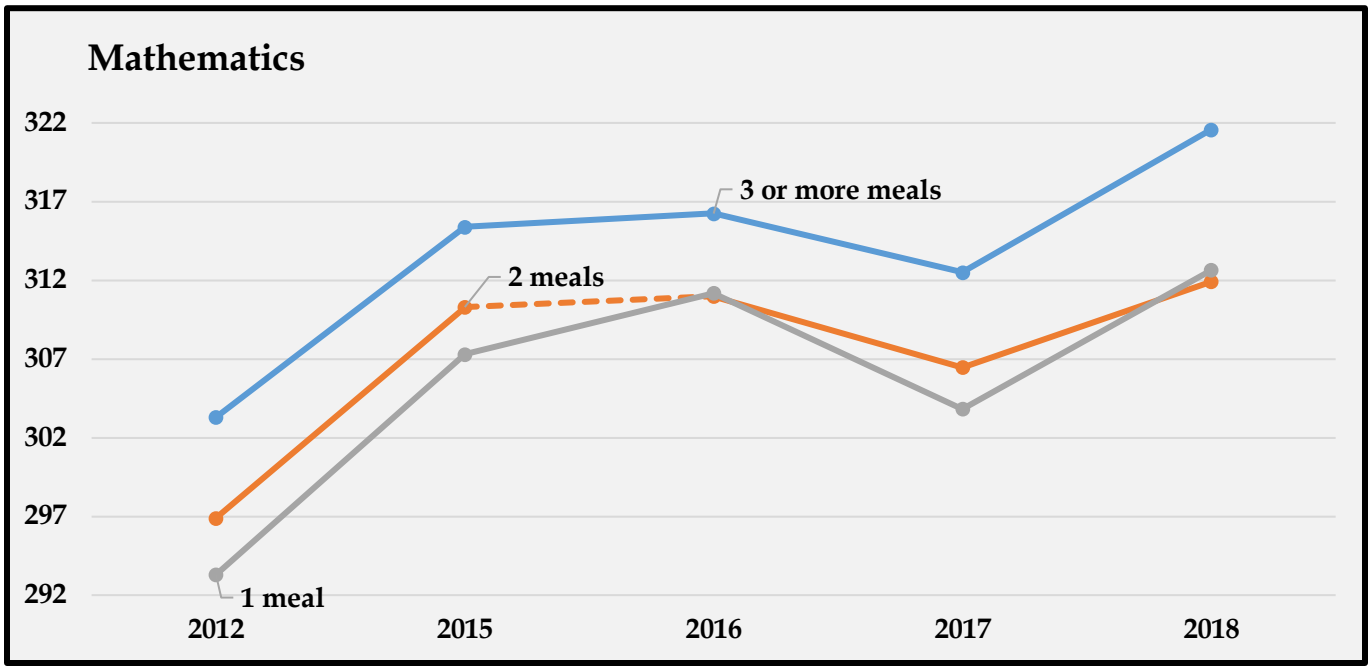

Figure 2.13: Mean performance in Mathematics by number of meals per day since 2012

As shown in Table 2.19, 82.4% of the learners eating 3 or meals performed at or above grade level in English. The percentages of learners performing at or above grade level for learners eating two meals was 70.4% whilst that for learners eating one meal was 72.3%. These results indicate that as the number of meals per day increases, the number of learners performing at or above grade level increases. For Mathematics, the percentages of learners performing at or above grade level for learners eating 3 or more meals was 79.1%, 65.9% for learners eating 2 meals and 65.3% for learners eating one meal. The same conclusion can be drawn for Mathematics, that as the number of meals per day increase, learner performance increases accordingly.

Table 2.19: Cross-tabulation of Proficiency level and number of meals per day for 2018

Proficiency Level	One meal	Two meals	3 or more meals	Total
English				
Above grade level	15.6%(295)	14.8%(955)	29.6%(2309)	22%(3559)
At grade level	56.7%(1072)	55.6%(3586)	52.8%(4126)	54.4%(8784)
Below grade level	27.6%(522)	29.6%(1911)	17.6%(1376)	23.6%(3809)
Total	100%(1889)	100%(6452)	100%(7811)	100%(16152)
Mathematics				
Above grade level	18.3%(345)	18.1%(1167)	33%(2580)	25.3%(4092)
At grade level	47%(888)	47.8%(3085)	46.1%(3601)	46.9%(7574)
Below grade level	34.7%(656)	34.1%(2200)	20.9%(1630)	27.8%(4486)
Total	100%(1889)	100%(6452)	100%(7811)	100%(16152)

2.7.8 Number of home possessions

Learners were asked which of the following home possessions they had at their home: electricity, piped water, television, borehole and radio. Descriptive statistics were computed on the total number of items, in the list, they had at their home. 5.7% had none of the items, 29.9% had one, 28.9% had two, 19.0% had three, whilst 16.4% had four or more home possessions. Results with combined groups are shown in Table 2.20 and results with split groups are shown in Table 2.22. In 2017, learners with four or more home possessions outperformed those with two or three home possessions who in-turn outperformed learners with one or less home possessions in English as shown in Table 2.20. The differences between the groups are significant as shown by the arrows. In Mathematics, the same trend is observed for all three groups. In 2018, the same trend is observed for both English and Mathematics but the difference is only significant for learners with four or more and two or three possessions. The difference is not statistically

significant for learners with two or three and those with one or less possessions in both English and Mathematics.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Four or more	316.6(2.32)	⇑	327.77(0.68)	⇔	326.29(0.57)	⇑
Difference	⇑		⇑		⇑	
Two or three	298.8(0.92)	⇑	314.08(0.29)	⇔	313.79(0.3)	⇑
Difference	⇑		⇑		⇔	
One or less	294.4(1.02)	⇑	310.66(0.31)	⇔	312.69(0.32)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Four or more	314.2(1.98)	⇑	318.08(0.52)	⇑	324.33(0.45)	⇑
Difference	⇑		⇑		⇑	
Two or three	299.5(0.92)	⇑	309.42(0.25)	⇑	315.6(0.26)	⇑
Difference	⇑		⇑		⇔	
One or less	294.3(0.99)	⇑	306.38(0.26)	⇑	314.54(0.29)	⇑

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

The difference in English performance between learners with four or more home possessions and learners with two or three possessions was consistently large across all the assessment years as shown in Figure 2.14. On the other hand, the difference in English performance between learners with two or three possessions and learners with one or less possession was small. Learners with one or less possessions at home showed a long term

significant improvement in English between 2012 and 2018. In comparison, other groups showed short-term improvement between 2015 and 2018 in English performance.

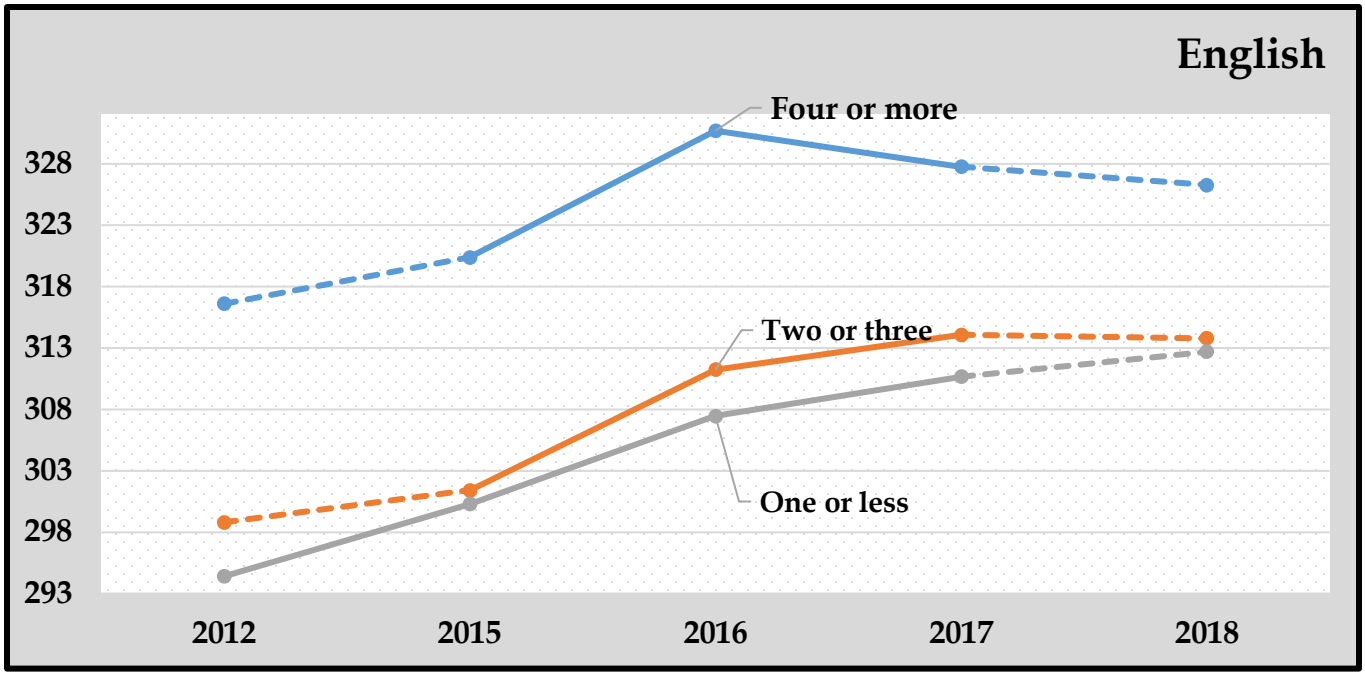

Figure 2.14: Mean performance in English by number of home possessions since 2012

For Mathematics, learners with two or three home possessions showed long-term improvement between 2012 and 2016. However, a significant decrease was observed from 2016 to 2017 and thereafter an increase in performance from 2017 to 2018. The other groups showed significant improvement in performance between 2012 and 2015 only as shown in Figure 2.15 below but decreased significantly in performance from 2016 to 2017, and increased significantly from 2017 to 2018.

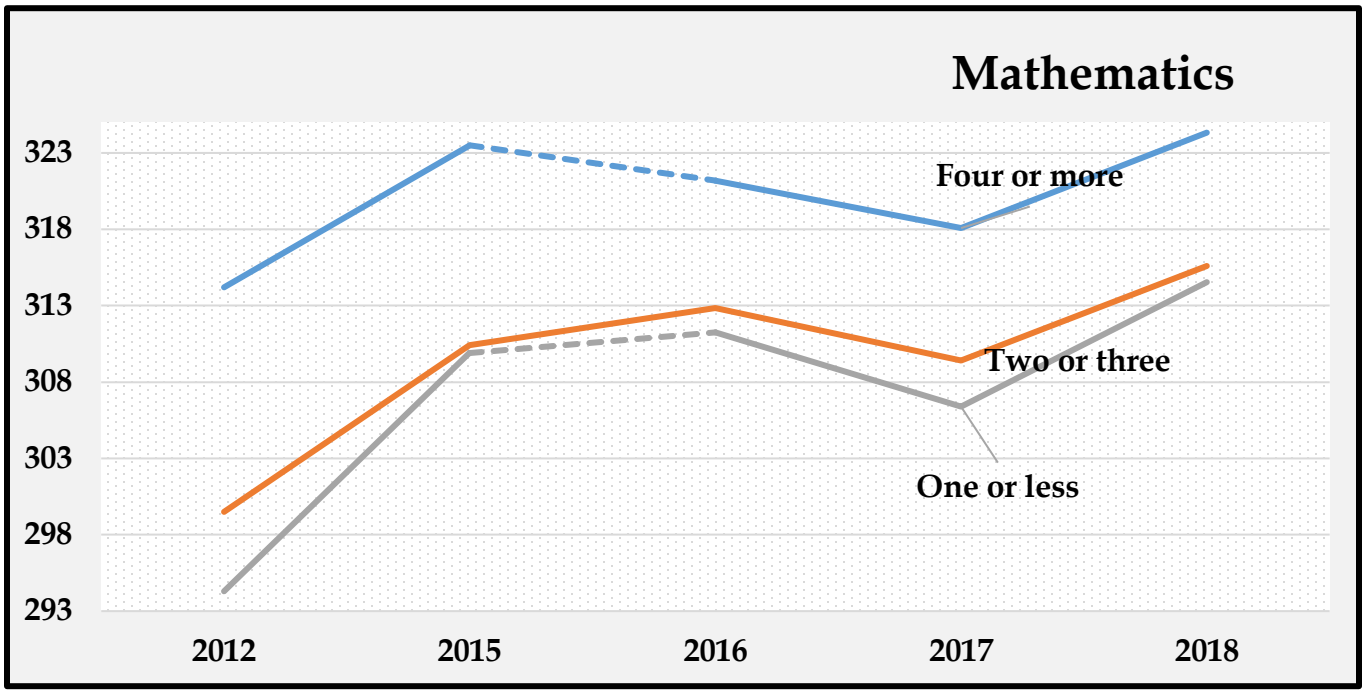

Figure 2.15: Mean performance in Mathematics by number of home possessions since 2012

Table 2.21 is a cross-tabulation of proficiency levels and number of home possessions for 2018. The majority (85.4%) of learners with four or more home possessions performed at or above grade level in English and 82.4% of learners with four or more home possessions in Mathematics. Learners with a higher number of home possessions outperformed those with a lower number of home possessions. This is true for all groups as there are 26.1%, 24.8% and 14.7% of learners below grade level for one or less, two or three and four or more home possessions groups respectively in English and 31.1%, 28.8% and 17.6% for one or less, two or three and four or more home possessions groups in Mathematics respectively. The percentage of learners within the below grade level decreases as the number of home possessions increases.

Table 2.21: Cross-tabulation of Proficiency levels and number of home possessions for 2018

Proficiency Level	**One or less**	**Two or three**	**Four or more**	**Total**
English				
Above grade level	17.5%(1009)	19.8%(1529)	38.2%(1021)	22%(3559)
At grade level	56.3%(3239)	55.4%(4283)	47.2%(1262)	54.4%(8784)
Below grade level	26.1%(1502)	24.8%(1914)	14.7%(393)	23.6%(3809)
Total	100%(5750)	100%(7726)	100%(2676)	100%(16152)
Mathematics				
Above grade level	21.7%(1247)	23.4%(1811)	38.6%(1034)	25.3%(4092)
At grade level	47.2%(2712)	47.8%(3691)	43.8%(1171)	46.9%(7574)
Below grade level	31.1%(1791)	28.8%(2224)	17.6%(471)	27.8%(4486)
Total	100%(5750)	100%(7726)	100%(2676)	100%(16152)

Table 2.22 below is similar to Table 2.20 above. The only difference is that in 2016, learners with none of the home possessions were separated from the one or less group as shown in Table 2.22. Also, learners 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 learners with four or more home possessions (electricity, piped water, television, borehole and radio) outperformed learners with any three of the home possessions and the difference was statistically significant in both English and Mathematics. In turn, learners with three home possessions outperformed learners with two home possessions and the difference was statistically significant. There was however no significant difference in performance between learners with two and learners with one home possessions in 2017 and 2018 as was the case in 2016. Learners with one home possession significantly outperformed learners with none. The results of English performance have a similar pattern to that of Mathematics performance.

Table 2.22: Performance in English and Mathematics by number of home possessions for 2016, 2017 and 2018

Category	**2016**		**2017**		**2018**
English					
None	304.19(0.53)	⇓	302.93(0.66)	⇔	300.04(0.82)
Difference	⇓		⇓		⇓
One	308.29(0.29)	⇑	312.11(0.34)	⇔	315.1(0.34)
Difference	⇔		⇔		⇔
Two	308.05(0.33)	⇑	311.55(0.34)	⇔	311.11(0.39)
Difference	⇓		⇓		⇓
Three	314.73(0.42)	⇑	317.94(0.49)	⇔	317.88(0.46)
Difference	⇓		⇓		⇓
Four or more	330.70(0.48)	⇓	328.24(0.74)	⇔	326.29(0.57)
Mathematics					
None	308.73(0.58)	⇓	299.34(0.66)	⇑	303.46(0.75)

Difference	⇓		⇓		⇓
One	311.93(0.29)	⇓	307.70(0.30)	⇑	316.65(0.3)
Difference	⇔		⇔		⇔
Two	311.60(0.33)	⇓	307.62(0.32)	⇑	313.61(0.34)
Difference	⇓		⇓		⇓
Three	314.18(0.34)	⇓	312.17(0.40)	⇑	318.64(0.39)
Difference	⇓		⇓		⇓
Four or more	321.19(0.35)	⇓	318.77(0.56)	⇑	324.33(0.45)

Where {⇑} *indicate a significant increase,* {⇔} *no change and* {⇓} *significant decrease.*

2.7.9 Number of home educational resources

Learners 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. 1.9% of the learners had none, 20.2% had one, 15.7% had two, 35.7% had three, and 26.5% had four to six home educational resources. Learners 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**		**2017**		**2018**	**2012-2018**
Four or more	315.7(2.38)	⇑	324.84(0.47)	⇔	324.56(0.43)	⇑
Difference	⇑		⇑		⇑	
Two or three	303.3(1.10)	⇑	310.97(0.25)	⇔	312.09(0.28)	⇑
Difference	⇑		⇔		⇔	
One or less	292.9(1.02)	⇑	311.37(0.43)	⇔	312.45(0.43)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Four or more	313.1(1.83)	⇔	316.24(0.37)	⇑	323.25(0.35)	⇑
Difference	⇑		⇑		⇑	
Two or three	303.6(1.12)	⇑	307.26(0.23)	⇑	314.35(0.24)	⇑
Difference	⇑		⇔		⇔	
One or less	293.0(1.02)	⇑	306.58(0.39)	⇑	314.16(0.38)	⇑

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 from 2012 and 2018. In 2018, learners possessing four or more home educational resources had a significantly higher mean performance than learners with two or three educational resources in both English and Mathematics. However, there were no significant differences in English and Mathematics performance between learners possessing two or three home educational resources and learners possessing one or less home educational resources in 2018. The same trends were observed in 2016.

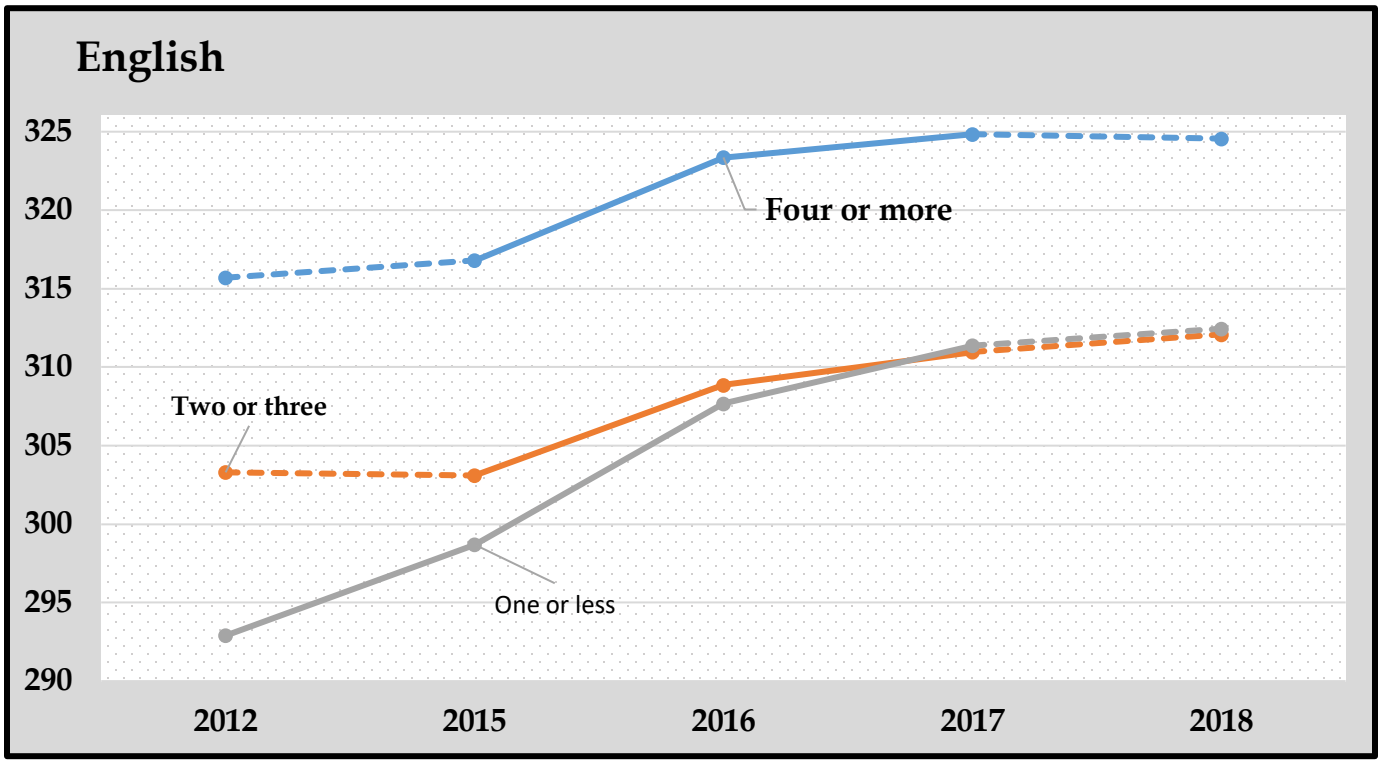

Figure 2.16: Mean performance in English by number of home educational resources since 2012

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 that of the number of home possessions shown in subsection 2.7.8 above. Learners possessing one or less home educational resources showed a long term improvement in English performance between 2012 and 2018. In 2012, these learners had mean score of 292.9, which increased significantly to 298.7 in 2015, then to 307.69 in 2016 and to 311.37 in 2017 and finally increased to 312.45 in 2018. The other groups experienced medium term (two years) improvement from 2015 to 2018. Figure 2.17 is showing the mean performance in Mathematics by number of home educational resources since 2012. Learners possessing four or more of home educational resources performed better than the other groups. The difference in performance appeared to be decreasing with time.

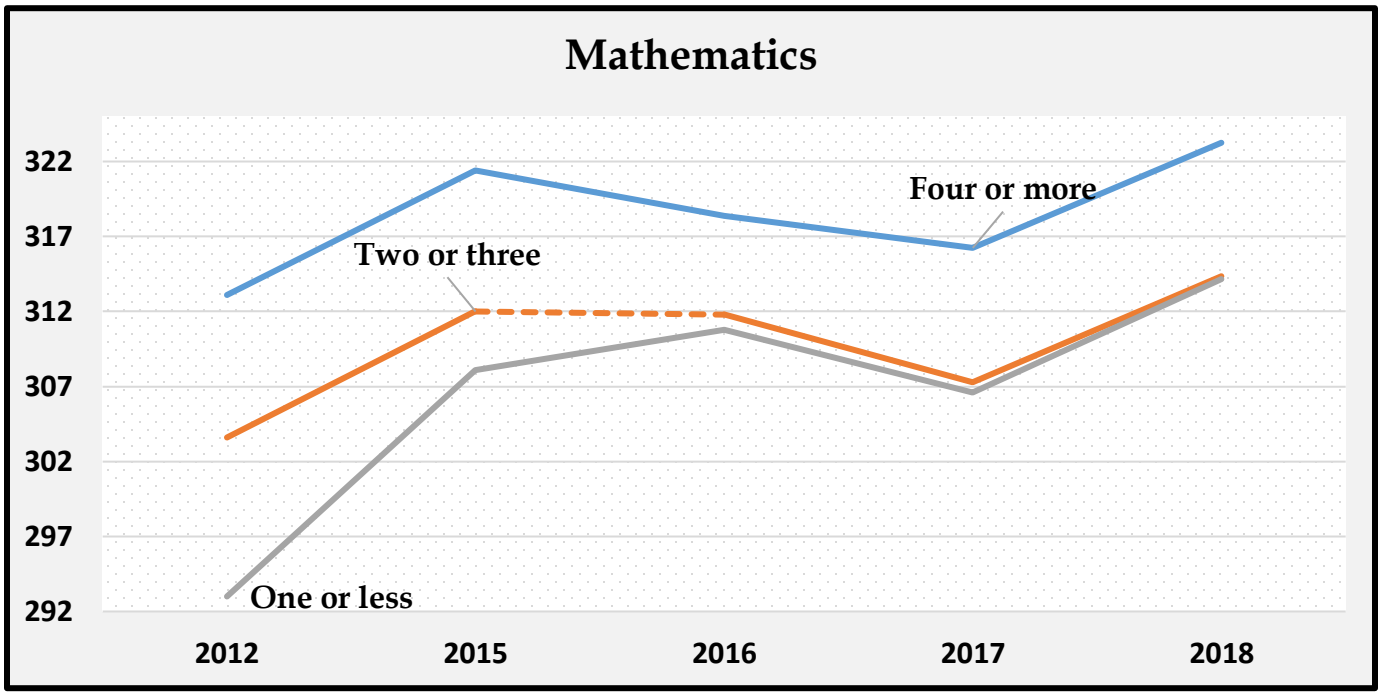

Figure 2.17: Mean performance in Mathematics by number of home educational resources since 2012

The proficiency levels for the number of home educational resources for 2018are shown in Table 2.24. For both English and Mathematics, the results indicate that as the number of home educational resources per learner increases, the percentage of students performing at or above grade level also increases. Put differently, as the number of home educational resources per learner 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 2018

Proficiency Level	One or less	Two or three	Four or more	Total
English				

Above grade level	18%(645)	17%(1412)	35.1%(1502)	22%(3559)
At grade level	54.8%(1957)	56.7%(4710)	49.5%(2117)	54.4%(8784)
Below grade level	27.2%(972)	26.3%(2180)	15.4%(657)	23.6%(3809)
Total	100%(3574)	100%(8302)	100%(4276)	100%(16152)
Mathematics				
Above grade level	21.5%(767)	21.1%(1751)	36.8%(1574)	25.3%(4092)
At grade level	46.1%(1646)	49%(4064)	43.6%(1864)	46.9%(7574)
Below grade level	32.5%(1161)	30%(2487)	19.6%(838)	27.8%(4486)
Total	100%(3574)	100%(8302)	100%(4276)	100%(16152)

In Table 2.24, learners with four or more educational resources had the highest percentage of learners performing above grade level with 35.1% and 36.8% in English and Mathematics respectively. Learners with higher home educational resources outperformed those with lower home educational resources. The obvious reason for this difference is that learners 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

Learners were asked to record the highest level of education completed by each of their parents or guardians. The variable used for the analysis was the higher education of the two parents or guardians. As shown in Table 2.25, learners with a parent or guardian who completed a tertiary education outperformed learners with a parent or guardian who completed secondary school in both English and Mathematics in 2012, 2017 and 2018. In 2018, the mean score for learners with a parent or guardian who completed a tertiary education was 329.68in English while the corresponding score for learners with a parent or guardian who completed secondary school was 313.07. The difference was large and statistically significant. Overall, all the groups except one (learners in English with a

parent or guardian who completed a tertiary education) experienced significant increases in both English and Mathematics performance between 2012 and 2018. It is important to note that learners from all groups experienced a significant increase in Mathematics performance between 2017 and 2018.

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

English	**2012**		**2017**		**2018**	**2012-2018**
Completed a tertiary course	325.8(2.93)	⇔	328.47(0.63)	⇔	329.68(0.53)	⇑
Difference	⇑		⇑		⇑	
Completed secondary school	300.5(0.94)	⇑	313.03(0.23)	⇔	313.07(0.24)	⇑
Difference	⇑		⇑		⇑	
Completed primary school	296.0(1.02)	⇑	308.02(0.47)	⇔	308.5(0.52)	⇑
Difference	⇑		⇑		⇑	
Did not go to school	293.2(1.52)	⇑	304.55(1.03)	⇔	304.09(0.98)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Completed a tertiary course	321.4(2.02)	⇓	318.56(0.48)	⇑	327.34(0.43)	⇑
Difference	⇑		⇑		⇑	
Completed secondary school	301.0(0.90)	⇑	308.67(0.21)	⇑	315.08(0.21)	⇑
Difference	⇑		⇑		⇑	

Completed primary school	296.3(1.13)	⇑	304.33(0.43)	⇑	311.01(0.47)	⇑
Difference	⇑		⇑		⇑	
Did not complete a school	292.7(1.67)	⇑	299.2(1.02)	⇑	304.73(0.9)	⇑

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. Between 2016 and 2017, only learners with a parent or guardian who completed secondary education decreased significantly, whilst the rest of the groups remained stable. Figure 2.18 further reflects that between 2017 and 2018 there were no significant changes in English performance for all the groups of learners. There is also a positive correlation between learners' performance and highest parental education in English as depicted by figure 2.18.

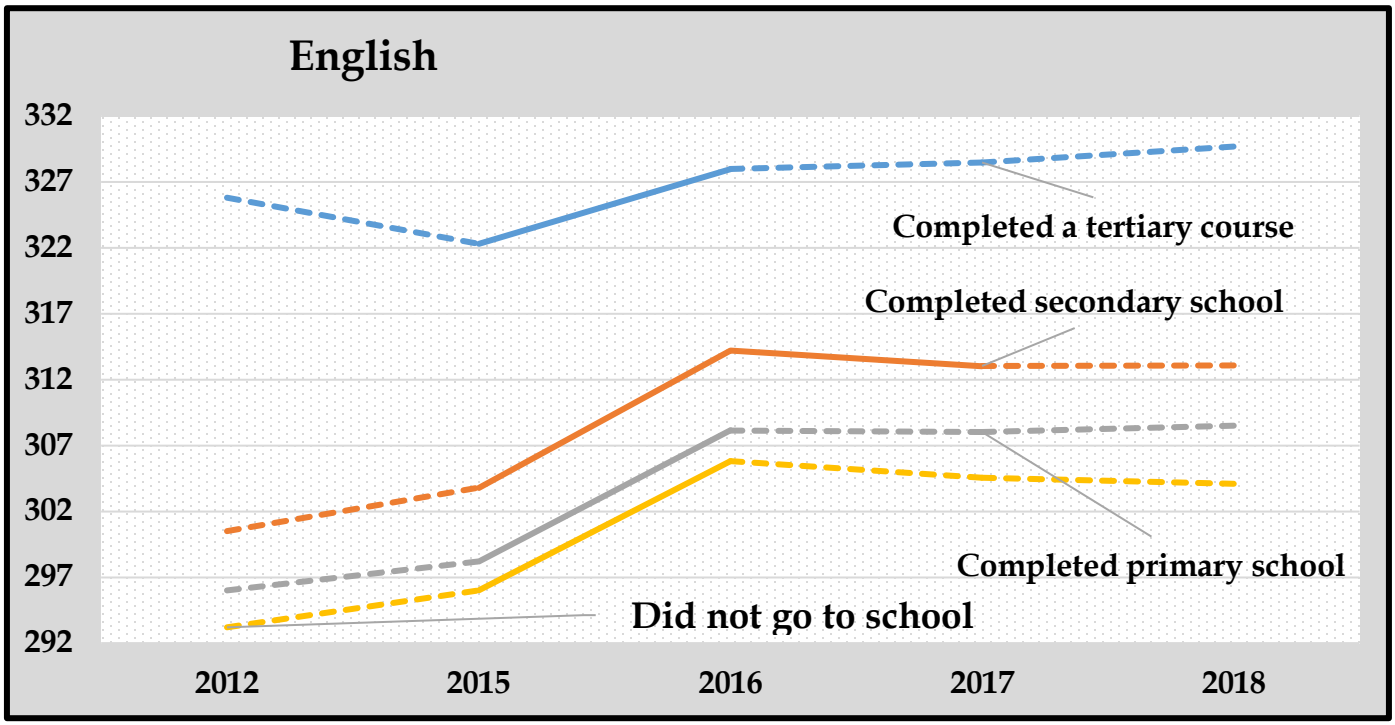

Figure 2.18: Mean performance in English by highest parental education since 2012

As shown in Figure 2.19, learners with a parent or guardian who completed a tertiary education outperformed all other groups in Mathematics. The difference was large between learners with parents who completed a tertiary course and learners with parents who completed secondary school. This difference appeared to be decreasing over time. Learners with parents who completed secondary school, learners with parents who completed primary school and learners with parents who did not go to school showed long term improvement in Mathematics between 2012 and 2016 but decreased significantly between 2016 and 2017, and finally increased significantly between 2017 and 2018.

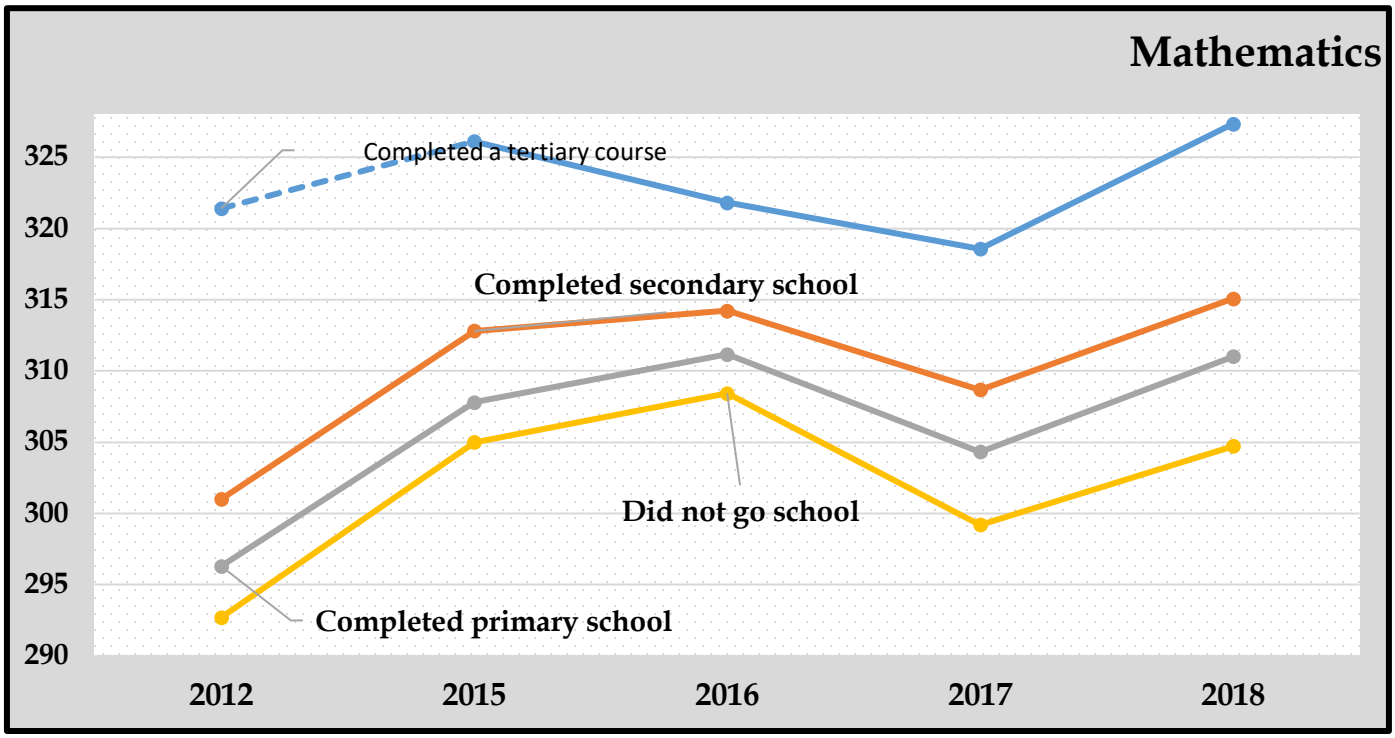

Figure 2.19: Mean performance in English by highest parental education since 2012

2.8 Learner Performance in Local Languages in 2018

Schools and learners were given the opportunity to select an African language test to respond to among Shona, Ndebele, Nambya, Tshivenda, Kalanga, Xichangana and Tonga. Tests were developed for these local languages. Among the sampled schools, only four local languages were administered (Ndebele, Shona, Tonga and Venda) and the rest did not have test takers. No weights were applied in analysing these language tests since these tests were self-selected by the schools and learners according to the local language taught at infant level. In addition, these results are also not comparable over time meaning no comparable analysis was done from all the assessment years but just for 2018.

Table 2.26: Mean performance of learners responding to Ndebele, Shona, Tonga, Venda tests

Variable	Options	Ndebele	Shona	Tonga	Venda
Gender	Boy	299.43	297.70	300.15	300.18
	Girl	300.45	301.81	299.88	299.87
School type	Registered	300.03	300.94	300.00	300.03
	Satellite	299.83	294.81	299.95	299.85
Location	Rural	299.64	298.53	299.99	299.98
	Urban	302.24	309.11	300.02	300.17
Province	Manicaland		301.53		
	Mash West	299.69	292.7	300.13	
	Mat South	300.98		299.81	301.35
	Mat North	296.9		299.52	298.65
	Masvingo		301.67		
	Midlands	300.18	300.36		
	Mash East		301.57		
	Mash Central		294.66		
	Harare		315.14		
	Bulawayo	310.94		300.46	

The mean performance of learners that responded to the Shona, Ndebele, Tonga and Venda tests for 2018 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 and the reverse is true for Tonga and Venda. The differences in mean performance were very small in all the four indigenous languages. Learners learning at

registered schools performed better than those at satellite schools in all languages. The difference in the mean performance was moderate in Shona but very small in Ndebele, Tonga and Venda. Learners from urban schools outperformed those from rural areas in all the local languages as shown in Table 2.26 with moderate difference between urban and rural learners in Shona and small difference in the rest. Harare, Bulawayo, Mashonaland West and Matabeleland South provinces were the best performers in Shona, Ndebele, Tonga and Venda tests respectively. Mashonaland West performed the worst in Shona, while Matabeleland North was the worst in the rest of the local languages.

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 2018 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, number of home possessions (electricity, piped water, borehole, television and radio), number of meals per day and number of home 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 based on education, occupational status and income.

3.1 Performance and Socio-economic status

One instinctive way to analyse the relationship between learners' performance and SES is to estimate the percentage of learners achieving at, above and below grade level of SES. Figure 3.1 below is a bar graph showing percentages of learners below, at and above grade level for English by SES in 2012, 2017 and 2018. In 2012, 2% of the learners in the Low SES category achieved above grade level while 12% in the Low SES category achieved above grade level in 2017, while 13% of these learners where above grade level in 2018. The

percentage of learners in the Low SES category achieving above grade level rose from 2% in 2012 to 13% in 2018. 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 2018 for learners in all SES groups. The results also show a widening gap in performance between learners from low SES and learners from high SES.

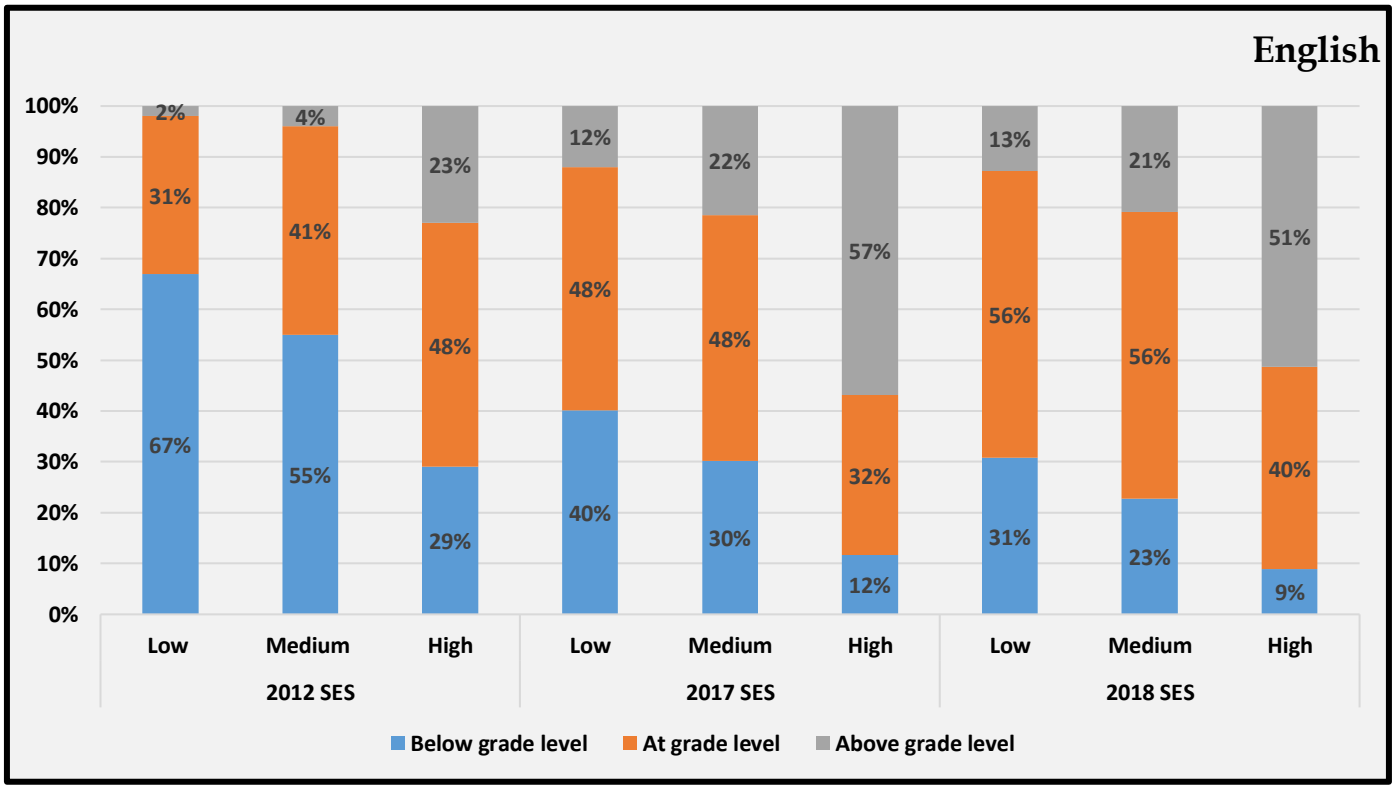

Figure 3.1: Percentage of learners below, at and above grade level for English by SES in 2012, 2017 and 2018

The percentage of learners achieving at or above grade level increases with increasing SES and the percentage of learners achieving below grade level decreases with increasing SES in both English and Mathematics. Figure 3.2 shows the percentage of learners below, at and above grade level for Mathematics by SES in 2012, 2017 and 2018. These Mathematics results portray a similar pattern to those of English. For Mathematics, the percentage of learners performing below grade level in 2017 was 55% in the Low SES group, 42% in the

medium SES group and 19% in the High SES group. In 2018, the percentage of learners performing below grade level fell to 37% for low SES while the percentage of learners performing below grade level for medium SES and High SES also decreased to 27% and 12% respectively. These findings show inequity in education in Zimbabwe, since most of the good performers are from the high SES category.

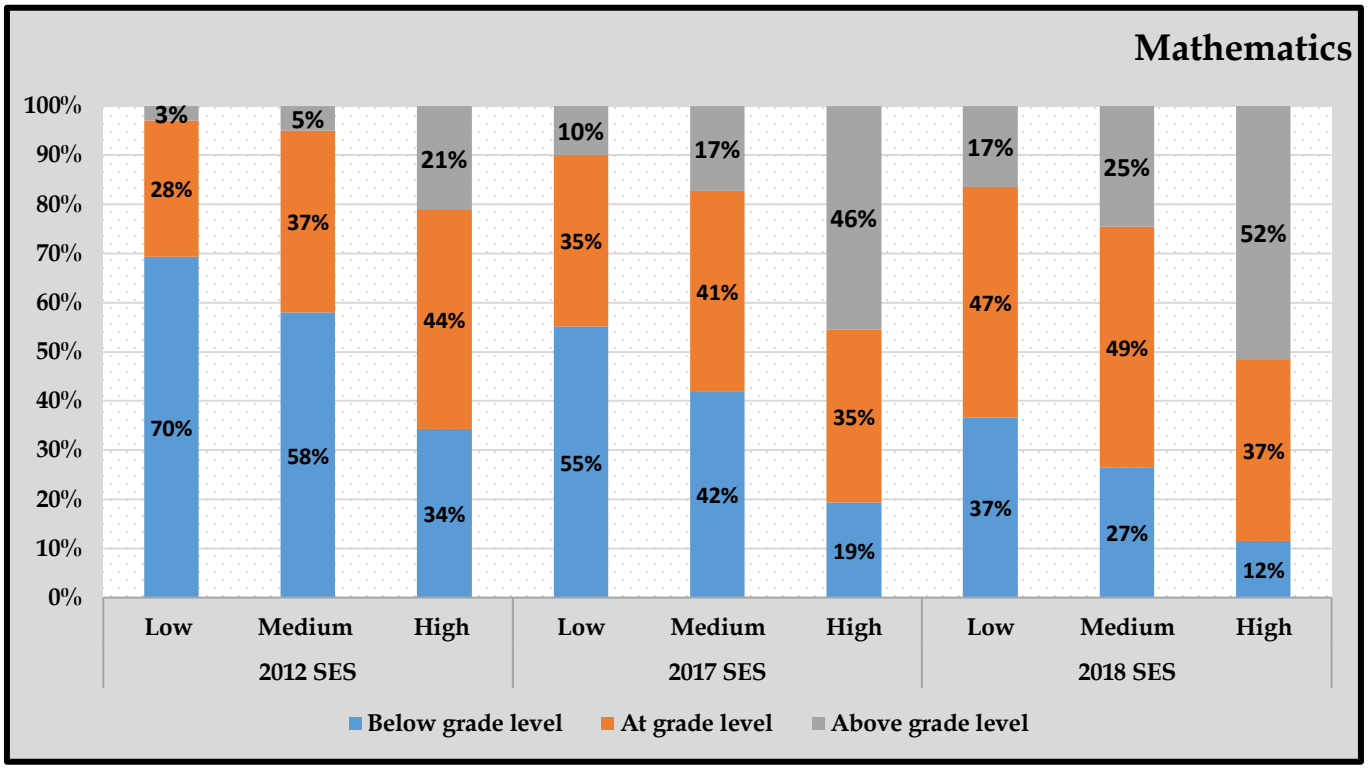

Figure 3.2: Percentage of learners below, at and above grade level for Mathematics by SES in2012,2017 and 2018.

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 learners' performance since 2012 in both English and Mathematics as shown in Table 3.1. Although the ZELA 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, learners with High SES outperform those with medium SES who in-turn outperform learners with low SES.

Table 3.1: Performance in English and Mathematics by socio-economic equity in 2012, 2017 and 2018

English	**2012**		**2017**		**2018**	**2012-2018**
Low SES	290.4(0.84)	⇑	307.97(0.29)	⇔	309.11(0.33)	⇑
Difference	⇓		⇓			
Medium SES	296.7(0.77)	⇑	315.02(0.27)	⇔	314.74(0.27)	⇑
Difference	⇓		⇓			
High SES	313.5(1.83)	⇑	339.26(0.87)	⇓	335.07(0.68)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Low SES	290.4(0.98)	⇑	304.11(0.27)	⇑	311.4(0.3)	⇑
Difference	⇓		⇓		⇓	
Medium SES	297.6(0.79)	⇑	310.27(0.23)	⇑	316.55(0.23)	⇑
Difference	⇓		⇓		⇓	
High SES	312.1(1.52)	⇑	325.88(0.65)	⇑	330.61(0.54)	⇑

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

For 2018, students from low socio-economic status (Low SES) had a mean performance of 309.11 score points, whilst those from medium socio-economic status (Medium SES) and high socio-economic status (High SES) had 314.74and 335.07score points respectively in English. For Mathematics, students from Low SES had a mean of 311.4, those from

medium SES had 316.55 and those from High SES had a mean of 330.61 score points. These statistically significant differences suggest that learners' 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 learners 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 levels and socio-economic status for 2018.

Table 3.2: Cross-tabulation of Proficiency level and socio-economic status for 2018

Proficiency Level	**Low SES**	**Medium SES**	**High SES**	**Total**
English				
Above grade level	12.8%(634)	20.8%(1924)	51.4%(1001)	22%(3559)
At grade level	56.4%(2787)	56.4%(5222)	39.8%(775)	54.4%(8784)
Below grade level	30.8%(1522)	22.8%(2114)	8.9%(173)	23.6%(3809)
Total	100%(4943)	100%(9260)	100%(1949)	100%(16152)
Mathematics				
Above grade level	16.5%(818)	24.5%(2271)	51.5%(1003)	25.3%(4092)
At grade level	46.9%(2318)	49%(4535)	37%(721)	46.9%(7574)
Below grade level	36.6%(1807)	26.5%(2454)	11.5%(225)	27.8%(4486)
Total	100%(4943)	100%(9260)	100%(1949)	100%(16152)

For English, results in Table 3.2 show that 69.2% of the students from low SES achieved at or above grade level, whilst 77.2% of the students from medium SES achieved at or above grade level and 91.2% of students from high SES achieved at or above the grade level. This means the percentage of learners achieving at or above grade level increases with increasing SES and the percentage of achieving below grade level decreases with

increasing SES. Although the performance in English was higher than that of Mathematics in 2018, both subjects have a similar pattern or trend. For Mathematics, the results are showing that 63.4% of the students from low SES achieved at or above grade level whilst 73.5% from medium SES and 88.5% from high SES achieved at or above grade level. The results presented in this chapter indicate an improvement in learners' performance and existence of inequity in education in both English and Mathematics between 2012 and 2018. What is clearer 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 learners vary from each other within schools and to relate these disparities with SES at the school and learner levels. Average performance differs between educational systems or countries. Similarly, the performance scores of individual learners within an educational system differ from the average. In some educational systems, these differences between learners 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 learners 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 learners 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 597.22 in English performance in 2018, where the between school variance was 37% and the within school variance, 63%. From 2012 to 2018, there was a decrease in the between school variance from 41% to 37%.However, for the within school variance, it increased from 59% in 2012 to 63% in 2018. From 2015 to 2016,

the between school variance decreased from 51% to 47%whilst the within school variance increased from 50% to 53%.In 2012, 2015, 2016 and 2017, the unexplained variance was larger than the explained variance. In 2018, 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.

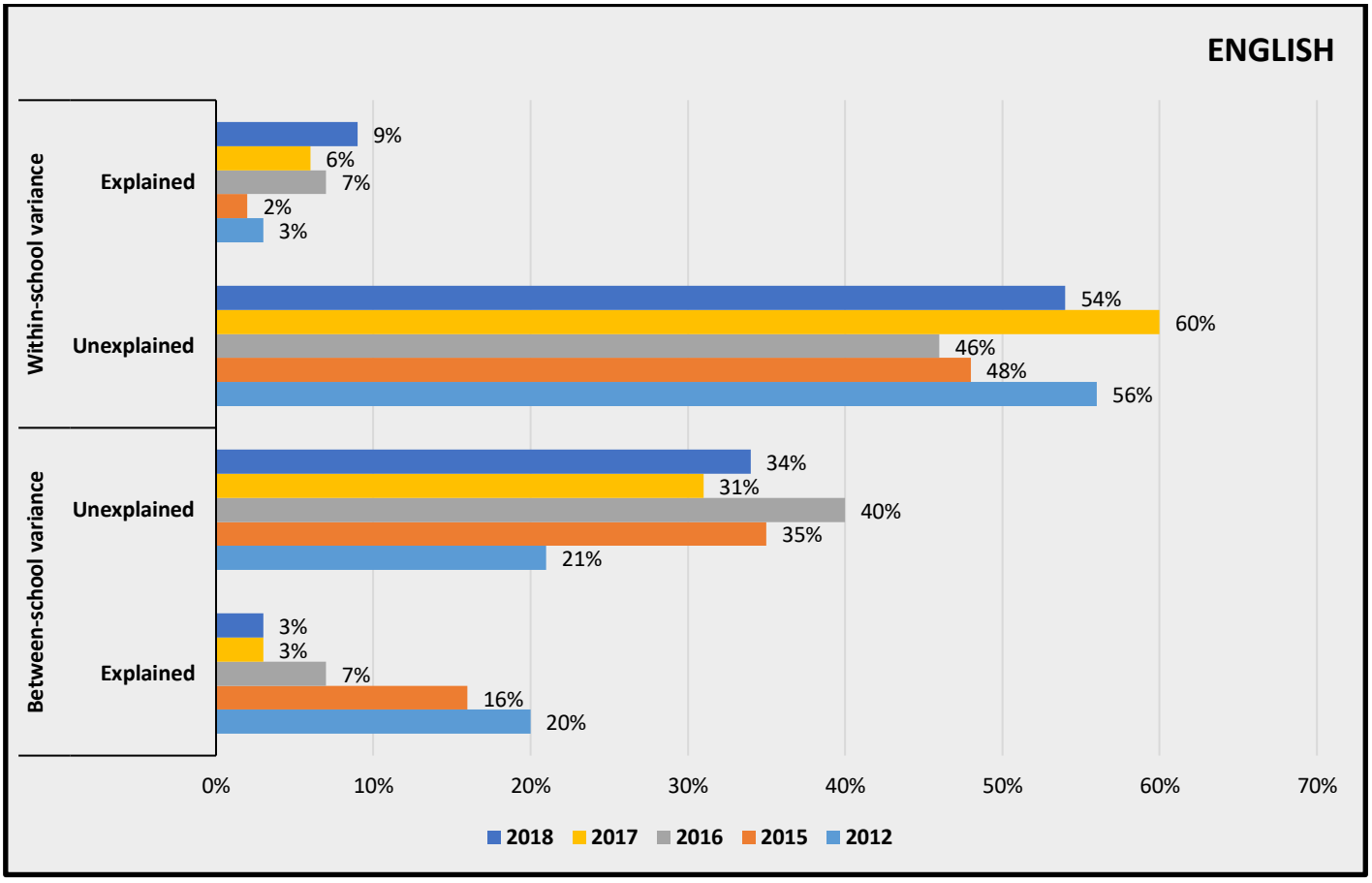

Figure 3.3: Between and within school variance in English performance, explained and unexplained by SES in 2012, 2015, 2016, 2017 and 2018

For Mathematics performance, in 2018, the total variance was 485.03 where the between school variance was 45% and the within school variance 55%. From 2012 to 2018, there was an increase in the between school variance from 35% to 45%. However, for the within school variance, it decreased from 65% in 2012 to 55% in 2018. From 2017 to 2018, the between school variance increased slightly from 39% to 45% whilst the within school variance decreased from 61% to 55%. In 2012, 2015, 2016 and 2017, the unexplained variance was larger than the explained variance. In 2018, the same trend was observed as

the unexplained variance was larger in the within school variance. However, for the between school variance, the explained variance was larger than the unexplained variance for 2017.

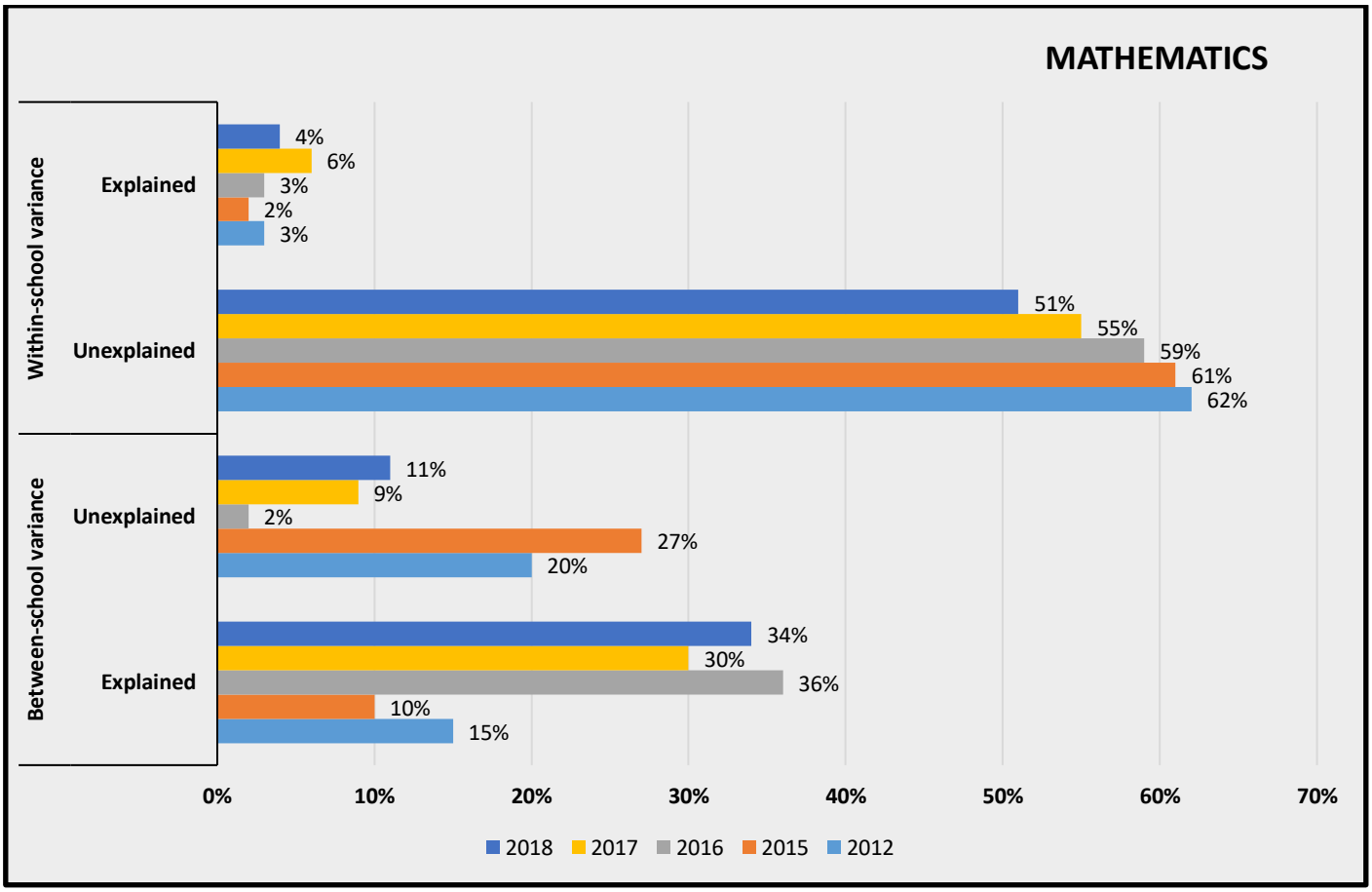

Figure 3.4: Between and within school variance in Mathematics performance, explained and unexplained by SES in 2012, 2015, 2016, 2017 and 2018

Since the SES of a learner 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 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 in English, the percentage explained by school level SES decreased somewhat from 20 in 2012 to 3 in 2018 and the percentage not explained by SES increased from 21 to 34. This result suggests an increase in equity, because the degree in which schools differ in performance, has become less strongly associated with SES. However, in Mathematics, the percentage explained by school level SES increased somewhat from 15 in 2012 to 34in 2018 and the percentage not explained by SES decreased from 20 in 2012 to 11 in 2018.However, the explained variance for 2018 increased to 34%.

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 learners' 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 2018, 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 learner 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 learner-level analysis. That is, learners 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)
ii. School facilities (Electricity and Water)
iii. School budget (The total budget divided by school size)

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, 2017 and 2018. Across the years, the results indicate a significant improvement in English and Mathematics performance from 2012 to 2018 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, 2017 and 2018. The difference in 2017 performance between registered and satellite school was 9.4(316.27-306.87) score points for English and 5.09 (310.34-305.25) score points for Mathematics. In 2018, the difference between registered and satellite schools was 9.91 score points for English (316.98-307.07) and 6.69 score points (317.69-311) for Mathematics. These differences are both significant. This shows that the difference in English performance between Registered and Satellite schools was larger than that of Mathematics. In addition, the gap in performance between registered and satellite schools continue to widen year by year.

Table 4.1: Performance in English and Mathematics by school type in 2012, 2017 and 2018

English	**2012**		**2017**		**2018**	**2012-2018**
Registered	300.8(1.09)	⇑	316.27(0.23)	⇔	316.98(0.23)	⇑
Difference	⇑		⇑		⇑	
Satellite	291.4(0.85)	⇑	306.87(0.40)	⇔	307.07(0.44)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Registered	300.6(1.06)	⇑	310.34(0.20)	⇑	317.69(0.19)	⇑
Difference	⇑		⇑		⇑	
Satellite	293.4(1.05)	⇑	305.25(0.39)	⇑	311(0.42)	⇑

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 learners in registered schools as compared to satellite schools in both English and Mathematics. Learners in registered schools outperformed learners in satellite schools.

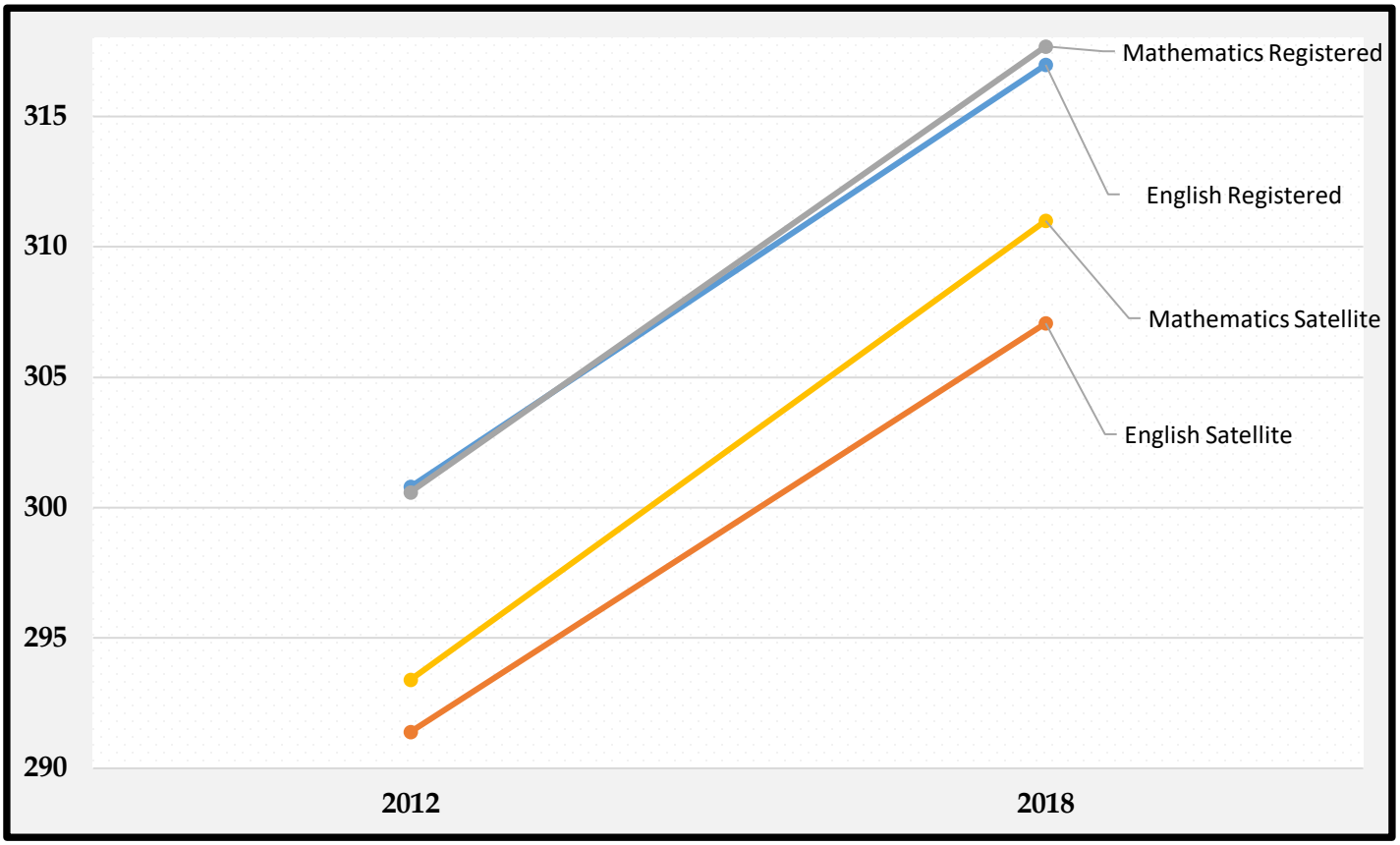

Figure 4.1: Mean performance in English and Mathematics by school type since 2012

Table 4.2 is a cross-tabulation of proficiency levels and school type for 2018. The results indicate that 78.1% of learners from registered schools performed at or above grade level in English whilst 67.0% of learners from satellite schools performed at or above grade level in 2018. For Mathematics, 73.8% of learners from registered schools performed at or above grade level whilst 63.4% of learners from Satellite schools performed at or above grade level in 2018. These results indicate that learners from registered schools performed better than learners 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 learners and attract better qualified teachers and hence produce better test results.

Table 4.2: Cross-tabulation of Proficiency level and school type for 2018

Proficiency Level	Registered	Satellite	Total
English			
Above grade level	24.3%(3326)	9.5%(233)	22%(3559)
At grade level	53.8%(7366)	57.5%(1418)	54.4%(8784)
Below grade level	21.9%(2995)	33%(814)	23.6%(3809)
Total	100%(13687)	100%(2465)	100%(16152)
Mathematics			
Above grade level	27.2%(3722)	15%(370)	25.3%(4092)
At grade level	46.6%(6381)	48.4%(1193)	46.9%(7574)
Below grade level	26.2%(3584)	36.6%(902)	27.8%(4486)
Total	100%(13687)	100%(2465)	100%(16152)

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 33% had neither electricity nor water, 37.5% had either electricity or water (but not both) and 29.5% had both electricity and water. English and Mathematics performance 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, 2017 and 2018

English	**2012**		**2017**		**2018**	**2012-2018**
Electricity and water	308.1(2.64)	⇑	314.37(0.38)	⇑	323.33(0.34)	⇑
Difference	⇑		⇔		⇑	
Either electricity or water	295.0(1.18)	⇑	314.65(0.34)	⇓	309.78(0.27)	⇑
Difference	⇑		⇔		⇔	
No electricity and no water	291.3(1.33)	⇑	315.05(0.37)	⇓	306.54(0.59)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
Electricity and water	306.6(2.27)	⇔	309.57(0.32)	⇑	322.38(0.28)	⇑
Difference	⇑		⇔		⇑	
Either electricity or water	296.2(1.45)	⇑	309.31(0.29)	⇔	312.4(0.24)	⇑
Difference	⇔		⇔		⇔	
No electricity and no water	292.6(1.68)	⇑	309.63(0.31)	⇔	310.86(0.55)	⇑

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 in 2018from schools with both electricity and water. The other two groups of learners showed a significant decrease in performance in English while the same groups of learners registered no significant change in performance in Mathematics. The 2017 results show no significant difference in both English and Mathematics performance

among learners in schools with access to both electricity and water, schools with either electricity or water and schools with none of the two.

Figure 4.2 below is a column graph showing that learners performed better in 2018 than 2012 in both English and Mathematics. In 2012, learners from schools with both water and electricity performed better than learners from schools with either electricity or water who in-turn performed better than learners from schools without electricity and water in both English and Mathematics. However, the graph shows no clear differences in height for both English and Mathematics performance in 2018. This means that the performance differences among the groups in 2018 were quite small.

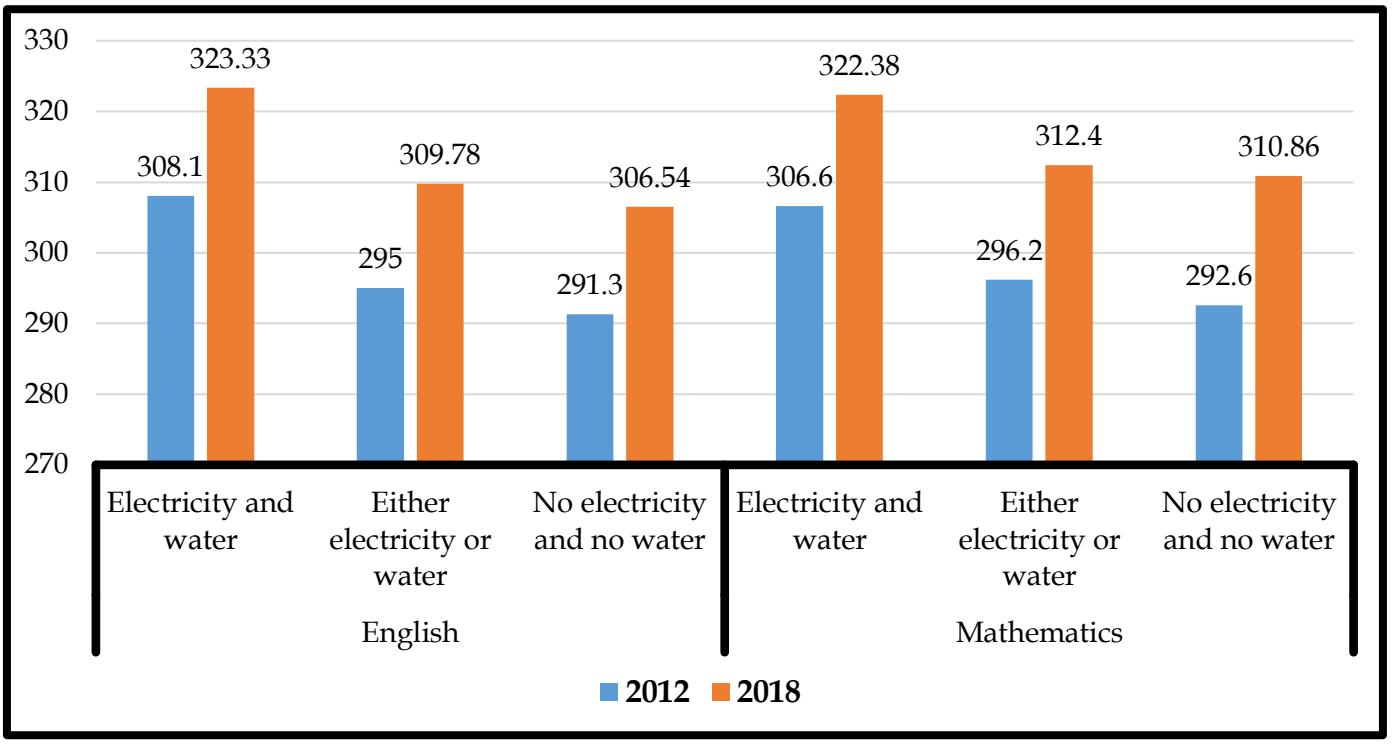

Figure 4.2: Mean performance in English and Mathematics by availability of water and electricity since 2012

Consistent with the results above, 83.3% of learners from schools with water and electricity performed at or above grade level in English and 71.5% and 67.4% from schools

with either electricity or water and schools with neither of the two performed at or above grade level respectively, as shown in Table 4.4 below. For Mathematics, 80.1% of learners from schools with water and electricity performed at or above grade level and 65.8% and 66.8% from schools with either electricity or water and schools with neither of the two performed at or above grade level respectively.

Table 4.4: Cross-tabulation of Proficiency level and availability of water and electricity for 2018

Proficiency Level	**No electricity and no water**	**Either electricity or water**	**Electricity and water**	**Total**
English				
Above grade level	9.5%(135)	13.7%(1040)	33.5%(2384)	22%(3559)
At grade level	58.9%(841)	57.8%(4394)	49.8%(3549)	54.4%(8784)
Below grade level	31.7%(452)	28.5%(2164)	16.7%(1193)	23.6%(3809)
Total	100%(1428)	100%(7598)	100%(7126)	100%(16152)
Mathematics				
Above grade level	14.6%(209)	17.5%(1332)	35.8%(2551)	25.3%(4092)
At grade level	52.2%(746)	48.3%(3673)	44.3%(3155)	46.9%(7574)
Below grade level	33.1%(473)	34.1%(2593)	19.9%(1420)	27.8%(4486)
Total	100%(1428)	100%(7598)	100%(7126)	100%(16152)

Permanent Classrooms

Table 4.5 shows the relationship between learner performance and proportion of permanent classrooms in schools in 2012, 2017 and 2018. Although the results indicate a

significant increase in performance between 2012 and 2018, there was no significant difference in performance within the groups. For example, in 2017, learners' performance from schools with all permanent classrooms did not differ significantly from learners' performance from schools with at least two thirds but not all permanent classrooms in both English and Mathematics.

Table 4.5: Relationship between learner performance and proportion of permanent classrooms in schools in 2012, 2017 and 2018

English	**2012**		**2017**		**2018**	**2012-2018**
All permanent classrooms	302.2(2.62)	⇑	314.68(0.30)	⇔	315.76(0.63)	⇑
Difference	⇔		⇔		⇔	
At least two-thirds but not all	298.6(2.31)	⇑	314.47(0.39)	⇔	314.21(0.22)	⇑
Difference	⇔		⇔		⇔	
Less than two thirds	295.5(1.30)	⇑	315.03(0.43)	⇔	313.18(0.96)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
All permanent classrooms	302.1(2.18)	⇑	309.51(0.26)	⇑	317.18(0.13)	⇑
Difference	⇔		⇔		⇔	
At least two-thirds but not all	298.1(2.24)	⇑	309.33(0.33)	⇑	316.93(0.47)	⇑
Difference	⇔		⇔		⇔	
Less than two thirds	296.7(1.6)	⇑	309.65(0.36)	⇑	317.02(0.83)	⇑

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 operations 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 learner.

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 learner (large budget), schools with US$30 to US$60 per learner (medium budget) and schools with less than US$30 per learner (small budget). Table 4.6 shows the relationship between mean performance and budget per learner within urban and rural areas in 2012, 2017 and 2018.

Table 4.6: Relationship between mean performance and budget per learner within urban and rural areas in 2012, 2017 and 2018

URBAN AREAS	**2012**		**2017**		**2018**	**2012-2018**
English						
Less than $30	308.4(3.7)	⇑	345.58(1.10)	⇓	337.73(1.37)	⇑
Difference	⇑		⇔		⇑	
Between $30 and $60	296.5(4.61)	⇑	345.53(1.12)	⇓	330.37(1.87)	⇑

Difference	⇓		⇔		⇓	
More than $60	318.2(4.81)	⇑	345.03(1.35)	⇔	342.71(0.75)	⇑
Mathematics						
Less than $30	306.9(4.46)	⇑	329.63(0.82)	⇔	327.75(1.12)	⇑
Difference	⇔		⇔		⇔	
Between $30 and $60	298.3(4.93)	⇑	330.03(0.80)	⇓	325.21(1.35)	⇑
Difference	⇓		⇔		⇓	
More than $60	315.7(3.55)	⇔	329.31(0.95)	⇑	336.11(0.62)	⇑
RURAL AREAS	**2012**		**2017**		**2018**	**2012-2018**
English						
Less than $30	293.2(1.27)	⇑	310.38(0.32)	⇔	309.83(0.33)	⇑
Difference	⇔		⇔		⇔	
Between $30 and $60	293.6(1.68)	⇑	310.25(0.30)	⇔	311.85(0.31)	⇑
Difference	⇓		⇔		⇔	
More than $60	305.2(3.15)	⇔	309.78(0.38)		313.09(0.45)	⇑
Mathematics						
Less than $30	293.7(1.71)	⇑	306.70(0.30)	⇑	312.87(0.3)	⇑
Difference	⇔		⇔		⇔	
Between $30 and $60	294.8(1.37)	⇑	306.42(0.28)	⇑	314.06(0.28)	⇑
Difference	⇓		⇔		⇔	

More than $60	306.0(2.62)	⇔	306.41(0.36)	⇑	315.61(0.38)	⇑

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

The 2017 results show no significant difference in English and Mathematics performance among all the three budget groups for both rural and urban schools. For English performance, there were significant performance increases for all the budget groups in both urban and rural areas with the exception of learners from urban schools with a budget of more than $60 from 2012 to 2017. For Mathematics performance, there were significant performance increases for all the budget groups in both urban and rural areas with the exception of learners from schools with a budget of more than $60 from 2012 to 2017. In 2018, there were no significant differences in performance in both English and Mathematics for rural schools in the three groups. However, significant differences were noted in urban areas where in English, there was a significant decrease in performance for the first two groups. No distinct pattern was observed in Mathematics in urban areas. 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 2018.

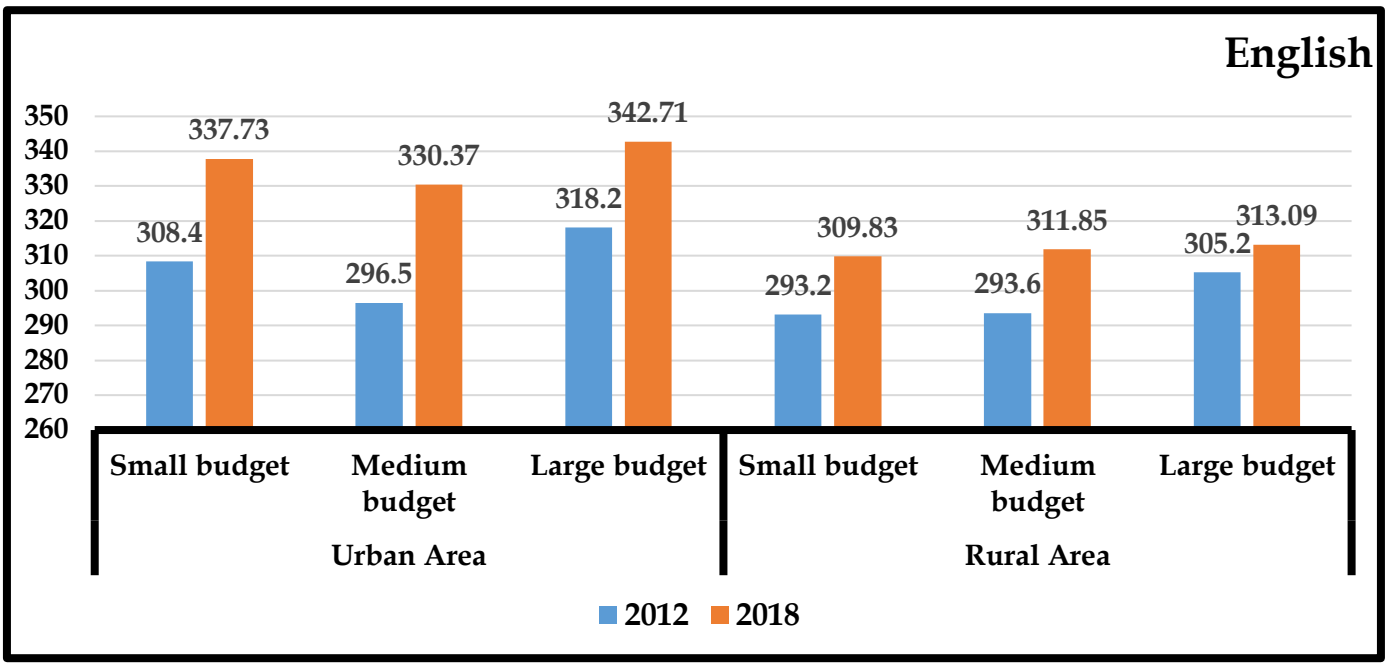

Figure 4.3: Relationship between mean English performance and budget per learner within urban and rural areas in 2012 and 2018

Figure 4.3 above shows that learners from urban schools performed better than learners from rural schools at every budget level in 2018 in both English and Mathematics. The graph does not show any relationship between school budget and mean performance for both English and Mathematics in 2018. 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.

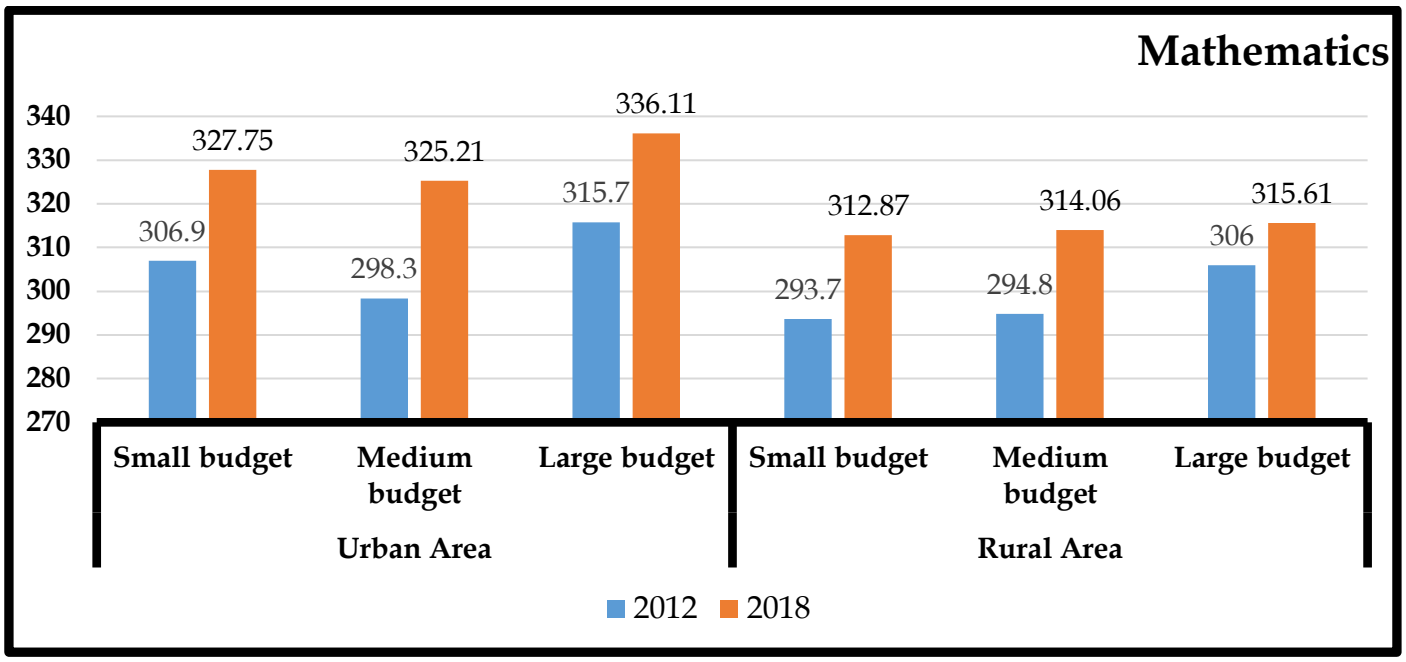

Figure 4.4: Relationship between mean Mathematics performance and budget per learner within urban and rural areas in 2012 and 2018

4.2 Teaching and learning opportunities

4.2.1 Days absent by learners

Learners were asked to respond on the number of days they had been absent in the 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 2018. Learners with no days absent outperformed all other learners who had been absent for at least one day in both English and Mathematics as shown by the significant group differences.

Table 4.7: Relationship between learner performance and number of days absent by learner in 2012, 2017 and 2018

English	**2012**		**2017**		**2018**	**2012-2018**
No days	306.6(1.41)	⇑	321.39(0.40)	⇔	322.69(0.36)	⇑
Difference	⇓		⇓		⇓	
1-2 days	298.0(0.99)	⇑	312.83(0.32)	⇔	312.64(0.32)	⇑
Difference	⇓		⇓		⇔	
3 or more days	294.2(0.94)	⇑	309.7(0.34)	⇔	309.39(0.4)	⇑
Mathematics	**2012**		**2017**		**2018**	**2012-2018**
No days	305.3(1.28)	⇑	314.55(0.32)	⇑	322.54(0.3)	⇑
Difference	⇓		⇓		⇓	
1-2 days	298.4(0.95)	⇑	308.45(0.28)	⇑	314.31(0.27)	⇑
Difference	⇓		⇓		⇔	
3 or more days	294.8(1.04)	⇑	305.23(0.31)	⇑	311.82(0.35)	⇑

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

Learners who had not been absent from school performed better than learners who had been absent for one or two days. In turn, learners who had been absent for one or two days performed better than learners who had been absent for three days or more in both English and Mathematics in 2018. Table 4.10 is a cross-tabulation of proficiency levels and number of days absent by learner for 2018. In English, 83.7% of learners who had no days absent performed at or above grade level. In Mathematics, 80.1% of learners who had no days absent performed at or above grade level. In general, learners who attend school more often have more opportunities to learn. Absenteeism is a strong predictor of undesirable outcomes in learners and many factors can contribute to learner absenteeism.

Table 4.8: Cross-tabulation of Proficiency level and number of days absent by learner for 2018

Proficiency Level	No days	One - two days	Three or more days	Total
English				
Above grade level	32%(1845)	18.1%(1200)	13.7%(514)	22%(3559)
At grade level	51.7%(2979)	55.9%(3709)	55.9%(2096)	54.4%(8784)
Below grade level	16.3%(940)	26%(1728)	30.4%(1141)	23.6%(3809)
Total	100%(5764)	100%(6637)	100%(3751)	100%(16152)
Mathematics				
Above grade level	35.8%(2061)	21.2%(1405)	16.7%(626)	25.3%(4092)
At grade level	44.3%(2554)	48.5%(3222)	47.9%(1798)	46.9%(7574)
Below grade level	19.9%(1149)	30.3%(2010)	35.4%(1327)	27.8%(4486)
Total	100%(5764)	100%(6637)	100%(3751)	100%(16152)

4.3 Explaining variance and change in performance

Multivariate analyses were undertaken to examine the combined effects of most important learner and school variables on performance and, in addition, to test if any changes in these variables in 2018 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 (number of home possessions, number of meals per day, parental education, number of home educational resources); two for other learner background variables (gender and number of hours of work for the family per day); location variable (urban versus rural); teaching and learning variables (satellite versus registered schools, school budget per learner per year, number of days absent in the current term, number of books).

Table 4.9: Results of multiple regression analysis explaining variance and trend in English performance

		MODEL 1	MODEL 2	MODEL 3	MODEL 4
	R-SQUARED	**0.15**	**0.20**	**0.21**	**0.24**
	CONSTANT	**283.00(0.63)**	**253.67(1.10)**	**253.91(1.43)**	**271.20(1.70)**
Location	URBAN	**-28.50(0.53)**	**-24.12(0.54)**	**-23.88(0.54)**	**-22.06(0.54)**
Socio-economic	HOMEPOS		**0.67(0.31)**	**0.62(0.31)**	*0.01(0.21)*
	MEALS		**3.90(0.27)**	**3.89(0.27)**	**3.70(0.26)**
	PARED		**6.38(0.29)**	**6.35(0.29)**	**5.54(0.28)**
	HEDRES		**2.24(0.31)**	**2.12(0.31)**	**2.07(0.26)**
Background	GENDER			**3.55(0.36)**	**3.60(0.35)**
	WORK			**-2.94(0.40)**	**-2.68(0.39)**
Teaching and Learning	SATELITE				**-6.20(0.49)**
	BUDGET				**1.54(0.23)**
	ABSENT				**-4.20(0.24)**
	BOOKS				**0.16(0.07)**

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 2018, learners in urban areas performed on average 28.5score points higher than learners in rural areas. The R-square was 15%, meaning that the URBAN variable is only explaining 15% of the amount of variation in English performance.

In model 2, 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 0.67 score points increase in English performance, every additional meal with 3.9 score points, every additional parental school level (no school, primary school, secondary school and tertiary education) with 6.38 score points and every additional home education resources with 2.24 score points. When adding the socio-economic variables to the model, the difference in performance between urban and rural areas decreased from 28.5 to 24.12 score points. Together, the location variable and the socio-economic variables explain 20% of the amount of variation in English performance.

In model 3, 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 significantly 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 21% of the amount of variation in English performance. The results also indicate that girls perform better in English than boys by 3.55score points. Every additional hour that learners worked for their families was associated with a decrease of 2.94 score points in English. These findings are consistent with those shown in Table 2.15. In 2018, Table 2.15 shows that there was a significant difference of 5.06 score points in English performance between learners working more than one hour a day for their family and learners who worked less. This difference decreased from 5.06 to 2.94 score points after taking into account the differences in family socio-economic status and school location.

In model 4, variables related to teaching and learning (SATELLITE, BUDGET, ABSENT and BOOKS) were included. Adding these variables to the model decreased the difference in performance between urban and rural areas from 23.88 to 22.06score points in English performance. In other words, when taking into account the number of satellite schools, the number of days a learner was absent and the number of reading materials (BOOKS), the difference in English performance between urban and rural areas decreased significantly. Of all the socio-economic variables, the number of home possessions (HOMEPOS) 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 24% of the amount of variation in English performance. Furthermore, learners in satellite schools performed 6.20 score points lower than learners in registered schools.

Table 4.10: Results of multiple regression analysis explaining variance and trend in Mathematics performance

		MODEL 1	MODEL 2	MODEL 3	MODEL 4
	R-SQUARED	**0.092**	**0.147**	**0.15**	**0.18**
	CONSTANT	**295.31(0.55)**	**269.51(0.96)**	**269.91(1.24)**	**282.32(1.49)**
Location	URBAN	**-18.75(0.47)**	**-15.07(0.47)**	**-14.87(0.47)**	**-13.18(0.47)**
Socio-economic	HOMEPOS		*2.19(1.20)*	*1.04(0.34)*	*2.54(0.11)*
	MEALS		**3.91(0.24)**	**3.90(0.24)**	**3.74(0.23)**
	PARED		**5.53(0.25)**	**5.52(0.25)**	**4.85(0.25)**
	HEDRES		**1.96(0.23)**	**1.85(0.23)**	**1.55(0.23)**
Background	GENDER			**2.54(0.31)**	**2.55(0.31)**
	WORK			**-2.24(0.35)**	**-2.06(0.34)**
Teaching and Learning	SATELITE				**-3.89(0.43)**
	BUDGET				**1.71(0.20)**

	ABSENT				**-3.58(0.21)**
	BOOKS				*1.32(0.22)*

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 2018, learners in urban areas performed on average 18.75 score points higher than learners in rural areas in Mathematics. The R-square was 9.2%, meaning that the URBAN variable is only explaining 9.2% of the amount of the variation in Mathematics performance.

In model 2, 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 predicted Mathematics performance. Every additional meal was associated with 3.91 score points increase in Mathematics performance, every additional parental school level (no school, primary school, secondary school and tertiary education) with 5.53 score points and every additional home education resources with 1.96 score points. When adding the socio-economic variables to the model, the difference in performance between urban and rural areas decreased from 18.75 to 15.07 score points in Mathematics performance. Together, the location variables and the socio-economic variables explain 14.7% of the amount of variation in Mathematics performance.

In model 3, 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 above, 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 15% of the amount of variation in Mathematics performance. The results also indicate that girls perform better in Mathematics than boys by 2.54 score points. Every additional hour that learners worked for their families was associated with a decrease of 2.24 score points in Mathematics.

In model 4, variables related to teaching and learning (SATELLITE, BUDGET, ABSENT and BOOKS) were included. Adding these variables to the model decreased the difference in performance between urban and rural areas from 14.87 to 13.18 score points. In other words, when taking the number of satellite schools, the number of reading materials and the number of days a learner was absent into account, the difference in Mathematics performance between urban and rural areas decreased significantly. Of all the teaching and learning variables, the number of books (BOOKS) per learner did not predict Mathematics performance significantly. Together, the location variables, the socio-economic variables, the background variables and the teaching and learning variables explain 18% of the amount of variation in Mathematics performance. Learners in satellite schools performed 3.89 score points lower than learners in registered schools.

CHAPTER 5
CONCLUSION, POLICY IMPLICATIONS AND FUTURE PROGRAMMING

5.1 Summary

The 2018 Zimbabwe Early Learning Assessment was the third 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 learners performed in 2018 on literacy and numeracy tests. Another question explored the relationships of a range of variables that may impact on learner performance on literacy and numeracy. The last question was on the extent to which improvement in literacy and numeracy performance could be attributed to EDF resources which were given to schools. Presented in the next section are the key findings of the 2018 research questions.

5.2 Key findings

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

1. Overall, the percentage of learners performing at or above grade level was 76.4% and 72.2% for English and Mathematics respectively in 2018. The 2018 results indicate an increase from 2017 in the number of learners who performed at and above grade level in both English and Mathematics. In 2017, 68% of the learners performed at or above grade level in English and 55.4% in Mathematics. This means that learner performance improved gradually year by year.

2. Performance in English increased between 2017 and 2018. English performance increased from 314.7 score points in 2017 to 315.47 score points in 2018 and this represents an increase of 0.77 score points. For Mathematics, the average mean performance increased significantly from 309.49 in 2017 to 316.67 in 2018 and this

represents an increase of 7.18 score points. There was a marked improvement of learner performance in Mathematics than English.

3. Analysis by gender revealed that in 2018, girls out-performed their male counterparts in both English and Mathematics. In 2018, boys and girls had a mean of 313.56 and 316.97 respectively in English while in Mathematics they had 315.31 and 317.74 respectively. The differences in performance between boys and girls in both English and Mathematics were statistically significant. In 2018, 73.9% of the boys performed at or above grade level, whilst 78.4% of the girls performed at or above grade level in English. For Mathematics, 53.7% and 52.6% of the boys and girls respectively performed at or above grade level.

4. The 2018 results indicate that urban schools outperformed rural schools by 34.50 score points in English and 18.75 score points in Mathematics. These performance differences were statistically significant for both English and Mathematics. In 2017, the performance differences between urban and rural schools were greater than those in 2018 with 35.23 score points in English and 23.19 score points in Mathematics. The 2018 results also show that 93.9% of urban learners performed at or above grade level in English as compared to 73.6% of rural learners. In Mathematics, 90.2% of the urban learners performed at or above grade level. Only 69.3% of the rural learners performed at or above grade level in Mathematics. The reason why urban schools performed better than rural schools is that they are better resourced and have good infrastructure than rural schools.

5. Analysis by province revealed that Bulawayo and Harare learners outperformed learners from all other provinces in both English and Mathematics in 2018. The reseason being that the provinces are predominantly urban. Learners from Mashonaland West performed the least in both English and Mathematics in 2018. For Mathematics, the results show that all the provinces recorded significant increases in performance between 2017 and 2018. Harare and Bulawayo performed

better in Mathematics than the rest of the provinces, with Mashonaland West being the least.

6. In terms of age, the 2018 results indicate that learners aged 8 performed the best in both English and Mathematics. Learners aged 13 years performed the worst in English while those aged 9 were also the worst in Mathematics. Learners aged 8 recorded a significant increase in Mathematics performance while the increase in English was not significant. The age of 8 is an appropriate age for learners completing the infant school, hence their performance was appropriate to the school level.
7. Language spoken at home had four groups; Shona, Ndebele, English and Others. The other languages included Venda, Tonga, Shangani, Kalanga, Sotho, Ndau, Sign, Chewa, Chibarwe, Khoisan, Tswana, Xhosa and Nambya. Descriptive statistics show that most of the learners speak Shona (76.7%) at home, followed by Ndebele (14.1%), other languages (6.7%) and English (2.4%). 2018 Results show that learners who speak English at home outperformed those who speak Shona, Ndebele and Other languages in both English and Mathematics. There were no significant differences in English performance between learners who speak Shona and Ndebele at home in 2018 but the difference was significant in Mathematics. The 2018results further showed that 90.4% of learners who speak English at home, 76.1% who speak Shona at home, 77.8% who speak Ndebele at home and 72.3% who speak other languages at home performed at or above grade level in English. In Mathematics, the percentage of learners who performed at or above grade level in 2018 were; 83.5%, 72.4%, 71.5% and 67.7% for learners who speak English, Shona, Ndebele and Other languages respectively at home.

8. Analysis was done based on the number of hours learners worked at home. Learners were classified into 4 non-overlapping groups: Less than 1 hour,1 hour and more but less than 2 hours, 2 hours and more but less than 3 hours and 3 hours or more. There are notable performance variations associated to the number of hours that learners spend working for their families. The 2018 English results

indicate that those who work less than one hour per day outperformed all the other groups in both English and Mathematics. Learners who worked for more hours at home performed poorly than those who worked for less the time. There was direct variation between number of hours worked at home and performance score points.

9. The number of meals the learners take per day had a bearing on their performance in English and Mathematics. The 2018 results indicate that learners who had three or more meals per day outperformed those with two meals who in-turn outperformed those who took one meal per day. The difference in performance between learners with three or more meals and those with two meals and the difference between those with two meals and one meal were statistically significant in both English and Mathematics. This trend was similar to that of 2012 and 2017.

10. The 2018 results show that home possessions have an effect on learners' performance in English and Mathematics. Learners were categorised into three groups based on the number of home possessions (electricity, piped water, borehole, television and radio) they had. In 2018, learners who had four or more home possessions outperformed those with two or three, who in-turn outperformed those with one or less home possessions. The differences in learner performance among all the groups were statistically significant in both English and Mathematics. The 2018 results also show that 85.4% of learners with four or more home possessions performed at or above grade level in English, while 75.2% and 73.8% of learners with two or three and those with one or less respectively performed at or above grade level. In Mathematics 82.4%, 71.2% and 68.9% of learners with four or more, two or three and one or less home possessions respectively performed at or above grade level. The results increased significantly from those of 2017.

11. Learners were categorised into three groups (Four or more, two or three and one or less) based on the number of home educational resources (pencil, school bag, pen, desk, computer and calculator) they had. The 2018 results indicated a

significant decrease in English performance for all the three groups between 2017 and 2018. However, there was a significant increase in Mathematics performance in for the groups between 2017 and 2018. In 2018, learners who had four or more home educational resources outperformed those with two or three and those with one or less in English and Mathematics. However, there was no significant difference between learners with two or three and one or less home educational resources in English and Mathematics. The 2018 results also show that 85.4% of learners with four or more home educational resources performed at or above grade level in English, while 75.2% and 73.8% of learners with two or three and one or less respectively performed at or above grade level. In Mathematics 82.4%, 71.2% and 68.9% of learners with four or more, two three and one or less home educational resources respectively performed at or above grade level.

12. Analysis was done based on the highest level of parental education attained. The 2018 English and Mathematics results showed that learners with a parent or guardian who completed a tertiary education outperformed those with a parent /guardian who completed secondary school who in-turn outperformed learners with a parent or guardian who completed a primary education. In addition, learners with a parent or guardian who completed a primary education outperformed those with a parent who did not go to school. Therefore, the higher the level of parental education, the higher the level of learner performance.

13. For 2017, mean performances for Shona, Ndebele and Tonga 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 did in all the three language tests. Learners in registered schools performed better than those in satellite schools in all languages. Furthermore, learners in urban areas outperformed those in rural areas in local languages. The differences in performance are larger in Shona as compared to all other local languages.

14. Learners were classified into three socio-economic classes (Low SES, Medium SES and High SES). The 2018 results have shown a significant increase in the mean performance of learners in all classes of socio economic status between 2012 and 2018 in English and Mathematics. However, only learners in the High SES class increased significantly in Mathematics between 2017 and 2018. There has been a significant increase in mean performance in both English and Mathematics between2012 to 2018. Learners from high socio-economic status (SES) outperformed those from medium and low SES in in both English and Mathematics in 2018. In 2018, the performance differences between different SES groups were statistically significant in both English and Mathematics. A similar trend was observed from 2012 to 2017. The higher the socio-economic status, the greater the performance of the learner.

15. Notable differences in performance were observed between registered and satellite schools. Between 2016 and 2017, only satellite schools recorded significant increase in English performance. In Mathematics, both satellite and registered schools experienced significant decreases in mean performance in 2018. The 2018 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 2018. The 2018 results also show that 78.1% of learners from registered schools performed at or above grade level in English, while 67% of learners from satellite schools performed at or above grade level. In Mathematics 73.8% and 63.4% of learners from registered and satellite schools respectively performed at or above grade level.

16. From 2012 to 2016, facilities such as water and electricity had a bearing on learner performance. 2018 results also indicate that facilities have a bearing on learner performance as reflected by the means for both English and Mathematics. The 2018results further showed that 83.3% of learners without electricity and water, 71.5% with either electricity or water and 68.4% with both electricity and water

performed at or above grade level in English. In Mathematics, the percentage of learners who performed at or above grade level in 2018 were; 80.1%, 65.8% and 66.8% for learners without electricity and water, with either electricity or water and with both electricity and water respectively.

17. In 2012, 2015, 2016, 2017 and 2018, results show no significant difference in performance between learners from schools with all permanent classrooms and those from schools with at least two-thirds but not all in both English and Mathematics. In addition, no significant differences were observed between the performance of learners from schools with at least two-thirds but not all and those from schools with less than two-thirds permanent classrooms in 2018 in both English and Mathematics. For all groups, significant increases in performance were also observed between 2012 and 2018 in both English and Mathematics.

18. Prior to 2017, school budget was found to predict performance significantly. However, in 2017 and 2018 results from multiple regression show that school budget did not predict learners' performance significantly.

19. In 2018, learners who were never absent in the term the assessment was administered, outperformed those who were absent for one or two days who in-turn outperformed learners who were absent for three or more days in both English and Mathematics. In English, the performance increases between the groups were not statistically significant. However, performance in Mathematics showed significant increases among all the three groups in 2018. In both English and Mathematics, all groups showed a significant increase in performances between 2012 and 2018. The 2018 results further showed that 83.7% of learners with no days absent, 74.0% with one day absent and 69.6% absent for three days or more performed at or above grade level in English. In Mathematics, the percentage of learners who performed at or above grade level in 2018 were; 80.1%, 69.7% and 64.6% for learners with no days absent, with one day absent and with three or more days absent respectively.

5.3 Policy Implications

The analysis of the performance of grade three learners who participated in ZELA 2018 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 learner questionnaires.

1. **Community Sensitisation** – Learners who work less than one hour for their families outperformed those who worked for one or more hours per day in both English and Mathematics. Therefore, there is great need to sensitise the community concerning the repercussions of learners working more than an hour per day. Parents and guardians should encourage learners to spend more time focusing on their education.

2. **Distribution of Resources**- Learners 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 and rural have significant relationship to learner performance. This pattern has been observed since 2012 through to 2018. 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. In order to capacitate rural schools, there is need to improve the learner textbook ratio, teacher learner ratio and introduce incentives for rural teachers. There is need to strengthen resource 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 partnerships should strengthen School Development Committees (SDCs), school boards and trustees.

3. **The effect of number of meals on performance of learners**- 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 school. Learner performance deteriorates if the learners are hungry.

4. **Develop systems that minimise the impact of socio-economic status (SES) on learners' 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, borehole, 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 learners 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 learners' performance. The impact of highest parental education on learners' performance can be reduced by creating incentives for teachers to do remedial education for under-performing learners. Incentives for teachers include providing them with affordable houses with access to water and electricity, better salaries and rural allowances.

5.4 Lessons Learnt

In the period 2012 to 2018, 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 learners 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 as location, gender, age and socio-economic status that influence learners' performance at grade3 can be compared to those that influence learners' 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 or registered-satellite performance difference be addressed?

Another lesson learnt is the need to engage parents more in the assessment of learners. Due to influence of socio-economic status on learners' performance as evidenced by ZELA (2012 - 2018), parents are a valued source of assessment information, as well as an audience for assessment. Because of the fallibility of direct measures of learners, assessments should include multiple sources of evidence, especially reports from parents and teachers. Assessment results should be shared with teachers and parents as part of an ongoing process that involves teachers and parents in the education of children.

The forth lesson learnt is that assessment of learners can be done in many ways and the best way is to use Item Response Theory (IRT). Some of the ways of assessing learners' 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 learner's performance is strongly influenced by the sample analysed. The IRT allows us to evaluate the learner'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, learning and assessment processes.

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 learners 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, improving ZIMSEC's assessment precision and developing local community support programmes.

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