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# THE INFLUENCE OF SCHOOL TYPE ON PUPILS' PROFICIENCY IN SELECTED SCHOOL SUBJECTS: IMPLICATIONS FOR CURRICULUM IMPLEMENTATION IN GHANA

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## ABSTRACT

This research examined the influence of private and public schools on pupils' proficiency in mathematics and English language subjects. The theoretical model that supported the study was the bioecological model of human development. The sample comprised 16,481 Primary 3 and 14,495 Primary 6 pupils from 448 and 426 schools respectively. The research design was a descriptive cross-sectional survey. Schools were sampled using a stratified random sampling technique. Data were analyzed using a multilevel modeling technique. The significance or otherwise of the influence of school type on pupils' proficiency in both subjects was assessed at p < 0.001. The results showed that many pupils performed below the minimum competency level in both subjects uniquely because they attended public schools. Conversely, many pupils were found to be proficient in both subjects exclusively because they attended private schools. The research findings suggest that the type of primary schools pupils attend in Ghana significantly mattered for their academic success and the progression from one grade-level to another. The results imply that learning opportunities are not equal for all pupils. This has implications for the effective implementation of the primary school curriculum in the country. To improve upon the academic achievement of primary school children in Ghana, first, there is the need to eliminate the achievement gap between private and public schools.

## INTRODUCTION

Education is an effective means of reducing poverty by equipping individuals with relevant skills, competencies, knowledge, and values (Bashir, Lockheed, Ninan & Tan, 2018; UNESCO, 2018; Organization for Economic Co-operation and Development [OECD], 2020).

Hence, providing children with a good quality education is of prime importance because of its social, economic, health, and other areas of our wellbeing (Hanushek & Woessmann, 2015; Peeta, Fink & Fawzi, 2015). As a result, in developing any curriculum, painstaking efforts are made at identifying selected bodies of

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knowledge, skills, values, and competencies that are critical for the survival of learners and that which would also equip them to contribute meaningfully to the development of the society. However, prior studies confirm that only a minority of primary school pupils from developing countries can acquire the most fundamental competencies in reading and numeracy before they complete this level of education (Bashir et al., 2018; UNESCO, 2018; World Development Report, 2018).

According to the United Nations Educational, Scientific Cultural Organisation Institute for Statistics [UIS] (2017), 387 million primary school children across the globe were functionally illiterate and innumerate. In the Ghanaian context, successive performances by pupils in different waves of the national education assessment tests confirm that many are unable to attain the expected grade-level competencies (Ministry of Education [MOE], 2013a; 2016a). Many of these children exit the primary level of education with a low level of knowledge which eventually leads them to drop out of school. The level of pupils' academic achievement is connected to several factors including the type of school (whether public or private) they attend (Filmer, Molina & Stacy, 2016; MOE, 2016a; Eshetu, 2015; Endeley, 2017). Beyond the school level, some studies have also suggested differences in achievement by pupils from Sub-Saharan Africa [SSA] and non-SSA countries. These studies contend the academic achievement of pupils from SSA is lower than those in non-SSA countries, with similar socioeconomic conditions and backgrounds (Sandefur, 2016; Bashir et al., 2018; Mullis, Martin & Loveless, 2016). This may be the case because a majority of children in SSA live in extreme poverty and have limited access to educational resources to support learning (Zakharov, Tsheko & Carnoy, 2016; Blampied et al., 2018). In such circumstances, children in SSA learn very little which reflects in the consistent abysmal achievement levels in national, regional, and international assessments (Bold et al., 2017; MOE, 2016a; Martin, Mullis, Foy & Hooper, 2016; Mullis et al., 2016).

Studies that focused on school-level achievements of children from the developed and developing countries found significant gaps between these two categories of countries. The between-school variance in achievement in the developed countries is smaller than that of the developing countries (Filmer et al., 2016; Martin et al., 2016; Mullis et al., 2016). What is more, the proportion of between-school variance in achievement is bigger for countries within the SSA and varies according to subjects and grade-levels (Lockheed, Prokic-Breuer & Shadrova 2015; Filmer et al., 2016; Bashir et al., 2018). The causes of these significant school-level differences are varied. Extant literature suggests that a greater proportion of the variance is caused by the socioeconomic characteristics of schools and pupils (Chmielewski, 2019; Kim, Cho & Kim, 2019; Bofah & Hannula, 2015; Banerjee, 2016).

In many countries in Africa, children from relatively socioeconomically-advantaged backgrounds attend private schools while a larger proportion of the relatively disadvantaged children attend public schools (MOE, 2016a; MOE, 2018; World Development Report, 2018; Blampied, 2018). The difference in the learning outcomes of pupils belonging to these school types has sustained studies among stakeholders at national, regional and international levels (MOE, 2016a; Martin et al., 2016; Mullis et al., 2016; Bietenbeck, Piopiunik & Wiederhold, 2017). Whereas most of the studies and reports we reviewed focused on finding the magnitude of the differences in academic achievement between private and public schools, others sought to establish the correlations between school types and quality of academic achievement (e.g. UNESCO, 2018; Hattie, 2009; MOE, 2016a; Tooley & Longfield, 2014). None of the reviewed literature accounted for the numbers of pupils who achieved or failed to achieve certain levels of proficiency uniquely as a result of attending a specific type of school. This gap in approach to investigate this vital educational issue particularly in the SSA and Ghanaian contexts necessitated this research with a two-fold purpose. First, we assess the unique influence of the type of school pupils attend on their proficiency in both subjects at both grade-levels. Second, the coefficient estimates derived as the unique effect of school type on achievement are used to account for the numbers of pupils who achieved or failed to achieve certain levels of proficiency in the selected subjects.

**THEORETICAL FRAMEWORK**

The theoretical framework that supports this study is the bioecological model of human

development developed by Bronfenbrenner (2005). The model provides a framework for looking at the different factors within an environment that influence human development (Bronfenbrenner & Evans, 2000). The theoretical model proposes that development takes place in a particular social context which influences the quality of human development. The operation of the model is captured in four elements namely: (i) Process (ii) Person (iii) Context and; (iv)Time (Bronfenbrenner, 2005; Bronfenbrenner & Evans, 2000; Wachs & Evans, 2010).

The proximal process connotes the primary mechanism in the development and includes the interactional processes and opportunities available to children in an environment (Bronfenbrenner & Morris, 1998; Bronfenbrenner & Evans, 2000). The theory advances that the characteristics (e.g. age, IQ level, gender) individuals bring into any social situation strongly determine their levels of achievement of outcomes of interest (Bronfenbrenner, 2001; Bronfenbrenner & Morris, 1998). According to the theory, humans develop within four interrelated systems namely; microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 2005). The microsystem refers to any environment, such as the home or school in which children engage in physical, social, and pro-academic activities (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). The mesosystem explains how the linkages between any two or more microsystems jointly influence children's development (Bronfenbrenner & Morris, 2006; Christensen, 2010). The exosystem contains both micro and meso systems and impacts the wellbeing of all those who come into contact with the child. It encompasses the processes taking place between two or more settings, at least one of which does not ordinarily contain the developing person, but in which events occur that influence processes within the immediate settings containing the person (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). The macrosystem describes the entire environment under which all the other systems function (Bronfenbrenner & Morris, 1998). The macrosystem offers the aggregate advantages and disadvantages available to persons in a specified geographical context (Tudge, Mokrova, Hatfield & Karnik, 2009). The final element of the theoretical model is time and it encompasses various aspects such as chronological age, duration, and nature of periodicity as it relates to a child's environments. For the dual reasons for brevity and purpose of this research, only the connection between the microsystem and academic achievement is emphasized.

## MICROSYSTEM

The microsystem consist of the child's home or school environment, and which may offer the most learning opportunities or challenges (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). In this study context, private and public schools epitomize different microsystems for children. Available evidence from Ghana and elsewhere (see empirical review) suggests that private and public schools differ in many spheres. The differences in the climate, ethos, and resource levels of schools offer different teaching and learning opportunities for pupils within specific microsystems or schools. For instance, private schools in Ghana usually have better school facilities and resources than public schools, which creates different opportunities and limitations for their respective pupils. The supporting theory suggests that children may have similar biological endowments (e.g. IQ level) but the difference in the quantity and quality of interactions they encounter determines the quality of outcomes in specific learning domains. In this study, pupils' gender and age), school (class size), and community (rural vs urban; deprived vs non-deprived) characteristics were controlled for except the types of schools pupils attended. It is expected that pupils who attend private and public schools, which are markedly different microsystems, are more likely to perform differently in the two subjects under focus. Contrary wise, pupils in the same microsystem or school are more likely to achieve similar results because they are influenced by similar opportunities and challenges. Microsystems (schools) that offered productive interactional opportunities for its pupils are more likely to attain higher scores. The reverse situation is equally valid.

## SCHOOL TYPE AND PUPILS' ACADEMIC ACHIEVEMENT

The type of school pupils attend has been linked to their present and future academic success (Filmer et al., 2016; MOE, 2016b; Eshetu, 2015; Endeley, 2017; UNESCO, 2018). Many of the studies on private and public school achievement gaps suggest that the gaps are wider for the developing countries than the developed

(Lockheed et al., 2015; Bashir et al., 2018). Within countries, children from private schools outperform those in public schools (Lockheed et al., 2015; Tooley & Longfield, 2014) with few exceptions when the socioeconomic characteristics of learners were controlled for (Mahuteau & Mavromaras, 2014; Lockheed et al., 2015). Therefore, Mahuteau and Mavromaras (2014) contend that the observed superior performances of pupils in non-government schools are explained by the favorable conditions they enjoy. For instance, parents of children in private schools are more supportive of their children and staff than those in public schools. Typically, private schools have better school infrastructure and social services (e.g. electricity, clean water, and sanitary facilities) and adequate educational resources to facilitate effective teaching and learning (Blampied et al., 2018; MOE, 2016; MOE, 2018). Moreover, school leadership and teacher accountability are more effective in private schools than in public schools (Cruickshank, 2017; Tooley & Longfield, 2014). The levels of effectiveness of these variables have a direct and indirect influence on school outcomes regardless of other micro or macro-level factors (Dutta & Sahey, 2016; Day, Gu & Sammons, 2016).

Apart from the perceived socioeconomic advantage of pupils in private schools, certain specific factors also play a crucial part in the Ghanaian context. Characteristically, private school pupils experience preschool education, unlike the many pupils in public schools (MOE, 2013b). The unavailability of good preschools in rural and public schools is cited as a major reason for children to stay at home until they are ready to be admitted to primary grade 1. As a result, the primary grade 1 teacher is faced with an additional task of teaching to make up for the pro-academic defects arising from skipping preschool education. The negative effects of not acquiring the fundamental language, literacy, and numeracy on children's academic achievement have been confirmed from many studies (e.g. Bakken, Brown & Downing, 2017; OECD, 2017).

## THE CONTEXT OF THE STUDY

The study relied on the 2013 wave of the Ghana National Education Assessment data. The assessment is done by the USAID and RTI International in collaboration with the Ghana Education Service. It is held every two years for primary grades 3 (in 2016 primary grade 4 pupils were examined instead of primary 3 pupils) and 6 pupils to test their competence in mathematics and English language subjects (MOE, 2013a; 2016a). Primary grades 3 (hereafter P3) and 6 (hereafter P6) pupils were assessed and scored over a 30-item and 40-item tests, respectively. For the P3 mathematics and English language tests, pupils who answered up to 10 items correctly (i.e. below 35%) performed "below minimum competency". Pupils who correctly answered 11 up to 16 questions (i.e. 35% - 54%) achieved "minimum competency". Finally, those who correctly answered at least 17 questions or better (i.e. ≥ 55%) were considered "competent". That for P6 achievement followed similar interpretations except with different performance ranges. Pupils who correctly answered 13 questions or less (i.e. below 35%) performed "below minimum competency". Achievement scores between 14 and 21 (i.e. 35% - 54%) were interpreted as "minimum competency" while those who correctly answered at least 22 items or better (i.e. ≥ 55%) were classified as "competent" in a subject (see Table 1 for performance distribution by subject and grade-levels).

**Table 1: Pupils' performance in the 2013 Ghana National Education Assessment by subject and grade**

| Competency level | Score range (marks) | | subject and percentage score | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | P 3 | | | | P 6 | | | |
| | P3 | P6 | English Language | | Mathematics | | English Language | | Mathematics | |
| | | | Number | % | Number | % | Number | % | Number | % |
| Below minimum competency | 0-10 | 0-13 | 7,555 [42,635][2] | 41.9 [45.8][1] | 7,558 [42,653] | 42.9 [45.9][1] | 4,885 [27,406][2] | 31.3 [33.7][1] | 5,874 [32,954][2] | 39.1 [40.5][1] |
| Minimum competency | 11-16 | 14-21 | 4,837 [27,297][2] | 29.7 [29.4][1] | 5,680 [32,054] | 35.0 [34.4][1] | 4,378 [24,561][2] | 29.7 [30.2][1] | 7,117 [39,927][2] | 50.0 [49.1][1] |
| Competency | 17-30 | 22-40 | 4,089 [23,076][2] | 28.4 [24.8][1] | 3,243 [18,301][2] | 22.1 [19.7][1] | 5,232 [29,352][2] | 39.0 [36.1][1] | 1,504 [8,438][2] | 10.9 [10.4][1] |
| Total % | | | 100 | | 100 | | 100 | | 100 | |

[1] equivalent percentage performance distribution after excluding unclassified localities and class sizes less than 10.

[2] equivalent weighted sample Source: Ghana 2013 National Education Assessment Technical Report, p. x.

The academic achievement of pupils across school types is shown in Table 2. Consistently, the percentage of pupils from private schools who were competent in both subjects across both grade-levels markedly surpassed pupils from public schools. On the contrary, the percentage of pupils from public schools who performed below minimum competency was significantly higher than those from private schools.

**Table 2: Performance levels of P3 and P6 pupils by school type**

| Competency level | School Type | |
|---|---|---|
| | Public | Private |
| P3 English language (%) | | |
| Below minimum competency | 49.0[51.9][1] | 14.9[14.5][1] |
| Minimum competency | 31.9[30.9][1] | 21.7[20.9][1] |
| Competency | 19.2[17.2][1] | 63.4[64.6][1] |
| P3 Mathematics (%) | | |
| Below minimum competency | 49.1[51.1][1] | 19.5[18.5][1] |
| Minimum competency | 35.7[34.9][1] | 32.3[32.1][1] |
| Competency | 15.3[14.0][1] | 48.2[49.4][1] |
| P6 English language (%) | | |
| Below minimum competency | 37.2[38.4][1] | 8.8[8.4][1] |
| Minimum competency | 33.1[32.7][1] | 17.0[16.8][1] |
| Competency | 29.7[28.9][1] | 74.2[74.8][1] |
| P6 Mathematics (%) | | |
| Below minimum competency | 44.5[44.8][1] | 18.9[17.6][1] |
| Minimum competency | 48.0[47.9][1] | 57.6[55.5][1] |
| Competency | 7.6[7.3][1] | 23.5[26.9][1] |

[1] equivalent percentage performance distribution after excluding unclassified localities and class sizes less than 10.

**Source:** Ghana 2013 National Education Assessment Technical Report, p. xi.

These performance levels do not accurately reveal the unique influence of the type of schools pupils attended on their achievement in the two subjects. The recorded achievement is the product of the characteristics of pupils (e.g. gender and age), and school (e.g. type and class size). Others are the characteristics of the school locality (e.g. rural vs urban), the type of district (deprived vs non-deprived), and other unknown variables. However, this research aims to determine the unique influence of the type of school (private vs public) pupils attended on their achievement in the selected subjects while controlling for the influence of other covariates. Controlling for all the other covariates except the independent variable enabled us to determine the unique contribution of school type to the within- and between-group variances in achievement for both subjects. Driven by this objective, this study is guided by these two research questions.

## RESEARCH QUESTIONS
1.       To what extent does the type of school pupils attend influence their proficiency in P3 English language and mathematics?
2.       To what extent does the type of school pupils attend influence their proficiency in P6 English language and mathematics?

## METHODOLOGY
The study population comprised primary school children from all the ten regions in Ghana (currently there are 16 regions following the re-demarcation of existing regions). However, the target population was P3 and P6 pupils. A total of 16,481[equivalent weighted sample = 93,008] P3 pupils and 14,495[equivalent weighted sample = 81,319] P6 pupils respectively from 430 [equivalent weighted sample = 12,223] and 386 [equivalent weighted sample = 10,972] schools participated in the study. The weighted values for schools are calculated by dividing the total number of primary schools (which had a class size of at least ten pupils) by the number of schools that participated in the assessment tests in each region. For example, in the Greater Accra Region, 55 of the total 1,542 schools participated in the assessment. The sample weight for schools in the Greater Accra Region is therefore 28.03 (i.e. 1,542 ÷ 55 = 28.03). Thus, each

school in the Greater Accra Region that participated in the assessment represented 28.03 schools. Weighted pupils samples are calculated by multiplying the weighted school sample value for each region by the number of pupils sampled from that region. For instance, the weighted sample for pupils from the Greater Accra Region is calculated by multiplying 28.03 by the total number of pupils (2,224) sampled from the 55 schools in the region (i.e. 28.03 x 2,224 = 62,338).

Participating schools were selected using a stratified random sampling method. Schools were stratified into rural and urban as well as public and private. Schools with less than 10 pupils in a class were excluded. In each region, 55 schools were sampled except the Ashanti and Northern regions which had 54 schools each. A school from each of these 2 regions was not in session at the time the test was administered. According to MOE (2013a), the reliability of the test was determined using SPSS Kuder-Richardson-20 (KR20) tests. Alpha values of 0.89 and 0.84 were achieved for the P6 mathematics and English language tests respectively. Alpha values of 0.82 and 0.84 were achieved for the P3 mathematics and English language tests respectively. To ascertain the validity of the instrument, the test questions were developed based on the specified topics in the national curricula. The English language test questions covered listening; reading comprehension; and usage (grammatical structure) domains. The mathematics test covered four domains namely: basic operations; numbers and numerals; measurement, shape and space; and collection and handling of data. The return rate for the answered scripts was 100% (MOE, 2013b). Content valididty of the items were ascertained through expert judgment subject and measurement and evaluation experts.

## DATA ANALYSIS PROCEDURE
For methodological and statistical purposes, two data exclusion criteria were applied to arrive at the final sample for the analysis. First, all schools which were neither designated rural nor urban in the dataset were excluded from the final analysis. Second, schools with class sizes of less than ten pupils were excluded from the final analysis (see Hox, Moerbeek, van de Schoot, 2017). Subsequently, 118 P3 schools (equivalent weighted sample = 3,354) comprising 2,977

pupils (equivalent weighted sample = 16,800) and 162 P6 schools (equivalent weighted sample = 4,605) comprising 2,952 pupils (equivalent weighted sample = 16,561) from the ten regions were excluded. A multilevel modeling technique was applied to analyze the data. The analysis was specified into three levels to account for the between-groups achievement at district and school levels, as well as the within-group variances. All the variable codes for the dichotomous variables, continuous variables, and dependent variables were grand mean-centered. The grand mean centered achievement score for each pupil is the variance (residual score) between a pupil's raw score and the grand mean achievement score derived from all pupils regardless of any differences such as the type of schools they attended. Grand mean centering ensured that the variances of the intercept and the slopes in the regression have a clear interpretation (Hox et al., 2017).

The first stage of the analysis was to compute the null model (with no predictor variables) to estimate the level of achievement around the district, school, and pupil levels. This made it possible for the Intra-class Correlation Coefficient to be assessed as well as providing evidence for the suitability of using multilevel modeling to analyze the data (Hox et al., 2017; Heck & Thomas, 2015). At stage two, the five covariates (pupils' gender, age, class size, district type, and school location) were added to estimate their effects on the scores obtained by pupils. The independent variable (school type) was introduced into the model at the third stage of the analysis to estimate its unique influence on pupils' achievement.

The next stage of the analysis was to determine the number of pupils who achieved or failed to achieve specific levels of proficiency after controlling for the disparities between private and public schools. As an example, we use the estimated effect for the P3 English language achievement. From Table 4, pupils from the public schools on average earned approximately 6 marks less when compared with pupils from the private schools. To account for this achievement variance due to the difference between a private and a public school, 6 marks are added to the initial scores obtained by all pupils. As a result, pupils who initially scored 0 to 4 mark(s) would now earn between 6 and 10 marks; a performance below minimum competency.

However, those who initially scored 5 to 10 marks (i.e. below minimum competency) would now earn between 11 and 16 marks to attain "minimum competency". This implied that pupils who initially scored 5 to 10 marks were disadvantaged by the schools they attended. Correspondingly, pupils who initially had 11 to 16 marks (i.e. minimum competency) would be getting a minimum of 17 marks to a maximum of 22 marks. In the same vein, 6 marks are added to 17marks (i.e. minimum score for competency) to get 23 marks. Thus, pupils who were competent but earned between 17 and 23 marks achieved this feat as a unique contribution from the schools they attended. Consequently, pupils who correctly answered a minimum of 24 out of the total 30 questions in the test were those predicted to have been competent in P3 English language on merit. The same procedure is applied to estimate the numbers of pupils who achieved or failed to achieve specific proficiency levels in both subjects across both grade-levels.

## RESULTS

### DESCRIPTIVE ANALYSIS

The descriptive information about the sample sizes, mean age, class size, and achievement is presented in Table 3. The analysis for the P3 sample reveals there were more pupils from the public (83.9%) than private (16.1%) schools. The proportion of P6 pupils from public schools was 84.5% compared with 15.5% from private schools. For each grade-level, the number of rural schools was more than thrice of urban schools. The mean class size for the P3 sample was bigger for public schools (52.4) than the private schools (46.0). The respective class sizes for the P6 public and private schools were 50.1 and 50.5. The average age for the P3 pupils from private schools was smaller (9.7) than the public school pupils (11.0). As well, the average age for the P6 pupils from the private schools was smaller (12.6) than the public school pupils (13.8). The mean mathematics and English language achievement for the P3 pupils was 12.0 and 12.7 respectively, while that for the P6 pupils was 15.1 and 19.0 respective to mathematics and English language. A t-test analysis showed statistically significant (p-value = 0.000) mean differences in achievement between private and public schools for both subjects.

**Table 3: Descriptive information about pupil and school characteristics**

| Variables | Total | School type | |
|---|---|---|---|
| **P 3** | | Public | Private |
| Sample size | 16,481[93,008][1] | 83.9(%) | 16.1(%) |
| No of Schools | 448 [12,734] | 80.6(%) | 19.4(%) |
| Rural schools | 349[ 9920] | 84.0(%) | 16.0(%) |
| Urban schools | 99[2,814] | 68.7(%) | 31.3(%) |
| Pupil Age[2] | 10.8 | 11.0 | 9.7 |
| Class size[2] | 51.8 | 52.4 | 46.0 |
| Mathematics[2] | 12.0 | 11.1 | 16.3 |
| English language[2] | 12.7 | 11.5 | 19.1 |
| **P 6** | | | |
| Sample size | 14,495 [81,319][1] | 84.5(%) | 15.5(%) |
| No of Schools | 426 [12,109] | 80.1(%) | 19.9(%) |
| Rural schools | 331[9,409] | 84.9(%) | 15.1(%) |
| Urban schools | 95[2,700] | 71.6(%) | 28.4(%) |
| Pupil Age [2] | 13.6 | 13.8 | 12.6 |
| Class size [2] | 50.1 | 50.1 | 50.5 |
| Mathematics[2] | 15.1 | 14.5 | 18.5 |
| English language [2] | 19.0 | 17.5 | 27.0 |

[1]equivalent weighted value                                    [2] means

**INFERENTIAL ANALYSIS**

The results from the analysis for P3 and P6 data are presented in Tables 4 and 5 respectively. The unconditional models for the P3 sample revealed that a greater proportion of achievement variances in the English language (54.8%) and mathematics (63.5%) tests remained unexplained by the number of variables investigated. School-level inequalities accounted for 29.7% and 28.4% of the achievement differences in English language and mathematics, respectively. District-level differences influenced achievement variances in the English language (15.5%) and mathematics (8.9%) tests. The five covariates (pupils' gender and age, class size, district type, and school location) had a statistically significant impact on achievement in both subjects as evidenced by the significant decrease in the deviances (see model 1, Table 4). The introduction of the independent variable (model 2, Table 4) led to the drop of the between-school variance for the P3 English language achievement from 30.9% to 24.2%, a difference of 6.7%. The between school-variance for the P3 mathematics attributed to the independent variable was 5% (i.e. 28.8% - 23.8%). The results in Table 4 indicate that P3 pupils who attended public schools achieved approximately 6 marks (b = -5.722) less in English language and 4 marks (b = -4.193) less in mathematics.

## Table 4: Fixed effect estimates for P3 sample

| Variables/subject | English language | | | Mathematics | | |
|---|---|---|---|---|---|---|
| | Model 0 Null model | Model 1 Covariates | Model 2 Predictor variable | Model 0 Null model | Model 1 Covariates | Model 2 Predictor variable |
| | Coeff.(SE) | Coeff.(SE) | Coeff.(SE) | Coeff.(SE) | Coeff.(SE) | Coeff.(SE) |
| Fixed part Intercept | -.331 (.273) | .757 (.644) | 5.648 (.610) | -.134 (.201) | .472 (.501) | 4.038 (.504) |
| Covariates | | | | | | |
| Pupil (male) | | .033 (.073) | .029 (.073) | | .230 (.068) | .226 (.068) |
| Pupil (age) | | -.168 .023) | -.156 (.023) | | .073 (.022) | .086 (.022) |
| Class size | | .005 (.008) | .010 (.006) | | -.008 (.006) | .003 (.006) |
| School location (Rural school) | | -2.489 (.544) | -2.085 (.441) | | -1.822 (.435) | -1.498 (.367) |
| Deprived district | | -1.396 (.510) | .894 (.404) | | -1.822 (.435) | .669 (.317) |
| Predictor variable | | | | | | |
| School type (public) | | | -5.722 (.385)*** | | | -4.193 (.336) *** |
| Variance component | | | | | | |
| Pupil (%) | 54.8 | 58.5 | 68.9 | 63.5 | 65.8 | 73.0 |
| School (%) | 29.7 | 30.9 | 24.2 | 27.6 | 28.8 | 23.8 |
| District (%) | 15.5 | 10.6 | 6.9 | 8.9 | 5.4 | 3.2 |
| -2LL (deviance) | 98083 | 97325 | 97147 | 95670 | 94966 | 94834 |
| Change in deviance (-2LL) | - | 758 | 178 | - | 704 | 132 |
| $X^2$ (.01) | - | 15.09 | 16.81 | | 15.09 | 16.81 |
| df | - | 5 | 6 | - | 5 | 6 |
| p-value | - | | *** | - | | *** |

Note: *** $p<.0.001$.  Coeff = coefficient; SE=standard error

The unconditional models for the P6 sample indicated that respectively, 54.2% and 70.1% of the variances in achievement in the English language and mathematics tests remained unexplained, given the number of variables investigated. School-level differences accounted for 29.1% and 20.5% of the achievement variances in the English language and mathematics tests respectively. District-level differences accounted for 16.7% and 9.4% of the achievement variances in the English language and mathematics tests respectively. The five covariates (pupils' gender and age, class size, district type, and school location) had a statistically significant impact on achievement in both subjects as evidenced by the significant decrease in the deviances (model 1, Table 5). The difference between private and public schools accounted for 5.0% and 2.8% of the between-school variances in achievement for P6 English language and mathematics respectively. The analysis in Table 5 indicates that P6 pupils who attended public schools, on average, earned approximately 6 marks (b = -6.257) and 3 marks (b = -2.611) less in English language and mathematics respectively.

**Table 5:  Fixed effect estimates for P6 sample**

| Variables/subject | English language | | | Mathematics | | |
|---|---|---|---|---|---|---|
| | Model 0 Null model | Model 1 Covariates | Model 2 Predictor variable | Model 0 Null model | Model 1 Covariates | Model 2 Predictor variable |
| | Coeff. (SE) | Coeff. (SE) | Coeff. (SE) | Coeff. (SE) | Coeff. (SE) | Coeff. (SE) |
| Fixed part Intercept | -1.293 (.373) | .662 (.827) | 6.281 (.857) | -.449 (.180) | -.142 (.428) | 2.200 (.473) |
| Covariates | | | | | | |
| Pupil (male) | | .707 (.100) | .704 (.100) | | .820 (.069) | .819 (.069) |
| Pupils age | | -.693 (.037) | -.670 (.037) | | -.274 (.025) | -.258 (.025) |
| Class size | | .028 (.010) | .040 (.009) | | .011 (.005) | .016 (.005) |
| School location (Rural school) | | -3.946 (.700) | -3.654 (.606) | | -1.525 (.365) | -1.401 (.335) |
| Deprived district | | -2.168 (.659) | -1.450 (.569) | | 1.060 (.337) | -.759 (.308) |
| Predictor variable | | | | | | |
| School type (public) | | | -6.257 (.532) *** | | | -2.611 (.300)*** |
| Variance component | | | | | | |
| Pupil (%) | 54.2 | 60.3 | 67.4 | 70.1 | 72.5 | 77.2 |
| School (%) | 29.1 | 29.0 | 24.0 | 20.5 | 20.3 | 17.5 |
| District (%) | 16.7 | 10.7 | 8.6 | 9.4 | 7.2 | 5.3 |
| -2LL (deviance) | 94041 | 93429 | 93309 | 82956 | 82518 | 82449 |
| Change in deviance (-2LL) | - | 612 | 120 | - | 438 | 69 |
| $X^2$(.01) | | 15.09 | 16.81 | | 15.09 | 16.81 |
| df | - | 5 | 6 | - | 5 | 6 |
| p-value | - | | *** | - | | *** |

Note: *** $p<.0.001$.  Coeff = coefficient; SE= standard error

The results in Table 6 revealed that 1,532(37.5%) and 1,143(35.2%) of those pupils who were initially ranked competent in P3 English language and mathematics respectively (see Table 1) were competent on merit after the disparities between private and public schools were controlled for. Likewise, 2,651(50.7%) and 479(31.8%) P6 pupils who were initially ranked competent "rightly" achieved competency level in English language and mathematics respectively after controlling for the disparities between the two types of schools. Significantly, none of the 4,837(100%) pupils who attained minimum competency achieved this level of performance on merit. Their achievement at this level is wholly attributed to the schools they attended. Likewise, only 414(8.5%) "truly" attained minimum competence in P6 English language when the disparities between private and public schools were controlled for. The remaining 3,964(91.5%) achieved minimum competency solely as a result of the conditions associated with the schools they attended. A total of 6,879(91.1%) and 5,308(70.2%) pupils achieved below minimum competency in P3 English language and mathematics tests exclusively because of the deficiencies associated with the schools they attended but not their characteristics. A total of 676(8.9%) and 2,250(29.8%) performed below the minimum competency in English language

and mathematics on merit. A total of 4,228(86.6%) and 3,313(56.4%) of the P6 pupils achieved below minimum competency in English language and mathematics respectively as a result of the deficiencies associated with the schools they attended. The remaining 657(13.4%) and 2,561(43.6%) pupils performed below minimum competency in English language and mathematics respectively on merit.

**Table 6: Number and percentage of pupils who attained specified competency levels after taking account of inequalities between public and private schools**

| Subject/competency level | | P3 | | P6 | |
|---|---|---|---|---|---|
| | | Number of pupils | % | Number of pupils | % |
| English language | Competent (due to inequalities) | 2,557 | 62.5 | 2,581 | 49.3 |
| | Competent (inequalities accounted for) | 1,532 | 37.5 | 2,651 | 50.7 |
| | Minimum competency (due to inequalities) | 4,837 | 100.0 | 3,964 | 91.5 |
| | Minimum competency (inequalities accounted for) | 0 | 0.0 | 414 | 8.5 |
| | Below Minimum Competency (due to inequalities) | 6,879 | 91.1 | 4,228 | 86.6 |
| | Below Minimum Competency(inequalities accounted for) | 676 | 8.9 | 657 | 13.4 |
| Mathematics | Competent (due to inequalities) | 2,100 | 64.8 | 1,025 | 68.2 |
| | Competent (inequalities accounted for) | 1,143 | 35.2 | 479 | 31.8 |
| | Minimum competency (due to inequalities) | 5,072 | 89.3 | 4,471 | 62.8 |
| | Minimum competency (inequalities accounted for) | 608 | 10.7 | 2,646 | 37.2 |
| | Below Minimum Competency (due to inequalities) | 5,308 | 70.2 | 3,313 | 56.4 |
| | Below Minimum Competency (inequalities accounted for) | 2,250 | 29.8 | 2,561 | 43.6 |

## DISCUSSION OF RESULTS

The unconditional models for both subjects and grade-levels indicated that more than 54% of the variances in achievement were not explained by the total number of variables contained in the dataset. This is comprehensible because more factors affect pupils' academic achievement than were available for this study. Nonetheless, the between-school variances for each subject across both grade-levels provide evidence that there are substantial differences in the characteristics of the schools pupils attend. This result is consistent with prior findings that found significant between-school variances between school types in developing countries like Ghana (Bashir et al., 2018; Lockheed et al., 2015). Similarly, there were statistically significant achievement differences at the district-level. From the descriptive statistics in Table 3, there is an unequal distribution of private and public schools in Ghana. The private schools are skewed in favor of the urban locations, while the public schools are dominant in rural locations. The unequal distribution of schools across the rural and urban communities, which vary in socioeconomic and educational resources, cumulatively influenced the between-district achievement variances. Consistent with prior studies (e.g. Martin, Foy, Mullis & O' Dwyer 2013; Lockheed et al., 2015; Filmer et al., 2016; Figlio & Karbownik, 2017) the margin of between-school variances differed for specific subjects and grade-levels. The between-school variance is bigger for the lower grade-level than the upper grade-level, while the difference is bigger for the English language than mathematics. Available evidence suggests that the disparity between rural and urban, as well as private and public school children in the practice of speaking the English language in and out of school initiates and sustains this gap (MOE, 2016a; MOE, 2013a).

On average, the P3 pupils who attended public schools achieved approximately 6 marks less in the English language and 4 marks less in mathematics. Likewise, P6 pupils who attended public schools, on average, earned approximately 6 marks and 3 marks less in

English language and mathematics respectively. Across many countries, the achievement levels of private schools are reported to be higher than public schools particularly at the primary level of education (Filmer et al., 2016; MOE, 2016a; MOE, 2016b). Many reasons account for this phenomenon. Characteristically, private schools in Ghana have adequate educational resources (e.g. textbooks, desks, chairs) to facilitate effective teaching and learning than public schools (Tooley & Longfield, 2014; Blampied et al., 2018). The quality of school leadership and teacher accountability (e.g. school attendance and use of contact hours) is effective in private schools than public schools (Tooley & Longfield, 2014; Blampied et al., 2018). Other studies cite the socioeconomic differences between private and public school children as the reason for achievement differences (Mahuteau & Mavromaras, 2014; Chmielewski, 2019; Kim, Cho & Kim, 2019). The aggregate impact of the difference in the quality of the tangible (e.g. textbooks, desks, chairs) and intangible variables (e.g. school leadership, school ethos, and teacher accountability) contributed to the achievement differences between private and public schools.

Most of the pupils who were competent in both subjects at both grade-levels attained this level of performance not on merit but as the unique impact of the types of schools they attended. Of educational importance is the fact that all the 4,837(100%) children who initially attained minimum competency (for P3 English language) did so by the characteristics of the schools they attended and not their abilities. Thus, the impact of schools overshadowed the impact of children's attributes. The results highlight that many pupils could not attain the expected levels of proficiencies as a result of the disadvantages associated with the schools they attended. The unfavorable conditions associated with public schools appeared to have exacerbated the plight of children who attended these schools. On the other hand, the favorable conditions associated with private schools greatly contributed to pupils' proficiencies in the two school subjects by mitigating the deficiencies they brought to school.

The inability of some school children to attain essential skills and proficiency in mathematics and the English language because of attending disadvantaged schools in the country has implications on the effective implementation of the primary school curriculum. The curriculum embodies the hopes, aspirations, and values of the Ghanaian people. A core aim of the curriculum is to contribute to reducing income inequality by offering opportunities for learners to be equipped with essential knowledge and skills to become productive and useful members of society. Evidence of the successful implementation and realization of this aim is the percentage of pupils who pass or fail in examinations meant to assess their competences. The marked achievement difference between private and public school children at this level of education is evidence of the uneven implementation of the curriculum across the country. It is therefore imperative that all schools are supplied the required human and non-human resources to facilitate effective teaching and learning of the content of the curriculum. Moreover, stakeholders, including school management and parent-teacher associations should ensure that effective monitoring and supervision of teaching and learning activities take place as required.

## LIMITATIONS OF THE STUDY

This study investigated the influence of the type of schools pupils attend on their proficiency in specified subjects. However, there are some potential limitations worth highlighting. First, this is non-experimental research, hence the association between school type and achievement is not the unconditional influence of the independent variable on the dependent variable. Nonetheless, they offer credible relationships that can be built upon for future studies. Second, the use of cross-sectional data, coupled with the unavailability of certain data (e.g. pupils' prior achievement, school attendance history, household wealth, and parental support) may have over- or under-estimated the effects attributed to school type. Having data on pupils' prior achievement and

controlling for it would have offered an opportunity to accurately determine the "value-added" to achievement by attending specific school types. Finally, the use of secondary data limited us to the range of variables available in the dataset.

## CONCLUSION

The study has presented credible evidence to attest that the majority of primary school children in Ghana, and for that matter, SSA countries are unable to attain expected grade-level competencies in school subjects primarily because of the disadvantages associated with the schools they attend. Apart from the generally low achievement levels, there exist statistically significant achievement gaps between private and public schools even after controlling for the pupil (e.g. gender and age), school (e.g. class size and location), and district (resource level) characteristics. The type of primary school pupils attend in Ghana significantly mattered most for their academic achievement. An effective strategy to improve upon the academic achievement of pupils in Ghana is to narrow or eliminate the existing gap between private and public schools. Poor academic achievement in schools leads to school dropout at very early stages of schooling, culminating in a low-quality human capital base. The low human capital base as a result of the low level of education has implications on the economic, health, and social wellbeing of a country (Hanushek & Woessmann, 2015; Peet, Fink & Fawzi, 2015). It is recommended for context-sensitive, quasi-experimental studies to be done to establish the core and remote factors that inhibit the effective teaching and learning at both the early grade and primary pupils in Ghana. This is because the problem of low achievement at the primary level begins with the failure of early graders to acquire the foundational skills they would need to successfully navigate through the primary school level.

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