

Geo-socio-economic determinants of primary school pupils' achievement in English language and Mathematics in Niger Delta, Nigeria

Veronica Odiri Amatari

Niger Delta University, Bayelsa, Nigeria.

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ABSTRACT

This study investigated the influence of geo-socio-economic factors of environmental degradation, school location, poverty, parental involvement in education and pupils, school attendance on their achievement in English language and Mathematics in the Niger Delta region, Nigeria. The study adopted correlational design. The sample size is made up of 1200 public primary six pupils and their parents. Five instruments: Poverty Questionnaire ($r = 0.73$), Environmental Degradation Level Scale ($r = 0.81$), Parental Involvement Scale ($r = 0.79$), Pupils' Mathematics Achievement Test ($r = 0.71$) and English Achievement Test ($r = 0.79$) were developed by the researcher. Pupils' school attendance scores were obtained from school records. Pearson correlation coefficients, path analysis and multiple regression were used for data analysis. The level of significance was set at 0.05. Environmental degradation ($\beta = .073; .065$), at-home parental involvement ($\beta = .110; .169$) and at-school parental involvement ($\beta = -.084; -.096$) had statistically significant direct effects on pupils' achievement in English language and Mathematics. School location ($\beta = .066$) and school attendance ($\beta = .086$) had direct effects on English; while poverty ($\beta = .082$) and English language ($\beta = .276$) had direct effects on Mathematics. 2%, that is, ($R^2 \text{ adj} = .021$) of the variation in English language achievement and 3.3%, that is, ($R^2 \text{ adj} = .033$) of the variation in Mathematics were accounted for by these factors. This study underscores the importance of good policy which when predicated on good politics will lead to socio-economic growth and success of the educational system in the region.

Keywords: Environmental degradation, poverty, school location, parental involvement, achievement determinants.

E-mail: dramatariodiri@gmail.com.

INTRODUCTION

The primary school is the next place where the child starts to gain formalized and fundamental knowledge, skills, thoughts and feelings after his/her pre-school experiences. Primary school addresses the child's emotional and intellectual development as well as the development of the child's creative, social, cultural, and physical skills. Primary education is the foundation upon which other levels of education are laid. The National Policy on Education (Federal Republic of Nigeria (FRN) 2004) describes primary school education as the key to the success or failure of the whole educational system since other levels are built upon it. The policy stipulates the objectives of primary education to include: inculcate

permanent literacy and numeracy and ability to communicate effectively; lay a sound basis for scientific and reflective thinking; and provide opportunities for the child to develop life manipulative skills that will enable the child function effectively in the society within the limits of the child's capacity (National Policy on Education, 6th edition, 2013).

Mathematics and English language are core subjects in the curriculum of primary education. They are fundamental and prerequisites for academic success, not only at primary school level but beyond. While Mathematics education seeks to enable the child to think and communicate quantitatively and spatially, solve

problems, recognize situations; English language plays vital role of being the medium of instruction in Nigerian schools from primary to tertiary level. Indeed, English language has become the pivot on which the educational wheel of Nigeria rotates. In primary school, English language education particularly involves oral communication and the reading of simple text forms.

The predictive relationship between English language and Mathematics is found to be positive (Adegoke and Ibode, 2007; Adegoke, 2010; Fakeye and Ogunsiji, 2009). The knowledge of the contents of school subjects like Mathematics is transferred to the students at all levels of education via English language medium. It therefore follows that how well students would fare in academic attainment in Mathematics depends largely on their level of proficiency in English language. Students' ability in English language is therefore, an essential ingredient to improve performance in Mathematics

Many factors have been attributed to pupils' academic success in schools in various research studies. However, this study observed and measured environmental degradation, school location, parental involvement in education, school attendance and poverty as determining variables of pupils' achievement in English language and Mathematics in the Niger Delta region. Environmental degradation is a major cause of productivity losses and poor human health in the Niger Delta (Ibaba, 2010). The devastation of the environment and ecological balance by oil and gas exploitation in the region has multidimensional implications for the people of the region: water pollution which is mainly induced by oil spillage; communities' shore lines washed away or eroded due to the high volume of deep sea exploration and exploitation activities; destruction of fresh water ecological systems as a result of constructed canals by oil companies; degradation of forests and depletion of aquatic fauna, which were caused by oil induced fire and pollution of the environment; air pollution induced by gas flaring; health issues including breathing problems and skin lesions (Aina et al., 2013; Mba and Ogbuagu, 2012).

The Niger Delta region is dominated by rural communities that depend solely on the natural environment for subsistence living. More than seventy percent of the people depend on natural environment for living and non-living livelihood (UNDP Report, 2006). Oil production, gas extraction and its attendant consequences for the declining productivity of the region which is predominantly based on fisheries and other agricultural activities as farming, lumbering, palm oil milling, palm wine tapping is of high significance (Aaron, 2006; Eregha and Irughe, 2009; Opukri and Ibaba, 2008). The UNDP Report (2006) argued that before the advent of oil in commercial quantities; the production of palm oil, palm kernel and timber earned considerable income for the region and Nigeria. But loss of the once vibrant agricultural and fishing sectors and very limited access to the benefits from oil resources set the stage for violence

and poverty in the region. Ekpenyong et al. (2010) averred that the poverty in the Niger Delta region is evident in mass unemployment and the inability of the oil multinationals and the Nigerian government to provide adequate welfare services and infrastructural and human development.

Parental involvement in education is a multi-dimensional concept that comprises the many different kinds of activities that parents and family members engage in both at home and at school that are intended to assist children's overall learning experiences in school and foster their academic success as well as a secured and fulfilling life in the future. Some of the specific types of family connections with schools include: homework help, supportive home environment, including the supervision and structure that parents give children outside of school to support their education, such as limiting television viewing time and providing structure time for homework and learning; home-school communication and interactions, including direct parent-teacher contacts and relationships as well as more general communication between school and home regarding school events and school practices.

Others are parent participation in activities at school such as parent-teacher association (PTA) meetings; home practices that support literacy development, such as parent reading with children or providing books and writing materials; parent support for the child, including emotional and academic support and the expression of parent aspiration and expectations regarding a child's current school performance as well as future college or career success. Also parent activities that deliberately connect students to out-of-school opportunities for learning and development, such as museum and library visits, private tutoring, and other enrichment opportunities. Parent-child discussions and the interactions about school-related issues and activities, including parental advice and guidance or academic decisions and course placements. A parent who serves as role model for why school is important and shares his/her own experiences with the child that reinforce the value of education is helping the child to succeed in school.

When parents are involved in the education of their children, children earn higher grades and receive higher scores on tests, attend school more regularly, complete more homework, demonstrate more positive attitudes and behaviours, graduate from high school at higher rates and are more likely to enroll in higher education than students with less involved families (Adegoke and Amatari, 2013; Hammer, 2009; Peters et al., 2008; Olatoye and Agbatogun, 2009; Park et al., 2011; Kloosterman et al., 2011; Boggs, 2011).

Research has indicated that the educational aspirations of rural youth lag behind those of their urban counterparts (Arnold et al., 2005; Hu, 2003; Xu, 2009). This line of literature suggested that compared with urban students,

rural students tend to have lower educational aspirations, place less value on academics and have lower academic motivation. As an advantage, the urban schools are well staffed and with good facilities that induce better performance academically in the students. Okoyo's (2009) study reported that location of a school has a significant effect on the academic performance of the child. Regular attendance is an important factor in a student achievement at school. Students that are frequently absent from school have fewer opportunities to learn the material that enables them to succeed in their classes. According to Kirby (2010), students with high attendance rates score higher on achievement test than those students who are frequently absent; and high attendance rates are indicators of effective schools. Regular attendance will help students achieve in classroom and prepare them for a successful life after graduation. Balfanz and Byrnes (2012) reported that achievement, especially in Math, is very sensitive to attendance and absent of even two weeks during one school year matters.

Statement of problem

The oil-related environmental degradation in the Niger Delta has its adverse multiplier effects on the geo-socio-economic life of the people of the region. Achievement archives have indicated that pupils' academic achievement in this region is often low. Is there a relationship between the geo-socio-economic context and pupils' academic achievement in this region? This study attempted to estimate and describe causal relationships through the use of correlational data between geo-socio-economic factors and pupils' achievement in English language and Mathematics in a parsimonious model.

Research questions

1. What type of correlation exists among geo-socio-economic factors (school location, poverty, environmental degradation, school attendance, at-school parental involvement, at-home parental involvement), achievement in English language and Mathematics?
2. What is the parsimonious structural path analysis model estimated from the hypothesized model?
3. What are the estimated direct, indirect and total effects among the variables?

METHODOLOGY

Sample

The study adopted correlational design. Random sampling method was used to select 39 (rural = 23, urban = 16) primary schools from three states in the Niger Delta region: Delta (rural 10, urban 05), Bayelsa (rural 07, urban 06), and Rivers (rural 06, urban 05). A

sample size of 1200 public primary six pupils and their parents (Rivers = 400, Delta = 400, Bayelsa = 400) participated in the study.

Instruments

Five instruments were developed and validated by the researcher. Data for school attendance was retrieved from school records.

Parental involvement questionnaire (PIQ)

This instrument consists of two subscales. These subscales are at-home involvement, and at-school involvement.

At-home involvement

At-home involvement has 30 items. Each item was scored on a 4-point Likert scale ranging from 1 (Never) to 4 (Very often). Scores of at-home involvement could range from 30 (low level of parental involvement) to 120 (high level of parental involvement). Face validity of this instrument was derived from experts' view on the suitability of the instrument; while the Cronbach alpha estimate of .87 was obtained for the internal consistency of the items. Examples of items include: "I read books, newspaper with my child" "I discuss issues, activities that take place in school with my child"

At-school involvement

At-school involvement has 14 items. Each item was scored on a 4-point Likert scale ranging from 1 (Never) to 4 (Very often). Scores of at-school involvement could range from 14 (low level of involvement) to 56 (high level of involvement). Face validity of this instrument was derived from experts' view on the suitability of the instrument; while the Cronbach alpha estimate of .92 was obtained for the internal consistency of the items. Examples of items include: "I participate in Parent-Teacher Association (PTA)" "I attend school events".

Environmental degradation survey (EDS)

This contains 21 items on a 3-point scale of (1) low, (2) moderate and (3) high. Score could range from 21 (lowest score) to 63 (highest score). Reliability coefficient of 0 .81 was derived by Cronbach alpha, statistical technique to measure internal consistency of the items.

Poverty questionnaire (PQ)

This contains 21 statement items on indices of poverty. The internal consistency of items was estimated at 0 .78 reliability coefficient using Cronbach alpha.

Pupils' Mathematics achievement test (PMAT)

It was developed by the researcher. It consists of 30 multiple choice test items with 4 options (ABCD) per item. Items were based on Mathematics curriculum developed by the National Educational Research and Development Council (NERDC, 1995). The difficulty index of each item ranged between 0.50 and 0.75, while the discriminating indices ranged between 0.43 and 0.65. The reliability index of PMAT was 0.71. This was established by using Kuder Richardson 20 formula. The maximum obtainable score in each

section was 30, that is, each item attracted a score of 1. The content validity of PMAT was ensured by the use of table of specification placed under understanding and application.

Pupils' English achievement test (PEAT)

This instrument consists of multiple choice 30 items with 4 options (ABCD) per item. These items were developed from three major sections of English language as prescribed by the National Educational Research Council, (NERDC, 1995). The difficulty index of each item ranged between 0.52 and 0.75, while the discriminating indices ranged between 0.46 and 0.61. The reliability index of PEAT was 0.79. This was established by using Kuder Richardson 20 formula. The maximum obtainable score was 30, that is, each item attracted a score of 1. The content validity of PEAT was ensured by the use of table of specification placed under knowledge, understanding and application.

Data collection and analysis

Seven research assistants and the researcher collected data from thirty nine public primary schools across the three states of study (Rivers, Delta and Bayelsa). Data collected were analysed using mean, standard deviation, Pearson Moment Correlation Coefficient and Multiple Regression (SPSS, Version15), and path analysis.

FINDINGS

Research question 1

What type of correlation exists among geo-socio-economic factors (school location, poverty, environmental degradation, school attendance, at-school parental involvement, at-home parental involvement), achievement in English language and Mathematics?

Table 1 shows fairly significant relationships among the variables ($p < .05$). It is quite interesting to note that the highest correlation ($r = 0.510$) is between parents' at-school involvement and at-home involvement. It also shows positive and statistically significant relationships ($p < .05$) between Mathematics achievement and environmental degradation; poverty; at-home involvement; and English language achievement. This implies the importance of these factors in predicting pupils' achievement in Mathematics at the primary school level. Results show positive and significant relationship ($p < .05$) between English language achievement and at-home Involvement; and school attendance.

Research question 2

What is the parsimonious structural path analysis model estimated from the hypothesized model?

The structural equations for the hypothesized model are:

$$Z_1 = e_1$$

$$Z_2 = e_2$$

$$Z_3 = P_{31}Z_1 + P_{32}Z_2 + e_3$$

$$Z_4 = P_{41}Z_1 + P_{42}Z_2 + P_{43}Z_3 + e_4$$

$$Z_5 = P_{51}Z_1 + P_{52}Z_2 + P_{53}Z_3 + P_{54}Z_4 + e_5$$

$$Z_6 = P_{61}Z_1 + P_{62}Z_2 + P_{63}Z_3 + P_{64}Z_4 + P_{65}Z_5 + e_6$$

$$Z_7 = P_{71}Z_1 + P_{72}Z_2 + P_{73}Z_3 + P_{74}Z_4 + P_{75}Z_5 + P_{76}Z_6 + e_7$$

$$Z_8 = P_{81}Z_1 + P_{82}Z_2 + P_{83}Z_3 + P_{84}Z_4 + P_{85}Z_5 + P_{86}Z_6 + P_{87}Z_7 + e_8$$

Paths in Figure 1 that are not statistically significant were deleted. These paths had coefficients (beta weight) lower than 0.05. Figure 2 shows the parsimonious model with the path coefficients which describes the causal effects among school location, environmental degradation, poverty, at-school, at-home parental involvement, school attendance, pupils' achievement in English language and Mathematics.

Research question 3

What are the estimated direct, indirect and total effects among the variables? (Table 2).

Direct effects

Five of the geo-socio-economic factors (school location, environmental degradation, at-school parental involvement, at-home parental involvement and school attendance) had statistically predicting influence on English language. On the other hand, environmental degradation, poverty, at-school parental involvement, at-home parental involvement and English language were direct predictors of Mathematics. At-home parental involvement had the most predicting influence on English with a beta weight of .110 while English language ($\beta = .276$) had the most influence on Mathematics.

DISCUSSION

From the above analyses, at-school and at-home parental involvement influence pupils' achievement in English language and Mathematics. This finding is consistent with other research findings. For example, Lew (2007) found fixed effects estimates for parental involvement on Math and Reading scores. Olatoye and Agbatogun (2009) reported that parental involvement is an important predictor of Mathematics achievement. Conway and Houtenwille (2008) found that parental involvement has a strong positive effect on student achievement. Others like Boggs (2011) found that parental involvement had a stronger effect on performance in language arts-related subjects; while Park et al. (2011) found that parents' effort in selecting and monitoring private tutoring were significantly associated with increased Math and English test scores. These various findings imply that parental involvement is a

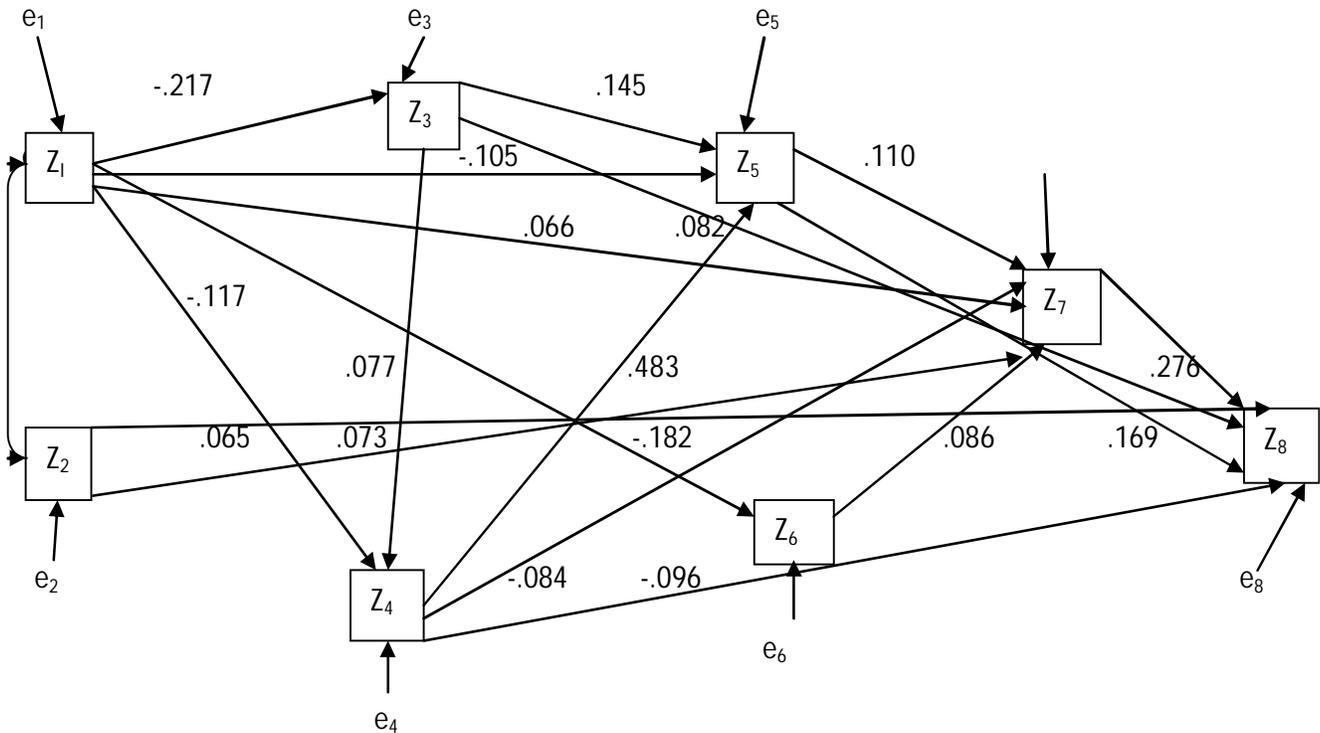


Figure 2. The Parsimonious Structural Path Model of the effects of poverty, at-home parental involvement, at-home parental involvement, achievement in English Language and Mathematics.

Table 2. Direction of causation.

Dependent variables	Determinants	Direct effects	Indirect effects	Total effects
Z ₃ (PO) R ² adj = .071	Z ₁ (school location)	-.217	-	-.217
Z ₄ (ASI) R ² dj = .024	Z ₁ (school location)	-.117	-.017	-.134
	Z ₃ (poverty)	.077	-	.077
Z ₅ (AHI) R ² adj=.297	Z ₁ (school location)	-.105	-.088	-.193
	Z ₃ (poverty)	.145	.037	.182
	Z ₄ (at-school parental involvement)	.483	-	.483
Z ₆ (SA) R ² adj=.032	Z ₁ (school location)	-.182	-	-.182
	Z ₁ (school location)	.066	-.042	.024
	Z ₂ (environmental degradation)	.073	-	.073
Z ₇ (EL) R ² adj=.021	Z ₃ (poverty)	-	.016	.016
	Z ₄ (at-school parental involvement)	-.084	.053	-.031
	Z ₅ (at-home parental involvement)	.110	-	.110
	Z ₆ (school attendance)	.086	-	.086
	Z ₁ (school location)	-	-.043	-.043
	Z ₂ (environmental degradation)	.065	.020	.085
	Z ₃ (poverty)	.082	.029	.111
Z ₈ (MT) R ² adj=.033	Z ₄ (at-school parental involvement)	-.096	.074	-.022
	Z ₅ (at-home parental involvement)	.169	.030	.199
	Z ₆ (school attendance)	-	.024	.024
	Z ₇ (English language)	.276	-	.276

involved in school activities have a better relationship with their child's teacher and a more positive opinion of the child's school than parents who are less involved. In this study, the probable induction is that bureaucratic set up in the public school system could be held culpable for parents' school based activities having negative effect on pupils' achievement. This is because school administrators/teachers' perception of parental involvement in education is restricted to the home. Even though the parents' engagement in some school-based activities is required, it is expected to be a passive engagement in order not to interfere with the bureaucratic principles of the school system. It is therefore evident that motivations, structures and policies that will favour a good smooth parent- teacher, home-school partnership, a synergy, are not sincerely pursued in the system. The image of a good relationship is an effective separation of roles and functions between home and school. The family meets the school's expectations efficiently and the school effectively educates the child without undue demands on the home (Keyes, 2010).

Achievement in English language has direct effect on achievement in Mathematics. This finding is in agreement with the study of Adegoke and Ibode (2007) that reported that students' ability in English language is an essential ingredient to improved performance in Mathematics. Alt et al. (2014) x-rayed the relationship between Mathematics and English language and found it to be impactful. It also confirms the researcher's view that the importance of English language for enhancing educational attainment especially in an educationally disadvantaged region like the Niger Delta which is marked with high level of illiteracy cannot be over flogged. Environment degradation has positive direct effects on achievement in English and Mathematics. By inference, the dynamics of any environment are expected to influence pupils' academic behavior. Teaching, learning and academic attainment are predicated on how available and accessible is the physical environment and its elements as a source of educational resources that enhance achievement. Pupils are best taught when they are made to observe and manipulate their natural environment. Whenever the environment is degraded, pupils are deprived of basic interactions with their physical environment and learning opportunities that could promote intellectual development. From another perspective, a school that is located in an environ that is devastated will probably have greater interest in the environment in such a way that teaching-learning activities could be heighten to make pupils to begin to appreciate the importance of a healthy environment. It is a common opinion that man naturally tends to pay greater attention to what he has allowed to slip off his hand and take for granted what he has with him.

The positive correlation between poverty and achievement in Mathematics could suggest that there is an inner drive that pushes parents to invest fully in the

educational pursuit of their children inspite of their low social economic status, aiming at enhancing the success of the children in school and later in life. The predictive and positive relationship between achievement in English and school location infers that pupils' performance in English language is better in the rural schools than in the urban schools. The major contributing factor that pitched the better performance of pupils in English language in the rural schools against the pupils in the urban schools is the issue of classroom size in schools. The small class size of 20 to 30 in the rural schools as observed in this study was pitched against the large class size of 50 to 60 in the urban schools. Literature has shown that smaller classes are particularly effective at raising achievement levels. Secondly, the quality of teacher's relationship with pupils will improve as a result of smaller class size and pupils are more likely to engage in learning. In his study, Bascia (2010) documented that parents of children enroled in smaller classes reported that their children appear to be learning and were more comfortable at school. In the same vein, Zyngier (2014), found in the overwhelming majority of the studies on class size reduction he analysed, that smaller classes have a significant impact on student achievement and narrowing the achievement gap. This study therefore, collaborates with many other studies that established that urban-rural ecology of schools determines academic achievement of students.

Another inference in this study is that school attendance predicts the performance of pupils in English language. This suggests that attendance in all school activities by pupils is a necessary ingredient for success in academics. Regular school attendance presupposes that the child enjoys school. Furthermore, the direct effect of school location on school attendance in the data analysis implies that pupils' school attendance is higher in urban schools than in rural schools. This finding aligns with literature that has suggested that compared with urban students, rural students tend to have lower educational aspirations, place less value on academics and have lower academic motivation (Howley and Maynard, 2006). These will inevitably impact negatively on pupils' attendance and success in school. Three percent of the variation in school attendance is attributed to school location.

Conclusion

The findings of this study imply that the social, economic, geographical and political context in which the school operates could either mar or enhance the well being of the whole educational system and the success of the child in school. The significant role of the parents in the education of their children is highlighted. Therefore, the need for good policies that must be predicated on good politics dealing with socio-economic and political

developments in the Niger Delta cannot be overemphasized; and parents to be mobilized and their support enlisted in helping their children to succeed.

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