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Determinant of Rural and Urban Student Performance in Ghana

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Abstract: ***Despite the large number of remedial students entering tertiary institutions in Ghana, very little empirical research has examined the impact of geographical and socio-economic variables on student performance. This study uses microdata on 360 urban and rural remedial students to examine the differences in educational outcomes between those attending remedial schools in rural areas and those enrolled in urban remedial schools. The study further analyzes the determinants of educational outcomes, with a focus on the relevance of geographical location. The descriptive analysis shows that the academic outcomes of urban remedial students are generally better than those of rural students. In contrast, the results from the student's t-test indicate a statistically significant difference in the performance of urban and rural remedial students. The determinants of these performances include age, gender, number of papers written, parental education, and, most importantly, the location of the remedial student. From a policy perspective, the findings of this paper support actions aimed at improving educational conditions in rural areas.***

Keywords: rural, urban, remedial students, performance

I. INTRODUCTION

Ghana is economically ahead of most sub-Saharan African countries due to its relatively high Gross National Product (GNP) per capita. In addition to its high per capita GNP, Ghana also boasts a higher literacy rate. Education is widely recognized as a powerful tool for reducing poverty and inequality, as well as laying the foundation for sustained economic growth [1]. In Ghana, education serves as a gateway to the job market, offering opportunities for employment with respectable incomes and helping individuals ascend higher levels of Maslow's hierarchy of needs. It is a key indicator of improved quality of life and societal progress. Educational institutions act as "factories" where children, the raw products, are shaped and developed to meet the various demands of life [2]. Recently, one of the most important aspects of the economics of education that has captured the attention of academics, researchers, and stakeholders is the analysis of factors influencing students' educational outcomes.

While the school may have other peripheral objectives, the foremost aim of the school is to work toward the attainment of academic excellence by students principally because almost everyone concerned with education places premium on academic achievement [1,3]. Compared to the urban areas, which have huge and numerous infrastructure and modern social amenities, rural communities usually lack numerous resources. Beyond rural schools simply being underrepresented, they often face serious resource issues, including a lack of economic support from businesses and corporations. Empirically, Lekhetho [4] has indicated that since 1998, the rural schools in Lesotho have been performing relatively poorly in the Cambridge Overseas School Certificate (COSC) Examinations in comparison with the high schools studied in the urban areas. Data from the Ugandan Ministry of Education (2002) suggests that, in terms of academic performance, urban learners continually outperform rural schools at primary and secondary levels whilst in Ghana, Opoku-Asare and Siaw [1] have shown in their qualitative analysis that urban schools perform better than rural and peri-urban schools in the final West Africa Senior Secondary Certificate Examination (WASSCE). This is an indication that the need for rural transformation is a global concern since approximately half of the world's population is domiciled in rural areas [5].

Empirically, while Tella, Indoshi, and Othuon [6] reported the falling trend in English proficiency in secondary schools in Kenya; they did not examine the role of remediation in helping students achieve higher academic laurels. Relatively little research has been conducted on factors responsible for the performance of remedial students while fewer studies have examined the impact of a school's rural or urban location on students' educational outcomes [1,5]. To the best of my knowledge, no study has been undertaken for the Ghanaian case that examines the rural-urban differential in student achievement attainment. Furthermore, no study has examined the factors influencing the educational attainment of rural and urban remedial students. The main objective of this study is to compare the performance of urban and rural remedial educational institutions in Ghana.

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To achieve this objective the researcher set out to address the following research questions:

1) What is the average performance of urban and rural remedial students in Ghana?
2) Is there a difference in performance between urban and rural remedial students in Ghana?
3) What effects account for these differences in performance?

To this end, the descriptive statistics, the student t-test, and the regression model are employed to answer research questions one, two, and three respectively. The rest of the paper is organized as follows: Section 2 presents the empirical on educational performance between the rural and urban poor in Ghana. Section 3 is the materials and methods whereas the results and discussion of the results are presented in Section 4. The final section is the conclusion and recommendation section of the study.

II. LITERATURE REVIEW: EMPIRICAL

Theoretically, there is no single theory that applies to rural and urban settings when it comes to issues of remedial education. This is because very few studies have taken into account the present needs of both rural and urban educational institutions and by extension students from remedial educational institutions.

This study, therefore, does not present a theoretical model but rather focuses on the empirical works that have been done in the area of performance of students located in different geographical locations.

Earlier empirical studies conducted in the United States have reported there is no significant difference in the performance of rural and urban remedial educational institutions and students. Ward & Murray [7] find no significant differences in the outcomes of students at urban and rural schools in the state of New Mexico. This finding is corroborated by Monk & Haller [8] for the state of New York. In contrast, Edington and Martellaro [9], for the whole of the United States, found that the rural-urban location variable is significant in explaining performance.

Litheko [10] argues that regarding the Cambridge Overseas School Certificate (COSC) examinations, schools in the rural areas in the Botha-Bothe district of Lesotho perform less satisfactorily than those in the urban areas. Litheko [10] attributes the difference in performance largely to poor infrastructure and the social amenities located in rural areas.

In Ghana, for instance, many teachers who are posted in rural areas to go and teach have largely declined to accept postings to these areas. This refusal is worrisome and has resulted in huge failures in rural communities [11]. Krueger [12] show that students perform better in small classes, while Rivkin et al. [13] fail to find a statistically significant effect of this variable on students' educational outcomes. Despite these findings, in developing countries, reports show that there is no significant difference between the performances of students undertaking remediation in urban areas and rural areas [14].

III. MATERIALS AND METHODS

A. Sampling Technique and Sample Size

The study adopted multi-stage sampling techniques in the collection of the samples for the study. The first stage involved purposively sampling remedial educational institutions in the Greater Accra, Eastern region, and the Ashanti region. In each of these regions, both rural and urban remedial educational institutions were located and sampled. Since we do not have records of the remedial students, the study relied on snowball methods of collecting the data. To check the reliability of the information given to us by the responding students, documentary evidence was sought from the respondents of the study. These documentary pieces of evidence were their remedial results.

B. Data Collection

This study utilized a quantitative research approach for the data collection. The collection of data for this research was done through the administration of questionnaires to responding students who had attended remedial institutions in urban and rural communities in three regions, that is, Greater Accra, Ashanti region, and Eastern region of Ghana. The one-month duration was employed in the collection of the data from respondents of the study.

C. Data Collection Procedures

Data was collected with the help of research assistants' domicile in the study area. In each data collection community, two respondents were employed to help in the data collection. One research assistant was tasked to collect the data from the urban community within a particular region whereas the other was tasked to collect the data from respondents within the rural community. A total of six research assistants were employed for this task.

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D. Measuring the Difference in Performance

Within this study, performance was measured using the pass rate assigned by the West African Examination Council (WAEC). All students who had A1 to C6 were rated as passed per the WAEC standard while those who had D7 to F9 were rated as failed by the WAEC standard. To measure the difference in performance of rural and urban remedial educational institutions, the student t-test (t-test) is employed. The t-test and its score is the difference between the two groups and the difference within the groups. The larger the t-score the more difference there is between groups. The formula for the t-test is presented as:

$$t = \frac{(\sum D)/N}{\sqrt{\frac{\sum D^2 - \left(\frac{(\sum D)^2}{N}\right)}{(N-1)(N)}}} \qquad (1)$$

By definition: $\sum D$: $sum\ of\ the\ difference$; $\sum D^2$ $sum\ of\ the\ difference$; $(\sum D)^2$ $sum\ of\ the\ difference$ and N is the population

E. Regression Model

In order to conduct our econometric analysis on the effect of location and socioeconomic factors on students' performance, the Ordinary Least Square (OLS) estimates was employed. The OLS regression used is presented in equation 1.1

$$Y = \propto + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \mu \ldots\ldots\ldots\ldots\ldots (2)$$

Where $Y$is the performance or the scores in the remedial examination, that is, eight plausible values of the WASSSCE results in each subject area for student i. Thus, the student either had A1, B2, B3, C4, C5, C6, D7, E8, and F9. The controlling variables were x_1 is the age of the respondent; $x_2$is the gender of the respondents; x_3 number of papers written by the student; x_4 shows whether the student is working or not working; x_4 is a dummy showing the location of the students; x_5 is mother's education; x_6 is father's education.

F. Data Analysis

Remedial education in Ghana is not very well organized like that of the regular secondary school education. The researcher, therefore, relied on well-structured remedial educational institutions to collect the primary data. All collected data were first edited, coded, and entered into the Statistical Package for Social Sciences. All analyses in this study were carried out using Rstudio and the results of the analyses are presented in tables.

IV. RESULTS

A. Descriptive Statistics

The analysis of the study shows that compared to urban remedial students (75%) had more passes on English examination than rural remedial students (70%). In addition, the study found that there were fewer passes in Integrated Science (52%) for rural remedial students than for urban remedial students (69%). The results also show that in mathematics there were approximately twice as many passes among students from remedial students located in the urban communities (71%) than there were among the rural remedial students in rural areas (38%).

Table 1: Descriptive Statistics

	Total		Urban		Rural	
	Mean	SD	Mean	SD	Mean	SD
English	72.425	1.32	75.13	1.65	69.72	1.23
Integrated Science	60.42	1.012	68.88	1.099	51.96	0.98
Mathematics	49.41	0.52	71.31	1.11	37.51	0.62
Social Studies	80.935	2.12	85.53	2.28	76.34	3.65
Mothers educ. (in years)	9.14	4.56	9.48	4.67	4.65	1.4
Fathers educ. (in years)	9.32	4.84	9.47	4.8	6.06	0.79
Age						
Gender (Female)	0.48	0.4	0.54	0.50	0.49	0.50
No. of papers written	5.84	0.29	5.85	0.29	4.37	0.21
Working (Yes)	0.31	0.46	0.27	0.47	0.35	0.23

In terms of gender, 48% of the total sample were females and the remaining were female. The urban remedial schools had 54% of the students being females and 49% of the rural remedial schools were females. The number of papers written varied in terms of the location of the respondents. On average both the total sampled respondents and the respondents located in the urban areas were writing an average of 6 papers whereas individuals residing in the rural communities were writing an average of 4 papers per sitting in the remedial examination. Additionally, 21% of the total sampled remedial students are working. The analysis also shows that only 27% of the urban remedial students sampled were working whereas more than 35% of the sampled respondents in the rural communities were working.

B. Differences in Performance

After the descriptive statistics, it was important to determine whether there were statistical differences in performance between rural and urban students who attended remedial educational institutions. Table 2 presents the t-test of significance between urban and rural remedial educational institutions. The results show that there is a significant difference in the performance of rural and urban remedial students. The results based on the four core subjects show that urban remedial students performed better than rural remedial students and these differences were highly statistically significant at a one percent significant level.

Table 2: t-test of significance between Urban and Rural Remedial Institutions

Subjects	t-value	df	p-value
English	4.92***	2	0.00324
Social Studies	5.95***	2	1.43E-05
Core Mathematics	9.28***	2	5.42E-07
Integrated Science	5.92***	2	0.00302

*** indicates that the t-test is at 1% statistical significant

Based on the results presented in Table 2, the study moved to examine the underlying causes of these differences, hence the use of the regression model.

C. Determinant of Performance

Regression analysis of the performance of students in the core subjects are presented in Table 3. The regression model shows that 40% of the variation in the performance of the remedial students in the WASSCE examination is explained by independent variables such as age, gender, education, mother and father's education, and location. In addition, 43%, 42%, and 58% of the variation in performance of the remedial students in Integrated Science, Mathematics, and Social Studies is explained by all the independent variables. The results show that older remedial students perform better in English language and Social Studies than younger remedial students. On the contrary, younger remedial students perform better in Mathematics and Integrated Science. The analysis also shows that female remedial students perform better in English language and Social Studies than male remedial students whereas males perform better in Integrated Science and Mathematics compared to female remedial students.

Table 3: Determinants of Performance

	English		Science		Mathematics		Social studies	
	Coef.	Std. Dev.	Coef.	Std. Dev.	Coef.	Std. Dev.	Coef.	Std. Dev.
Demographic								
Age	**0.11****	0.05	-1.83*	0.28	-0.18**	0.11	1.62**	0.82
Gender (Female)	0.16**	0.08	-0.25*	0.11	-0.003*	0.001	0.005**	-0.002
No. of papers written	-0.19**	0.1	-0.20*	0.1	-0.21*	0.1	-0.18*	0.08
Working (Yes)	0.33*	0.19	-0.09	0.29	-0.01	0.0019	0.17**	0.09
Mothers education	3.01***	0.28	-2.04***	0.26	-1.76***	0.51	0.89*	0.522
Fathers education	0.70**	0.28	0.23	0.21	1.53***	0.39	0.35***	0.034
Location (Rural)	0.201***	0.051	0.179***	0.041	1.63***	0.43	0.21***	0.011
Adjusted R-square	0.4		0.43		0.52		0.58	

*, **, *** indicates that the t-test is at 10%, 5% and 1% statistical significant

Additionally, the study reports that an increase in the number of papers written by remedial students results in a decrease in the performance of students in the four core subjects written in the WASSCE. The study also reports that individuals who claimed to be working while attending remedial institutions performed better in English language and Social studies but poorly in Integrated Science and mathematics.

The study further reports that mother education significantly influences the performance of remedial students in all four core subjects. The detailed analysis shows that mothers' education positively influences remedial students' performances in English and Social studies WASSCE examination whereas it negatively influences the performance of remedial students' performances in Mathematic and Integrated science. On the other hand, fathers' education had a positive and significant influence on the performance of remedial students in the WASSCE examination. For instance, 70%, 28%, 153%, and 35% improvements were experienced in the performance of the students in English, Integrated Science, Mathematics, and Social studies respectively.

Finally, the study shows that when compared to the rural communities, remedial students in urban communities performed better in the four (4) core subjects. For instance, urban remedial students were found to be 20%, 18%, 163%, and 21% more likely to perform better in English, Integrated Science, Mathematics, and Social studies respectively.

V. DISCUSSION

The result of the study shows that there are significant differences in the performance of remedial students located in rural and urban areas. This finding is similar to those of Litheko [10] who reported that rural areas in the Botha-Bothe district of Lesotho perform less satisfactorily than those in the urban areas in the COSC examination. The reason for this finding has been largely attributed to the poor infrastructure and the social amenities located in the rural areas. For instance, in Ghana, most teachers who are posted in rural areas to go and teach have largely declined to accept postings to these areas.

The study found that aside from academic performance, other variables were associated with the performance of students in the rural and urban centers. Thus, variables such as age, gender, and fathers and mothers' education have a significant influence on the performance of remedial students in Ghana. This finding is corroborated by Aremu and Sokan [14], who argue that the academic performance of students, especially at the secondary school level, is not only a pointer to the effectiveness or otherwise of schools but a major determinant of the future of youths in particular and the country in general.

VI. CONCLUSION AND RECOMMENDATIONS

This paper has analyzed the factors accounting for the differences in the performance of remedial educational students located in the rural and urban areas of Ghana. The focus of the study was on core subject areas of mathematics, Integrated Science, English Language, and Social Studies. To do so, the researcher collected cross-sectional data from the Greater Accra, Ashanti region, and Eastern region of Ghana. The study uses a student's t-test to assess the difference between urban and rural educational institutions, and a regression approach that includes variables related to the school's location, along with typical controls at the individual and family levels, was employed to identify the factors responsible for the differences in student performance across both geographical locations.

The results obtained from the application of the student t-test show that generally there are significant differences in the performance between rural and urban students in the four core subjects in the WASSCE examination of Ghana. The regression approach utilized showed that the difference in performance between the rural-urban students is related to family characteristics (father and mother's educational level), gender of the student, age of the student, and the number of papers being written.

From the policy perspective, the evidence obtained from the results reinforces the adoption of measures aimed at improving the general educational situation, especially, for those from rural areas. When it comes to gender, educational policy should focus on helping females with mathematics and integrated science clinics that will help boost their interest in these subjects. Males should be encouraged to learn and love reading, especially, in English and Social Studies which are the areas in which they performed poorly. Parents with minimal educational levels should be aware of the need to encourage their wards, especially, to take their education seriously.

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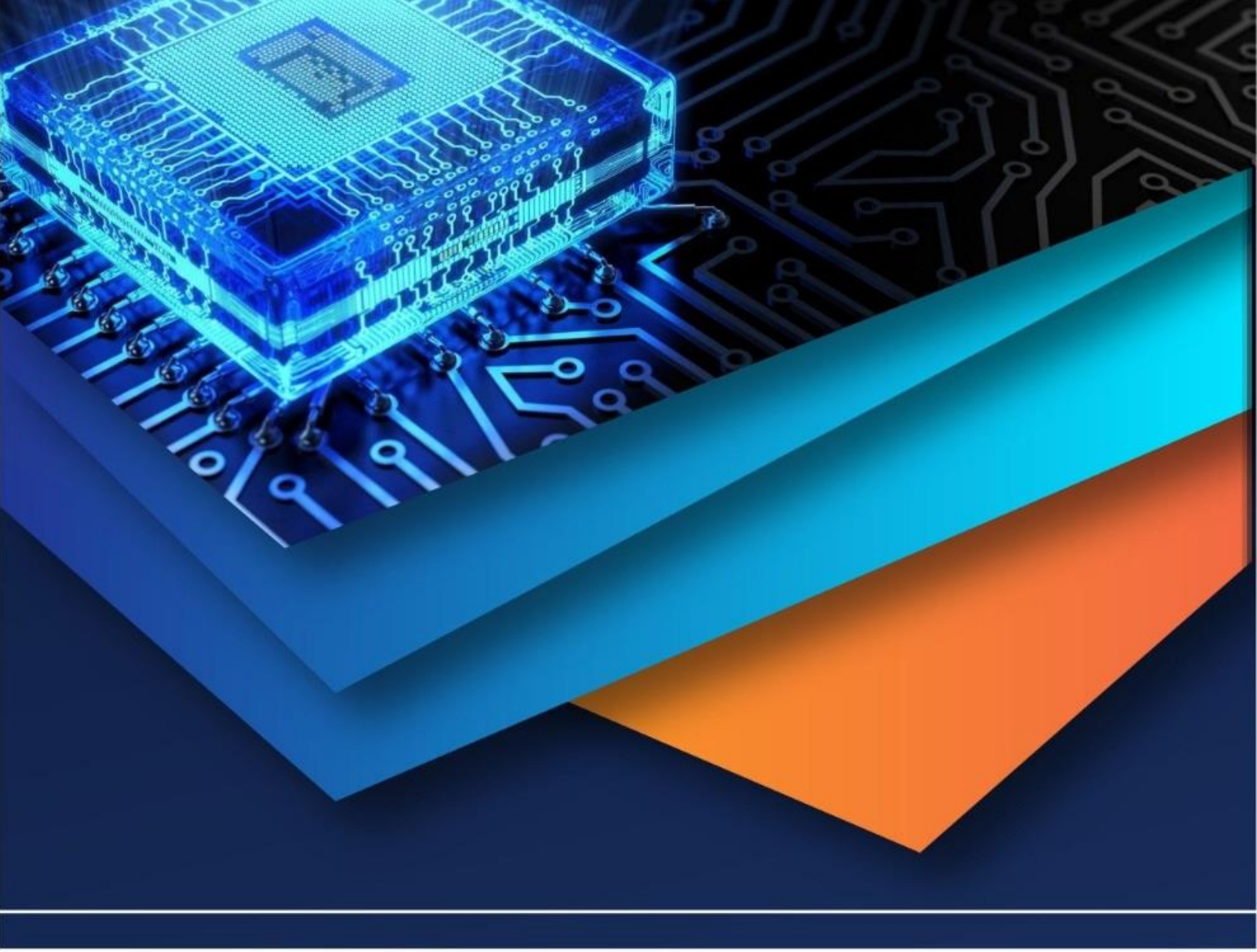
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