International Journal of Secondary Education
2022; 10(1): 1-12
http://www.sciencepublishinggroup.com/j/ijsedu
doi: 10.11648/j.ijsedu.20221001.11
ISSN: 2376-7464 (Print); ISSN: 2376-7472 (Online)

Role of Input, Process Factors and School Context on the Effectiveness of Junior High School Education in the Central Region of Ghana

Regina Mawusi Nugba*, Francis Kodzo Amedahe, Kenneth Asamoah-Gyimah

Department of Education and Psychology, University of Cape Coast, Cape Coast, Ghana

Email addresses:

regina.nugba@ucc.edu.gh (R. M. Nugba), famedahe@ucc.edu.gh (F. K. Amedahe), kasamoah-gyimah@ucc.edu.gh (K. Asamoah-Gyimah)

*Corresponding author

To cite this article:

Regina Mawusi Nugba, Francis Kodzo Amedahe, Kenneth Asamoah-Gyimah. Role of Input, Process Factors and School Context on the Effectiveness of Junior High School Education in the Central Region of Ghana. *International Journal of Secondary Education*. Vol. 10, No. 1, 2022, pp. 1-12. doi: 10.11648/j.ijsedu.20221001.11

Received: December 21, 2021; **Accepted**: January 21, 2022; **Published**: January 28, 2022

Abstract: This study examined the role that input, process factors and school context play in the effectiveness of Junior High School education in the Central Region of Ghana. Descriptive survey design was employed in the conduct of the study. The target population for this study was made up of public and private JHSs in all the 20 Metropolitan/Municipal/District Assemblies in the Central Region. Proportionate stratified random sampling was employed to sample 126 head teachers for the study. Questionnaire and performance data sheet were used for data collection. The data were analysed using the partial least square and multi-group structural equation modelling approach. The study result revealed that input, process factors and school context played a significant role in the effectiveness of junior high school education in Ghana. The results showed that there is a significant indirect effect of input factors on output/outcome through process factors, indicating that process factors significantly mediated the relationship between input factors and outcome. The multi group analysis revealed a statistically significant difference between the indirect effect for the urban and rural schools. Similarly, a significant indirect effect of input factors on output/outcome through process factors for both public and private schools was found. The study concluded that the existence of just input factors is not enough to improve academic achievement of learners. It was recommended that Ghana Education Service and heads of school should not focus only on providing input factors but also process factors in schools to improve academic performance of learners.

Keywords: Process Factors, School Context, Junior High School, School Effectiveness

1. Introduction

Education in Ghana, more especially, at the basic level, has witnessed a relatively unsatisfactory performance/outcome in academic performance. According to available records, in the last ten years (2007-2016), out of over 3,669,138 Basic Education Certificate Examination (BECE) candidates who took that examination 1,562,270 (43%) of them failed to make the required grades of aggregate 30 and below for progression to a secondary, technical or vocational school. The Ghana News Agency (GNA) reported on some results of some selected schools in the Central Region and indicated that six schools in the Assin Central Municipality of the Central Region recorded zero percent in the 2015 Basic Education Certificate Examinations (BECE). The then Municipal Director of Education of the area, in an interview with the Ghana News Agency at Assin Fosu said that out of the 148 candidates including 78 females who sat for the examination in the six schools, none qualified to be placed in a Senior High, Technical or Vocational School [20]. Similarly, in 2017, a total of 36, 849 candidates (8%) across the country were not placed into senior high school because they scored a grade 9 in either English or Mathematics [5]. As a result of the failure, the Ministry of Education (MOE) and Ghana Education Service (GES) instituted a re-sit policy for those who failed the BECE [34]. According to literature, several factors lead to such students' failure and among these

include school related factors such as lack of teaching and learning resources [37, 13], teacher related factors including absenteeism, lateness to school, unsavory remarks about student's performance, and poor method of teaching, [25] and also parental factors. A study conducted by [14] revealed that the inability of parents to provide the basic needs of students, attend Parent Teacher Association (PTA) meetings and poor interaction with their children's teachers among others are some of the causes of low academic performance of some public schools in Ghana. Inability to provide basic school needs like textbooks, supplementary readers, in some cases food to eat before coming to school, and non-provision of school uniforms among others, have ripple effects on the child's performance.

If as a country, we fail to arrest this situation early enough, education in the country will lose it credibility ultimately.

Contextual factors, particularly location of a school in rural or urban setting function differently for different members of the school community. For example, teachers' perceptions of school context tend to be more sensitive to classroom-level factors such as classroom management and student behavioural issues, while students tend to be more sensitive to school-level factors such as student-staff relationships and principal turnover [35]. The nature of school context such as school location and type (which is the primary consideration in this study) has an impact on child learning [8, 16]. Schools in different contexts differ in terms of the resources available for teaching and learning such as libraries, children's services, and well-educated and successful adult role models for children [8, 27, 41]. In Ghana, schools in different locations (i.e., urban and rural) and schools which are either public or private also differ in terms of resources available for teaching and learning. As a result, children in different schools tend to have different competency levels, attitudes and behaviours, due to different school environments and conditions [12]. Therefore, the context in which a school is situated can be a source of motivation, aspiration and a facilitator of direct interactions in learning [24, 7] or it can also be a demotivation. Several sources of literature [15, 2, 36] support the assertion that school children in the urban setting have better access to quality education compared to those in the rural setting. The resulting factors could be attributed to challenges like the inability of the government to deploy teachers to rural schools [43]. Interestingly, while there are surplus teachers in urban schools, teaching posts in rural schools tend to remain vacant [10]. Also, there are unequal distribution of input factors such as teaching and learning materials, as well as textbook ratio in the different context.

One important process factor is time-on-task (or engaged learning time). It refers to the amount of allocated instructional time during which students are actually engaged in learning. In Ghana, at the basic level, the timetable is the same across the country but time-on-task may vary from classroom to classroom. Classroom instruction is considered to be of higher quality when time-on-task is maximized [31]. Huge between-school differences in the delivery of intended time are relatively rare in such systems, since reasonably effective administrative mechanisms regulate and monitor school compliance in the provision of instructional time. The main policy challenge becomes how to improve the quality of classroom time for a specified time quantity. In the Third developing World, by contrast, studies examining educational quality in general, and the delivery and management of instructional time in particular, are much more limited [31].

Furthermore, Fuller, B. et al claim that instructional time is one pertinent process factors in addition to teacher quality and textbook availability [19], in which consistent achievement effects are obtained. Their review of fourteen less developed countries (LDC) based studies involving instructional time identified positive relationship with academic achievement in twelve of them. Many studies of education systems in developing countries underscore the aforementioned distinction between time-quantity and time-quality. In short, the optimisation of instructional time may be as important for pupil achievement in LDCs, as the quantity of available time [28, 40].

It has been observed that the actual teaching and learning time is often affected by weather conditions and the unattractiveness of the school facilities, particularly in the rural areas [17]. In Ghana, many of the schools in deprived parts of the country have no proper school buildings. For example, some schools are still under trees, while a large number of school buildings have leaking roofs and other impediments [39] in rural setting. There are obvious disparities in the provision of facilities, such as classrooms, and teaching and learning materials (TLMs) for basic schools based on location in the country. The most felt disparity in terms of urban and rural education is the infrastructural deficit in the rural schools. Pupils in the urban areas have many advantages over those in the rural areas in terms of infrastructure, teacher deployment, TLMs and other learning resources, including libraries, computers and access to the internet. It is worthy of note that students in the cities are being exposed to many social and environmental events that enrich and make their life far better than the rural students as part of their experiences which contribute to the depth of their knowledge and academic performance [33]. Rural schools, on the other hand, are often characterised by inadequate number of teachers as well as, in some cases, teachers who have not received professional training), and poor classroom structures. For the schools under trees, it becomes impossible to have lessons during the rainy seasons and bad weather. Some rural students study under very dilapidated structures and as a result teacher deployment to such schools is difficult. In a news report, the Upper East Regional Directorate of the Ghana Education Service (GES) expressed worry at the alarming number of schools under trees and those in dilapidated conditions [33].

In most schools in the rural areas, a cloud forming in

the sky is a threat to academic work because the schools have to be closed for the safety of the teachers and pupils. The situation causes these schools to lag behind in teaching and learning especially during the rainy season. Additionally, external distraction of pupils' attention is very high when classes are held under trees as practiced in a number of rural schools. Another challenge associated with holding classes under trees is the size of the chalkboard. The mobile chalkboards are usually very small in dimension, hence cannot contain enough illustrations; not to talk of the display of teaching learning materials (TLMs). With respect to teacher quality, according to [33], 71.1% of teachers at the JHS level in both public and private schools were trained with 28.9% untrained. The percentage of trained teachers in public JHS schools stood at 89.6% while that of the private JHSs is 18.7%. However, the private school pupils generally tend to perform better than the public schools in the BECE over the years.

1.1. Educational Production Function

This study is premised on the theory of education production function (EPF) by [6] which views education sector as an industry that uses a variety of inputs and processes to maximise output [23]. Education production function theory takes schools as enterprises in which children serve as "raw materials" with which other factors/inputs are combined through a given process or technology to produce certain outputs (products) [23].

The first factor of this study is the context factor. This refers to the setting in which a school is located, including conditions within which the school operates which in one way or the other tend to affect the operation of the school system. In Ghana, the context can be defined as urban and rural. Geographically, the schools are put into urban and rural schools. Also, the schools are classified into category under the context and it is made up of public and private schools for this study. Of course, this context does not make up educational institutions to fully function to give the expected outcome educational institutions. The second factor is inputs. The input factors are those inputs that the school has control over. In this study, they include class size, availability of teaching-learning materials, infrastructure including appropriate pieces of furniture, and adequacy of pupil-textbook ratio. This study examined these inputs to establish their relationship with educational outcomes (student performance at the BECE level) in urban, rural, public and private junior high schools in the Central Region of Ghana.

Similarly, availability of these inputs in schools cannot produce the expected result without the function of process factors. Take for example, an urban school with sufficient textbooks available but without a teacher to do the teaching; this is similar to a school with insufficient textbooks but teachers are available to teach. Thus, process factors provide a catalyst role in the outcome. There is the relevance of process factors. The process factors for this study are teacher use of instructional time in the classroom, level of parental and community involvement, type of leadership provided, and curriculum coverage in the classroom. These factors tend to, generally, have some influence on students' performance. They were, therefore, considered in this study as to how they affect students' performance in the BECE. All these factors, namely context, input, and processes interact to produce the outcome of education in terms of student's performance.

Applying education production function theory as expressed by [6] to the study of the effectiveness of junior high school education in terms of contexts, input, and process factors as well as the resulting outcome (performance) in the Central Region of Ghana, the equation takes the following form:

$$A = f(X_{1(1)}\ldots X_{1(4)}, X_{2(1)}\ldots X_{2(5)}, X_{3(1)}\ldots. X_{3(4)})$$

where

A = students' academic achievement (outcome; performance in BECE)

X_1 = contexts ($X_{1(1)}$ = urban, $X_{1(2)}$ = rural, $X_{1(3)}$ = public and $X_{1(4)}$ = private)

X_2 = input factors ($X_{2(1)}$ = class size, $X_{2(2)}$ = availability of teaching-learning materials,

$X_{2(3)}$ = infrastructure (appropriate pieces of furniture), $X_{2(4)}$ = adequacy of pupil-textbook ratio)

X_3 = process factors (i.e., $X_{3(1)}$ = teacher use of instructional time, $X_{3(2)}$ = level of parental and community involvement, $X_{3(3)}$ = type of leadership, $X_{3(4)}$ = curriculum completion rate by teachers.

This means that the outcome of education in terms of student performance at the end of the three-years JHS programme is a function of the combination of various factors, namely context, input, and process.

Based on the proposed interaction among the input, process, and context variables, this study developed a model which was tested. The model (see Figure 1) has two exogenous constructs that are context and input, and two endogenous constructs which are process and outcome The input is measured by means of multiple indicators which are class size (CS), teaching and learning materials (TLMs), infrastructure (INFRA), parental support (PS) and pupil textbook ratio (TBS). The process factors serve as a mediating variable between the input and the outcome. In terms of the context, it was looked at in terms of rural and urban setting of the schools and type of school, whether private or public.

1.2. The Objectives of the Study

This study was guided by two objectives namely;

1. to examine the mediating role of process factors in the relationship between input factors and outcome variable while holding context constant, and
2. to describe the extent to which schools in the different contexts (urban, rural, public and private) differ in outcome performance in the BECE using the input and

process factors as constant.

Research Hypotheses

The following hypotheses guided the conduct of the study:

H_0 1: Process factors will not significantly mediate the effect of input factors on the outcome of BECE holding context constant.

H_A 1: Process factors will significantly mediate the effect of input factors on the outcome of BECE.

H_0 2: The outcome of the proposed model will not significantly differ in outcome in terms of school type (public and private) and school location (urban and rural) all other things being equal.

H_A 2: The outcome of the proposed model will significantly differ in terms of school type (public and private) and school location (urban and rural) all other things being equal.

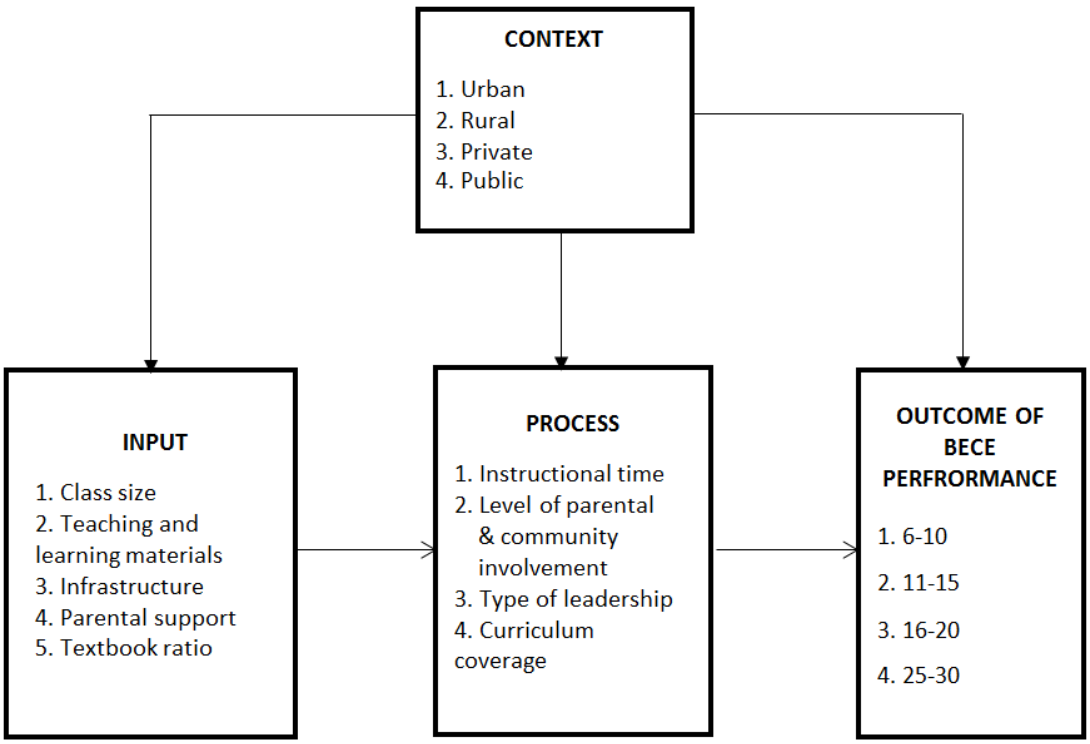

Figure 1. *Proposed Model.*

2. Research Methods

2.1. Design

Exploratory Cross-sectional descriptive survey design was used to carry out the study. This design was appropriate for this study because the study sought to gather information from public and private JHS and with regard to context, input, process and output factors of the schools as they were, without any form of manipulation. Descriptive studies may be pre-cursors to future research because they can be helpful in identifying variables that can be tested. Limitations of this research design include inability to measure the incidence, difficult to make a causal inference and also unable to investigate the temporal relation between outcomes and risk factors.

2.2. Population

The target population for this study was made up of public and private JHSs in all the 20 Metropolitan/Municipal/District Assemblies in the Central Region. There were 1,871 junior high schools in the 20 Metropolitan, Municipal and Districts Assemblies (MMDAS) in Central Region made up of 1,190 (63.60%) public and 681 (36.40%) private schools (EMIS, 2016). The accessible population was made up of JHSs in 6 district assemblies (30%) and their head teachers in the region selected based on their academic achievement ranking in the core subjects in the 2015/2016 BECE in the region. Two (2) of the districts each were selected based on the ranking from the top, middle and bottom purposively to be the accessible population.

2.3. Sampling Procedures

Six districts with a total of 420 JHSs were selected. The details of the number of JHSs in each of the six selected MMDAS are as follows: (1) Upper Denkyira West District - 47; (2) Upper Denkyira East Municipal – 68; (3) Ajumako/Enyan/Essiam District – 101; (4) Twifo/Heman/Lower Denkyira District - 71; (5) Effutu Municipal District – 47; and (6) Agona East District – 86. To determine the sample size in terms of schools for the study, proportionate stratified random sampling was used to ensure that the proportion of each stratification variable (private urban, private rural, public urban and public rural) in the sample reflects their proportion in the accessible population.

A total sample size of 1260 was used for the study and they were sampled from 420 schools within Central Region.

2.4. Data Collection Instrument

Data were collected from two sources, the primary source and the secondary source. The primary data for the study were collected using a questionnaire. The secondary data were the performances of students in BECE (2014-2018) in English, Mathematics and Science. With this, the proportion of students who passed successfully in the BECE was obtained. This was used as a measure of output. The passing rate was determined using grades 1 to 5. This, therefore, implies that students obtaining at most a Grade 5 or better in six subjects including English Language and Mathematics were considered to have passed the BECE successfully. This actually translates into aggregates 6 to 30 for a pass.

With reference to the primary data, a thirty-six-item questionnaire was constructed and validated using related literature. The questionnaire was made up of three sections. Section A covered head teacher's demographic data such as gender, age, highest academic qualification, experience and school type, and location (rural or urban) among others. Section B gathered information on the essential input factors in the schools; that is, student-textbook ratio, instructional materials, infrastructure, parental support and adequacy of student-textbook ratio. The Section C focused on process factors that are relevant in promoting quality education in the schools including use of instructional time, level of parental and community involvement and school leadership. The selected head teachers responded to the thirty-six items.

2.5. Validity and Reliability

A confirmatory factor analysis was performed using the Structural Equation Modelling (Analysis of Moment Structures, AMOS) to validate the questionnaire [21]. The results of this analysis were used to determine what items should be included and excluded as measures of the various constructs such as input factors and process factors. The items which measured the context factors are categorical and did not require validation. From the results of the factor analysis, items with factor loadings of .512 and above were considered appropriate and maintained as recommended by [32]. This means the items accounted for a minimum of 26% (percentage value for square of .512) variance in the factor.

Evidence on the construct validity of the questionnaire was determined by estimating the convergent and discriminant validity using the variances of the items and the average variance extracted (AVE). The AVE was used to determine the convergent validity. An AVE coefficient of .50 or above was used as the cut-off. A coefficient within this range confirms convergent validity [18]. In order to determine discriminant validity, the square root of the AVE value of each construct was computed. Values larger than the inter-dimensional correlation value were considered to be evidence of discriminant validity [18].

To determine the reliability of the items on the questionnaire, Cronbach Alpha (α) was used to estimate the internal consistency of the sub-sections of the instruments. An alpha value of .70 or above was considered appropriate [26]. The reliability coefficients of the scales of the instrument ranged from .72 to .89. Generally, these coefficients were good indicators of internal consistency, since they were not below .70.

2.6. Data Collection Procedure

Permission was sought from the Regional Education Director while University of Cape Coast, Institutional Review Board (IRB) gave ethical clearance for the study. The questionnaires used to collect data for the study were delivered by hand to the head teacher respondents in the sampled schools. Data on student performance were also gathered from the records of the selected head teachers Four working weeks interval were given for the completion of the questionnaires. Five (5) M. Phil (Measurement and Evaluation) students assisted in the data collection.

2.7. Data Processing and Analysis

Hypothesis 1 was tested using the Partial Least Square (PLS) approach to SEM because parameter estimation efficiency of PLS-SEM delivers high levels of statistical power compared with covariance-based SEM (CB-SEM). Consequently, PLS-SEM better identifies population relationships and it is also better suited for exploratory research purposes – a feature that is further supported by the method's less restrictive requirements in terms of model setups, model complexity, and data characteristics [22].

Hypothesis 2, aimed at testing whether or not the predictions in the path model are heterogeneous and also whether the evaluations of variables in the model would yield significant different predictions in terms of school type (public and private) and school location (urban and rural). Based on the purposes, SEM-multi group analysis was conducted to compare parameters (path coefficients) between groups of data. In such an instance, [22] assumed that there is categorical moderator variable (in this case school type and school location) that influences the relationships in the path model. When conducting a multi group analysis, the interest is to test the null hypotheses H_0 that the path coefficients are not significantly different (i.e., $P^1 = P^2$). Thus, the path coefficients (P^1) for group one, say, public school is equal to the path coefficients (P^2) of group two, private school.

3. Results

3.1. Hypothesis 1

The aim of this hypothesis was to determine the effect of input factors on output/outcome through a third variable, process factors – mediator. The exogenous variable was input factor. The endogenous variables were process factors (mediator variable) and outcome/output. The Variance Inflation Factor (VIFs) of each of the three variables was equal to 1, which is less than 5.0. This indicates there was no

multicollinearity.

Table 1 presents the results of path coefficients for inputs and process factors on outcome/performance. From Table 1, input factor was a significant predictor of output, β = .58, *Boot 95%CI* (.47,.67), with large effect size (f^2 = 1.23). Hence, input factor positively predicted output. This implies that for any one standard deviation unit increase in input factor, output/outcome would increase by .58. This means that as input factors improve, performance – in terms of the percentage of students passing would also increase. It was also found out that input factors such as class size, teaching learning materials, infrastructure, parental support and adequacy of pupil-textbook ratio was a significant positive predictor of process factor, β = .80, *Boot95%CI* (0.66, 0.89).

Input factor explained 64% of the variance in process factor (such as teacher use of instructional time, level of parental and community involvement, type of leadership and curriculum coverage), and the effect was large (f^2 = 1.8). Again, process factor significantly predicted students learning outcome, β = .42, *Boot95%CI* (0.32, 0.52), with large effect size (f^2 = 0.62). Process and input factors jointly explained 90% of the variations in students learning outcome. Interestingly, all the paths were significant, and they contributed to high variances of the endogenous variables. The Q^2_s of 0.61 and 0.87 imply that the model has predictive relevance for both endogenous variables (process and output), since the Q^2_s are greater than 0. It can be said that the model has small prediction errors. The path coefficients and p-values (in parenthesis) for the model are presented in Figure 2.

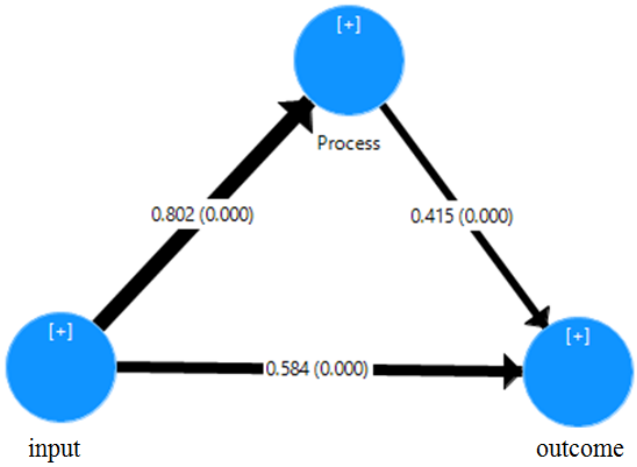

Figure 2. *Path for input, process, and outcome factors.*

Table 1. *Path Coefficients for Input and Process on Students Learning Outcome.*

Exogenous		Endogenous	β	Std. err	*t-value*	Confidence Interval		R^2	*Adj.* R^2	f^2	Q^2
						LL	UL				
Input factors	--->	Process factors	0.802*	0.06	14.35	0.659	0.886	0.643	0.639	1.8	0.61
Process factors	--->	Output	0.415*	0.05	8.22	0.318	0.516	0.901	0.899	0.62	
Input factors	--->	Output	0.584*	0.05	11.56	0.473	0.669			1.23	0.87

*Significant, $p < .05$.

The actual mediation test, which comprises the total effect, direct effect, and indirect effect of input is presented in Table 2.

Table 2. *Mediation Test Results.*

	β	SE	*t-value*	*p-value*	Confidence Interval	
					Lower Limit	Upper Limit
Total effect of X on Y	0.92*	0.02	44.02	<0.01	0.87	0.95
Direct effect of X on Y	0.58*	0.05	11.56	<0.01	0.49	0.68
Indirect effect of X on Y	β	SE	*LLCI*		*ULCI*	
Process (M)	0.33*	0.05	0.24		0.42	

X- Input factors; Y- Outcome; M – Process factors. *Significant, $p < .05$.

As shown in Table 2, there is a significant indirect effect of input factors on output/outcome through process factors, β = 0.33, *Boot95%CI* (0.24, 0.42). However, there is a reduction in the effect of input on outcome from 0.58 to 0.33 when the process factor was introduced. This implies the mediation was competitive, thus, the presence of mediator variable rather competes and decreases the effect of input on outcome. This result, generally, could be that the process factors were not that efficient. For example, it was found that majority of the head teachers (56.8%) indicated that only between 50 – 60% of the syllabus was taught by the end of the academic year in Form 3. This was inadequate to achieve better performance of pupils. In addition, it was reported by head teachers that the parents/guardians involvement as a factor was not much. Thus, parents/guardians do not involve themselves so much in school activities, and they do not contribute much to school development.

In sum, following the result of this study, the researchers, therefore, accepted the research hypothesis which states that: "Process factors will not significantly mediate effect of input factors on the outcome (product) BECE". From the results, it can be said that activities that go into process factors should be held in high-esteem as far as academic performance of pupils are concerned. When process factors are not in good shape, irrespective of how strong and

efficient the input factors may be, the poor nature of the process factors will thwart its (input factor) relationship with the outcome, and this can adversely affect pupils' performance in the end.

3.2. Hypothesis 2

This hypothesis sought to determine the effect of input factors on output/outcome through the process factors when varied with respect to context, such as school type (public and private) and school location (urban and rural). The SEM-multi group analysis was used to compare parameters (path coefficients) with respect to the various contexts. The endogenous variables were process factors (mediator variable) and outcome/output. The grouping variables were location: rural and urban, and school type: private and public. There was no multicollinearity among the variables, as the VIFs of each of the three variables was equal to 1, which is less than 5.0.

As presented in Table 3, input factor was a significant predictor of output for schools in both rural, β = 0.65, *Boot95%CI* (0.55, 0.74), and urban areas, β = 0.48, *Boot95%CI* (0.37, 0.61), with large effect size (f^2 = 1.41). In addition, the process factor significantly predicted output in both rural, β = 0.34, *Boot95%CI* (0.23, 0.43), and urban areas, β = 0.53, *Boot95%CI* (0.39, 0.63), with large effect size (f^2 = 1.41). Input and process factors jointly explained 93% and 88% of the variances in output for schools in urban and rural areas respectively.

Similarly, input factor was a significant predictor of outcome for schools in both rural, β = 0.77, *Boot95%CI* (0.48, 0.90), and urban areas, β = .81, *Boot95%CI* (0.55, 0.89), with large effect size (f^2 = 1.67). The variances in the process factor explained 65% and 59% of input factor for urban and rural schools respectively. All the predictions were relevant, since the Q^2_s for both endogenous variables (process and output) within rural and urban schools were greater than 0. Figures 3 and 4 show the path models for rural and urban areas with their significance figures in parentheses. The thickness of the path shows the quantum of the effect which depicts (the size of the regression co-efficient).

Table 3. *Path Coefficients for Input and Process on Output based on Location (Rural and Urban).*

Path/Location	β		Std. err		*t*		Confidence Interval				R^2		*Adj.* R^2		f^2		Q^2	
							Lower		Upper									
	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U
Input ---> Process	.770*	.806*	0.110	.078	7.00	10.39	.477	.545	.902	.891	.592	.650	.584	.641	1.45	1.86	.52	.63
Process ---> Output	.335*	.534*	.059	.066	5.71	8.12	.225	.390	.431	.632	.876	.931	.871	.927	.37	1.44		
Input ---> Output	.653*	.481*	.054	.064	12.15	7.47	.545	.369	.737	.614					1.41	1.67	.83	.89

R- Rural; U – Urban; *Significant, $p < .05$.

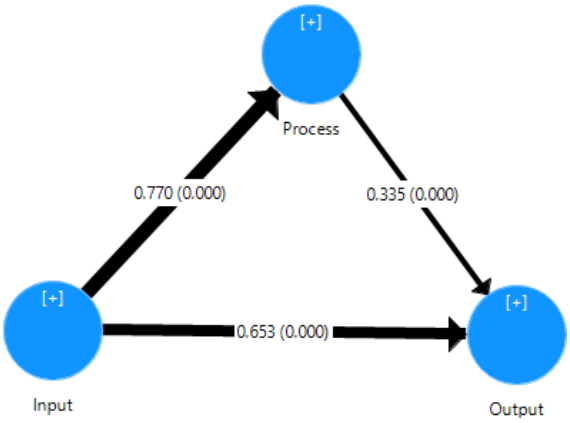

Figure 3. *Path for input, process, and output factors for rural settings.*

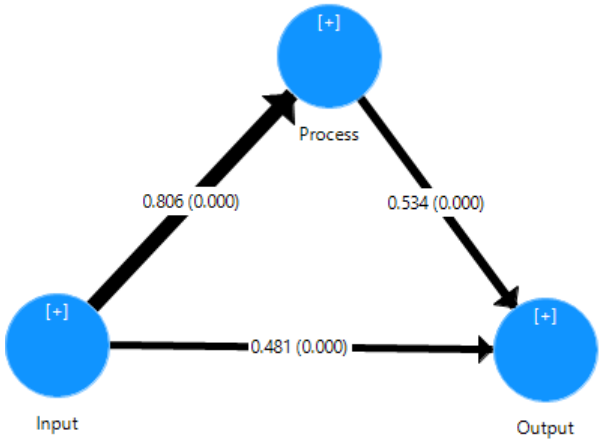

Figure 4. *Path for input, process, and outcome factors for urban settings.*

Table 4. *Mediation Test Results.*

	Effect (β)		SE		*t-value*		*p-value*		Confidence Interval			
									Lower		Upper	
	R	U	R	U	R	U	R	U	R	U	R	U
Total effect of X on Y	.911*	.912*	.036	.032	25.49	28.1	<0.01	<0.01	.810	.829	.947	.954
Direct effect of X on Y	.653*	.481*	.054	.064	12.15	7.47	<0.01	<0.01	.545	.369	.737	.614

Indirect effect of X on Y	Effect (β)		SE		LLCI		ULCI	
	R	U	R	U	R	U	R	U
Process (M)	.258*	.431*	.060	.062	.168	.309	.394	.545

Multi-group result (U – R)	Effect (β)	*t-value*	*p-value*	Confidence Interval	
				Lower	Upper
Difference in indirect effect	.173*	2.116	.037	.166	.176
Difference in direct effect (X on Y)	.172*	2.177	.032	.154	.179
Difference in direct effect (X on M)	.036	.251	.802	-.124	.059
Difference in direct effect (M on Y)	.199*	2.384	.019	.163	.201

X- Input factors; Y- Output; M – Process factors; R- Rural; U - Urban
*Significant, $p < .05$.

Details of the direct, indirect, and total effect for rural and urban as well as the multi group analysis are presented in Table 4.

As Table 4 shows, there was significant indirect effect of input factor on output/outcome through the process factor for both rural, β = 0.26, *Boot95%CI* (0.17, 0.39) and urban areas, β = 0.43, *Boot95%CI* (0.31, .55). Clearly, the indirect effect of input on outcome through process factor for urban was greater than the rural. The effect of input on outcome reduced from 0.65 to 0.26 for rural, with the introduction of the process factor. Comparatively, the effect of input on outcome reduced from 0.48 to 0.43 for urban, with the introduction of the process factor. The multi group analysis revealed that the difference between the indirect effect for the urban and rural setting, (U - R) = 0.17, and this is statistically significant, *Boot95%CI* (0.17, 0.18). This result implies that even though, generally, the process factor reduced the effect of input on outcome, it was better for schools in the urban areas than in the rural areas.

The study further examined whether the effect of input factor on output/outcome would differ based on the school type (i.e., private and public). From Table 4, input factor was found that a significant predictor of outcome factor in both public, β = 0.64, *Boot95%CI* (0.44, 0.93), and private schools, β = 0.56, *Boot95%CI* (0.44, 0.66), with a large effect size (f^2 = 1.04). Also, the process factor significantly predicted outcome in both public, β = 0.34, *Boot95%CI* (0.01, .53), and private schools, β = 0.44, *Boot95%CI* (0.34, 0.56), with moderate effect size, (f^2) of 0.29 and 0.72 for public and private schools respectively. Input and process factors jointly explained 88% and 90% of the variances in output for public and private schools, respectively. Furthermore, the input factor was a significant predictor of process factor for respondents in both public, β = .85, *Boot95%CI* (0.59, 0.95), and private schools, β = 0.80, *Boot95%CI* (0.64, 0.90), with large effect size (f^2) of = 2.56 and 1.77 for public and private schools respectively. The variances in the process factor explained 72% and 64% of input factor for public and private schools respectively. All the predictions were relevant, since the Q^2_s for both endogenous variables (process and output) for both public and private schools were greater than 0.

Figures 5 and 6 show the path models for public and private schools with their significance figures in parentheses. The thickness of the path shows the quantum of the effect (the size of the regression co-efficient).

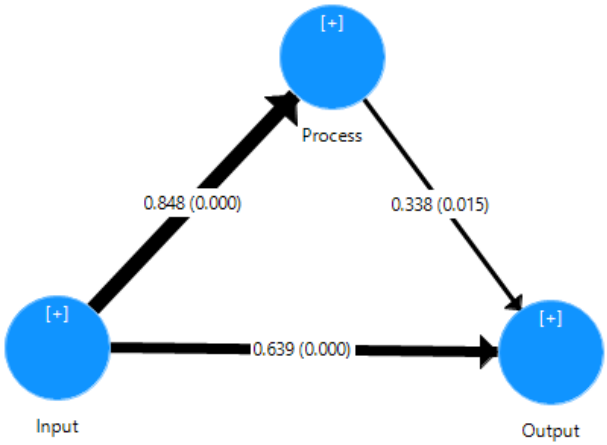

Figure 5. *Path for input, process, and output factors for public school.*

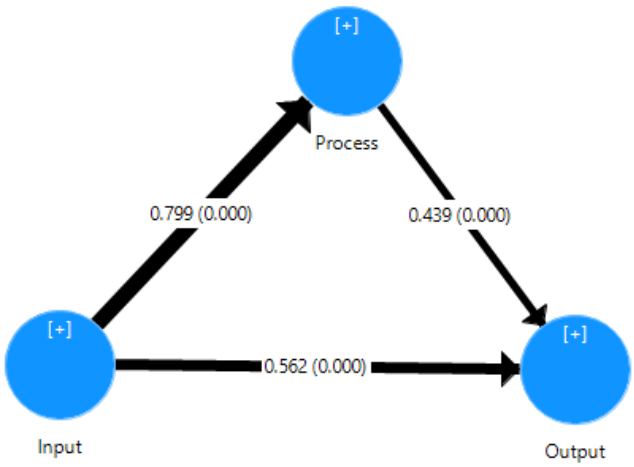

Figure 6. *Path for input, process, and output factors for private school.*

Table 5. *Path Coefficients for Input and Process on Output based on School Type.*

Path/School type	β		Std. err		*t*		Confidence Interval				R^2		*Adj.* R^2		f^2		Q^2	
							Lower		Upper									
	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR
Input ---> Process	.848*	.799*	.149	.063	5.68	12.62	.59	.64	.95	.90	.72	.64	.70	.63	2.56	1.77	.66	.59
Process ---> Output	.338*	.439*	.149	.056	2.26	7.86	.01	.34	.53	.56	.89	.90	.88	.90	.29	.72		
Input ---> Output	.639*	.562*	.132	.059	4.85	9.49	.458	.44	.93	.66					1.04	1.18	.84	.86

*Significant, $p < .05$; PU- Public; PR- Private.

Table 6 presents details on the indirect effect, direct effect, total effect, and multi group test.

Table 6. *Total Effect, Direct Effect, and Indirect Effect in terms of School Type.*

	Effect (β)		SE		*t-value*		*p-value*		Confidence Interval			
									Lower Limit		Upper Limit	
	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR	PU	PR
Total effect of X on Y	.926*	.913*	.050	.026	18.52	35.63	<0.01	<0.01	.823	.853	.969	.947
Direct effect of X on Y	.639*	.562*	.116	.057	5.51	9.79	<0.01	<0.01	.458	.44	.93	.66

Indirect effect of X on Y	Effect (β)		SE		LLCI		ULCI	
	PU	PR	PU	PR	PU	PR	PU	PR
Process (M)	.287*	.351*	.117	.056	.042	.263	.490	.484

Multi-group result (PR – PU)	Effect (β)	*t-value*	*p-value*	Confidence Interval	
				Lower	Upper
Difference in indirect effect	.064	.558	.578	-.05	.20
Difference in direct effect (X on Y)	-.077	.646	.520	-.098	.132
Difference in direct effect (X on M)	-.049	.340	.735	-.122	.115
Difference in direct effect (M on Y)	-.101	.828	.410	-.176	.129

X- Input factors; Y- Output; PU- Public; PR- Private.
*Significant, $p < .0$.

As shown in Table 6, there was significant indirect effect of input factor on output/outcome through process factor for both public, β = .29, *Boot95%CI* (0.04, .49) and private schools, β = .35, *Boot95%CI* (0.26, 0.48). From the results, the indirect effect of input on output through process factor for private school was greater than the public school. The effect of input on outcome reduced from 0.64 to 0.29 for public school, with the introduction of process factor. Likewise, the effect of input on outcome reduced from 0.56 to 0.35 for private school, with the introduction of process factor. The multi group analysis revealed that the difference between the indirect effect for the private and the public schools, (PR - PU) = 0.06, and this was not statistically significant, *Boot95%CI* (-0.05, 0.20). This result implies that even though generally the process factor reduced the effect of input on output, there was no difference in its reduction for both public and private schools.

In sum, from the results, the path model based on school location was significantly different in terms of rural and urban areas. However, in terms of school type (private and public), there was no difference in the path models. Based on this result, the null hypothesis that "the proposed model will not significantly differ in terms of school type (public and private) and school location (urban and rural)" was rejected in favour of its alternative hypothesis, that "the proposed model will significantly differ in terms of school type (public and private) and school location (urban and rural)". Based on this, it can be said that context has influence on the relationship between input and output factors.

4. Discussion

Results of the study revealed that the input factor was a significant predictor of output factor, β = .58, *Boot95%CI* (.47, .67), with large effect size (f^2 = 1.23). That is to say, input factor positively predicted output/outcome. This means that as input factors improve, performance of students in terms of the percentage pass of pupils would also increase. It was also found that input factor was a significant positive predictor of process factor, β = .80; *Boot95%CI* (.66, .89). Again, process factor significantly predicted output/outcome.

The findings of this study are consistent with the assertion made by the [11]. According to the [11], adequacy of instructional materials such as textbooks which serve as is the main instruction materials is the most cost-effective input affecting student performance. This assertion was also re-echoed by [38] who emphasised that adequacy of TLM determines an educational system's efficiency. This implies that, for effective teaching and learning to take place, the presence of basic input tools such as textbooks and resource materials are very important; their absence or inadequacy makes teachers handle subjects in an abstract manner, making the teaching to be 'dry' and non-exciting. This could in turn affect students' performance (outcome).

The findings of this study also agreed with the assertion of [3] who found the JHS national core textbook student ratio to be 2.5:1. Ampiah stressed that the fact that not all pupils have textbooks (i.e., a ratio of 1:1) affects the effectiveness of lessons negatively since the Ghanaian basic school curricula are heavily dependent on textbooks. This suggests that input factors such as text books are significant predictors of outcome factors (students' performance). In other words, input factors positively predict outcome factors. Thus, lack/inadequacy of textbooks means children have to depend very heavily on what teachers write on the chalkboard/white board. Pupils, therefore, were not provided the opportunity to use textbooks at home for practice.

The findings of the current study were also in line with the findings of [9] who found that many teachers face transportation and housing obstacles that hinder them from getting to school on time and staying until school hours are over. This situation prevails more in Ghanaian rural areas and denies pupils of effective use of instructional time. Additionally, many teachers hold second jobs, which may

distract them from the time and energy they expend in the classroom. In some cases, teachers miss school altogether. This suggests that the unavailability of some basic input factors such as transport system that will aid teachers to arrive in school on time could to some extent affect students' performance. That is to say, the unavailability of transport system, for instance, could delay the early arrival of both teachers and students on campus which could in turn affect the time spent for lessons in the classroom; hence affecting students' performance (output factors).

Similarly, the finding of this study was consistent with the assertion of [45]. In the view of UNESCO, teaching and learning materials (TLM), well equipped library, are very important resources when it comes to quality education. According to [45], the achievement of teaching and learning is influenced by the availability of resources to use for the process and how these resources are regulated. This shows that schools that have no textbooks or inadequate textbooks and learning materials or well-equipped library cannot do effective and efficient work. [1] also stipulated that a well-equipped library provides different types of material resources like books, journals, governmental documents and graphics for references. This denotes that a library is a reference source ("a life blood") for any school and a point of individual studies in schools where relevant information from primary and secondary sources can be extracted. Adequacy of library resources and their usage by students and teachers are therefore, associated with better educational performance.

The findings of the study revealed that the path model based on school location was significantly different in terms of rural and urban areas. However, in terms of school type (private and public), there was no difference in the path models. Based on this, it can be said that context have influence on the relationship between input and output factors. The finding of the present study was at par with the findings of [44] who reported on one large-scale survey carried out by the Ministry of Education of China. The authors found out that the academic achievement of pupils in urban areas was higher than that of pupils in townships, whose achievement was in turn higher than that of pupils in rural areas. This implies that the context within which a particular school is located could influence the input and output factors. Similarly, the findings of this study agreed with the findings of [30] who reported that in Shanghai there are differences in students' test scores between schools in urban and rural areas, with those in the urban areas scoring higher.

In his view, [29] also emphasised that many educators, researchers, legislators, and the general public believe that students from smaller and rural schools receive education that is inferior to that of students from larger urban or suburban schools. The assertion of Lipton was consistent with the findings of this study. The findings of the current study also agreed with the findings of a number of authors (e.g., [4, 42]) who postulated that urban schools are generally overstaffed with qualified teachers, overenrolled, better funded, and monitored. Urban schools tend to have better infrastructure and adequate resources to work with compared with rural schools. This provides enough evidence to support the fact that the context within which a particular school is located is of much concern since the context could have an influence on the relationship between input and output factors.

5. Conclusion and Recommendations

Clearly, the input factors in education to a greater extent influence the process factors which also affects the outcome of education. The study concluded that the existence of input factors is not enough to improve academic achievement of pupils. However, the context and process factors are also significant. That is, process factors explain the relationship between input factors and academic performance. From the foregoing, if input and process factors are not adequate, performance of pupils suffer. In the case of urban schools which were found to have better input and process factors, pupils in such schools definitely tend to perform better than pupils in rural schools. Therefore, the poor performance of pupils in rural schools can be attributed to the fact that input and process factors in these schools are not adequate and accessible in some cases. Generally, the government should not only be interested in providing input factors but also make sure that process factors exist, since adequate input factors will need sufficient process factors to improve academic performance. Irrespective of the availability and adequacy of input factors, performance will continue to be relatively poor if process factors are inadequate and not optimally used.

Based on the findings, the following recommendations are made:

1. Ghana Education Service and heads of school should not only focus on providing input factors but also strengthen process factors in schools to improve academic performance. This is because even when input factors are present without adequate process factors, outcome is likely to be low.
2. The Ministry of Education/GES should give special attention to rural schools when providing input and process factors to schools. This is because the effect of the absence of input and process factors on outcome is large for rural schools.

References

[1] Adeyemi, T. O. (2010). Principals' leadership styles and teachers job performance in senior secondary schools in Ondo State, Nigeria. *International Journal of Educational Administration and Policy Studies*, *2* (6), 83-91.

[2] Akyeampong, K. (2009). Revisiting free compulsory universal basic education (FCUBE) in Ghana. *Comparative Education, 45* (2), 175–195.

[3] Ampiah, J. G. (2011). *Quality basic education in Ghana: Prescription, practice and problems.* Africa-Asia University Dialogue for Educational Development. Report of the International Experience Sharing Seminar (1). CICE, Hiroshima University. CICE Series 4.

[4] Anamuah-Mensah Committee Report (2002). *Meeting the challenges of Education in the Twenty First Century*, Review report of the President's Committee on Education Reforms in Ghana: Author.

[5] Ansah, J. (2017). Supporting education in Africa: Opportunities and challenges for an impact investor. Francesca Marchetta, Tom Dilly.

[6] Bowles, S. (1970). Towards an Educational Production Function. In W. L. Hansen (Ed.), *Education, income, and human capital* (pp. 9-70). New York: Columbia University Press.

[7] Burke, M. A. & Sass, T. R. (2011). *Classroom peer effects and student achievement*. Public Policy, Federal Reserve Bank of Boston, Discussion paper. Retrieved from http://www.bostonfed.org/economic.

[8] Carlson, D. & Cowen, J. M. (2015). Student neighbourhoods, schools, and test score growth: Evidence from Milwaukee. *Sociology of Education ASA, 88* (1), 38-55.

[9] Carron, G., & Chau, T. N. (1996). The quality of primary schools in different development contexts. Paris: UNESCO.

[10] Cobbold, C. (2006). Attracting and retaining rural teachers in Ghana: The premise and promise of a district sponsorship scheme. *Journal of Education for Teaching,* 32 (4), 453–469.

[11] Department for International Development [DFID] (2007). Secondary textbook and school library provision in Sub-Saharan Africa: A Review based on 19 National Case Studies World Bank, Washington.

[12] Downey, D. B., von-Hippel, P. T., & Broh, B. (2004). Are schools the great equalizer? School and non-school sources of Inequality in cognitive skills. *American Sociological Review, 69* (5), 613-635.

[13] Durlak, J. A., Weissberg, R. P., Dymnicki, A. B, Taylor, R. D, & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82* (1), 405-432.

[14] Etsey, K. A. (2005). Assessing performance in schools: Issues and practice. *Ife Psychologia*, *13* (1), 123- 35.

[15] Fentiman, A., Hall, A., & Bundy, D. (1999). School enrolment patterns in rural Ghana: A comparative study of the impact of location, gender, age and health on children's access to basic schooling. *Comparative Education, 35* (3), 331–349.

[16] Fischer, C. S. (2013). Showing that neighbourhoods matter: City and community. *American Sociological Association, 12* (1), 7–12.

[17] Fobih, D., Akyeampong, K. A., & Koomson, A. (1999). *Ghana primary school development project: Final evaluation of project performance.* Accra; Ghana: Ministry of Education.

[18] Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18* (1), 39-50.

[19] Fuller, B., & Clarke, P. (1994). Raising school effects while ignoring culture? Local conditions and the influence of classroom tools, rules and pedagogy. *Review of Educational Research 64,* 119–57.

[20] Ghana News Agency [GNA] (2015) Six schools scored 0% in Basic Education Certificate Examination. Retrieved from https://www.google.com/url?

[21] Green, S. B. & Salkind, N. J. (2014). Using SPSS for Windows and Machintsh: Analysing and understanding data. (8th ed), Hoboken: Pearson.

[22] Hair, J., Hult, T., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: Sage Publications, Inc.

[23] Hanushek, E. A. (2007). *Education production functions*. Hoover Institution, Stanford University.

[24] Hanushek, E. A., Kain, J. F., Markman, J. M., & Rivkin, S. G. (2003). *Does peer ability affect student achievement? National Bureau of Economic Research Working Paper No. 8502.* Cambridge, MA: National Bureau of Economic Research.

[25] Harris, J., & Bourne, P. A. (2017). Perception of teachers and pupils on factors influencing academic performance in mathematics among a group of fifth and sixth graders in *Jamaica. Eureka Journals, 1* (1), 1-23.

[26] Karagoz, Y. (2016). *SPSS and Amos 23 applied Statistical Analysis.* Ankara, Turkey: Nobel Publishing House.

[27] Katz, L. F. (2014). Reducing inequality: Neighbourhood and school interventions. *Focus, 31* (2), 12-20.

[28] Lavy, V. (2015). Do differences in schools' instruction time explain international achievement gaps? Evidence from developed and developing countries, *The Economic Journal*, *125* (588), 397–424.

[29] Lipton, M. (1977). Why poor people stay poor: A study of urban bias in world development. Temple Smith/Harvard University Press.

[30] Lo, L. N. K. (1999). Knowledge, education and development in Hong Kong and Shanghai. *Educational Journal, 26* (2), 55–89.

[31] Lockheed, M. & Verspoor, A. M. (1992). *Improving primary education in developing countries.* New York, NY: Oxford University Press.

[32] Mayers, R. E. (2013). The relative benefits of learning teaching and teaching expectancy. *Contemporary Educational Psychology, 38,* 281-288.

[33] Ministry of Education (2016). *Education Sector Performance Report.* Accra; Ghana: Ministry of Education.

[34] Ministry of Education. (2015). *Teaching syllabus for visual arts*. (Curriculum Research and Development Division) Accra, Ghana: Author.

[35] Mitchell, M. M., Bradshaw, C. P., & Leaf, P. J. (2010). Student and teacher perceptions of school climate: A multilevel exploration of patterns of discrepancy. *Journal of School Health*, *80* (6), 271-279.

[36] Nudzor, H. P. (2013). Exploring the policy implementation paradox: Using the free compulsory universal basic education (FCUBE) policy in Ghana as an exemplar. *International Journal of Qualitative Studies in Education, 26* (8), 933–952.

[37] Okyerefo, M. P. K., Fiaveh, D. Y., & Lamptey, S. N. L. (2011). Factors prompting pupils' academic performance in privately owned junior high school in Accra, Ghana. *International Journal of Sociology and Anthropology*, *3* (8), 280-89.

[38] Padmanabhan, T. (2001). *Theoretical Astrophysics: Volume 2, Stars and* stellar systems. Cambridge University Press.

[39] Quansah, K. B. (2000). *1999 report on the administration of primary 6 criterion-referenced tests.* Accra; Ghana: Ministry of Education.

[40] Rivkin, S. G., & Schiman, J. C. (2015). Instruction time, classroom quality, and academic achievement, *The Economic Journal, 125* (588), F425–F448.

[41] Sastry, N., & Pebley, A. N. (2010). Family and neighbourhood sources of socioeconomic inequality in children's achievement. *Population Association of America, 12* (5), 777-800.

[42] Siaw, A. O. 2009). *A comparative study of teaching and learning processes of the visual arts in selected senior high schools in urban and rural settings in Ashanti Region Ghana.* Master's thesis, Department of General Art Studies, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

[43] Tanaka, C. (2012). Profile and status of untrained teachers: Experiences in basic schools in rural Ghana. Compare: *A Journal of Comparative and International Education,* 42 (3), 415–438.

[44] Tang, X., & Wu, X. (2000). Educational change and development in the People's Republic of China: Challenges for the future. In T. Townsend & Y. C. Cheng (Eds.), *Educational change and development in the Asia-Pacific region: Challenges for future* (pp. 133–161). Lisse, The Netherlands: Swets & Zeitlinger.

[45] UNESCO. (2005). *Cultural heritage, creativity and education for all in Africa; for education in the arts and creativity in primary and secondary schools.* Regional Conference on Arts Education, Port Elizabeth, South Africa.