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Relevant Continuing Professional Development (CPD) and Quality Resource Situation Make the Difference in Student Academic Performance

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Abstract

This study seeks to look at the relationships among teachers' academic qualification, availability of quality resources and the performance of students in Mathematics, English and Integrated science of Basic Schools at Kwahu-East in the Eastern Region of Ghana. The authors used a descriptive survey design which adopted the questionnaire, interview and observation in the collection of data. The authors used stratified random sampling in selecting 180 teachers whereas purposive sampling was used in selecting 27 headteachers and District Education Officers which used the Pearson correlation in the analysis. The study revealed that a teacher's academic qualification obtained through education had no significant relationship with student's academic performance in the respective subjects being measured by this study. The authors recommend that the Government of Ghana concentrate on providing CPD programs that concentrate on practical situations in the schools and channel more resources to schools.

Keywords: professional development; academic performance; teacher quality

Introduction

Individuals through relevant education are equipped with the necessary knowledge, skills, abilities and competencies that increase their capacity to meaningfully contribute to their maximum. There is considerable evidence that education has a direct impact on various aspects like the socio-economic and political development of any nation. Hallak as cited in Adedeji and Owoeye (2002) determined that the quality of the educational system depends on the quality of teachers. This is corroborated by the European Union as cited in

Newman (2013) that "within educational institutions, teaching professionals are the most important determinants of how learners will perform; and it is what teachers know, do and care about that matters" (p.18). It could be deduced from the European Union's assertion that the indispensability of teachers in the governance structure of the educational enterprise cannot be overemphasized.

Subsequently, since independence, there have been numerous major and minor reforms in teacher education in Ghana which have had very little impact on children's learning outcomes (Addae-Boahene, 2019, p. 14). The lack of improvement in learning outcomes at the basic school system level has yielded inadequate teacher preparation, and this has called for reforms in the teacher education sector in Ghana. Some of these reforms include the Education Act of 1961 that initiated the free and compulsory primary education and consolidated in the 1992 constitution, the passage of the Education Act in 2008 (Act 778); the creation of the National Teaching Council to regulate and license the teaching profession; the introduction of the Pre-Tertiary Teacher Development and Management Policy in 2012. All of these reforms were to serve two major purposes. Some of these reforms over the years are also to streamline the career progression of teachers based on established standards and competencies. It is worth noting that the primary purpose of all these reforms were interventions to solve the issue of participation and retention. It is also important to acknowledge that the reforms can help solve the persistent underachievement in the learning outcomes of children in the Ghanaian basic schools. Though the problem of students' participation and retention has seen tremendous improvement, the issue of student performance and achievement is of great concern to the public. The question therefore is: are the teachers not competent enough or there are other contributing factors?

Teacher Quality and Academic Performance

According to Okunlola and Oni as cited in Adedeji and Owoeye (2002) there exists a significant positive relationship between the quantity and quality of teachers and the academic performance of students. While rough measures of teachers' quality have been observed to be related to higher levels of students' achievement, findings are mixed on the effect of the teacher's length of schooling. This has been studied in 26 analyses across many countries; a significant relationship was found in 12 of these studies. The strength of this relationship is moderate in a few analyses. The International Energy Agency (IEA) survey of literature achievement in Chile included 103 schools and 1,311 students (Sihen, Saha & Nonone as cited in Adedeji & Owoeye, 2002). A moderate correlation

between teachers' school attainment and pupil performance was observed (r = 0.34). The significance of this factor remained after controlling for students' background and other school factors. An early study of school quality in Puerto Rico found that teachers' schooling was most related to the achievement of primary school students and among pupils from lower-income families. In sharp contrast, no significant relationship was found for secondary school students in the same Puerto Rico study as the case for the primary schools (Carnoy as cited in Adedeji and Owoeye, 2002). The teacher schooling effect has been negligible in several other studies; for instance, a study of more than 21000 Thai primary school students found a statistically significant, yet small association between teachers' school attainment and student performance (r = .11). This low magnitude is worrisome from a policy viewpoint (Fuller & Chantavanich as cited in Adedeji & Owoeye, 2002).

In contrast, achievement effects are more consistent for teachers' length of post-secondary schooling or the number of teacher training courses completed. Heyneman and Loxley as cited in Adedeji and Owoeye (2002) found significant effects of teachers' school attainment and pupil performance in independent work in ten other countries, which revealed significant effects. Twenty-two studies out of 31 studies have found significant achievement effect from teachers' general university or specific teacher training. Fuller (1987) also discovered an achievement effect for the interaction of teacher trainee and the length of teaching experience. However, the teachers credential level was the strongest predictor of students' achievement in a sample of 463 primary school students in Uganda when compared against several other school factors (Durojaiye, 1974).

Another study of Iranian second-grade students found a modest correlation between an index measuring the quality of teachers' secondary schools and their pupils' subsequent performance (Melesse & Gulie, 2019). Teachers' experience did appear to make a significant difference in Chile, India, Iran and Nigeria. The study of 37 primary schools in Botswana found that the influence of teachers' experience rivalled the influence of father's occupation used as a background control variable (Loxley as cited in Adedeji & Owoeye, 2002)

Continuous Professional Development (CPD) and Teacher Quality

The extent to which public education succeeds in delivering services with effective use of scarce resources will depend largely on the quality of the personnel engaged in the educational process and on the effectiveness with which they discharge individual and group responsibilities (Mensah, 2016).

Quality could be ensured in terms of the initial knowledge, skills, and attitude the employee acquired through education before recruitment and selection (Afreh, 2018). However, it is impossible today for any individual to learn a job or enter a profession and remain in it for ten or more years with his or her skills unchanged. Societies and organizations including the school system change and grow. It is in the light of this that Continuous Professional Development (CPD) is not only desirable but also an indispensable activity to maintain a viable, knowledgeable and high quality of teachers. A regular investment of time in learning and development should be seen as an essential part of professional life, not an optional extra, with learning an integral part of classroom work. Badu-Nyarko (2015) confirms the significance of CPD when he opines that no matter how well qualified or successful the professional maybe, further development is always possible.

There have been several studies showing that there exists a positive relationship between CPD and employees' performance but not necessarily teacher quality. For example, there was a study by Melessi and Gulie (2019), on teacher CPD and its impact on quality in education in Ethiopia. They found out that CPD implementation helps teachers to access new ideas, share experience and engage in professional interactions. A similar study conducted in Ghana by Mensah (2016), examined the influence of teachers CPD on their classroom practices. Their findings revealed that CPD programmes were relevant to teachers' classroom management practices, hence capacity building programmes should be promoted regularly in basic schools. There was another study conducted by Chikari, Rudhumbu and Svotwa (2015) on lecturers' views towards performance on private higher educational institutions in Botswana found that lecturers viewed CPD as a panacea for professional growth, efficiency and teaching effectiveness. They recommended that CPD implementation is essential and required stakeholder involvement.

Hassan and Ismail (2006) studied employees' perception of CPD practices in twenty selected companies in Malaysia. To collect data for the study, questionnaires were administered to a total of 239 employees from the twenty organizations' which were divided into two groups of 10 in each group. One group was made up of organisations that had better learning, training and development system for their teachers as well as a career development plan, a performance guidance system, a reward and recognition system. The other group of organisations did not have well developed CPD systems. The study compared

employees' perception of CPD activities in the two groups of organisations. It was revealed that employees in the first group of organisations recognised that their organisations were implementing good CPD programmes which reflected in their performance in terms of productivity.

Since Guggisberg's initiative of improving teacher quality, education in Ghana has undergone numerous transformations and reforms, all towards the agenda of quality (Acquah, 2012; Antwi, Dela, Mensah & Awuddy, 2018; Baafi-Frimpong, 2019). Some of these reforms include the passage of the Education Act in 2008 (NCTE, 2013); the introduction of the Pre Tertiary Teacher Professional Development and Management Policy (PTPDM) in 2012 to streamline career progression of teachers based on established standards and competencies; the passage of the Colleges of Education Act in 2012 (NCTE, 2013). Thus, the varying transformational regimes and reforms only means that some basic requirements must be met. The Ministry of Education (MoE) argues that universal goals set for education in terms of access need to be accompanied with quality instruction. This in turn requires teachers to be qualified to do their job effectively as reflected in the National Teacher Education Curriculum Framework (NTECF) (MoE, 2017). Teachers in Ghana are therefore expected to be reflective and change-oriented thereby to meet the government and public demand for quality education (MoE, 2017). Teachers are expected to consider the dynamic nature of the learners and the society at large. Thus, teachers must continually expand their knowledge in order to keep pace with the rate of change and current standards of others in the same field globally. The need for CPD in Ghana, therefore emanates from the fact that survival and growth of the education sector, in a constantly changing and increasingly complex environment, depends on the existence of observed and nurtured knowledge and skills of its teachers. Yaqub, Owusu-Cole and Frempong (2020) further strengthen the argument when they posit that CPD is a must for all professionals and has been important in the past as it is more significant in this era of knowledge society.

Resource Situation and Academic Achievement

In as much as the 'personnel' component in the school environment is essential, money, equipment and materials are of significant importance. All these constitute a well-resourced environment that cannot be overemphasized in the success story of any educational institution. There have been some studies indicating a positive relationship between teaching resources and students' academic performance. Yara and Otieno (2010) conducted a study that looked at

the effect of teaching/learning resources on academic performance in secondary school mathematics in Bondo district of Kenya. Four hundred and five secondary school students were used for the study and the multiple regression analysis was used to analyse the eight independent variables (resource materials) and the dependent variable (mathematics achievement).

The study concluded that there was a positive correlation between teaching resource materials and the mathematics performance of students. Opare (1992) also found a significant relationship between recommended textbooks, quality of teachers and academic performance. Obemeata (1995) sees an improvement of staffing situation is schools, in terms of quality and quantity, as a way to an appreciable improvement in the quality of education in Nigerian schools. Agezo and Christian (2002) in a study identified facilities such as the school buildings, classroom accommodation, furniture, libraries, laboratories, recreational equipment and other instructional materials as a major factor contributing to academic achievement in the school system. While the availability relevance and adequacy of these resource items contribute to academic achievement, the researchers did not fail to point out those unattractive school buildings, crowded classroom and surroundings devoid of aesthetic appearance can contribute to poor academic attainment.

Nasir, Owusu-Cole and Frempong (2020) also found a significant relationship between the teacher, facilities and academic performance. Similarly, Eshiet (1987) found the adequate provision of instructional material to be one important method that science teachers can use in promoting skill acquisition in consonance to develop manipulative skills in students as spelt out in the junior and secondary education science curriculum. According to Arubayi (1987), a positive relationship exists in the independent variables of laboratory facilities, recommended textbooks, number of science books in the library and teachers' qualifications and the dependent variable (academic performance of students in Biology, Chemistry and Physics). Thus, studies Obemeata (1995) provide evidence to support the claim that physical structure is significantly related to school academic performance.

However, the research conducted by Jebson and Moses (2012) show a contrary view to the concept of teaching resources and academic performance. The study investigated the relationship between learning resources and students' academic achievement in science subjects in Taraba State Secondary Schools. A total of

35 science teachers and 18 science head of departments from 6 schools from three geopolitical zones of Taraba State were involved in the study. Four null hypotheses were raised and tested using Pearson's Product Moment Correlation Coefficient and student's t-test statistics. The results of data analysis showed that laboratory equipment and the number of qualified teachers were inadequate for Biology, Chemistry and Physics where there were no qualified teachers at all. The study concluded that there was no difference in the academic performance of schools with adequate laboratory equipment and those without them.

Given the importance of CPD and quality resources to student academic performance in educational institutions, there was the need also to conduct studies on CPD and resource situations at Basic schools in Kwahu-East in the Eastern Region of Ghana. However, little is known about CPD and resource situations in the basic schools at Kwahu-East in the Eastern Region of Ghana. In the face of these observations, the study, therefore, wants to answer the following research questions:

1. What is the relationship between the academic qualifications and the academic performance of students in Mathematics, English and Integrated Science at Basic schools in Kwahu-East in the Eastern Region of Ghana?
2. What is the relationship between the number of resources available and the academic performance of students in Mathematics, English and Integrated Science at Basic schools in Kwahu-East in the Eastern Region of Ghana?

Method

The study used the descriptive survey design which was both exploratory and explanatory research. Gravetter and Forzano (2006) explained that "a descriptive survey typically involves measuring a variable or a set of variables as they exist naturally" (p. 136). In a descriptive survey design, the researcher draws a sample from the population of interest and generalisations are made taking into consideration their responses. Osuala (1991) also pointed out that descriptive surveys are practical to the researcher and identify present conditions and at the same time point to the present needs.

The population of the study comprised all primary and junior high school teachers (teaching mathematics, English and integrated science); all headteachers; the education directorate officers (like the director, HRDM personnel, basic school coordinator, deputy director in charge of monitoring and supervision, circuit

supervisors) in Kwahu-East in the Eastern Region of Ghana. There were 113 basic schools [comprising both primary (64) and JHS (49)] which have been grouped into seven zones. For practical purposes, the stratified random sampling technique was used to select 20 basic schools from the 113 schools. The study focused on three basic subject teachers (Mathematics, English and Integrated Science) and all the basic schools used did not have more than one teacher teaching these subjects. Subsequently, these subject teachers did not warrant any sampling technique but the census approach was used in selecting all the teaching staff responsible for the three subjects as well as their respective head teachers. Also, the indispensability of some officials relevant to the study from the education directorate did not require any sampling but were purposively selected (director, HRDM personnel, basic school coordinator, deputy director in charge of supervision as well as the deputy director in charge of EMIS). A summary of the sample used is shown in Table 1.

Table 1

Summary of Sample used in the Study

Teachers		Head Teachers	DEO	Total
Primary	JHS			
120	80	15	12	227

Note. Key: JHS = Junior High School; DEO = District Education Officers

However, it must be noted that there was a return rate of 207 representing 91.1% of the total respondents used for the study. Three instruments (questionnaire, interview schedule and observation guide) were used in the data collection. An unstructured interview schedule was used for the district education directorate personnel to elicit information on varying issues ranging from their analysis of the academic qualification of their teachers, the output of work, resource situations in the schools as well as documentary evidence of the schools' performance in standardized examinations like the BECE.

The questionnaire was used for both teachers, head teachers and their respective circuit supervisors in collecting information on their respective qualifications being used in teaching; CPD programs they have had in their practice and how either their qualifications or CPD programs or resource situations has affected their work output and subsequent performance on students. The administration of the instruments (questionnaire, interview guide and the observational guide) strictly adhered to all the ethical considerations required for the conduct of academic research. Appropriate ethical protocols for the collection of field data

from the study areas went through the appropriate steps of authority. Approval was sought from the district director of education and the various head teachers through an introductory letter. Prior to the administration of the instruments, arrangements were made with the appropriate focused groups for suitable time upon which the instruments were administered. Only the physical distribution approach was used in the questionnaire administration which offered us the opportunity to explain the purpose of the study, the meaning of some unclear items to respondents as well as appealed for their cooperation. Questionnaires were left with the respondents for two weeks to aid objective responses to the items and an additional one week was allowed for respondents who had not completed theirs. Upon receipt and analysis of questionnaire, a structured interview was organised with the respective district education directorate personnel to further probe some of the issues that emerged from the responses in the questionnaire.

The observation techniques were applied to gather such information as the teaching techniques of teachers during teaching and learning as well as the resource situations in the selected schools. There was also a documentary review of reports and relevant documents such as WAEC reports on students' performance in the various selected schools. The study used the Pearson correlation in establishing the direction and degree of the linear relationship that exists between the teachers' qualifications and students' academic achievements. Also, the mean and standard deviations, as well as percentages, were used in analysing the CPD programs available to teachers and the availability of resources in the schools respectively.

Results and Discussion

Research question 1: What is the relationship between the quality of teachers (in terms of their academic qualifications) and the academic performance of students in Mathematics, English and Integrated Science at Basic schools in Kwahu-East in the Eastern Region of Ghana?

To answer this research question teachers' academic qualifications were collected through data from the set of questionnaires and confirmed through other documents like the school's logbook and staff records book. Students' academic record through their WAEC performance was also obtained from the District Education Office and equally cross-checked from the records of the respective schools. The Pearson correlation was used in establishing the

direction and degree of the linear relationship that exists between the teachers' qualifications and their students' academic achievements in the various subjects. Tables 2, 3, and 4 present the results from the Pearson Correlation analysis for the subjects Mathematics, English and Integrated Science respectively.

Table 2

Correlation between Academic Qualification of Teachers and Students' Academic Performance in Mathematics

Year	Qualification	Performance		
		C	P	F
2017	Cert 'A' and below	.6551	.5268	.1263
	DBE	.2845	.3436	.3104
	B.Ed.	.3647	.3665	.2274
	B.Sc.	.1324	.0732	.0487
	M.Sc./M.Ed.	.2748	.1574	.1187
2018	Cert 'A' and below	.6399	.7957	.3204
	DBE	.4422	.5031	.1552
	B.Ed.	.5012	.4032	.2163
	B.Sc.	.1456	.1098	.0731
	M.Sc./M.Ed.	.3298	.2361	.1781
2019	Cert 'A' and below	.5512	.6399	.2528
	DBE	.5551	.4741	.2495
	B.Ed.	.4551	.4665	.2564
	B.Sc.	.2184	.1427	.0879
	M.Sc./ M.Ed.	.1979	.1889	1603

Note. Key: C = Credit; P = Pass; F = Fail *p < .05 (Significant level)
Source: Field data (2017 – 2019)

Table 2 showed the coefficient of correlation (at a significance level of p<.05) of the students' academic performance in Mathematics in terms of their academic qualifications. The correlation coefficient revealed that there was no special significant relationship between the performance of students in mathematics and almost all the qualifications of teachers except the Teacher's Certificate 'A' which showed a significant relationship. Certificate 'A' which happened to be a qualification below the minimum requirement in Ghanaian basic schools in recent times, rather showed a significant relationship with students' performance

in mathematics as compared with teachers with higher qualifications (DBE, B.Ed., B.Sc., M.Sc., M.Ed.). This revelation was evident and consistent in all the three years analysis as shown by the correlation coefficient. Though not a very strong significant difference, it corroborates the findings of Adedeji and Owoeye (2002) that revealed that there was a significant relationship between teachers who had lower-level qualifications and students' academic performance than teachers with higher qualifications. It must also be noted that Table 2 shows another significant relationship between DBE and B.Ed. certificates and students mathematics achievement though not as significant as the Certificate 'A' and even lower qualifications. A quest to find better insight and explanations to this development revealed that most teachers with the DBE and B.Ed. certificates upgraded themselves from the lower qualifications like Cert 'A' to the DBE and subsequently B.Ed. certificates. It was, therefore, no surprise that the DBE and B.Ed. qualifications equally showed quite a significant relationship with students' mathematics achievement which was consistent in the three years duration. This shows that teacher quality does not depend on higher qualifications but rather tied to other variables like relevant practical training and development that pertains to existing challenges in the classroom and the school as a whole as well as experience that comes with years in practice. (see Table 3 overleaf)

Table 3

Correlation between Academic Qualification of Teachers and Students' Academic Performance in English

Year	Qualification	Performance		
		C	P	F
2017	Cert 'A' and below	.7335	.5557	.2419
	DBE	.5956	.5154	.4098
	B.Ed.	.4625	.5032	.3514
	B.A.	.4310	.4294	.1218
	M.A./M.Ed.	.4110	.3361	.1781
2018	Cert 'A' and below	.5642	.5094	.4388
	DBE	.4964	.5275	.3514
	B.Ed.	.4133	.4736	.2136
	B.A.	.3640	.4745	.3539
	M.A./M.Ed.	.3628	.3542	.2672
2019	Cert 'A' and below	.5121	.3200	.3664
	DBE	.4841	.4112	.4002
	B.Ed.	.3906	.4398	.2964
	B.A.	.3058	.4141	.1319
	M.A./M.Ed.	.3969	.3834	.2405

Note: Key: C = Credit; P = Pass; F = Fail *p < .05 (Significant level)
Source: Field data (2017 – 2019)

Results from Table 3 further revealed that Cert 'A' teachers, DBE graduates as well as the B.Ed. teachers consistently had a significant relationship with the academic performance of students in English with still the Certificate 'A' teachers showing superiority amongst them. However, unlike Mathematics, the quality of other higher qualifications like B.A., M.A., and M.Ed. equally showed a significant relationship with the academic achievement of students in English though not as high as the lower qualifications. This revelation showed that in as much as there was evidence that higher qualification did have some impact on the quality of teaching and students' academic achievement, the impact was not so much significant as compared to lower-level qualifications. It was therefore surprising how major stakeholders in education were trumpeting and heralding all forms of CPD programs that lead to higher qualifications as a panacea and antidote to students' persistent underachievement in learning outcomes in our basic schools.

Table 4

Correlation between Academic Qualification of Teachers and Students' Academic Performance in Integrated Science

Year	Qualification	Performance		
		C	P	F
2017	Cert 'A' and below	.4931	.4841	.2621
	DBE	.4414	.4004	.3401
	B.Ed.	.3947	.3522	.2427
	B.Sc.	.3013	.2122	.2387
	M.Sc./M.Ed.	.4248	.4551	.3359
2018	Cert 'A' and below	.5199	.5973	.2852
	DBE	.4844	.5127	.2852
	B.Ed.	.3012	.3031	.1816
	B.Sc.	.2912	.2547	.2193
	M.Sc./M.Ed.	.2968	.3245	.2267
2019	Cert 'A' and below	.3412	.3414	.1528
	DBE	.3941	.4002	.1595
	B.Ed.	.3677	.3940	.2764
	B.Sc.	.2998	.3120	.1816
	M.Sc./M.Ed.	.3009	.3589	.1979

Note. Key: C = Credit; P = Pass; F = Fail *p < .05 (Significant level)
Source: Field data (2017 – 2019)

Table 4 equally reveals that the lower-level qualifications as defined in this study showed equal variance with some of the higher-level qualifications with students' academic performance. This revelation provoked further investigation through an interview schedule which revealed that about 90% of the teachers with higher qualifications started with the minimum qualification from teacher training institutions and had been in the service between 15 to 25 years. It was therefore evident through this study that CPD through practical experience was paramount to initial higher qualifications.

A cursory view and analysis of the unfolding findings in this study had shown that the quality of teachers is not measured by the certificate obtained by teachers but can be tied to a myriad of indicators and variables. Some of these variables include practical experience acquired on the job, attitude to work, interest and the passion of teachers in their job, job satisfaction (in terms of the teaching environment and motivation packages, personal fulfilment). A classical case in

recent times was the much-acknowledged unemployment situation in Ghana that have rendered most graduates idle at home and therefore find teaching as a stopgap for better and more gainful employment in the future. It could therefore be deduced that such individuals who parade themselves as teachers may have the requisite qualifications but the attitude and passion is a non-starter and will eventually impact negatively on students' achievement.

CPD Techniques adopted in schools in Kwahu-East District

Having looked at the teacher academic qualification and relationship with students' academic performance, teachers were then asked to indicate the kind of CPD techniques that were mostly adopted by the Kwahu-East Directorate of Education in their CPD programmes. The techniques were categorized into off-the-job and on-the-job techniques. The mean and standard deviation of these techniques were computed and Table 5 presents a summary statistic of the results.

Table 5

Mean Statistics Showing the Types of CPD Techniques Adopted in Schools at Kwahu East District

CPD Technique	N	Mean	Std. Deviation
Reading	207	1.7246	.4478
Talking to colleagues	207	1.5411	.5887
Workshops	207	1.5314	.5002
Mentoring	207	1.3430	.7525
College courses (short)	207	1.1981	.3995
Lectures/Talks	207	.3285	.4708
One-on-one instruction	207	.2899	.4548
Problem-solving	207	.2657	.4428
Coaching	207	.2415	.4291
Online courses	207	.1498	.3577
College courses (long)	207	.0000	.0000
Job rotation	207	.0000	.0000

Note. *p < .05 (Significant level)
Source: Field Data (2017-2019)

Table 5 shows that Kwahu East District teachers were much more inclined to most of the in-house techniques (reading, talking to colleagues, workshops,

mentoring) as the culture have mostly been. It could be deduced that amongst the most adopted techniques, only 'workshops' and 'short colleges courses' were the off-the-job CPD techniques that were mostly used by teachers. This corroborates a study by Sloman as cited in Buckley and Caple (1996) in the United Kingdom that training delivered on the job by most organisations accounted for at least, half of the total training undertaken.

This revelation stems from the fact that the Ghana Education Service (G.E.S) has mostly been tagged as a sector relatively lacking resources and subsequently, it comes with no surprise that GES had to maximize its dividends by adopting most of these in-house training techniques that have proven relatively cheaper. Some merits of this training technique as expounded by Buckley and Caple as cited in Owusu (2011) include little loss of time during training; output of staff not adversely affected; maintenance and retention services while acquiring new knowledge and skills; as well as the use of actual situations during training. This is in line with Harris' (2000) observation that with on-the-job training, employees learn various aspects of their job while at the same time, performing actual tasks.

A common feature that emerged from the responses obtained was that occasionally there was a blend of all the techniques to cater for individual differences. The argument was that human beings are not endowed with the same learning capabilities; hence there cannot be one distinct technique that would suit all and sundry. This revelation does not agree with a previous study by Noble as cited in Owusu (2011) who reported that organisations in the same industry have similar training and staff development strategies.

To further examine the relationship between teacher qualification and the academic performance of students, the study considered an analysis of the initial and current academic/professional qualifications of teachers. In all, a total of 54.3% of teachers understudy could boast of a bachelor's degree and even some with masters of different shades. However, their impact on the academic performance of students was not felt greatly as one would have expected about their respective qualifications. This corroborates the work of Jebson and Moses (2012) which indicated that there was no relationship between schools that had qualified academic credentials and students' performance in science. This notwithstanding, the study established that 90% of teachers who currently possess university first degree in their respective subjects started teaching with initial teacher training certificates (Cert 'B', 4-year Cert 'A', Post-Secondary Cert 'A', and DBE).

Further analysis through the interview and observation conducted revealed that these categories of teachers have had an enormous quality of experience and that explains their tremendous and positive impact on students' academic performance. Thus, there has been a tremendous increase in trained teachers with corresponding higher qualifications in recent years at the basic level, a situation that was very rare even in the second cycle institutions in Ghana in the '90s and early 2000 (Ministry of Education (MoE as cited in Ossei Anto, 1999). This could be attributed to a very good staff development policy available to the GES teaching staff. The remaining 10% represents teachers who joined the service with an initial professional/academic qualification of bachelor's degrees but their influence was not much felt on students' academic performance.

There was another category of teachers representing 39.5% of the teachers under study who could also boast of the minimum teaching requirement of DBE. Here also, there was a category of 45% of these teachers who acquired the DBE through a CPD programme while in practice. The remaining 55% were trainee teachers that were turned out from the various Colleges of Education awarding DBE. It must be noted that a correlation of their impact on the academic performance of students was not significant as compared to the same DBE teachers who acquired their qualifications whiles in service.

These findings further corroborate what has earlier been discovered that the quality of teachers is not measured by the certificate obtained but can be tied to a myriad of indicators like practical experience acquired on the job, attitude to work, interest and the passion of teachers in their job, job satisfaction amongst others. There was a minority of 5.2% of teachers who could not meet the current initial teaching qualification of DBE but had various forms of qualifications like the Cert 'B', 4-year Cert 'A', Post-Secondary Cert 'A'. This category of teachers also showed a non-significant relationship with the performance of their students. It was identified that about 90% of them were left with less than 3 years to go on retirement with 10% between 4-6 years remaining for their retirement age and subsequently saw no need for any form of an upgrade in terms of qualification since it was not even rewarding.

Research question 2: What is the relationship between the number of resources available and the academic performance of students in Mathematics, English and Integrated Science at Basic schools in Kwahu-East in the Eastern Region of Ghana?

The study further sought to establish the directional relationship between the availability of resource materials and academic performance of basic schools at Kwahu-East in the Eastern Region of Ghana through the Pearson Correlation. A correlation for the data revealed that the availability or unavailability of resource materials and students' academic achievement were significantly related ($r = .72, n = 207, p = .05$, *two-tailed*). The statistic indicated showed that there was a significant positive relationship between the allocation of resources (physical/material) and the academic performance of students. Similarly, there was a negative significant relationship between the unavailability of resource materials and students' academic achievements. This finding corroborates an earlier study by Nasir et al (2020) and Fuller (1987).

In the study of science, for instance, the e*nvironment and Space* play such an important role in teaching and for that matter impacts academic performance. The picture of the environment as a resource base for the teaching of science is reflected in these two objectives of primary science:

1. To introduce the pupil to the world of science by exploration and experimentation according to his interest.
2. To develop his ability to observe things around him more closely so that he can perceive relationships among objects and phenomena.

One wonders how these stated objectives can be achieved without a well-resourced and rich environment. Thus, in operational terms, a well-composed environment will provide pupils with the opportunity to observe, examine and critically analyse events and situations as they naturally occur (Ossei-Anto, 1999). Moreover, in the study of the three subjects (Mathematics, English and Integrated Science) under investigation as in all school subjects, the community for instance can become an extension of the classroom. In integrated science, for instance, one thinks immediately of the zoo, parks, farms, the local hospital, natural resources (like rivers, streams, swamps, ponds, forest etc), factories producing various items that are used in everyday life and a lot more others. Direct experience is essential to effective learning which confirms the gainsaying that field experience provides first-hand experiences which are more lasting and worthwhile than all the classroom lectures. This finding is also in consonance with Ajayi and Ogunyemi (1990) who found that when physical and material resources are provided to meet the relative needs of a school system, students will not only have access to reference materials mentioned by the teacher, but individual students will also learn at their own pace. This undoubtedly satisfies the '*individual differences'* principle in teaching and learning. The net effect of

this is an increased overall academic performance of the entire students. This study has shown a highly significant relationship between resource allocation and the academic performance of students. However, it must be noted that 75.6% of the schools used for this study were struggling with most of the relevant and appropriate resources needed to yield the necessary and desired work output due to the central government's inability to provide them. This can largely be attributed to the students' poor performance in the said subject areas for the last three years. A further check from the educational authorities concerned revealed that the educational directorate itself has been suffocating with their activities halting momentarily occasionally due to lack of subventions from the central government. However, the study equally revealed that the situation is gradually improving and that government is doing everything possible to improve the resource situation in the various schools. The district education office for instance had in stock enough textbooks amongst other teaching and learning materials for distribution for the 2018/19 academic year.

Conclusions

The study examined the relationship between teacher qualification and resource situations on students' academic performance. From the findings, it could be concluded that, first, at a significance level of .05, there is no positive significant relationship between teachers' higher university qualifications obtained and the academic performance of the students. Second, the quality of teachers is not measured by the certificate obtained, but can be tied to a myriad of indicators which can all be encapsulated into one concept called relevant CPD. Third, there was a highly significant positive relationship between the allocation of resources (physical/material) and the academic performance of the students. Finally, resource situations still inadequate but improved during the 2018/19 academic year.

Recommendations

1. Tannenbaum (1997) assertion should serve as a blueprint in the evolution of GES CPD programmes: Tannenbaum states that: "Rather than the amount of training, it is the quality and appropriateness of the training, the supportiveness of the work environment, and the use of appropriate training policies and practices that determine how well training contributes to continuous learning*"* (p. 447).

2. With the tremendous increase in academic qualifications of teachers at the basic level which has had very little or no positive impact on students learning outcomes, GES, must consider on-the-job/in-house techniques of

CPD as an alternative to the off-the-job techniques. On-the-job techniques aside its economic benefit in terms of cost efficiency has equally proven beneficial since it focuses on practical situations, experiences and problems in the teaching and learning process. Subsequently, teachers are well equipped with practical tools and modern techniques for dealing with classroom situations.

3. In CPD, the development aspect must be given much attention. The current practice is that CPD activities concentrate mainly on training which seeks to improve the skills, knowledge and attitude of teachers towards their present task performance. However, the development component in most cases is ignored. The concept of development has a broader scope and aims at developing people in all respects. Accordingly, the development component covers not only activities/skills which improve job performance, but also those activities which bring about the growth of the personality, help individuals progress towards maturity and actualisation of their potential. Thus, development enables individuals to become not only good employees but better men and women also.

4. Due to the development component of CPD, stakeholders must ensure a well conducive and serene physical environment for teaching and learning, attractive and well-packaged incentives for performing teachers, improved salary structure that commensurates with the individual's qualification and performance.

5. The government of Ghana must ensure adequate and appropriate teaching and learning resources in the basic schools to ensure appropriate learning outcomes from students.

6. GES must also put in place adequate measures to ensure effective use and proper care of resources available to schools.

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