Exploring the impact of teacher quality on student academic achievement in primary schools

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ABSTRACT

There has been debate among scholars, policymakers, and practitioners regarding the effects of teacher quality on students' academic performance. This quantitative descriptive study seeks to determine the impact of teacher quality on students' performance and the relationship between teacher quality and student performance. Student performance was measured using regional assessments in mathematics and language arts. A survey was conducted to collect primary data from teachers, and both sets of data were analyzed using the t-test, ANOVA, and Pearson's correlation coefficient (r) to test for performance differences and relationships between student performance and teacher quality. The findings revealed no significant differences in the academic performances among students taught by trained and untrained teachers, degree and non-degree teachers, and teachers with varying years of experience and hours of professional development. The interactions of the teacher quality variables had no practical effect on student performance, and there were no significant relationships between student performance and the teacher quality variables of experience and professional development. There are implications for reorganizing or advancing teacher professional development, training, certification and licensing. The study adds to the scarce literature in the region and can guide policy development in teacher workforce planning, retention, and hiring.

Keywords: *Grenada, Primary schools, Student achievement, Teacher quality, Teacher training.*

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Highlights of this paper

- This study adds to the discourse on teacher quality and its influence on student performance.
- Most studies in this area produced mixed results; however, in this study, it is revealed that teacher quality has no impact on student performance.
- The implications of these results are for the retraining and the evaluation of the training programs for teachers.

1. INTRODUCTION

A fundamental issue that every country seeks to address is the apparent need to advance the quality of teaching and learning outcomes for all students. Researchers have contended that many educators in small developing states are not in a position to facilitate effective instruction, and many will report having shortcomings in the teaching methodology and subject matter content to develop student learning (Bold et al., 2017; Bruns & Luque, 2014; Tandon & Fukao, 2015). Interestingly, the educators who have documented education layers could not translate these qualifications into exhibiting critical academic skills and highly effective instructional practices (Bold et al., 2017; Bruns & Luque, 2014). In Grenada, and to an extent, the wider Caribbean region, this concern raises questions about the qualifications of teachers at the primary and secondary school levels. The Ministry of Education reported that less than 50% of secondary school teachers and less than 70% of primary school teachers are trained (Ministry of Education, 2019). Additionally, many teachers need the essential qualification to teach mathematics at the primary school level. Moreover, although professional development is conducted or organized by the Ministry of Education and individual schools, there needs to be clear evidence that these sessions are impactful in the classroom.

Traditionally, educational research measured teacher quality by formal qualifications and experience. Goldhaber, Lavery, and Theobald (2015) summarized that, until recently, the most widely available substitutions for teacher quality were input variables such as teacher credentials or experience. According to Toropova, Johansson, and Myrberg (2019), the characteristics suggestive of teacher quality include academic ability, years of education, teaching experience, knowledge of the subject matter, certification status, and teaching behaviors in the classroom. A large body of research has examined a unified angle of teacher quality with student outcomes or has only used certain indicators of formal competence. However, fewer studies have combined formal qualifications with perceived competence indicators, e.g., teacher self-efficacy beliefs (Toropova et al., 2019). Moreover, Scheerens and Blömeke (2016) purported that teacher quality has many aspects. Consequently, there appear to be several conditions involved in teaching used to elucidate differences in teaching practices (Toropova et al., 2019).

Although there is a substantial body of work supporting the impact of teacher quality on student achievement, there is yet to be a consensus on which of the teacher quality variables is most significant for student performance results from Scheerens and Blömeke (2016). Furthermore, Nilsen and Gustafsson (2016) explained that the correlations between teacher quality and student achievement have often been problematic to measure and comprehend analytically. Student contextual factors can often offset the impact of other constructs causing the influence of teacher quality to go unnoticed. Finally, due to teacher selection and certification rules, these variables often vary only slightly within a school system, making it challenging to identify the effects (Nilsen & Gustafsson, 2016).

Policymakers generally accept that improving teacher quality is crucial in developing students' academic achievement (Bruns & Luque, 2014). In the pursuit of improving student academic performance, policymakers, educators, and researchers frequently cite the assumption that increasing the quality of teachers is crucial to such advancement. This research investigates the relationship between teacher quality and the academic achievement of primary and secondary students in Grenada. It also examines the impact of teacher quality on students' academic achievement. For this study, teacher quality refers to the academic qualifications, teacher certification/training, years

of experience in teaching the subject area, and the hours of professional development sessions attended over the last academic year. The investigation will examine the impact that teachers' training, qualification, experience, and professional development have on student achievement in mathematics and language arts. Hence, the following research questions guided the study:

1. Are there significant differences in the academic performance of primary school students taught by i) trained and untrained teachers, ii) degree and non-degree teachers, iii) experienced, mid-career, and inexperienced teachers, and iv) teachers with varying numbers of professional development sessions?
2. Do interactions occur between the teacher quality variables affecting students' academic performance in mathematics and language arts?
3. Are there statistically significant relationships between teacher quality variables and primary school students' academic performance in mathematics and language arts?

The relationship between teacher quality (including demographic characteristics) and student performance is essential for education policy. Ensuring that the best-suited teachers who are most able to enhance student performance are employed is a crucial responsibility for policymakers. This study provides empirical evidence on which teacher characteristic impacts student achievement to guide the focus on developing quality teachers. The research seeks to determine the effect of teachers' fulfillment of the requirements of the Teacher Training College on students' performance. It further determines whether there is a direct linear relationship between teachers' years of experience and student achievement. Finally, the research determines whether the higher academic qualifications of teachers can lead to better student performance.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

An examination of the empirical studies has revealed a continuous dialogue on the influence of the qualities of teachers on student performance. Over the last decade, research has confirmed that numerous factors contribute to student achievement, but teacher quality has been the most outstanding element. On the contrary, Bruns & Luque, (2014) asserted that student factors most significantly predict student achievement. Interestingly, a critical review of the literature by Maamin, Maat, and Ikhsan (2020) on how teacher factors influence student achievement in mathematics concluded that teacher quality is the latest dominant factor that impacts mathematics achievement. (Seebruck, 2015) indicated that a large body of education literature discloses the optimistic effects of teacher quality on student achievement; however, only primary schools were represented in most of those studies but they did not use proper statistical analysis, which is most applicable to education-related data.

Goe (2007) developed a framework that captures a better understanding of teacher quality. The framework identified and defined crucial elements of teacher quality and illustrated how these elements relate to student learning. Within the framework, inputs such as teacher training, education, certification, credentials, and experience form part of overall teacher quality that impacts the quality of classroom instruction, thereby influencing student learning outcomes. Likewise, Blömeke, Olsen, and Suhl (2016) included teacher qualifications, educational background, experience in teaching, personality traits, and professional development as crucial indicators of teacher quality.

The dialogue in the current literature concerning teacher quality focuses on how teachers influence student academic learning through many variables of teacher quality, such as teachers' pedagogy, teaching experience, and qualifications. Interestingly, Ambussaidi and Yang (2019) contended that teacher quality is dynamic and multidimensional. So, continuous dialogue surrounds the conceptualization as there needs to be a consensus on a suitable and encompassing definition of the concept.

2.1. Teachers' Academic Background (Qualifications and Training)

Qualifications, subject matter knowledge, teaching experience, and pedagogical skills determine the quality of teachers. Kola and Sunday (2015) investigated teachers' quality in Nigeria using seven indicators, including qualifications and training. Their findings indicated that subject matter knowledge, pedagogy studies, professional development, and years of experience affect, and positively correlate with, students' academic achievement. In contrast, a study by Bonney, Amoah, Micah, Ahiamenyo, and Lemaire (2015) found no relationship between teachers' quality and pupils' academic performance in Nigeria's Basic Education Certificate Examination. Similarly, Lydia and Joash (2015), who carried out a study in Kenya, indicated that even though the performance scores of students taught by post-graduate teachers were much higher than those of their counterparts, there was no significant difference between the performance scores of the two groups.

Gustafsson and Nilsen (2016) reported results showing that the level of education that teachers attained affected students' mathematics achievement. The study by Toropova et al. (2019) demonstrated a positive relationship between teachers' content knowledge and students' achievement in mathematics. These findings are in line with other studies on the critical nature of teacher–subject familiarity for pupil education.

In contrast, Ambussaidi and Yang (2019) showed that teacher qualification variables regarded as indicators of teacher quality, such as teachers' highest level of formal education and majoring in mathematics, were not associated with student achievement in Oman and Taiwan. Although Coe, Aloisi, Higgins, and Major (2014) argued that teachers with strong subject knowledge significantly impact pupils' learning, Gustafsson and Nilsen (2016) study found that major academic discipline studies did not affect student achievement.

Concerning teacher training, Ikram, Hameed, and Imran (2020) found a significant effect on student academic performance and revealed a strong association with students' academic achievement. Similarly, a study by Seebruck (2015) in the US found that teacher credentialization positively affected both state-issued reading and mathematics examination measures of student achievement.

2.2. Teachers' Professional Background

Teacher quality includes professional development, which incorporates certification and training. Teacher professional development programs aim to assist educators in acquiring content and aptitudes in various subject areas, developing effective pedagogy and enduring positive attitudes and high standards to deliver constructive education (all of which significantly positively affect student achievement (Bold et al., 2017). Darling-Hammond, Hyler, and Gardner (2017) defined effective teacher professional development as learning that occurs from externally provided and job-embedded activities that assist teachers in modifying their pedagogy to support student learning**.** Loyalka, Popova, Li, and Shi (2019) acknowledged that although government spending has mainly contributed to pedagogy development in emerging states, there needs to be more evidence of their effectiveness. They found that in a randomized evaluation of a national professional development (PD) program in China, precise estimates indicated that pedagogy development and related interpositions still needed to meet the requirements to fulfil education demands after one year. The conclusions drawn support the view that the fundamental connections show that educators find PD subject matter highly irrelevant and PD delivery too repetitive and outdated to be valid.

Additionally, Ambussaidi and Yang (2019) concluded that while teacher participation in professional development activities shows positive and significant effects on student learning in Oman, it has non-significant effects on student learning in Taiwan. Interestingly, Gustafsson and Nilsen (2016) also noted the considerable impact of professional development on student learning.

2.3. Teacher Years of Experience

Toropova et al. (2019) suggested that increases in teaching experiences do not proportionately relate to increases in student achievement. Their findings indicate that the effect of teacher experience on student learning can be optimal for up to nineteen years of experience. This finding is consistent with recent findings by Papay and Kraft (2016), who challenged the prevalent conception among teachers that a "performance plateau" is reached after just a few years in service. Canales and Maldonado (2018), Ayieko, Kanyongo, and Nelson (2018), and Nkrumah (2018) also support the view that teacher experience has a non-linear relationship with student achievement. Conversely, at the junior high school level in the US, Sirait (2016) found that teacher experience and educational background did not correlate with student achievement.

Furthermore, Ambussaidi and Yang (2019) found that the number of years of teaching experience is positively and significantly associated with student achievement in Taiwan. This finding verifies that teachers' years of experience positively affect student learning. However, Gustafsson and Nilsen (2016) indicated that teaching experience did not affect student achievement. They also found no correlation between years of experience and student achievement in Oman.

3. METHODOLOGY

The research was approached from a quantitative perspective using a cross-sectional analysis of secondary data compiled by the Ministry of Education on the Caribbean Examination Council students' results at the Caribbean Primary Exit Assessment (CPEA) at the primary school level. Primary data were collected from the schools using a questionnaire designed to quantify the demographic characteristics of Grade Six teachers. This method makes provisions for using examination scores already collected from a large-sized population and generalizations for future references (McMillan & Schumacher, 2010).

3.1. Population and Sampling

A simple random sample of 38 schools representing 72% of the overall school population was selected. This sample comprised 1155 students, representing 69.6% of the student population. A cohort of primary school students who wrote the external component of the CPEA examinations in language arts and mathematics and their teachers make up the study population. A total of 62 teachers were included in the sample.

3.2. Variables and Data Analysis

For this study, teacher quality comprises training, an academic degree, teaching experience, and hours of professional development completed the previous year. Categories of teaching experience on a scale were created for different analytical purposes. These categories are experienced teachers with over 20 years of teaching experience, mid-career teachers with 11 to 20 years of teaching experience, and novice teachers with less than 11 years of teaching experience. Similarly, categories of professional development are high-level PD teachers who completed over 34 hours of PD, medium-level PD teachers who completed 17 to 34 hours of PD, and low-level PD teachers who completed less than 17 hours of PD. Student academic achievement in mathematics and language arts was measured using the students' external CPEA results.

The analysis used descriptive statistics (means, standard deviations, and percentages) and inferential statistics, including the t-test for independent samples, one- and two-way analyses of variance (ANOVA), and Pearson's product moment correlation using the Statistical Package for the Social Sciences (SPSS) version 19.

3.3. Ethical Consideration

The research considered personal issues and the disclosure of the identity of the students and their teachers. It was ensured that the necessary steps were taken to protect the integrity of the data collection, storage, and management processes. Alphanumeric codes identified the teachers, and registration numbers identified the students.

4. FINDINGS

4.1. The Sample

The study participants, representing 69.6% of the population, were taken from a cohort of 1155 Grade 6 students who took Primary Exit Examinations in mathematics and language arts in Grenada. Of the 1155 students in the study, 55.5% were male and 44.5% were female. Regarding the mathematics students, those who were taught by trained teachers represent 76.8% of the sample, and 38.7% represents students taught by teachers with degrees. A total of 40.9% were taught by experienced teachers, 37% by mid-career teachers, and 22.2% by novice teachers. In addition, teachers who completed a high level of PD taught 9.1% of the sample, teachers who completed medium-level PD taught 25.2%, and teachers who completed a low level of PD taught 65.7% of the sample.

Regarding language arts students, trained teachers taught 83.1% of the sample, and 28.3% represents students taught by teachers with degrees. Experienced teachers taught 49% of the language arts sample, 33.3% by mid-career teachers, and 17.7% by novice teachers. In addition, teachers who completed a high level of PD taught 9.1% of the language arts sample, and teachers who completed medium-level PD taught 28.3%. Teachers who completed a low level of PD taught 62.6% of the language arts sample.

4.2. Impact of Teacher Quality on Student Performance

After obtaining the performance scores of the primary school students, the t-test for independent samples determined whether there were differences in the scores of students taught by i) trained and untrained teachers and ii) degree and non-degree teachers in mathematics and language arts. Table 1 displays the mean and standard deviation (SD) scores.

Table 1. Students' mean and standard deviation (SD) scores based on teacher quality.

Teacher quality		Mathematics			Language arts		
		N	Mean	SD	N	Mean	SD
Training	Trained teachers	887	35.89	10.75	960	47.47	12.93
	Untrained teachers	268	35.97	9.92	195	48.96	12.98
Qualification	Degree teachers	447	36.15	10.91	327	47.87	13.65
	Non-degree teachers	708	35.75	10.34	828	47.66	12.66
Experience	Novice teachers	256	34.73	9.74	204	47.81	13.12
	Mid-career teachers	427	35.84	10.17	385	47.12	13.09
	Experienced teachers	472	36.60	11.27	566	48.09	12.78
Professional development	Low level	759	35.67	10.75	723	47.57	13.0
	Medium level	291	36.76	9.81	327	48.27	12.57
	High level	105	35.27	11.16	105	47.02	13.70

The findings indicate that the students taught by untrained teachers have higher mean scores than those taught by trained teachers. They also reveal that the students taught by teachers who possess an academic degree have higher mean scores than those taught by teachers who do not possess an academic degree. However, there were no significant differences in the students' performances based on teacher training. These findings suggest that the teacher quality variables of training and academic qualifications do not impact students' academic performance.

Table 1 also presents the academic performance of the students in mathematics and language arts based on teachers' years of experience and hours of professional development completed. The one-way between-group ANOVA revealed no significant differences among the mean scores of the students taught by teachers with varying years of experience and hours of professional development. These results further support the notion that teacher quality has no impact on the students' academic performance.

4.3. Interactions Among Teacher Quality Variables and Student Performance

A two-way between-group analysis of variance determined the interactions among teacher quality variables on the students' performance in mathematics and language arts. The students' mean and standard deviation scores based on teacher quality variables are displayed in Table 2a and Table 2b.

Table 2a. The mean and standard deviation scores of students based on the interaction effects of teacher training.

Teacher quality variables		Mathematics			Language arts		
		Mean	SD	N	Mean	SD	N
Trained teachers	Degree teachers	36.48	11.26	343	48.13	13.77	259
	Non-degree teachers	35.51	10.41	544	47.22	12.60	701
Untrained teachers	Degree teachers	35.06	9.64	104	46.87	13.25	68
	Non-degree teachers	36.55	10.08	164	50.09	12.74	127
Trained teachers	Novice teachers	32.70	8.16	64	45.55	11.98	64
	Mid-career teachers	35.81	10.37	369	47.33	13.37	348
	Experienced teachers	36.40	11.31	454	47.78	12.75	548
Untrained teachers	Novice teachers	35.41	10.14	192	48.85	13.52	140
	Mid-career teachers	36.02	8.91	58	45.14	9.98	37
	Experienced teachers	41.83	9.21	18	57.72	10.10	18
Trained teachers	Low-level PD	35.36	10.79	599	47.08	12.97	599
	Medium-level PD	36.94	10.29	205	47.87	12.70	278
	High-level PD	37.07	11.43	83	48.94	13.35	83
Untrained teachers	Low-level PD	36.82	10.54	160	49.97	12.93	124
	Medium-level PD	36.33	8.60	86	50.55	11.67	49
	High-level PD	28.45	6.72	22	39.77	12.85	22
Degree teachers	Novice teachers	32.74	8.44	106	45.33	14.040	55
	Mid-career teachers	34.80	10.04	201	42.32	12.80	120
	Experienced teachers	40.69	12.29	140	53.16	12.15	152
Non-degree teachers	Novice teachers	36.15	10.36	150	48.73	12.69	149
	Mid-career teachers	36.77	10.23	226	49.29	12.65	265
	Experienced teachers	34.88	10.37	332	46.23	12.52	414
Degree teachers	Low-level PD	36.57	10.95	424	48.71	13.68	269
	Medium-level PD	30.00	.	1	46.53	12.42	36
	High-level PD	28.45	6.72	22	39.77	12.85	22
Non-degree teachers	Low-level PD	34.53	10.39	335	46.90	12.54	454
	Medium-level PD	36.78	9.82	290	48.48	12.60	291
	High-level PD	37.07	11.43	83	48.94	13.35	83

Table 2b. Students' mean and SD scores based on the interaction effects of teachers' personal development.

Teacher quality variables		Mathematics			Language arts		
		Mean	SD	N	Mean	SD	N
Low-level PD	Novice teachers	35.39	10.15	178	48.84	13.02	163
	Mid-career teachers	35.05	9.93	235	43.94	12.54	155
	Experienced teachers	36.23	11.55	346	48.45	12.94	405
Medium level PD	Novice teachers	35.11	8.57	56	48.32	11.53	19
	Mid-career teachers	36.60	9.61	109	49.45	12.90	147
	Experienced teachers	37.63	10.44	126	47.19	12.37	161
High-level PD	Novice teachers	28.45	6.72	22	39.77	12.85	22
	Mid-career teachers	37.07	11.43	83	48.94	13.35	83
	Experienced teachers	-	-	-	-	-	-

For mathematics, the interaction effects between training and degree [F (1, 1151) = 2.677, p = 0.102], training and experience [F (2, 1149) = 1.759, p = 0.173], and experience and professional development [F (3, 1147) = 3.676, p = 0.012] were not significant. However, significant interactions were found for training and professional development [F (2, 1149) = 1.759, p = 0.001; μ = 0.012], degree and professional development [F (2, 1149) = 8.49, p ≤ 0.0005, μ = 0.015], and degree and experience [F (2, 1149) = 20.285, p ≤ 0.0005, μ = 0.034], but the effect sizes were too small.

Similarly, concerning language arts, the interaction effects between training and degree [F (1, 1151) = 2.677, p = 0.102], training and experience [F (2, 1149) = 1.759, p = 0.173], and experience and professional development [F (3, 1147) = 3.676, p = 0.012] were not significant. Significant interactions were found for training and professional development [F (2, 1149) = 1.759, p = 0.001; μ = 0.012], degree and professional development [F (2, 1149) = 8.49, p ≤ 0.0005, μ = 0.015], and degree and experience [F (2, 1149) = 20.285, p ≤ 0.0005, μ = 0.034], but all the effect sizes were too small. The size of the effect indicates the practical or theoretical significance of the difference between means. It is easy for a test of significance to find a slight difference between statistically significant means if the sample size is large.

4.4. Relationship Between Teacher Quality and Student Performance

The Pearson product moment correlation (r) determines the relationship between student performance and teacher quality. Table 3 depicts the correlation matrix, which reports a low, indirect relationship between mathematics students' performance and teachers' professional development, which was insignificant at the 0.05 level (r = -0.027, p = 0.353, n = 1155).

A low, direct relationship was found between mathematics students' performance and teaching experience, which was not significant at the 0.05 level (r = 0.004, p =0.897, n = 1155). Regarding language arts, Table 3 indicates a low, indirect relationship between student performance and teachers' professional development, which was insignificant at the 0.05 level (r = -0.043, p = 0.14, n = 1155), and the relationship between student performance and teaching experience was also not significant at the 0.05 level (r = -0.044, p = 0.133, n = 1155).

Table 3. Correlation matrix for teacher quality and student performance.

Variable	Student performance	Teacher experience	Professional development
Student performance	**X**	-0.044	-0.043
Teacher experience	0.004	**X**	-0.18
Professional development	-0.027	-0.137	**X**

Note: N = 1155. Mathematics results are displayed below the diagonal, while the language arts results are above the diagonal.

5. DISCUSSION

The study's findings indicate that the academic performance of the students taught by teachers who possess quality characteristics of training, experience, qualification, and professional development were similar to those taught by teachers who did not possess these characteristics. The interactions of the teacher quality variables had no practical effect on student performance, and there were no significant relationships between student performance and the teacher quality variables of experience and professional development. These results are surprising and are contrary to the findings of extant literature and studies on the impact of teacher quality on student learning, as the literature supports the impact of teacher quality on student performance. Seebruck (2015) stated that there is sufficient empirical evidence on the impact of teacher quality on students, while Maamin et al. (2020) found that teacher quality influenced the achievement of mathematics students. Ikram et al. (2020) confirmed that teacher training had a significant effect on student academic performance and, in contribution to earlier research, revealed a strong association with student

academic achievement. Similarly, Seebruck (2015) found that teacher credentialization positively affects both state-issued reading and mathematics examinations measures of student achievement in the US. Furthermore, a study in Nigeria by Kola and Sunday (2015) revealed that teacher training, qualification, professional development, and years of experience are imperative and positively correlated with students' academic achievement.

Additional studies of the impact of teacher quality on student performance are needed to offer greater support for the findings of this study as this area of research has produced mixed results. Sirait (2016) found that teacher experience and educational background did not correlate with student achievement. Loyalka et al. (2019) acknowledged that, despite massive investments in professional development programs for teachers in developing countries, there needs to be more evidence of their effectiveness. Gustafsson and Nilsen (2016) found that the major academic disciplines studied and years of teaching experience did not affect student achievement. Furthermore, the works of Bonney et al. (2015) in Nigeria and Ambussaidi and Yang (2019) in Taiwan concluded that teacher quality did not affect student performance.

Primary school teachers in Grenada must be included in deliberations regarding the nature and the relevance of the training, professional development, and degree programs. These programs likely need to be more relevant to instruction in schools, which will, in turn, generate improved student learning and higher academic performance. There has been speculation in the Grenadian education arena that the training program at the Teachers College needs revamping. In addition, teachers need to transfer the knowledge and skills acquired from degree, professional development, and training programs to practical use in the classrooms where they will facilitate learning. Bold et al. (2017) accentuated that in developing countries, even though teachers possess certification and qualifications in teaching, many have yet to translate this training into practical results in the classroom. This may explain why the teachers produced similar student performance results despite having training, degrees, more years of experience, and more hours of professional development. There is a likelihood that the teachers resorted to their modus operandi before training, professional development, or earning their academic degree as they spend many years in the classroom before attending training college or getting a degree from a recognized institution. Moreover, their teaching practices are similar to those who have yet to receive training or a degree. On the contrary, it could mean that the high percentage of trained teachers in primary schools impacted the lower grades, influencing the overall development of the students, which minimizes the differences in student performance based on variations in teacher quality. This contention adds to the debate on the impact of teacher quality on student performance issues.

Nilsen and Gustafsson (2016) explained that the relationship between teacher quality and student achievement has often been challenging to quantify and understand empirically. Another plausible explanation posits that other variables, such as student and parental influences, can impact student performance. The influence of the characteristics brought by students may offset the impact that the elements of teacher quality may have on learning, causing these elements to be less noticeable.

6. CONCLUSION

The study's findings imply that teacher quality does not have an impact or share a significant relationship with student performance. While the findings contradict the literature, in some aspects, it adds to the discourse that there are mixed results regarding the issue. However, it is somewhat surprising to find that the teacher characteristics of training, qualification, years of experience, and hours of personal development completed have no impact on student achievement. In a Grenadian context, expectations are for schooling to have an impact on students' learning, and teacher quality is assumed to have the most significant impact. Moreover, what is instructive is that the programs that aim to add value to teachers and teachers taking the time to improve their instructional quality are worthy of

further investigation. It is also essential to consider whether the findings of this study will agree with other studies done in the Caribbean on the impact of teacher quality on student achievement.

The study's findings have policy implications for evaluating teacher education in Grenada. This includes suggestions to review the Teachers' College Education Programme and to monitor and evaluate the PD programs offered to schools. It may be helpful to make the Teacher Education and PD programs more relevant by including technology in teaching or facilitating online learning. A review of the concept of graduate teachers in the Grenadian education school system is also suggested. The Ministry of Education needs to consider whether the degrees possessed by teachers are relevant to classroom instruction along with the tangible benefits associated with the qualification. There are further implications for policy development, such as establishing teacher training as a prerequisite for hiring and including a licensing structure or retention program for teachers who are required to update their training on a regular basis.

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