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In Pursuit Of Equity And Excellence: Using Value-Added Measures To Guide Educational Policy, Practice, And Parental High School Decision-Making

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IN PURSUIT OF EQUITY AND EXCELLENCE: USING VALUE-ADDED MEASURES TO GUIDE EDUCATIONAL POLICY, PRACTICE, AND PARENTAL HIGH SCHOOL DECISION-MAKING

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Dedication

I dedicate this study to the one who has been there for me at every step of my journey, through the challenges of getting to William & Mary, completing the Ph.D., and keeping me sane through it all. To the one who has conquered it all!

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Abstract

This study focused on the performance of students from traditional and nontraditional high schools in Jamaica and the value-added to student outcomes. The student considers issues of excellence and equity as it relates to the student's performance. An extant database was used with student examination results for the Grade Six Achievement Test (GSAT) and Caribbean Secondary Examination Certificate (CSEC) from 2001 to 2019. The study used three value-added models in the analysis. The CSEC Quality Score was the outcome variable used for all three models, with the GSAT score being the main predictor and sex, GSAT cohort, parish, and percent of students achieving the CSEC certificate being the control variables. The study found that students at nontraditional high schools generally had lower outcomes than expected based on their GSAT performance. Analyzing school performance using value-added methods allowed for a reexamination of what excellence means for schools and allowed some schools to shatter the perception of being of low quality. The results yield educational policy, practice, and parental high school choice recommendations.

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Chapter 1: Introduction

Background

Education is important for national development, with some social scientists and scholars arguing that a sound education system is vital for building a democratic society (Ornstein & Hunkins, 2017; Stanley, 2009). The importance of education to Jamaica's national development is outlined in the country's Vision 2030 national master plan that sets out targets for Jamaica to become a developed country by 2030. The plan acknowledges the importance of a well-educated citizenry as a crucial element for sustained economic growth and national development (Ministry of Education, Youth, and Information [MOEYI], 2009; Planning Institute of Jamaica, 2010). Despite the lofty goals of the plan, the country lags in many ways in terms of the quality of the education system that is essential to achieving the goals set out in the plan (Caribbean policy Research Institute [CAPRI], 2014). Structural inequity built into the Jamaican education system is partly to blame for the lack of progress toward meeting the development goals (CAPRI, 2014; S. Gordon, 1958; Pearse, 1956).

Structure of the Jamaican Education System

The MOEYI oversees the Jamaican education system through the *Education Act and Regulations of 1980*. The MOEYI is directly responsible for all public education institutions. It also provides some oversight of private institutions at all levels through its agencies, such as the Early Childhood Commission and the University Council of Jamaica (MOEYI, 2022). The country has four education levels and is similar in many respects to the British education system: early childhood, primary, secondary, and tertiary levels. The system's structure and student

enrollment numbers based on the 2018–2019 census are outlined in Table 1. The academic year 2018-2019 gives the most recent accurate picture of the numbers as the Covid-19 pandemic saw many students unable to access the education system; therefore, numbers from subsequent years would not be reflective of student enrollment.

Table 1

Structure of the Jamaican Education System: 2019 – 2018 Census

Educational Level	Institutions	Age	Grades	Enrollment		
				Male	Female	Total
Early Childhood	2,207	3 - 5	Pre-K - K	47,715	47,339	95,054
Primary						
Preparatory (Private)	161	6 - 11	1 – 6	12,099	12,056	24,155
Primary (Public)	760			104,435	99,075	203,510
Secondary						
Lower	213	12 - 14	7 - 9	102,178	104,507	206,683
Upper		15 - 16	10 - 11			
Pre-University (Sixth Form)		17 - 18	12 - 13			
Independent Schools (Private)	31	17 - 18	7 - 13	3,100	2,000	5,100
Special Education						
Public	23	6 - 18		1,903	1,107	3,010
Private	13			684	432	1,116
Tertiary	2,908	16+		285,391	292,921	578,312

Note. Information adopted from "The Reform of Education in Jamaica, 2021" by Orlando Patterson (2021). Independent Secondary Schools are private high schools that come under the oversight of the Ministry of Education but not directly. Pre-Universities exist in both traditional and nontraditional high schools. They are schools with an additional 2 years, Grades 12 and 13.

Students generally enter the public education system at the early childhood level at 3 years old. This level is considered the preprimary level, after which students are promoted to the primary level, usually at age 5. Students are served by primary schools from Grades 1-6, similar to the first through sixth grades in the US system, where they pursue an integrated curriculum of

Mathematics, Language Arts, Sociology, and Science (D. Miller, 2017; MOEYI, 2022; Patterson, 2021). Students first encounter a national standardized assessment in Grade 4 called the Grade Four Literacy and Numeracy test (MOEYI, 2022).

Primary Level. Students transition from the primary level to high school. Schools at the primary level generally offer education to students ages 5 to 12 from Grades 1–6 and are equivalent to elementary schools in the US. Sometimes, a public primary-level school has students from ages five to fourteen and goes from grades one to nine. These schools are called All-Aged Schools or Primary and Junior High Schools. Private primary-level schools are called preparatory, and government-run primary-level schools are called primary. Students take the Primary Exit Profile (PEP) examination to enter high school.

The Grade Six Achievement Test (GSAT) is a curriculum-based test that assesses Grade 6 content in Mathematics, Science, Social Studies, and Language Arts. PEP replaced GSAT in 2020, but the onset of Covid-19 hampered its rollout. PEP consists of three key components: (a) a *performance task*—completed in Grades 4, 5, and 6 administered by the classroom teacher requires students to apply their content knowledge to real-world problems; (b) the *ability test*—completed in Grade 6 and is not curriculum based but requires students to use their reasoning skills; and (c) the *curriculum-based test*—assess the same areas as GSAT (MOEYI, 2017). Like the GSAT exam before it, students are ranked based on their performance on the PEP. Before sitting the PEP exam in Grade 6, parents must register their student for the exam and select seven high schools in order of preference. The first five schools are to be selected in order of priority, with the remaining two schools being close to where the student currently attends primary school. The PEP exam is open to students from primary and preparatory schools. Students are placed in their high school of choice, with priority given to those students ranked higher

(MOEYI, 2017, 2022). Many parents list traditional high schools as their preference due to their strong history of exemplary performance.

Secondary Level. Unlike in the US, where secondary education is split between middle and high schools, high schools in Jamaica serve students from Grades 7 to 11 in most cases, with some schools offering an additional 2 years of grammar-styled education called sixth form (Grades 12–13; MOEYI, 2022; Trines, 2019). Sixth form prepares students for university and is normally pursued by the more academically gifted students. Only 35% of the 40,000 students who successfully complete Grade 11 go onto sixth form (M. Martin, 2022; MOEYI, 2020).

Although there is no distinction between high and middle schools in Jamaica, high schools generally operate on two levels: lower school Grades 7–9 and upper school Grades 10-11-13, depending on the institution. In some instances, Grades 7-9 are offered in a primary school context called All-aged schools. The government is working to phase out these institutions and allow all students to complete their secondary education at a high school. Currently, there are 31 such schools (MOEYI, 2022). At the end of Grade 11, most students sit a set of regional examinations administered by the Caribbean Examinations Council (CXC) called the Caribbean Secondary Examinations Certificate (CSEC). Students typically sit for five to nine CSEC subjects, and they are used as the first job market certification for students. Students sit for additional CXC examinations in Grades 12-13 called the Caribbean Advanced Proficiency Examinations (CAPE). CAPE is similar to Advanced Placement courses in the US. CAPE and CSEC are used by students to matriculate into three-year universities in the Caribbean and the UK or to apply for college credits in the US and Canada. The expectation for Jamaican students set by the MOE is that they graduate high school, achieving at least a pass (Grade I-III) in five CSEC exams (MOEYI, 2020).

Tertiary Level. At the tertiary level, students who successfully complete high school may pursue advanced degrees, diplomas, or certificates in various disciplines. The country has diverse public and private institutions providing many student options. The institutions include the three leading universities in the country, the University of the West Indies, the University of Technology, and the Northern Caribbean University. There are also offshore institutions with campuses and departments located in Jamaica. Tertiary institutions are accredited by the University Council of Jamaica (D. Miller, 2017; MOEYI, 2022; Patterson, 2021).

Issues of Quality Education in the Jamaican Context

As a small island developing state, Jamaica achieved universal primary education in 1978 following reforms in the 1970s, long before the UN millennium development goals established this target (Planning Institute of Jamaica, 2010). However, maintaining this high enrollment at the upper secondary and tertiary levels remains one of the country's greatest challenges (CAPRI, 2012; MOEYI, 2009). Many young Jamaicans leave school at around 16 without achieving the CSEC certificate, which is essential for access to an office-type job and matriculation to college (CAPRI, 2012). The underperformance of boys and the increasing disparity in educational outcomes based on socioeconomic status (SES) continue to be a considerable concern for many in the country. To address some of the inequality in performance between social classes, the government has spent a significant amount of the country's Gross Domestic Product to tackle the problem. One of the steps taken is to address the gap in spending between the early childhood and tertiary levels (MOEYI, 2022). Though there has been some improvement in educational outcomes, students' performance at the secondary level does not reflect the level of spending as high achievement is concentrated in the traditional (elite) high schools (CAPRI, 2014; Sewell & Henry-Wilson, 2021). For example, passes in CSEC mathematics remained the same at 38.2%,

while English passes moved from 66% to 69.9% in 2022 (“Get into the CXC Data,” 2022; Loop News, 2022; Luton, 2015).

The percentage of students who achieve the CSEC certificate (percent CSECC) is used to measure the quality of Jamaican schools used by the government, scholars, parents, students, and the public. Its use is because of its currency in providing job readiness certification for non-degree job seekers and, as stated before, entry to university. It has become the de facto standard in assessing the educational outcome (measurement of quality) of schools on the island (Knight & Rapley, 2007; Sewell & Henry-Wilson, 2021). Students enrolled to take a CSEC subject are said to sit the subject. Despite the importance of the CSEC certificate, students in some schools are not even given the opportunity to sit for the requisite number of subjects exams, with statistics showing that in 2010 only 53% of Grade 11 students sat for four or more subjects (CAPRI, 2012). Some students are not allowed to sit the required number of subjects as school administrators do not believe they will succeed. Some scholars have argued that students' performance in attaining the CSEC certificate is directly related to their school (CAPRI, 2014). It would also not be surprising to know that most students from low SES backgrounds are concentrated in poorer-performing schools (Beckles, 2016; D. Miller, 2017; Universal Service Fund 2018).

In Jamaica, students from a high SES background are 8 times more likely to attend college than those from a low SES background. A study conducted by the thinktank CAPRI found that at the current level of improvement, it will not be until 2036 before every Grade 11 student is able to achieve the CSEC certificate and be eligible for college (CAPRI, 2012). Given this outlook, many parents continue pushing their children hard on the GSAT examinations and

now PEP by sending them to extra classes, sometimes up to 7 days per week, to secure a coveted space in one of the elite traditional high schools (D. Miller, 2017).

Many debates have been about using high stakes testing, such as student outcomes on the CSEC exam, as a quality measurement (CAPRI, 2014; “Get into the CXC Data,” 2022). In the Jamaican system, as described earlier, such high stakes standardized exams occur in Grades 4-6 and 11-13 (MOEYI, 2022). Advocates of these quality measures argue that they foster accountability among schools and teachers by helping them focus on more precise targets for student learning allowing administrators to monitor performance and redirect resources where needed to achieve meaningful outcomes (Lewis, 2010). The benefits are also for students and parents because they have clearer expectations and may become more motivated to push for higher achievement. The assessments also allow all students to be measured using the same standard and, therefore, a more consistent assessment of the education system (CAPRI, 2012).

CAPRI (2014) highlighted that opponents of high stakes testing argue that these types of assessment have been used for a long time, dating back to the Common Entrance Examinations at the primary level and the British General Certificate Examination in the 1950s. Despite their enduring presence, little evidence has been of their effectiveness in leading to student performance change (CAPRI, 2012). They argue that the exams allow schools to cheat by limiting the number of subjects students can take and only sending their best students forward for exams. An example of this is seen in the data on the number of students allowed to sit the requisite number of subjects for the CSEC certificate. The assessment also creates undue stress on students and parents trying to get one of the coveted spots (CAPRI, 2012).

Exams by themselves are an imperfect measure of quality and, as discussed in Chapter 2, are not the best means of assessing whether a school is a quality school. Students' performance

on an exam can be affected by several factors that have nothing to do with their ability. These factors include limited resources, SES background, out of school learning, and prior attainment (Alexander et al., 2001; Downey et al., 2004, 2008). Therefore, using this measurement of quality may falsely inflate the contribution that certain elite schools make to their students who already came to them with a high standard of performance (Clerkin, 2016; Van De Gaer et al., 2009; Van Landeghem et al., 2002). It may also undervalue the excellent work that is going on in many nontraditional schools that receive students at a lower starting point and are able to help them improve their performance and do well on the CSEC exams even if they do not meet the CSEC certificate. A better way is needed to measure school quality than this traditional approach.

Parent Choice

On paper, parents have a considerable say in their child's high school. However, it is more of a choice for parents from high SES backgrounds than it is for parents from low SES backgrounds. Parents may not have access to reliable information about quality, with many acting on reputational information that may not map closely to relevant school differences that can benefit their students (Holme, 2002). Given that schools' social backgrounds are associated with student achievement at the individual level, schools serving more advantaged groups will appear better by absolute achievement.

Many students from low SES backgrounds have no chance of getting into many of the elite schools based on deficiencies in their learning, leading to lower performance on standardized exams. They end up at one of their last seven choices due to their low performance on GSAT or PEP. Evaluating schools on the limited data available to parents may be misleading about the benefits a school offers, particularly for low achieving students (Beuermann &

Jackson, 2022). Some evidence in the US context suggests that families from higher SES backgrounds are better able to distinguish schools based on the perceived needs of their students than parents from low SES backgrounds who simply use the artificial standard of quality (Billingham & Hunt, 2016). However, in the Jamaican context, rather than all parents simply selecting schools based on their historical background of being a traditional school would it be better to match students to schools based on the need of the student and the strength of the school to provide for that need? This matching might benefit children of parents from low SES backgrounds since they often do not have the scores to get into elite schools. Ultimately, the goal should be to improve the quality of all educational institutions. However, in the interim, parents having information about the ability of schools to help students make progress based on their starting point can be beneficial in making school decisions.

Problem Statement

Jamaica has come a long way from its poor developing country status and is now classified as an upper-middle-income country in Latin America and the Caribbean region (United States Agency for International Development, 2022). Jamaica is ranked 11 out of 27 countries in the region and 39 out of 180 countries in the world in terms of total net enrollment rate at the primary level at 82.84%. It has a completion rate of 81.98% at the upper secondary level, which is 22 out of 26 countries in the region and 92 out of 156 countries worldwide. It has a relatively low adolescent out-of-school percentage of 5.55% (% of lower secondary school-age children who are out of school) which is relatively low compared to the world average of 14.89% and the regional average of 9.54%. The country spends 21.68% of its GDP on primary education compared to the regional average of 16.53%. It also spends 29.73% of GDP per student at the

secondary level compared to 18.19 in the region and 19.21% in the world (United States Agency for International Development, 2022).

Jamaica looms large on the world stage in many respects, but there are also many challenges, including high unemployment and lackluster growth (United States Agency for International Development, 2022; Planning Institute of Jamaica, 2010). Challenges also exist in the education system, where some schools produce students that are as good or even better than others in the world. At the same time, many others are of poor quality, as articulated by Patterson (2021). Jamaica participated in Program for International Student Assessment (PISA) for the first time in 2022 (PISA, 2023). Despite the significant investment in education, the country lags behind others in the region in terms of student achievement. The country has also fallen behind its own student achievement target of 60% of students attaining the five CSEC standard (often referred to as the CSEC certificate) by 2015, having only 38.6% of the grade 11 cohort achieving this standard with this number only increasing to 40% in 2022 ("Get into the CXC Data," 2022; Luton, 2015; M. Martin, 2022). With only approximately 40% of students who sit the CSEC exam achieving job workplace entry-level certification, many parents are desperate to send their child to the 'right' high school. This number is even starker when broken down by school type, with only 0.0095% of nontraditional high schools reaching this 40% mark, while 88% of traditional high schools have 40% or more of their students achieving the standard (Patterson, 2021). Providing additional information about school quality will aid parents in listing their schools of choice when entering students for the PEP exam at the primary level.

The Purpose and Significance of the Study

As discussed earlier, the significant investment made by Jamaica in the public education system makes the issue of school quality and school effectiveness particularly important and a

matter of national interest. While there have not been many studies assessing the performance of high schools, one significant study considered value-added measures as a tool for assessing school quality (Patterson, 2021). This Patterson report was significant in that it was one of the first studies to look at the performance of Jamaican high schools by attempting to separate the value added by the school from the other external factors. The study used the students' performance on the CXC exams to evaluate their performance against their intake performance on GSAT.

Chapter 2 discusses the deficiencies in how the Patterson report conducted the analysis, but I will provide a summary here. The approach by the team failed to acknowledge differences in the quality of the performance of the students on the CXC exams though quality was a key measure in evaluating the GSAT performance at entry. Campion College has an average GSAT student performance of 97%, simply looking at the number of students who passed five or more CXC subjects in Grades I -III delineate quality in a coarse manner. A more precise, or fine-grained, measure of quality would consider the particular scores of the students, not just their level of meeting the criterion. How many students got ones, how many got twos, and how many got threes will give a better picture of the quality of the performance of these students. The information provided by the Patterson report, though useful, did not provide enough information that would be helpful to parents in deciding on which school would be better to send their child to based on the child’s current level of attainment overall or in specific subject areas. Providing information on the overall value-added to student outcomes by the schools on the CSEC exam and the value-added to student outcomes in key subject areas, the study intends to provide additional information to help parents make school decisions.

Theoretical Framework

The study is framed generally through an education equity and excellence lens. Educational equity is the provision of the resources a child needs to develop completely academically and socially (Amadeo et al., 2021; Sammons, 2007). Providing resources equally to all students is not enough to achieve equity. Equity involves (a) working to ensure that student outcomes are not correlated to social or cultural factors; (b) the examination of biases and removing structural inequitable systems and practices by creating inclusive and multicultural environments; and (c) giving scope for the unique abilities, gifts, and interest of every student to be developed (Amadeo et al., 2021). The OECD argues that two essential dimensions must be considered when looking at educational equity: fairness and inclusion. Fairness ensures that personal and social circumstances do not hamper a student's educational potential. These personal and social circumstances include gender, ethnic background, or socioeconomic status. Inclusion ensures that a basic minimum acceptable standard of education is provided for all. Inclusion also involves providing additional support and resources to those students who need it. While equality in education focuses on ensuring all students have the same opportunities and chances to succeed, equity takes it a step further by ensuring students get what they need to succeed, not just the same as everyone else (Blankstein et al., 2016; Littky, 2016). Providing the same level of support and funding creates equality which is better than discrimination; however, equality is not enough if students who are at a lower level of performance are to rise to a high level (Organization for Economic Cooperation and Development, 1996, 2012, 2021). A fundamental problem with the Jamaican education system today, particularly at the high school level, is the inequity in the system seen in traditional and nontraditional high schools. The two types of schools receive similar funding from the government. However, given the prior

attainment scores of many students at nontraditional high schools, more funding and perhaps different approaches are needed to bridge the equity divide.

Equity in Education

Looking at the economic impact of educational inequity on the country is a powerful argument for the need to fix the issue. Educational equity is an essential component of the overall economic mobility of a country. In its absence, the economy suffers from an achievement gap between groups in society. The inability of some students to achieve their working potential creates income inequality, which in turn, forms a wealth gap (Amadeo et al., 2021). Auguste et al. (2009), in their study of the effects of achievement gaps on the US economy, found that the achievement gap between 1998 and 2008 caused by educational inequity resulted in the country's gross domestic product being lower by $525 billion of what it potentially could have been. The study also found that if low SES students had the same educational attainment as students from high SES families over the same period, they could have added $650 billion in GDP.

A 2018 study by the St. Louis Federal Research Bank that used the triennial Survey of Consumer Finances data of the balance sheet and spending behaviors of 47,776 American families surveyed between 1989 and 2016 found that education affects wealth in three ways. First, families led by a college graduate tends to earn more. Second, there was a head start or upward mobility effect, meaning that once a child in a family without a previous member with a college degree earned a diploma, the family's wealth increased by 20 percentage points. Third, there was a downward mobility effect. Children of parents who are not college graduates saw a decrease in wealth by 10% compared to those whose parents were college graduates. Also, those children whose parents were college graduates but who did not graduate from college saw their wealth decrease by 18% (Emmons et al., 2018). Given that inequality increases the achievement

gap, students from low SES backgrounds are less likely to attend college, lowering their ability to improve their economic standing and wealth.

Parents' unequal access to quality schools for their children helps create structural inequity in the educational system, where the institutions contribute to inequity. Parents of students from low SES backgrounds are not able to send their children to higher quality schools like preparatory schools in the case of Jamaican parents with children at the primary level of the system (Amadeo et al., 2021). Students from low SES communities may sometimes be forced to attend poor-quality public education institutions. At the same time, their wealthier counterparts can attend higher-quality public schools in a more suburban, wealthier school district or private schools (Dumont & Ready, 2020; Tahir et al., 2021). Schools are supposed to act as the great equalizer. However, this objective cannot be achieved if there is structural inequity in the educational system. It will also result in slower economic performance for the country as the economic potential of low-income families is not realized (Amadeo et al., 2021; Auguste et al., 2009; Dumont & Ready, 2020; Smeding et al., 2013).

Excellence in Education

Excellence is difficult to define, and sometimes other terms are used in the literature when referring to excellence in education. These terms include good, quality, and effectiveness, particularly when referring to schools (Best, 2008). Excellence in education is generally discussed in the literature along three broad thoughts. The first is that excellence is norm-referenced, suggesting that some persons are better to some degree than others (Best, 2008; Strike, 1985). Therefore, people compete for it, and it is not attainable by everyone. Adding a layer of complexity to this consideration is that a student can achieve the highest scores at a

particular school while only considered average compared to students at other schools (Hodes & Kelley, 2017). Here, excelling does not necessarily mean excellence or quality (Best, 2008).

The second view of excellence is that it is criterion-referenced and defined by some standard independent of the performance of others (Best, 2008; Strike, 1985). Here, a school can set a demanding but attainable standard for students. Students are considered excellent based on if they achieve their goals. This view of excellence suggests that excellence is about achieving a given level of proficiency and that people are not competing against each other to achieve it (Sergiovanni & Green, 2014). Therefore, anyone can achieve excellence by this standard, though not everyone will. The challenge is that what is considered a reasonably demanding standard varies.

The third view of excellence is where a student, teacher, or school surpasses a previous performance that they achieved (Best, 2008). Here excellence is viewed as the quality of the achievements leading to improvements over time. For example, if a student scores 70% on a test, up from 40% on a previous test in a subject, that performance would be considered excellent. Schools continually improving their performance over time would be viewed as excellent or schools of quality (Best, 2008; Sergiovanni & Green, 2014). Unfortunately, without the information about school improvements, it is difficult for some schools to shake a negative image of underperformance and for the excellence in their improvement over time to be easily seen.

Equity and Excellence in Education

The third view of excellence is an important perspective often lost when considering the performance of students with lower prior attainment than others. Looking only at the current outcomes of students or schools without considering their prior attainment performance robs

those students and schools of credit for the excellence in their students' performance based on the students' improved outcomes given their starting point (Hodes & Kelley, 2017).

Children from low-income families are disadvantaged when only the first or second view of excellence is applied. B. Hart and Risley (2003) conducted a study on performance gaps of students from different socioeconomic backgrounds from K-3. They found that exposure to high-quality early childhood education and exposure to language and rich vocabulary created an improved opportunity to learn and gave these students a competitive edge. They also found that children whose parents were professionals were exposed to 3 times as many words in the home than students whose parents were on welfare. The study's findings aligned with those conducted by Kornrich and Furstenberg (2013) and Peters and Engerrand (2016), who considered other factors for opportunity to learn. Parental spending on their children, from childcare to other forms of quality educational exposure, created greater opportunities to learn in their children and provided twice as much education as formal schooling.

Excellence gaps are the discrepancies in scores among students from different subgroups at the highest levels of academic performance (Peters & Engerrand, 2016). The variability in opportunity to learn creates differences in quality between students from different socioeconomic backgrounds, and these performance gaps can travel with the students as they move through the education system (B. Hart & Risley, 2003). Different contextual factors, such as students' family income, parental education, geographic location, and racial and ethnic identity, correlate with academic success (B. Hart & Risley, 2003). They may have an impact on the excellence gap. Students in grades four, eight, and twelve from lower socioeconomic backgrounds tend to perform lower in reading, math, and science (Peters & Engerrand, 2016). It is important to

explore the excellence gaps in the performance of students from traditional and nontraditional schools in the core areas of English, Math, and Science based on their CSEC scores.

Research Questions

Based on the abovementioned issues, it is relatively easy for traditionally high performing schools to exist on name recognition alone rather than the actual value they add to their students. This dissertation was therefore designed to explore the issues relating to school quality using value-added measures and is explored using the following research questions:

1. What is the value being added to student outcomes by traditional versus nontraditional high schools in Jamaica?
2. What is the expected value that should be added by a school, given the profile of its students?
3. How do traditional high schools compare in their value-added between students from primary and preparatory schools?
4. How do traditional and nontraditional high schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?
5. How do students from preparatory and primary schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?

Definition of Terms

To aid in understanding of the study, the following terms are defined to provide clarity.

Caribbean Secondary Examination Certificate (CSEC) – is an examination offered by the Caribbean Examinations Council.

CSEC Certificate (CSECC) – student achieving a grade I, II, or III in five or more CSEC examinations inclusive of Mathematics and English Language (Patterson, 2021).

Education Equity – Education equity provides students with the necessary resources to succeed. Education equity also includes ensuring that students have an opportunity to learn (Garcia & Weiss, 2017; Littky, 2016).

CSEC Quality Score (CQS) – the outcome variable used to build some of the value-added models in the study. It is the average of a student's CSEC results.

Excellence gap – The excellence gap is the discrepancies in scores among students from different subgroups at the highest levels of academic performance (Peters & Engerrand, 2016).

Grade I, II, III – CXC uses a grade scale of Grade I-VI for CSEC to indicate student performance or proficiency on their examinations, with Grade I indicating mastery and the highest standard possible on the exam. A Grade I-III is considered a passing score. A grade scale of I to VII is used at the CAPE level, with Grade I indicating mastery and Grades I-V being considered a pass.

Nontraditional High School – A public high school built by the government after 1962 or an upgraded Junior Secondary school. Their population primarily comprises lower- and middle-class students (Patterson, 2021).

Primary Level School – Schools at the primary level of the education system generally have students ages 5–12 and go from Grades 1–6. A Primary-level schools can either be a preparatory or primary schools. It is equivalent to elementary schools in the US. Some public primary-level schools go from Grades 1–9 with students aged 5–14. These are referred to as All-Aged Schools.

Primary School – A public primary-level school under the direct influence of the MOEYI. The school receives funding from the government for teachers' salaries, as well as some capital and operational expenses.

Preparatory School – A private primary-level school that receives oversight from the MOEYI but does not receive funding from the government.

Sit – When a student is enrolled to take a CXC exam, it is said that the student is sitting the exam. After taking the exam, the student is said to have sat the exam.

Traditional High School – A public high school built in Jamaica before independence in 1962, mainly by the church and trusts. They are the more elite educational institutions at the secondary level and comprise primarily students from middle- and upper-class backgrounds (Patterson, 2021).

Value-added – the value that a school or teacher contributes to a student's academic performance and attainment over and above what the student and their background bring to the school (Patterson, 2021).

Table of Acronyms

Table 2 provides a list of all the acronyms used in the study and what they mean for this study.

Table 2

Acronyms Used in the Study

Acronym	Meaning
ANOVA	Analysis of Variance
CAPE	Caribbean Advanced Proficiency Examination
CQS	CSEC Quality Score
CSEC	Caribbean Secondary Examinations Council
CSECC	CSEC Certificate
CVA	Contextual Value-Added
CXC	Caribbean Examinations Council
EER	Educational Effectiveness Research
EVAMS	Educational Value-Added Assessment Systems
G4LT	Grade 4 Literacy Test
GCSE	General Certificate of Secondary Education
GSAT	Grade Six Achievement Test
IDB	Inter-American Development Bank
MOEYI	Ministry of Education Youth and Information, Jamaica
NAP	National Assessment Program
NTHS	Nontraditional High School
OECD	Organisation for Economic Cooperation and Development
OTL	Opportunity To Lean
SCVA	School Contextual Value-Added
SES	Socio-economic Status
THS	Traditional High School
TVAAS	Tennessee Value-Added Assessment Systems
VA	Value-Added
VAM	Value-Added Model

Chapter 2: Literature Review

Like many other countries, education in Jamaica is a vital avenue to upward mobility. Despite several years of self-rule, the Jamaican education system continues to be hampered by the challenges of its colonial past. The country's colonial past has created a high level of inequality in our society which is also strongly reflected in the country's education system and its schools, particularly at the secondary level (Patterson, 2021). This inequality has given rise to two types of public secondary or high schools: the *traditional high schools* established mainly by the church and trusts and the *nontraditional high schools* established mainly by the government (CAPRI, 2012, 2014). Parents and students at the primary level experience much stress and anxiety navigating the national standardized examinations, previously GSAT and now PEP, to get into a traditional high school of their choice (Lewis, 2010; D. Miller, 2017). The poor performance of the boys compared to the girls is also a big concern for many in the country (Chin, 2018; Sewell-Lawson et al., 2012; Sewell & Henry-Wilson, 2021).

Getting into the right high school can critically affect a student's future as students in traditional institutions do significantly better, are more likely to go to college, and end up with higher-paying jobs (CAPRI, 2012; Knight & Rapley, 2007). It is, therefore, not surprising that many Jamaican parents believe that their children have a better chance of doing well on the CSEC and CAPE examinations in a traditional public high school than they do in a nontraditional school (CAPRI, 2014; Dodman, 2021; P.-J. Gordon, 2012). More students from low SES backgrounds tend to be concentrated in nontraditional high schools compared to

traditional ones, and many parents make decisions regarding high school selection based on the reputation of those institutions rather than tangible information about quality. Before exploring the issue of parent choice and school quality, it is crucial to examine what led to the rise of traditional and nontraditional schools and the inequity in the system we see today. To understand the genesis of the two systems, the study will briefly examine the historical context of the Jamaican Education System.

Brief History of the Jamaican Education System

The Jamaican education system closely reflects the British education system, which is unsurprising given its colonial past. Prior to the emancipation of the enslaved people in 1834, there was little formal education for the White colonial masters and no formal education for the enslaved (Whyte, 1983). Sugar cane was the primary economic activity of Jamaica at the time, and it is believed that there was no value in making the enslaved literate. In addition to the fact that many White people did not receive a formal education, the skills needed by the enslaved were based on manual labor and not intellectual agility (Lunan Ferguson, 1947; View & Frederick, 2011). Also, many plantation owners believed it was dangerous to their economic bottom line and control over the enslaved if they were allowed an education (Schneider, 2018; Weimer, 2009). The White aristocracy essentially educated their children at home by employing private tutors brought to Jamaica from Britain for this purpose. These families would send their boys back to Britain when they were old enough for university or further schooling. Many of these children were then expected to return to Jamaica and take over the business of the estate (D. Miller, 2017; Schneider, 2018; Whyte, 1983).

Education of children in less affluent White families who could not afford tutors or to send their boys back to Britain for further education was done through free public schools once

they were created through the bequests of wealthy sugar barons and traders (Keith, 1978; Whyte, 1983). These free schools mirrored the British Education system's curriculum, practices, and objectives at the time. It had as its primary focus to prepare White boys for their leadership role in society and, at its inception, excluded girls and Black people (D. Miller, 2017; Schneider, 2018; Whyte, 1983). The first public school for White children in Jamaica was established through the generosity of John Wolmer, with a population of 10 boys in 1736. The school later included girls in 1782, but Black people were still excluded. It was not until 1815 that Wolmer's admitted its first free people of color (Schneider, 2018). This school is known today as Wolmer's High School and is the oldest high school in the English-speaking Caribbean (Schneider, 2018). Another free school was built in Portland on the island's north coast, called Titchfield Free School, which later became known as Titchfield High School and is still operating today (Schneider, 2018). Both high schools are trust schools and are named among the traditional high schools in the country.

The early education of Black people before and immediately after slavery was largely due to the efforts of churches and had a high religious focus (D. Miller, 2017; Whyte, 1983). This push to educate the Black population even after the end of slavery proved somewhat of a challenge even among the newly freed Black people. The planter class's (White sugar estate owners) position on educating Black people came up against the push by Moravian and Baptist missionaries who were in Jamaica. It was a problem because they largely did not see, at the time, the value of education and therefore did not embrace the efforts of the missionaries to fight for their education (Espeut, 1991; Lewis, 2010; Pearse, 1956). With the formal abolition of slavery in Jamaica in 1934 following rebellion and revolt, the Negro Education Act of 1835 was signed by the British government as a grant to promote elementary education among the formerly

enslaved. In drafting the legislation, the British government believed that the lives of the newly freed Black people could only be improved through education (S. Gordon, 1958; Keith, 1978; Lunan Ferguson, 1947). However, scholars such as Keith (1978) argue that it was more about educating the newly freed Black people, so they were more willing to accept the conditions of wage labor. The plantocracy feared that the newly freed Black people would be less willing to work their agricultural crops, resulting in less access to labor if the Black people were more literate and educated. Seeing that the prevailing production condition at the time did not require skilled labor, there was no need in the ruling class's minds to push for Black education, and they, in fact, actively opposed it (Keith, 1978).

While many White plantation owners returned to Britain following the emancipation of the enslaved people, other members of the plantocracy remained to protect their investment. The continued presence of members of the plantocracy led to the further development of the colonial plantation economy and the social-class stratification between the majority Black population and the plantocracy (Lunan Ferguson, 1947). This stratification is also seen in the education system at the time with the development of private secondary education for White children through the generosity of the local plantocracy while at the same time having some amount of hostility towards primary education for the majority of the population, which was predominantly Black (Keith, 1978). Formal education was a privilege reserved for the landed bourgeoise, colonial administrators, merchants, certain groups of professionals, and local clerks. Literacy and numeracy were tools to legitimatize their class position and control. This inequity quickly led to clashes with the Black majority leading to the Morant Bay Rebellion in 1865, which saw many White-owned plantations burned across the island (Espeut, 1991; James et al., 2013; Keith, 1978).

The Morant Bay rebellion led to direct British rule for a period and forced a rethinking of the local colonial masters as to the importance of mass education. Select persons of color were to be sent to Britain to receive education and acculturation in developing fealty to the crown (Espeut, 1991; Keith, 1978; Schneider, 2018). The secondary education system was intended for the children of the upper- and middle-class colonial masters who received superior education to the poorer classes at the elementary level. With the decline in sugar, many of the White ruling class could no longer afford to send their children to Britain for secondary and tertiary education (James et al., 2013). Even though missionaries got involved in the education of Black people early, academics such as James et al. (2013) argue that the establishment of many private schools by churches in the mid-1800s was related to their concern for their own children and not benevolence. The protestant missionaries were unwilling to send their children to Roman Catholic schools but were also unwilling to participate in the same schooling they provided for the ex-slaves (Espeut, 1991; S. Gordon, 1958; James et al., 2013; Pearse, 1956).

The colonial government's lack of solid financial input into the education system at all levels led to the establishment of two systems of education in the country. There was a private fee-paying school system that was funded by White and Brown individuals. This system offered a traditional grammar school curriculum. In contrast, a public school system was available for individuals from poorer backgrounds. This public system focused on manual training. (Keith, 1978). The traditional grammar school curriculum supported the needs of upper- and middle-class children who had the background to be successful with this curriculum (Espeut, 1991; P. Taylor & Soares, 2013). The colonial powers had no incentive to provide substantial investment in education because, as explained before, the plantation economy did not require skilled labor, so there was no motivation to train the masses, primarily people of color (Espeut, 1991; P.

Taylor & Soares, 2013). The plantocracy, who was in charge of the legislative assembly, did not share the colonial state's ideological thinking that it was better to maintain capita labor relations through the education of the masses rather than the repressive approach that defined slavery (Keith, 1978). The worst fears of the potential disruption of the economy and status quo from emancipation were not realized (despite the Morant Bay rebellion), so there was no political or economic motivation to make a more significant investment than was already made. There was also not much interest by the people of color that had secured a privileged position in the state bureaucracy for mass public education. With the economic importance of Jamaica and the Caribbean waning due to the decline of sugar, the British colonial powers showed little interest in making the financial investment needed. This responsibility for education was left to the different groups mentioned earlier (Espeut, 1991; James et al., 2013; Keith, 1978; Shepherd, 2012; P. Taylor & Soares, 2013).

The industrial revolution following the Second World War eventually led to a trend towards overseas investment with a push towards manufacturing and developing the internal markets of developing countries. Growth in bauxite mining, tourism, and other manufacturing industries led to a growth in the working class and a need to look at the problem that the lack of education of the masses caused (Keith, 1978; P. Taylor & Soares, 2013). The declining economic position of Jamaica led to many White colonial masters returning to the mother country, creating a need to expand the education system to train and hire locals to fill the vacancies created through the exodus of White workers (E. Miller, 1990; Whyte, 1983). The dual education system with public primary for the masses and private preparatory schools along with secondary British-styled “grammar school” for the children of the petty-bourgeois and bourgeois suited the colonial class but was unhelpful in allowing for the development that Jamaica needed (Keith, 1978;

Pearse, 1956). The colonial class, therefore, in order not to upset this class structure, stifled many of the early reform approaches to address the challenges of the education system (E. Miller, 1990; Whyte, 1983).

Education Reform Initiatives

The colonial administration eventually established a colonial education department reflecting the renewed interest and focus on developing a modern education system. However, as of 1939, the department's role in financing education at the primary and secondary levels was still only minimal, with the majority of primary schools still being church owned and operated and all the secondary schools in the country privately owned through some received government aid (Espeut, 1991; Keith, 1978; P. Taylor & Soares, 2013). A report commissioned by the colonial government to assess the education system, the Kendel report, was submitted in 1943 (Whyte, 1983). The report outlined the education system's challenges and recommendations for its improvements. The Kendel report led to the establishment of a national plan for education reform in 1947. The plan included expanding secondary education and awarding scholarships to persons interested in training to become teachers. The plan presented to the governor general needed to not only justify colonial aid but also reflect the liberalization policies of the British government towards the middle class (Woolcock, 1984). The plan called for establishing a single government authority encompassing primary and secondary education with all privately owned schools registered and regulated by this authority. The plan saw the establishment of the first Minister of Education and the first central education authority a few years later in 1950 (Keith, 1978; Woolcock, 1984).

The Kendel report had two significant issues at the center of its recommendation. First, there was no curriculum articulation between primary and secondary education. At that time, the

government mainly funded primary schools and was under the Board of Education. However, the secondary level schools were financed largely from trusts, primarily for the upper and middle classes, under the Schools Commission. Second, these two bodies functioned independently from each other as policymaking bodies for their respective areas (Woolcock, 1984). The recommendation of the central authority was to address the lack of articulation of the two entities. The upper and middle classes resisted the commission's recommendations as it threatened the class structure (Woolcock, 1984). The commission, therefore, as a compromise, proposed a national standardized exam called the Common Entrance Examination to be held for all students at the age of 12 in order to determine the type of secondary school more suited to their abilities. The exam regulated the number of students in the secondary system and the need to provide additional funding while maintaining the status quo (E.Miller, 1990; Woolcock, 1984). Many of the Kendel Commission reforms were not enacted until 1957 though the report was in 1943. It created a mandate for universal primary education for all children between the ages of 7–22 years, inclusive.

Reforms After Independence. Jamaica gained independence from Britain in 1962, and the restructuring of the country's economy and political development created the need to further reform the country's education system and address the dual system. Therefore, in 1962 the 70:30 system was introduced to address the concerns of the lower class and provide more space in secondary schools for students from the government primary schools. Most of the spaces in secondary schools before this were occupied by students from preparatory (private) schools (MOEYI, 2022). The 70:30 system represented scholarships to enter secondary schools given to students based on their performance on the Common Entrance Examination. In total, 70% of the scholarships were reserved for primary school students, mainly children from lower-class

families or low SES backgrounds. The remaining 30% went to students from preparatory schools. Even with the scholarship, the support the children from primary schools received was too low, and many students from these low SES backgrounds dropped out of school before graduating (Espeut, 1991; Keith, 1978). The government also created more, but alternative, spaces at the secondary level though the offering was severely limited and considered less quality than the traditional grammar schools (Espeut, 1991; Keith, 1978).

The church also had a role to play in the inequity of the education system. The churches owned many preparatory schools at the primary level and many of the traditional high schools. As Espeut (1991) put it,

> the fact that the Catholic church operates more preparatory schools than primary and more high than secondary schools is an indication that the Catholic church is exercising a preferential option to educate the elite rather than a preferential option for the poor which is its charism. (p. 63)

He further argued that "6% of private preparatory schools and 20% of traditional high schools in Jamaica indicates the depth of its commitment to educate the elite compared to the rest of the education sector" (p. 63). He also pointed out that without the church and missionary schools in Jamaica and the Caribbean, many free Black people would not have been able to access education (Espeut, 1991).

The government enacted the 1965 Education Act, and by the 1970s the number of school places at all levels of the education system under government control significantly increased. The larger share of spending on education now comes from the government. The number of government-sponsored places in existing secondary schools increased; however, the number of schools only increased slightly (MOEYI, 2022). Junior Secondary schools were created to

increase the spaces available at the secondary level and were fully financed by the government. The government also gave grant-in-aid places to forty or 90% of secondary schools in existence (E. Miller, 1992, 1990; MOEYI, 2022). The independence project and the need for educated and specially trained labor had significantly outstripped the financial and administrative capacities of the education system at the secondary level, which was administered mainly by decentralized religious bodies and charitable bodies (Keith, 1978; Pearse, 1956). The industrial imperative of the time created the need for the state to intervene in the existing inequitable education system. This intervention was necessary as the state is the only institution in a capitalist society with the resources and organizational capacity to fund, systematically develop, and maintain the training required for the labor force needed to sustain development (Pearse, 1956).

In 1974 then Prime Minister Michael Manley introduced free education at all levels of the education system (MOEYI, 2022; Petgrave, 2011). The initiative improved the 70/30 reform, eliminating fees for any student, regardless of background, who qualified for a space in secondary school by passing the CEE (Keith, 1978; Petgrave, 2011). The government also changed the names of all Junior Secondary Schools to Secondary Schools to eliminate the stigma associated with them, as they were seen by many to be of a lower quality than the elite grammar secondary schools (Keith, 1978; Petgrave, 2011). This change started to create a difference in the public's mind between the traditional elite grammar schools and the nontraditional secondary schools. Many parents continued to be concerned about the quality of these institutions compared to their traditional counterparts, so the government created an exam so that students from the former Junior High Schools may transfer to a traditional high school after 3 years (Grade 9). The government eventually expanded all the Junior schools to 6 years to not inundate traditional secondary schools (Keith, 1978).

The education system saw another reform initiative in 1980 through a joint venture between the government of Jamaica and the Inter-American Development Bank (IDB) called the Primary Education Improvement Project. The program saw the creation of a national core curriculum and a national assessment standard to monitor student academic progress. This new curriculum led to the creation of a National Assessment Program to monitor student outcomes in Grades 1–6, culminating in the creation of the Grade Six Achievement Test (GSAT) in 1999 to replace the CEE (MOEYI, 2022). The government in 1999 also upgraded all the nontraditional secondary schools to Comprehensive High Schools or Technical High Schools (MOEYI, 2022). This new renaming did nothing to change the perception of traditional versus nontraditional high schools in the mind of parents and the public at large (CAPRI, 2014; Pearse, 1956).

Despite all these reforms over time, the dual education system has largely proved resilient to being dismantled. The government created another task force on education in 2004, which led to the creation of the Jamaica Teaching Council and the National Education Inspectorate to improve the quality of teaching and learning as well as leadership at the primary and secondary levels of the education system (MOEYI, 2022). The government has also changed the GSAT examination to the Primary Exit Profile, which saw its first sitting in 2021 though a much more scaled-back version due to the Covid-19 pandemic. Now that we better understand the Jamaican education system's historical background, I will discuss school accountability through school effectiveness research in the next section.

School Quality Defined Through School Effectiveness

Regardless of socioeconomic background, most parents are concerned with getting their children into a quality school at the primary or secondary levels (Jennings et al., 2015). Many Jamaican parents make a significant sacrifice to send their children to a preparatory school in the

hope that their child will secure a coveted space in an elite high school due to its reputation for being a quality school (CAPRI, 2012). The search for quality schools is not a unique Jamaican experience. De Talance (2020) examined 849 private and public schooling in Pakistan, with 60% of them being public. De Talance found that objectives and perceived quality measures determined parents' choice of schools. Parents were likely to send their children to private schools when public schools were of lower quality and when they thought they were. C. M. D. Hart and Figlio (2015) conducted school accountability research on introducing official school grades in Florida. The research examined the incoming kindergarten classes from 1,412 elementary schools. The study found that these grades affected parent choice, which affected the school composition for A-rated elementary schools. In the US, many parents make decisions about purchasing homes based on the quality of the school district and the desire to be within the catchment area of particular schools perceived to be of quality (Holme, 2002). Given the importance parents place on selecting quality schools for their children, it is important to consider what is excellence as it relates to schools and how it is measured.

School excellence sometimes referred to as school quality can be considered the success of schools in supporting the development of their students. This challenging and complex mission of schooling to provide varied and multidimensional educational opportunities for students based on their needs and abilities makes developing a single comprehensive definition and measure of quality nearly impossible (Hanselman & Fiel, 2017). There are many intergenerational transmissions of inequality created from persistent school segregation that has allowed disadvantaged groups to be consigned to minority lower-quality educational experiences compared to advanced groups. This inequality can be propagated all the way to the college level for those students who make it that far (Hanselman & Fiel, 2017; Rich & Jennings, 2015).

Jennings et al. (2015) analyzed data from the Massachusetts Department of Education and the Texas Education Agency elementary and secondary departments. They tracked students who completed eighth and ninth grades in 2003 to 2004 and their college enrollment data across the US in the case of Massachusetts students, but only college enrollment data in Texas for the Texas students as Texas only had college enrollment data for Texas colleges. They found that the disparities in schooling followed students even in college, with many students from disadvantaged homes unable to make it to graduation.

The information on school quality available to parents tends to reflect academic performance rather than the school's ability to develop students' academic strength. The challenge in getting helpful information on school quality lies in the fact that student performance tends to be sensitive to out-of-school influences, particularly for high-achieving schools (Gray, 2004; Holme, 2002). Downey et al. (2008) examined school effects from non-school effects using data from a longitudinal study. They found that racial disparities in learning opportunities outside of school were a more significant factor than between-race disparities when considering student achievement and school quality. Even where parents have access to school quality information, it does not necessarily help parents from low SES backgrounds make better school choice decisions. These parents often simply move their children from one low performing school to another in a district without a deeper understanding of school quality, as in the case of the accountability system in Florida (Rich & Jennings, 2015). Educational researchers have therefore sought to answer the questions of quality and the provision of information about school quality by examining what makes a school good through the development of Educational Effectiveness Research (EER; Reynolds et al., 2014). EER attempts to tackle the challenge of separating the non-school effects, such as prior attainment and student intake, from the effects of

the school through complex modeling tools (Creemers et al., 2010; Goldstein, 2003). The following section takes a brief look at the history of EER.

Brief Overview of EER

The genesis of school effectiveness research stems from the 1966 Coleman report that said, “Schools bring little influence to bear on a child’s achievement that is independent of his background and general social context” (Coleman et al., 1966, p. 325). The report argued that students' learning was more directly linked to school level factors such as the students' socioeconomic background, and prior achievement was the most important indicator. This report disrupted the widely held belief that schools mattered and that choices among schools and leadership activities within a school were important in affecting student attainment (Teddlie & Springfield, 2011). The antipode finding of this report led many educators and educational researchers to take a closer look at claims made by the report with studies presented to contradict the Coleman report (Reynolds et al., 2014). The work of these researchers to ascertain whether schools have any effect on student attainment above and beyond the influence of home environments and, if they do, how schools accomplish this effect is the basis of EER and school improvement research (Gilleece & Clerkin, 2020).

Most of the EER studies surround academic achievement in areas such as literacy and mathematics, with limited but growing interest being shown in noncognitive and nonacademic outcomes (Gilleece & Clerkin, 2020). After decades of research in this area, evidence suggests that schools and teachers do have a significant effect on student achievement separate and, in some cases, over and above home background (Clerkin, 2016; Creemers et al., 2010; Gilleece & Clerkin, 2020; Teddlie & Springfield, 2011). Evidence also suggests that school effects tend to be stable over a few years (Doolaard, 2002; Kyriakides & Creemers, 2008).

The success of EER in justifying the increased spending on schools by the government in the area of school accountability has led to increased use in many countries around the world, including the UK, Australia, Ireland, Canada, and the US, as well as many developing countries trying to improve their education systems (Gilleece & Clerkin, 2020; Leckie & Goldstein, 2009; Schrouder, 2008; Teddlie & Reynolds, 2000). Despite the increased use, more widespread adoption of EER is constrained by (a) the complex statistical calculations and therefore required knowledge to interpret EER findings; (b) the preference of some politicians to focus on school level effects to classroom-level effects, which EER prefers; (c) the variables that are more easily manipulated and leveraged are not necessarily those that have the most significant impact on student achievement; (d) findings can lead to difficult and unpopular from a political perspective; and (e) often requires contextual policies that again may not find acceptance (Reynolds et al., 2014).

Problems with EER

Though EER provided the means for educational practitioners, researchers, and policy analysts to evaluate school effects through empirical evidence, it was primarily reactive to the ideas raised by Coleman et al. (1966) and not goal-directed. This reactive genesis of EER may be at the center of its deficiency (Reynolds et al., 2014). One major criticism of EER research was the general absence of qualitative data in the early stages of EER to provide a deeper understanding of the information presented by the quantitative data (Gilleece & Clerkin, 2020). EER research was missing rich, thick descriptions of important factors like teacher attitudes, school ethos, learning environment, school culture, and student views as part of the evaluation of an effective school (Coe et al., 2014; Teddlie & Reynolds, 2000; Van Landeghem et al., 2002). These factors had long been the concern of qualitative researchers and they were often omitted or

ignored in the early days EER. An explanation for the lack of qualitative and mixed methods research may be because the initial attack on EER was through the use of quantitative methods, therefore, it was thought that a quantitative response would have been more effective in dispelling the claims (Reynolds et al., 2014). To provide the quantitative response, EER research replaced the qualitative data collection methods without providing adequate descriptions of what the quantitative instruments were measuring (MacBeath, 2007; Macbeath & Mortimore, 2001; Wallin, 2003).

Another criticism of EER is that since it developed during a time when it was being debated that schools made no difference, early EER focused heavily on schools, districts, and local authority rather than on teachers, with the consideration of teacher effectiveness left to that tradition. More recent EER studies, however, have focused on teacher effectiveness as an essential component of school effectiveness (MacBeath, 2007; Reynolds et al., 2014). In developing countries like Jamaica, where teacher-level data is unavailable, EER research focuses mainly on schools and local authorities.

Reynolds et al. (2014) argued that the development of multilevel modeling allowed for the consideration of the educational system in new ways by incorporating background characteristics into the models. However, early multilevel modeling did not contemplate the possible reciprocal effect of students on the behavior of teachers. Thus, the early multilevel modeling approaches acted like a sort of black box of education and did not allow the study of the interaction between levels. EER saw an explosion in the number of researchers in the field within a relatively short time. This fast growth has resulted in differences in how factors are conceptualized, measured, and analyzed in many studies. As a result, the body of knowledge in EER is difficult to assess and weigh (Reynolds et al., 2014; Teddlie & Reynolds, 2000). It is of

note that the advantages of EER far outweigh the problems described. There have also been continual improvements in the relatively young field, with new studies produced each year. Therefore, school effectiveness through EER is a valuable tool for evaluating school quality. In the next section, I will discuss some of the measures of quality that emerged from EER.

School Effectiveness Measures

The school accountability climate calls for monitoring the performance of schools and teachers, with proponents arguing that it brings more transparency to the education system and provides parents with the ability to make informed school choices (Gilleece & Clerkin, 2020). England and the US are leaders in using EER and its complex statistical methodology to compare schools (and in the case of the US teachers). The analysis of the data from the school system is generally publicly available and is used to inform policy (Gilleece & Clerkin, 2020). The focus of many of the policy decisions coming out of EER describes effective schools as those schools with high student achievement levels (Sloane et al., 2013). However, other researchers have warned that many more factors aside from student achievement must be considered when evaluating school effectiveness (Creemers et al., 2010; Organization for Economic Cooperation and Development, 2021; Sammons, 2007; Sloane et al., 2013; Wallin, 2003).

Creemers et al.'s (2010) multilevel framework looked at the interactions between different factors at the student, classroom, and school levels within the educational system. These factors include traditionally omitted things such as gender, motivation, opportunity to learn, school policies, leadership, school climate, national education policies, and public attitudes toward education. The study found that these factors interacted within and between each other at different levels. It was, therefore, crucial that they be accounted for in EER. Teddlie and

Reynolds's (2000) systematic review of the literature on EER contended that evidence from the literature suggests that some or all of the following characterize effective schools: (a) effective leadership, (b) positive school climate, (c) emphasis on teaching and learning, (d) parental involvement, (e) incorporation of student's voice, (f) professional development of staff, and (g) monitoring of learning outcomes at all levels. Teddlie and Reynolds's (2000) findings were similar to those of Muijs et al. (2004), who studied school improvement factors that vary depending on the presence or absence of socioeconomic status. The literature was primarily based on the US educational system but found nine important factors. The four factors unique to the Muijs et al. (2004) study are (a) effective use of data in school decision-making, (b) developing a professional learning community, (c) external support, and (d) resources. These additional four factors were important in school improvement in disadvantaged areas.

Martin et al. (2013) combined international data from Trends in International Mathematics and Science Study and Progress in International Reading Literacy Study to study the factors linked with attainment at the elementary level in reading, mathematics, and science after controlling for different home background factors. The study considered to be meaningful the following factors: (a) a safe and orderly environment, (b) adequate resources to support academic success, (c) effective instruction in well-resourced classrooms, and (d) well-prepared teachers. Caponera and Losito (2016) used post-primary level data from TIMSS to study the relationship between student achievement and school context. They found a strong link between student achievement and school socioeconomic status, with the discrepancy between the two strongest in countries with greater inequality. Paying attention to SES is vital in determining school effectiveness. Other school effectiveness studies looking at the Program for International Student Assessment (PISA) post-primary level data found that better student performance is

measured by student achievement when controlled for student and school SES. The data confirm that schools with a better student attendance record and less disciplinary infractions had higher achievement (Organization for Economic Cooperation and Development, 2013). The analysis of the data also confirmed the importance of the adequate resources.

On the other hand, Marks (2010) conducted a study using the Australian PISA data to research the relationship between schooling and entrance to college. He found that very few significant factors mattered in its effect on the college prospects of students from disadvantaged communities. He argued that the focus should be on the student's needs rather than the schools. He wrote,

> "in order to improve the outcomes of disadvantage groups (weaker achievers or students with low socioeconomic backgrounds), the policy focus should be individual students in need of assistance rather than the schools they attend because such students are not limited to a small number of schools with particular characteristics" (p. 282).

This is similar to the findings by Aloisi and Tymms (2017) in their examination of PISA data from 2000 to 2015. Aloisi and Tymms (2017) argued that there is "more evidence pointing towards a strong relationship between the socioeconomic and demographic characteristic of the PISA population and country outcomes than evidence in favor of the effectiveness of educational policies such as reforms of the school curriculum" (p. 206).

The overall consensus of the literature on school effectiveness measures is that a simple focus on school attainment without consideration of the noncognitive outcomes will lead to results that are not particularly useful (Clerkin, 2016; Gilleece & Clerkin, 2020; Reynolds et al., 2014). The availability of data to account for many of the factors outlined in the literature varies internationally (Reynolds et al., 2014). Small island developing states like Jamaica, which has

suffered from chronic underfunding of the education system for many years, often does not have the data to account for all the factors raised by the literature. Even in countries where the data are available, they might not be used in evaluating school effectiveness, as seen with the rollback of certain factors in evaluating school effectiveness in England (Department of Education, 2010, 2015; Sloane et al., 2013). In the next section, I discuss value-added models and why they are valuable tools for evaluating school effectiveness.

Is Family Background the Single or Most Prominent Predictor of Student Performance?

Garcia and Weiss (2017) contended that children's social class is one of if not the most significant predictors of academic attainment or success. They further argued that performance gaps between children from different social groups take root in the earliest years of children's lives. The gaps failed to narrow as the children grew older, with little hope of the children from the lower social class catching up. They based their argument on their study of two academic cohorts of kindergarten children between 1998 and 2010. They found that a large gap existed in the academic performance of students from the lowest SES and the highest SES based on their cognitive and noncognitive skills. They also found that this gap persisted over the two years and did not narrow even though parents from low SES families had increased involvement in their children's early childhood education. They argued that the gaps reflect the existence of a considerable number of unmet needs and untapped potential in these children.

Other researchers have also shown some correlation between the academic performance of students from low SES backgrounds and academic achievement (Berger & Archer, 2016; Gratz, 2006; Jury et al., 2015). These students tend to be less resilient in achieving their academic goals (Berger & Archer, 2016; Jury et al., 2015; Wiederkehr et al., 2015). They have a greater problem with absenteeism, which also affects their academic performance (Chin, 2018;

Cook & Ezenne, 2010; Vidyakala & Vaishnavi Priya, 2017). Parents' academic background, particularly the mother's educational status, plays an important role in student achievement. Mothers with higher education levels do a better job of protecting, guiding, and advocating for the educational needs of their children leading to higher academic success (Ayub et al., 2021; Gratz, 2006; Hernandez & Napierala, 2014; Perna et al., 2015; Tahir et al., 2021).

Though a significant amount of research shows the correlation between socioeconomic status and student achievement, the role of schools should not be overlooked. If schools do not matter and serve no role in correcting the impact of educational inequity, then from my study, we expect to see students from primary schools at elite high schools in Jamaica performing significantly less than their preparatory school counterparts. It also raises the question of whether all students from primary schools perform at the same academic level in different schools or do their performance varies depending on the school to which they were assigned. The answer might give us insight into whether schooling in Jamaica is actually making a difference for these students. The 90/90/90 schools study in the US has given some answers to the questions in the US context, where we see that an effective school is not limited or affected by the family background of its students (Amadeo et al., 2021; Organization for Economic Cooperation and Development, 2012).

The 90/90/90 schools are schools with more than 90% of their students being eligible for free and reduced-price lunch, more than 90% of their students being from ethnic minorities, and more than 90% of their students achieving high standards based on independently conducted assessments (Reeves, 2014). Although these schools have met all the traditional checkmarks for having a majority of their students from low SES families, they are still able to have the vast majority of their students achieving high academic performance. These schools debunk the belief

that poverty, ethnicity, and academic achievement are inextricably linked. They do this through a laser focus on academic achievement, making clear curriculum choices that focus on key subject areas, conducting frequent classroom level assessments with multiple opportunities for students to improve, having an emphasis on writing, conducting external scoring inclusive of exchange of papers with another school (Reeves, 2014). They show that schools matter and that effective schools make a difference regardless of SES background. The performance of the 90/90/90 schools increases the importance of knowing if our elite high schools are helping or hurting our students from primary schools, at least as it relates to equity at that level.

Does Tracking Affect Performance and Inequity?

Though not explicitly said, the Jamaican education system tracks students through a merit-based system that provides access to high school. Other countries, such as Austria, Germany, Hungary, and the Slovak republic, use a similar model. Japan, Norway, Sweden, the United Kingdom, and the United States have a more comprehensive secondary school system (Hanushek & Woessmann, 2005). A study of six international student assessments by Hanushek and Wößmann (2005) allows for between 18 and 26 cross-country comparisons of the different approaches. The study's results suggest that early tracking increases educational inequity without the expected efficiency gains through such systems (Hanushek & Wößmann, 2005).

Giersch (2018) conducted a longitudinal study that used data on one cohort of students from North Carolina from public high school through the state university system to see if academic tracking produced differences in outcomes. The study results showed that upper-track students do better in college and that tracking was a more accurate predictor for these students even when the researchers controlled for academic achievement on high-stakes tests. That was not the case for students on lower tracks, as these high-stakes tests were not a predictor of

academic success in college for students on the lower track (Giersch, 2018). Giersch (2018) concluded that academic tracking, as currently practiced, was harmful to student outcomes as the students in lower tracks were not adequately prepared for the next level of education. Giersch further argued that tracking does not fulfill the goal of improving student outcomes by holding them to high expectations, which is the articulated goal of tracking. Also, most of the students placed in a lower-level track were students from families of lower SES backgrounds leading to family backgrounds being the driving force behind track placements which can have a lasting impact beyond its early achievement levels (Schnepf, 2003).

A key argument behind tracking is that homogenous schools and classrooms permit a focused curriculum and suitably paced instruction that leads to the highest student outcomes. Teachers can better focus on the more advanced or slowest learners without boring or losing the others. This greater focus allows for greater efficiency as the teachers are not challenged to create lessons for students at vastly different attainment levels (Hanushek & Wößmann, 2005). This notion, however, is challenged by scholars who argue that having a heterogenous classroom does not negatively affect high-ability students. However, it benefits lower-ability students through the interaction from better classroom discussions, motivation, and other positive peer effects leading to decreased inequality (Argys et al., 1996; Dobbelsteen et al., 2002; Hanushek & Wößmann, 2005). For the Jamaican education system, an area that needs to be studied is whether students benefit from tracking. For example, whether students who attend nontraditional high schools with weaknesses in particular subject areas based on their prior performance on GSAT improve in those subject areas on the CSEC exams.

Value-Added Models

The traditional approach to evaluating school effectiveness evaluates schools based on student achievement, usually using standardized tests (Sloane et al., 2013). The literature review on EER above shows that this approach is woefully inadequate in separating the school effects from the other external factors that influence student achievement. Value-added models (VAMs) allow for a greater alignment with the literature by including more factors than raw performance scores (Gilleece & Clerkin, 2020). VAMs attempt to achieve this by examining students' performance over time after comparing performance on a pre and posttest. Early VAMs only focused on student achievement scores, but more VAMs now include demographic and contextual factors (Dearden et al., 2011; Deming, 2014; Gilleece & Clerkin, 2020; Leckie & Goldstein, 2017). There are many different types of VAMs, and a review of the six main types varies in the following ways: (a) the number of attainment measures used; (b) the number of students that make up the cohort; (c) how missing data are handled; (d) treatment of teacher effects; (e) the number of contextual information incorporated, such as family inputs and demography; and (f) the inclusion of assumptions about linear student growth (Sloane et al., 2013).

Brief Overview of the Six Main VAMs

The six main types of VAMs used are the *Gain Score model*, *Covariant Adjusted Model*, *Educational Value-Added Assessment System*, *Contextual Value-Added Model (CVA)*, *Regression Discontinuity Model*, and *Structural Equation Modeling*. The simplest of the VAMs is the gain score model. The model calculates the gain made by each student over a year and associates this with the student's teacher. Each student's gain score for a particular teacher is averaged together and then compared to the average gain score for all teachers under review, for

example, in a district or country (Sloane et al., 2013). A similar approach is also used in calculating the gain score of schools. A challenge of the gain score model is that it implicitly assumes that school effects remain undiminished or equally effective over time without additional effort (Mccaffrey et al., 2004). The movement in effectiveness is gradual over time and is not reflected in a single year (Kyriakides & Creemers, 2008). Also, the simplicity of the gain score model and other shortcomings make it unsuitable for high-stakes decisions associated with teacher pay but can be helpful in low-stakes acknowledgment of schools for progress (Sloane et al., 2013).

An extension of the gain score model is the covariant adjusted model, which allows for adjustments to be extended. This model uses prior scores as covariates for student outcomes (Rowan et al., 2002). An example of this type of VAM is used in the Dallas value-added system (Sloane et al., 2013). The limitation of this type of model in including many of the contextual issues described in the literature makes it suitable for low-stakes decisions such as student improvement plans (Sloane et al., 2013).

A further extension of VAMs includes the layered model, also referred to as the Educational Value-Added Assessment System. An example of this model is the Tennessee Value-Added System, widely used elsewhere. The Tennessee Value-Added System uses a layered model to estimate teacher effects by adding the model for earlier years to the model created for the current period (Mccaffrey et al., 2004; Sanders & Horn, 1998). Other types of Educational Value-Added Assessment Systems are the cross-classified, persistence, and cumulative within-child mixed-effects models. In considering the application of Educational Value-Added Assessment Systems to the Irish context, which has a similar education system to

Jamaica, Sloane et al. (2013) cautioned policymakers about their use, arguing that it was unlikely to improve students' teaching and learning experience.

The regression discontinuity model uses cross-sectional data. It allows for scores from adjacent grades to be subtracted to obtain gains that are then modeled. This approach is only possible when all scores are on the same scale (Mccaffrey et al., 2004; Rowan et al., 2002). The model allows for the variation across schools to be estimated using the absolute effect of 1 year of schooling. The model uses the fact that students are assigned mainly to grade levels based on their ages as defined by their date of birth. The model can therefore compare the achievement of the oldest student in the lower grade to the youngest student in the upper grade and is associated with the effect of a year of schooling (Luyten et al., 2009). The model, however, encounters difficulties when students are retained for whatever reason as it requires strict adherence to the cut-off point based on birthday. Sloane et al. (2013) argue that this model would not work in Ireland as there is no strict cut-off for grade assignments based on age. The same is true for Jamaica.

A fifth VAM approach is structural equation modeling that uses longitudinal outcomes from three or more periods in time, along with meta-analytic methods and growth curve modeling (Reynolds et al., 2014). As with any other VAM, a challenge of this model is that it generally tries to compare one school using a set of characteristics relative to another characteristic shared by other schools. The implication of this is that a school is considered to be effective relative to another school. Therefore, all schools could be making progress overtime but the schools making the least progress ranked as the lowest in terms of progress despite doing better in absolute terms.

VAMs in the US largely focus on teacher effects. In contrast, in England, with a similar education system to Jamaica, VAMs focus on school effects and ranking schools based on performance (Sloane et al., 2013). When England started to use VAMs to evaluate the effectiveness of their schools, they used the Contextual Value-added Model (CVA). CVA is a VAM that incorporates an adjustment for student backgrounds and was used between 2006 and 2010 (Leckie & Goldstein, 2017). For the CVA model, a multilevel model calculates a student's CVA score based on the difference between the student's actual and predicted exit scores. In the UK, students' General Certificate of Secondary Education is the predicted exit score for students. The predicted General Certificate of Secondary Education score is calculated as a function of the student's contextual circumstances, such as prior attainment, SES background, age, gender, and ethnicity (Leckie & Goldstein, 2017). The school attainment measures are used in England to measure students' performance at the end of high school (11th grade, ages 15 and 16). Here the attainment measure is based on the percentage of students achieving 5 or more General Certificates of Secondary Education subjects at Grade I-III, inclusive of English and Mathematics as of 2006 (Dearden et al., 2011; Department of Education, 2015; Leckie & Goldstein, 2017).

The CVA model aims to measure student progress over the 5 years of high school (ages 11 to 16) through the application of contextual factors. This approach is considered a fairer assessment of school performance to inform school choice and keep school leaders accountable (Dearden et al., 2011). Despite these advantages, the attainment measure of five General Certificates of Secondary Education in England used in CVM is not without its criticism, as some researchers have argued that it encourages schools to focus the attention and resources on the borderline C and D students at the expense of the others (West, 2010; Wilson et al., 2006).

They also argue that it encourages teaching to the test rather than allowing for a broader approach to the curriculum (Goldstein, 2004). Finally, some school control student entry for specific subject areas by marshaling then into areas perceived to be easier that the students may be uninterested in if they are weaker academically (R. C. Taylor, 2016; Wilson et al., 2006).

The Department of Education in England switched from CVM to Expected Progress approach in measuring school progress and effectiveness. Expected Progress is defined as the percentage of students in a school who make the expected progress of three or more national curriculum levels (Leckie & Goldstein, 2017). The Department of Education explained that the new measure was introduced because the public found it difficult to read and understand the CVA reports and that it cemented low educational aspirations in students from low SES backgrounds (DFE, 2010). Critics of the move by the Department of Education to switch from CVM to Ep have argued that Expected Progress is not a value-added approach. By not considering the socioeconomic and demographic backgrounds of the students, the measure is biased in favor of schools with high-prior attaining intakes from higher SES backgrounds. They argue that it is harder for students with low prior attainment to make the expected level of progress compared to other students whose advantage lies mainly external to the school they attend (Dearden et al., 2011; Gilleece & Clerkin, 2020; Goldstein, 2003; Leckie & Goldstein, 2009; Sloane et al., 2013). In support of this belief, Leckie and Goldstein (2017) found that across 3,056 high schools in 2010, the differences between the Pearson correlation between CVA and Expected Progress for mathematics and English was 0.29 and 0.36, respectively. They found that 15% of schools were classified as underperforming using Expected Progress compared to 10% using the CVA. The authors argued that by ignoring contextual factors, schools with

students making real progress were being unfairly classified, adding to their stigma and challenge to improve further.

Criticism of VAMs

Although most scholars will agree that VAMs may offer a better approach for assessing school effectiveness and hence school quality, even supporters of VAMs have to acknowledge some of its problems and limitations. One of the challenges of VAM is that there is a lack of randomization in how students or teachers in a school are selected for a class, while at the same time, VAM's estimates of school or teacher effects are influenced by other factors (Dearden et al., 2011; Sanders & Rivers, 1996). Although attempts might be made in some models to address this limitation through statistical adjustments, no adjustments can fully offset this absence of randomization. There are also questions surrounding how errors affect estimates and when assessments are best administered, raising concerns about the construct validity of the approach (Mccaffrey et al., 2004; Reynolds et al., 2014; Sloane et al., 2013).

Though there has been significant improvement in VAMs over time, scholars have yet to design a model that provides a valid estimate of teacher and school contribution to learning. VAMs require risky assumptions as a tradeoff for a model to be applied to particular tasks making it imperfect by design and leading to no single correct way for VAM approaches to be applied (Rowan et al., 2002; Sloane et al., 2013). Another issue to consider is the information policymakers, and other stakeholders require from school effectiveness data, which can affect the variables included. Is it important to know effective practices using data over time, for example, most improvement within a timeframe given certain measures, or is absolute attainment important? There is no simple answer to these questions, and when VAM results are used in

high-stake scenarios such as teacher incentive pay, the problem may be compounded (Dearden et al., 2011; Gilleece & Clerkin, 2020; Rowan et al., 2002; Sloane et al., 2013).

A significant point in the literature review on EER is that VAM models where the focus of progress is prior attainment without controlling for other contextual factors create very biased results. However, even where more detailed contextual information such as gender, ethnicity, and SES are included, how do you decide which variables should be included and which should be omitted? This dilemma can also be a complex question and decision to be made by researchers (Dearden et al., 2011). Therefore, the expectations of VAMs have to be tempered in how they are used as a tool for teacher and school accountability and should never be used as a single measure of the effectiveness of a teacher or a school (Goldstein & Leckie, 2008; Leckie & Goldstein, 2017; Sloane et al., 2013; West, 2010).

This section has reviewed some important criticism of the use of VAMs in school and teacher effectiveness to define quality. While the studies examined considered education systems similar to Jamaica, it is essential to look at how VAM has been used in the Jamaican education system. The subsequent section does that.

School Effectiveness and VAMs in the Jamaican Context

Jamaica has had very little application of value-added measures in determining school effectiveness. The only publicly known and available study of school quality was the recent report on the state of the education system in Jamaica by Jamaican and Harvard professor Orlando Patterson in 2021, commonly known as the Patterson report. Previous evaluations of the country's education system, particularly at the secondary levels, have used a more traditional approach. This approach looked at school effectiveness as a measure of the percentage of students in a school who have met the expected attainment measure of five CSEC subjects at

Grades I -III. This attainment measure is called the CSEC certificate (CAPRI, 2012; National Education Inspectorate, 2010).

As explained earlier in the historical overview of the Jamaican education system, it is easy to see how this approach to evaluating effective schools would be biased in favor of traditional high schools over nontraditional high schools that are primarily populated with students from more disadvantaged backgrounds. The Patterson (2021) report recognized this issue:

> The traditional method of evaluating high schools is simply on the basis of the percentage of students who pass at different levels, the CSEC and CAPE exams. It is now generally accepted that this method, taken alone, is both misleading and unfair. How students perform in the CSEC and CAPE exams is only partly attributable to the schools they attend. Of equal or even more importance are the inputs students bring to the school: their individual qualities, their socioeconomic background, the amount of tutoring they receive outside of school, the region in which they live, and so on. For these reasons, one can usually fairly accurately predict how a student will perform on the CSEC and CAPE exams largely on the basis of their performance on their baseline GSAT exam before they have had any exposure to their high schools. (p. 65)

The report went on to say:

> Schools do make a difference, but the difference they make may not be accurately reflected in the percentage of passes in the final CSEC and CAPE exams. If a high school gets mainly students from disadvantaged homes and poor performing primary schools but ends up with only 40% of them passing their CSEC exams, it may well be a better performer than a school that gets very advanced and well

> prepared students that end up with a pass rate of 75% in the CSEC and CAPE exams. The value-added approach was developed to get around this problem and to provide a better means of evaluating the relative performance of schools (Patterson, 2021, p. 65).

The VAM Used in the Patterson Report

The Patterson report used what he described as the Composite Value-Added Approach. Although the approach used by the Patterson team has a name that sounds similar to the CVA used in the British system, it is very different and uses a two-step gain score VAM approach. The approach uses the GSAT scores and CSEC outcomes to estimate the value that a school adds to students (Beuermann, 2021). The data analysis found that GSAT scores were a good predictor of a student's CSEC outcome. The technical commentary from the Patterson report argues that it is important to look at the input scores and the final scores to better understand the student's performance from an unbiased perspective. To calculate the added value a school adds to a student, a two-stage least squares model was used (Beuermann, 2021). The model used the assigned school to estimate the value a school adds to a student achieving the CSEC certificate. The model does control for some contextual characteristics such as GSAT cohort, parish of primary school, sex, and GSAT score.

A composite value-added ranking of the schools was done by averaging two different single-ranking approaches. The ranking approach ordered the schools with first place belong to the school with the highest rank. The second ranking orders the schools from highest to lowest performance based on the CSEC certificate rate. The CSEC certificate rate is the more traditional ranking approach used in the past that attempts to include the percentage of students in a school attaining the CSEC certificate. The combination of the two ranking systems gives rise to the

name of the approach. It is important to note that the Patterson report ranked traditional high schools and nontraditional high schools separately. As the report explains:

> One of many the advantage of providing two sets of ranking is that it brings to attention the many high performing schools in the nontraditional group that usually go unnoticed because their CSEC results are much lower than those of nearly all the traditional schools even though they are working educational wonders with the disadvantaged and poorly prepared students that they recruit. Another advantage of separating the schools into traditional and nontraditional is that the former ends up competing for rank only with their fellow privileged schools with equal proportions of well-endowed baseline recruits. Hence, formerly top schools that find themselves no longer at the top cannot complain that they only had limited room to demonstrate added value since other equally well-endowed schools show that it is still possible to add to the already well-prepared incoming cohort of students, not to mention being better at taking in more students from less fortunate homes and bringing them up to the standards of the majority of privileged, initially far better prepared students (Patterson, 2021, p. 65).

In many ways, the Patterson report attempts to address the criticism of using VAMs in evaluating school effectiveness highlighted in the literature, particularly its use in the British Education System. By comparing the results of the Composite VAM with the report from the National Education Inspectorate, the report sought to address concerns relating to internal validity, causal inference, and consistency over time. The report, however, provided no details on how the comparison was made save to say that the Chief Inspector of the National Education Inspectorate confirmed that the reports agreed (Patterson, 2021). Using the body of evidence

from the literature, the following section briefly discusses the literature gaps that provide for this study's relevance.

The Gap in the Literature

The Patterson report and the tests conducted by the IDB team provided very important information on the state of Jamaican schools. The report provided a comprehensive look at the state of the education system using both quantitative and qualitative methods. However, the report was commissioned by the Government of Jamaica and did not do much regarding the information it provided to help parents make an informed school choice. The information in the report only served to confirm what parents and many in the country already believed about many schools. One major element missing from the value-added consideration conducted by the technical team is in using the CSEC certificate without any additional consideration of quality. This approach of a CSEC certificate is the same limitation in how the measure is used in the British system. The CSEC certificate represents the minimum standard expected of students for matriculation into college, university, and many entry-level jobs. Without further consideration of how well the students do in earning the certificate, we do not have a good sense of the student's performance. For example, consider two students with identical profiles except in CSEC scores vying for a scholarship or place at a university. Student A has five CSEC subjects, all being Grade Is, and the other, student B, has five CSEC subjects but all Grade IIIs. It is more than likely that student A will receive the scholarship or space over student B unless there are adverse issues in student A’s profile and something extremely exceptional in student B’s profile that will allow B to get it over A. These quality issues weigh in the mind of parents but may not necessarily be a consideration of the report to a government agency.

The gain score approach used by the VAM in the Composite VAM compared each school's performance in terms of the value added to the average baseline performance. Therefore, rather than calculating the value added by a school based on the expected performance of the students it had at the starting point, the model compared the students' performance against all students in the pool under consideration. This approach to calculating value added can have a capping effect on high profile schools that are doing well in that they are limited in the amount of value they can add given the students' already high starting point. This problem is compounded by the example I shared earlier by the model not looking at the quality of the passes in the CSEC certificate. Using the average baseline for comparison may also allow some schools to seem better in value-added than they actually deserve while not pushing their students to where they could be based on starting point. The disadvantage of the approach just described is part of the argument of the British government in moving to the Expected Progress model.

Another gap in the literature and missing from the Patterson report is whether a particular school is better at particular areas than others. For example, a student, based on their GSAT score, may show some promise in Language Arts (English) but may have performed poorly in Mathematics and Science. Within traditional and nontraditional high schools, there may be better programs to support one area or another, but this is not a consideration of many researchers. The reason for this might be similar to the issue raised before in that it may not be an area in which many policymakers might be interested. Nevertheless, consideration of the performance of schools by categories will provide invaluable information for parents in making school choice decisions. It may better allow schools and local authorities to assess intervention programs to help boost student outcomes in specific areas while working on lifting the overall standard of the school.

Another interesting question that may provide helpful information to parents is whether there is any correlation between student outcomes and whether a student is placed at their school of choice. This is important for students who eventually attend a traditional or nontraditional high school and perhaps should be considered separately. The answer to this question is important because of the stress experienced by parents and students regarding performance on the GSAT exam and being assigned to their school of choice. If there is no correlation, then perhaps parents need not place such anxiety on their children when they are not assigned to their school of choice.

Finally, traditional high schools in Jamaica and their elite status present a valuable opportunity for researchers to take a closer look at the long-term impact of student performance from the two types of schools at the secondary level. In traditional high schools, students from preparatory and primary schools represent high-performing students from low SES backgrounds and high-performing students from medium and high SES backgrounds. However, few studies have been done on how well these high achieving students compare to others in elite schools, and virtually none are available in the Jamaican context.

This study intends to address those five key gaps in the literature that has been identified. It is significant because it will help to extend our understanding of the effect of schooling on different subgroups and how Jamaican schools help those students who are weaker academically to thrive. Also, how well our schools do in helping bright students from low SES backgrounds overcome the structural disadvantages to do well on the GSAT and get one of the coveted spaces in an elite school. Not much is known about what happens to them after this. We know they are competent, so it is vital to know if elite schools help them to excel or regress. All measurements are imperfect; however, when the contextual context is considered, student attainment outcomes

are valuable measures of school effectiveness. Also, they can provide useful information for low-stakes purposes, such as informing the parent of choice. For this reason, as well as the time limitation, the study will be restricted to a quantitative consideration of student attainment outcome using a contextual valid added approach that includes the quality of the CSEC certificate that a student obtains. The details of the approach to the study will be presented in Chapter 3.

Chapter 3: Methodology

This chapter outlines the study's research design, data collection approach, and data analysis. A quantitative methodology was employed to investigate the research questions, specifically a causal-comparative research design. A causal-comparative design was used for this study as it allows for comparing the outcome of two or more groups (Creswell & Gutterman, 2019). Based on the research questions, the study sought to know the performance related to value-added by traditional and nontraditional schools to the outcome of students from primary and preparatory schools. Therefore, looking at the outcomes for these groups, data were considered after the fact, and I was not manipulating any condition to see its effect on the variables confirmed the appropriateness of choosing a causal-comparative research design (Creswell & Creswell, 2018).

Research Approach

Valued-Added measures, despite their limitations, provide a practical approach for measuring the effectiveness of schools and offers insight into how well high schools in Jamaica have been preparing students to satisfactorily complete the CSEC exams and earn the CSEC certificate (Patterson, 2021). Based on the literature, the study used a value-added model inclusive of a Contextual Value-Added Model (CVA) to measure the value added by schools based on the prior attainment of students on the GSAT test and their expected outcome on the CSEC examination. A series of advanced statistical approaches, described below, was used to address the five research questions for the study. The specifics of the statistical approaches are outlined in the data analysis subsection.

Research Questions

The research questions for the study are:

1. What is the value being added to student outcomes by traditional versus nontraditional high schools in Jamaica?
2. What is the expected value that should be added by a school, given the profile of its students?
3. How do traditional high schools compare in their value-added between students from primary and preparatory schools?
4. How do traditional and nontraditional high schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?
5. How do students from preparatory and primary schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?

Participants and Data Sources

The study uses an extant database, and the data for the study is based on the attainment data of Jamaican high school students for GSAT and CSEC from 2001 to 2019 collected by the IDB. An estimated 40,000 students in Jamaica sit the CSEC exam each year ("Get into the CXC Data," 2022; MOEYI, 2020). The dataset contains 805,336 cases, including data for 668 schools and 793 variables.

The dataset links student data for the Grade 4 Literacy Test (G4LT), Grade Nine Assessment Test, GSAT, CSEC, and CAPE. The variables relating to G4LT, Grade Nine Achievement Test, and CAPE will not be considered for the study. The variables for the study

include a unique identifier for student, GSAT cohort, sex, primary level school attended, parish of the primary level school, primary school type, GSAT results for Mathematics, Science, Composition, Language Arts, high school allocated based on GSAT results, high school type, high school code, CSEC results by subject, the number of subjects taken, and the percentage of students achieving the CSEC certificate at the school. GSAT results are reported as percentages except for Composition, which is reported as a score out of 12. The resulting average for each GSAT subject is reported as the GSAT score. CSEC results are separated by column and are represented by 184 variables relating to CSEC subject performance, including the first year the subject was taken, the first year passed if taken more than once, and the best grade the student received in the subject if taken more than once. There are 36 unique CSEC subjects that Jamaican students have sat over the 18 years under review.

Data Collection

The data in the extant database were collected from the Ministry of Education Jamaica (MOEJ) over 3 years by the IDB as part of the multilateral's work on Jamaica. The data housed by the IDB belongs to the MOEJ, and the IDB staff had to sign a privacy agreement to access the data. The data are stored on secure servers at the agency.

Contact was made with the gatekeeps at the MOEJ in the form of the Permanent Secretary of the MOEJ, who is the chief accounting officer and represents the highest-ranking civil servant in the ministry. I also contacted a director at the IDB, who oversees Jamaica, to provide permission to access the data with the permission of the Permanent Secretary. The data were received as a Stata file. The file was then password protected and stored on an encrypted hard drive. Only the anonymized data were requested and received from the IDB and the MOEJ. The anonymized data provided anonymity and confidentiality for the students whose data are

contained in the dataset. Confidentiality and anonymity were not a concern for the schools involved in the study as the school rankings are often in the public domain and constitute a matter of public concern. Also, the Patterson report has ranked schools based on the same dataset (Patterson, 2021).

Data Analysis

As stated earlier, the data were received as a Stata file and converted to SPSS as this was the software available to conduct the analyses. The variables in the dataset were reduced to focus on the ones pertinent to the analysis needed to answer the research questions. The primary variables used are the average GSAT and CSEC Quality Score (CQS). The CQS represents the CSEC results of each student based on the quality of their overall performance on the exam. Details about how the CQS was calculated for each student are explained in the approach to answering research question one. The specific variables used at the different levels are outlined in the figures below.

The data analysis for the five research questions was conducted using statistical tests such as linear regression, two-stage least squares regression models, Independent Samples *t*-test, Analysis of Variance (ANOVA), and descriptive analytics information. The data sources and statistical tests used are outlined in Table 3. The approach to answering each research question and how the variables were used are described below.

Table 3

Research Questions, Sources, and Analytical Approach

Research Question	Sources	Analysis
What is the expected value that should be added by a school, given the profile of its students?	GSAT score, GSAT cohort, sex, primary level school type (primary/preparatory), parish of the primary level school, and CQS.	Linear Regression, Two-Stage Least Squares Regression, and Descriptive Analytics.
What is the value being added to student outcomes by traditional versus nontraditional high schools in Jamaica?	GSAT score, GSAT cohort, sex, primary level school type (primary/preparatory), parish of the primary level school, secondary level school type (traditional/nontraditional), and CQS.	Linear Regression, Two-Stage Least Square Regression, Independent Samples t-test, and Descriptive Analytics.
How do traditional high schools compare in their value-added between students from primary and preparatory schools?	CQS, VA (value-added score with GSAT score only as predictor); CVA (contextual value-added score with GSAT as predictor, and sex, primary level school type, primary school parish, and GSAT cohort as controls); and SCVA (school contextual value-added score with GSAT score as a predictor and percentage of students taking five or more subjects along with the percentage of students achieving the CSEC certificate as controls.	Linear Regression, Two-Stage Least Square Regression, ANOVA, and Descriptive Analytics.
How do traditional and nontraditional high schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?	VA scores for Mathematics, Science, Language Arts, and secondary school types.	ANOVA, Descriptive Statistics.
How do students from preparatory and primary schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?	VA scores for Mathematics, Science, Language Arts, and primary school type.	ANOVA, Descriptive Statistics.

Note. GSAT = Grade Six Achievement Test; CSEC = Caribbean Secondary Examination Certificate; CQS = Caribbean Secondary Examination Certificate Quality Score; VA = Value Added; CVA = Contextual Value Added; SCVA = School Contextual Value Added

The dataset did not have variables for primary and secondary level school types, so these variables had to be created. The type of primary school was extracted using the school name, and the type of secondary school was determined using the guide from the Patterson report on the schools considered traditional versus those labeled nontraditional (Patterson, 2021). Where there was uncertainty in the primary school type, the school name was matched against the MOEJ's list of public schools (MOEYI, 2018, 2022). Basic descriptions were also used to provide context information, such as the number of students in the sample from primary and preparatory schools and traditional and non-traditional high schools.

The details of the approaches taken are outlined for each question in the sections that follow.

Research Question 1

To answer the question, "What is the expected value that should be added by a school, given the profile of its students?" different perspectives were taken to evaluate value-added. First, the CQS was calculated. The CQS is the student's overall performance based on their CSEC results. The CQS was calculated as the average of a student's CSEC results. CSEC results are reported from Grades 1–6; the lower the CQS, the better the student's overall performance.

A challenge in building the CSEC score was addressing the fact that many students did not take enough subjects to qualify for the CSEC certificate. Therefore, in theory, a student could have a good CQS based on the number of subjects taken but perform worst overall because they did not take enough subjects. A chi-square test was conducted on the data to see how many students did not take enough subjects to qualify for the CSEC certificate and if the difference in the number by groups (traditional vs. nontraditional) was statistically significant. This significant test indicated that eliminating cases with fewer than five CSEC exams would have significantly

affected the study results because a significantly higher proportion of nontraditional students did not sit for at least five exams. The results of the Chi-square tests are reported in Table 6 in Chapter 4.

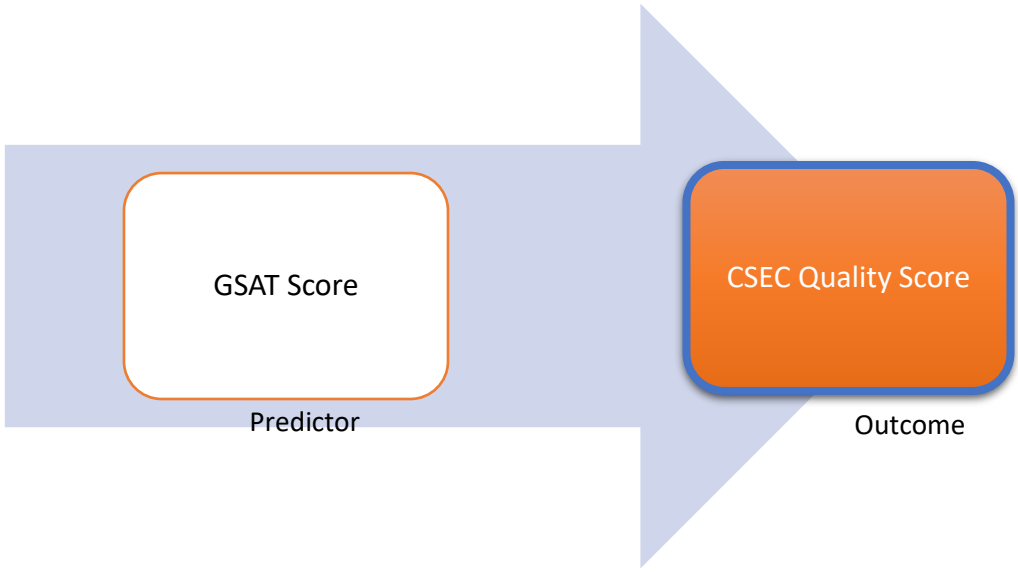
The question then turned to how to report the CQS in such a way that it showed the student's overall performance while considering the number of subjects sat if it is less than the required number to achieve a CSEC certificate. A grade between 1 and 3 represents a pass on a CSEC exam. A grade between 4 and 6 represents a failing grade. The grades of each subject were reverse-coded. For example, a grade of 1 became a grade of 6, and Grade 2 was recoded to Grade 5. This change made interpreting the findings easier as higher grades are generally associated with a stronger performance. With the recoded results, Grades 6-4 would be passes, and Grades 3-1 would be failing grades.

The decision was also taken to apply a penalty grade of two for each missing subject of a student. This decision assumed that the reason for a student not sitting the required number of subjects to achieve the CSEC certificate is that the student, parents, and or the school determined that the student would not have been successful in the subject and therefore entered them for fewer subjects to increase their chances of success. For example, if a student sat four subjects, a score of two was applied as the score for the fifth subject. A score of 2 was applied for the fourth and fifth subjects if the student sat only three subjects. These scores were then averaged with the results for the other subjects. The VA, CVA, and SCVA were calculated in three stages.

VA Model. The VA model used linear regression with GSAT score as the predictor and CQS as the outcome variables. The resulting predicted CQS was subtracted from the actual CQS to give each student value-added scores or VA.

Figure 1

Variables Used to Build the Value-Added Model at Stage 1

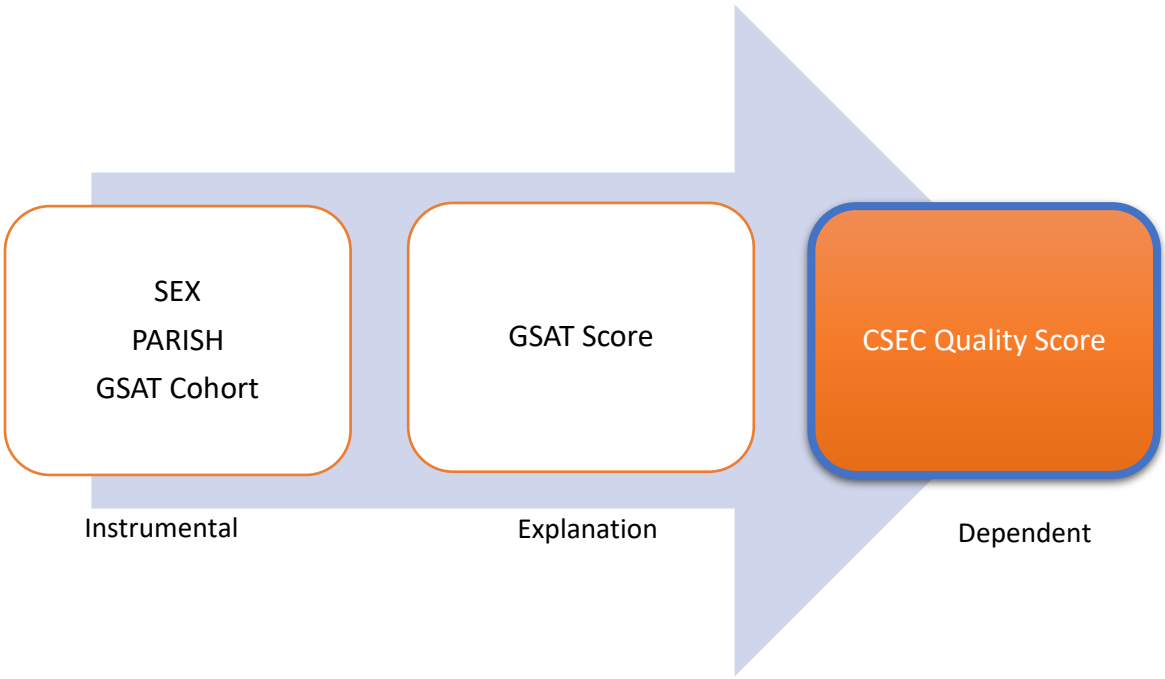


Note: GSAT = Grade Six Achievement Test; CSEC = Caribbean Secondary Examination Certificate

CVA Model. The CVA model provided a more contextual value-added result for the school based on some characteristics of the students. To do the stage two analysis, the GSAT score was again used as the predictor (explanation) variable and CQS as the outcome (dependent) variable while controlling for sex, parish, and GSAT cohort (instrumental variables). The selection of these control variables was primarily based on the work done by the Patterson commission (Patterson, 2021). However, the parish, primary, and GSAT cohort variables are confounded, with all the students in the same school sharing those characteristics. Therefore, in keeping with the statisticians who worked on the Patterson commission, a two-stage least squares regression analysis was used to calculate the CVA (Beuermann, 2021).

Figure 2

Variables Used to Build the Contextual Value-Added Model at Stage 2

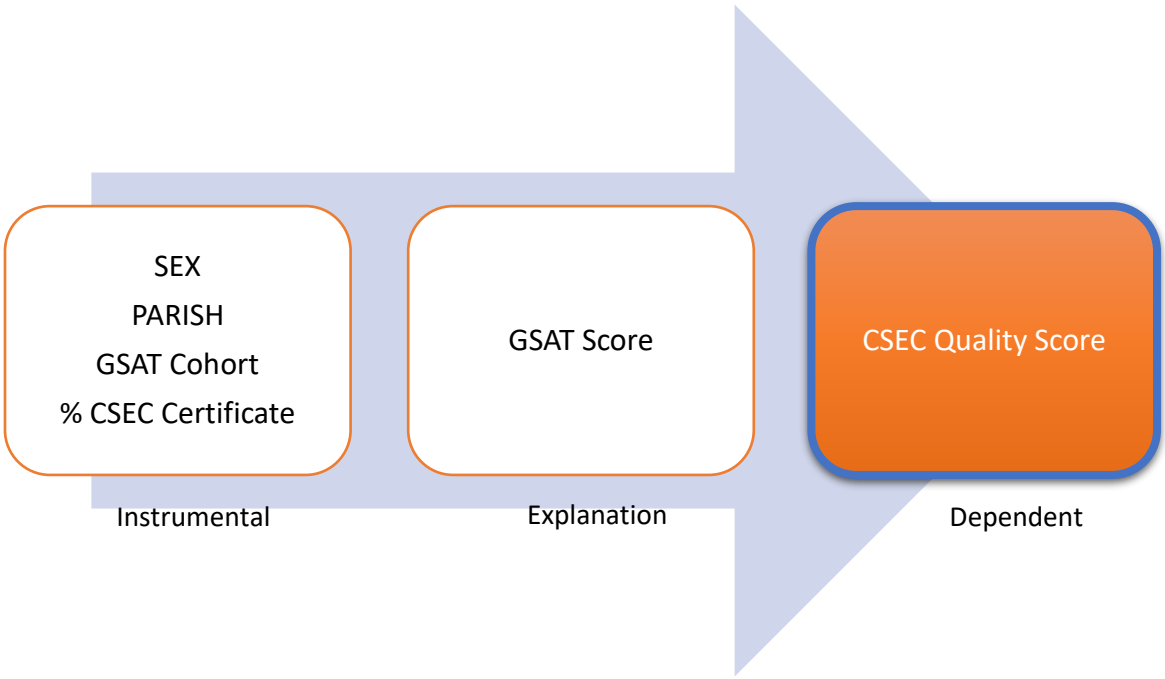


Note: GSAT = Grade Six Achievement Test; CSEC = Caribbean Secondary Examination Certificate

SCVA Model. The SCVA model focused on calculating the SCVA. Similar to CVA, the GSAT score was again used as the predictor (explanation) variable and CQS as the outcome (dependent) variable. In this instance, however, I included the percent achieving the CSEC certificate as one of the control variables (instrumental variables). It is important to point out that the three models were built at the individual level with the data for VA, CVA and SCVA and then rolled up to give the school-level data. A two-stage least squares regression model was also used to calculate the predicted CQS and subsequent SCVA by subtracting the actual CQS from the predicted CQS calculated using this model**.**

Figure 3

Variables Used to Build the School Contextual Value-Added Model at Stage 3



Note: GSAT = Grade Six Achievement Test; CSEC = Caribbean Secondary Examination Certificate

Research Question 2

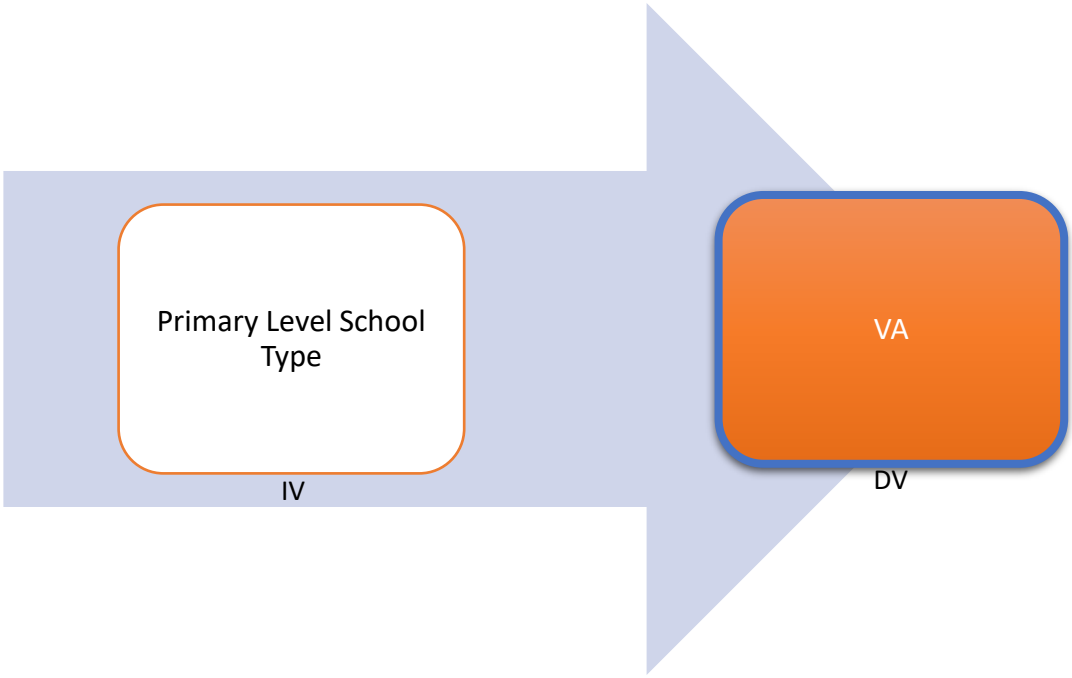
To answer Research Question 2, "What is the value being added to student outcomes by traditional versus nontraditional high schools in Jamaica?" The data for the CQS, VA, CVA, and SCVA were calculated and reported in a table. The difference between students' performance from traditional and nontraditional high schools was compared using an Independent Samples t-test. A composite ranking was prepared for students from traditional high schools. A separate list for nontraditional high schools was generated based on the schools ranking according to CQS, VA, CVA, and SCVA.

Research Question 3

The third research question asked, "How do traditional high schools compare in their value-added between students from primary and preparatory schools?" Due to time constraints and to reduce the complexity of the analysis, I decided to focus only on the VA while looking at the differences between the performance of students from primary and preparatory schools at traditional and nontraditional high schools. Given that primary and preparatory exist at the individual level, this analysis occurred at the individual level. A one-way ANOVA statistical test was conducted at the individual level using primary school types as the independent variables and VA score as the dependent variable.

Figure 4

Variables Used to Conduct the ANOVA on School Types and Value-Added Score



Note: VA = Value-Added; IV = Independent Variable; DV = Dependent Variable.

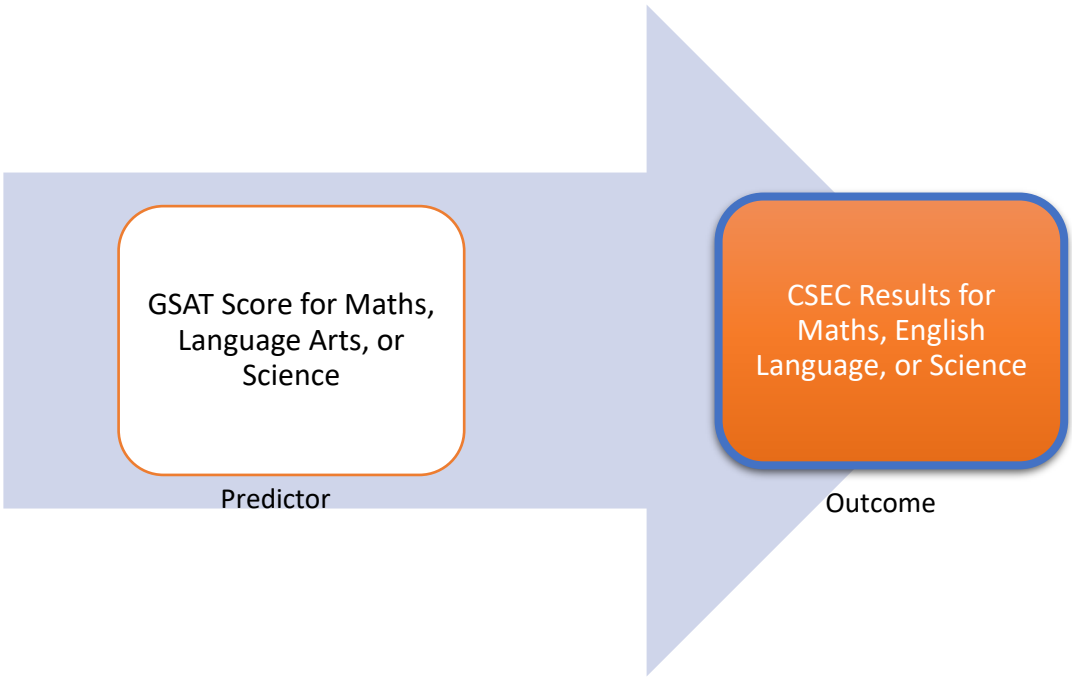
Research Question 4

Research Question 4 asks, “How do traditional and nontraditional high schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?” This question was answered using the primary and secondary level school type, GSAT scores for Mathematics, Language Arts, and Science, and VA scores for Mathematics, English Language, and Science. The VA scores were calculated similarly to the approach outlined in Stage one for research question one.

Calculating the CSEC Science score posed a challenge in that though there is one Science course at GSAT, students can sit any of seven science subjects depending on the offerings at their school. In some cases, a student sits on more than one science subject. For simplicity, the best science subject score was used for all students who sat a science subject. For example, suppose a student sat Biology and Agricultural Science and received a Grade I in Agricultural Science but a Grade II in Biology. In that case, the Agricultural Science grade was used in the calculation. The VA model for science was built by selecting only the data for students that took a science subject and using linear regression. A similar VA approach was used for Mathematics and English. After calculating the VA scores for each student, an ANOVA statistical test was performed using the secondary school type as the independent variable and the VA for CSEC Mathematics, English, and Science as the dependent variables. CSEC offers English as two subjects: English A for English Language and English B for English Literature. English A was used as the outcome for the English VA model, and GSAT Language Arts for the predictor.

Figure 5

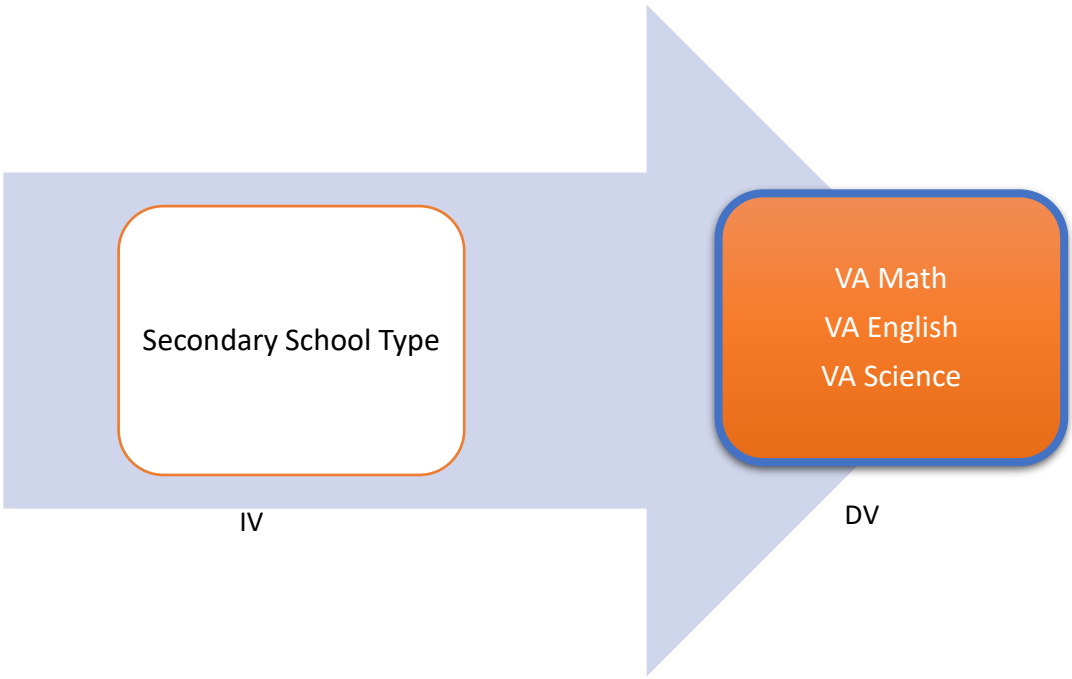
Variables Used to Build the Value-Added Model to Answer Research Questions 4 and 5



Note: GSAT = Grade Six Achievement Test; CSEC = Caribbean Secondary Examination Certificate

Figure 6

Variables Used for ANOVA Statistical Test to Answer Research Question 4



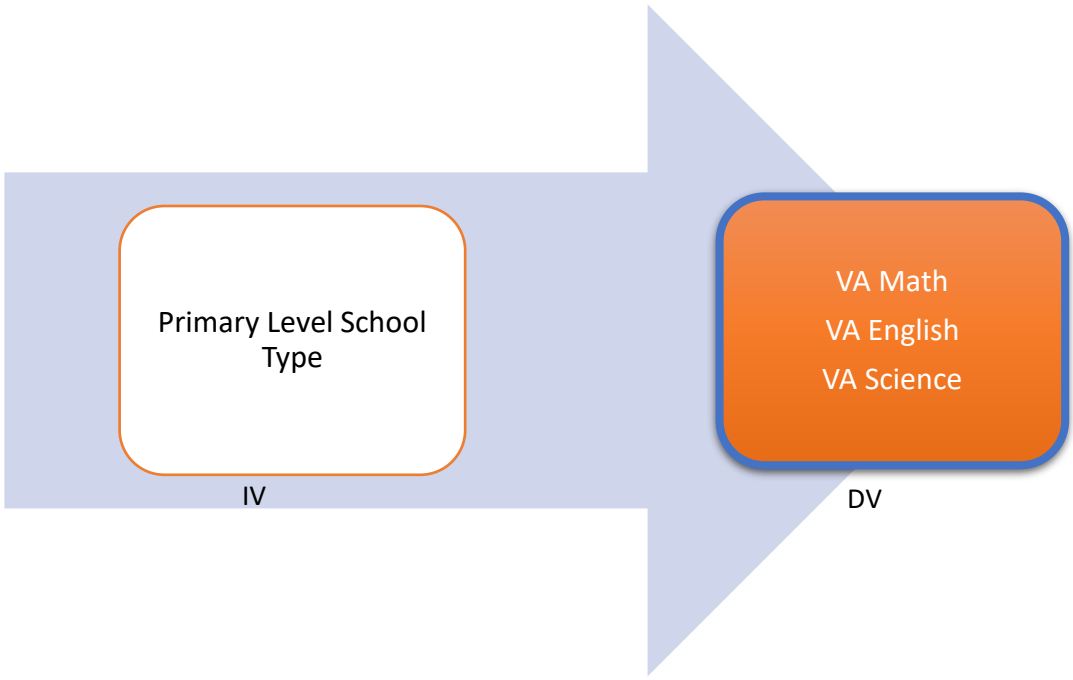
Note. ANOVA is the Analysis of Variance statistical test. VA = Value-Added; IV = Independent Variable; DV = Dependent Variable

Research Question 5

The final research question asks, "How do students from preparatory and primary schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?" The same VA model used to answer Question 4 was used to answer this question, and an ANOVA statistical test was conducted. However, the primary-level school type was the independent variable in this instance. Figure 7 outlines the variables used in the ANOVA.

Figure 7

Model for the Analysis of Value-Added Outcomes For Math, English, and Science Based on Primary Level School Type



Note: GSAT = VA = Value-Added; IV = Independent Variable; DV = Dependent Variable.

Ethical Considerations

Ethical issues must be considered when designing your research approach. Issues relating to scientific integrity, protecting human rights and dignity, and providing meaningful information to society are critical ethical issues for consideration when designing a study (Bhandari, 2022). Ethical considerations relating to scientific integrity for this study involved paying attention to my academic values concerning honesty, reliability, and credibility, focusing on the quality of the research methods that are applied and the researchers' ethical standards (L. Cohen et al., 2011; Institute for Employment Studies, 2004; Kaiser, 2019). To improve the study's credibility, the study received IRB approval. Care was taken to report the study results and write the implications fairly and credibly based on the evidence in the results. A journal was

kept of all steps taken in carrying out statistical steps. Decisions were discussed with my chair to ensure that the best statistical approach was taken to improve the statistical findings' reliability and eliminate or reduce any bias. All findings reported were directly connected to the results, with care taken that the conclusions were not driven by my preconceived notions and assessment based on my involvement at one of the elite schools in the country (Kaiser, 2019). Statistical tests were conducted to verify that the regression models' assumptions were not violated. These assumptions include linearity, normality of errors, homoscedasticity, independence of errors, lack of multicollinearity, and model specification. Residual plots, histograms of errors, Q-Q plots, Durban-Watson, Variance Inflation Factor, and Tolerance were used to detect any problems with the violation of the assumptions of the regression models.

The protection of the human rights and dignity of the participants were dealt with through the principle of not harming, seeking informed consent, and protecting the participants' anonymity and confidentiality (Bhandari, 2022; Cacciattolo, 2015; Kaiser, 2019). There were no direct participants for this study as the data is being used from an extant data source. However, since informed consent is not possible, and the database is not publicly available, extra care was taken to ensure that the data received from the gatekeepers were anonymized at the level of the student. As indicated in the data collection section, the data is kept on a secure, encrypted, password-protected computer. The raw data was only available to my supervisor and me. This increases the privacy and anonymity of the students.

To protect the integrity of the study, clear initiatives were taken to prevent unworthy conditions in the form of scientific misconduct and academic dishonesty. Several measures were enacted, as described above, to strengthen the ethical way the study was conducted. These include protection of the participant's identity, anonymity, and, thus, privacy. These controls

outlined in the study aid the reliability of the results and increase the credibility of the findings and implications of the study. By implementing clear initiatives and methods incorporated into the study's design to prevent academic dishonesty and scientific misconduct in the study, the academic integrity of the study is increased (Kaiser, 2019).

Limitations

An important limitation of the study is the absence of PATH data in examining students' performance from low SES backgrounds. Access to the PATH data would have provided a more accurate picture of the students from low SES and their performance in elite high schools. However, given that the PATH data was unavailable, the performance of students from primary schools is being used as a substitute for low SES. Though most students from primary schools are from low SES backgrounds, it is essential to note that a few primary schools do have students from the middle class who make up their populations.

Another limitation of the study is that certain contextual information that would make the CVA model more accurate is unavailable because the MOEJ does not request such data from parents or make that kind of data available. These include data such as the mother's educational background, the father's educational level, and other sociodemographic variables. These would have made for an even more compelling CVA. However, the data was not available for inclusion.

Another limitation of the study is the challenges associated with the sitting of the exam and the number of students who sat for less than five subjects. This issue gave rise to the penalty scores, which had implications for the findings.

Delimitations

While this is an intriguing study to conduct for future research, it was omitted from this study to keep the scope manageable, and the fact that it would have proved challenging to get access to the data needed to conduct that part of the research. A delimitation of the study is that it focuses on the value being added by public high schools in Jamaica. It does not include the value-added schools at the primary level or in private schools. Also, primary-level schools operating a pseudo-secondary program will be omitted from the study—for example, All-Aged Schools. All-aged schools end at Grade 9 and do not enter students to sit CSEC, limiting an essential component of analysis.

Another delimitation of the study is that I decided not to include the CAPE results in the analysis. Fewer than 50% of Jamaican High schools have a sixth-form program that allows students to sit CAPE subjects. Given that significantly fewer schools would have CAPE data for the analysis, I decided to exclude that from the study. A third delimitation of the study is not including the G4LT and GNAT in the analysis. The reason for their omission is again to keep the scope of the study manageable. Although G4LT data should be available for all the cases in the dataset and would allow for valuable future consideration of the performance of these schools, including the data would have added a level of complexity to the study that is not needed to answer the research questions posed. The GNAT exam is taken by fewer than one-third of all high school students; therefore, too many cases would have missing data for this variable to be helpful.

Assumption

I assumed that the performance of the students from primary school is enough to give a picture of the performance of students from a low SES background, given that most of the

students in primary schools are from the lower middle and poor socioeconomic classes (CAPRI, 2012, 2014; Sewell & Henry-Wilson, 2021). The use of the CSEC quality score provides a greater variability in the data that will allow for a better indication of the performance of elite schools than the method used by the Patterson commission.

Chapter 4: Analysis of Results

Before addressing the research questions, descriptive statistics were used to verify that the variables considered irrelevant to the analysis were removed, including 23 variables related to CAPE results. The total number of variables removed was 453. Descriptive statistics were then used to verify the dataset. The dataset was analyzed for missing records, and records with no CSEC results were deleted. Some primary-level schools were classified as special schools, with the students in these schools having particular needs ranging from physical disabilities to learning challenges. Given the unique circumstances of the students in these schools, I decided not to include these schools in the analysis so that the CSEC performance of these students would not skew the results of the primary schools.

The literature suggests that aggregated data, such as those at the school level, should be based on having a minimum of 20 persons per school (J. Cohen, 1988; Hair et al., 2019; Nitta et al., 2009). However, in keeping with the approach taken in the Patterson report and to further improve the reliability and confidence in the results, schools with less than 100 persons were eliminated from the study. All these changes resulted in 439,394 cases of the original 805,336 remaining and used in the analysis. The changes also resulted in 251 schools remaining out of 668 schools in the original dataset. The demographics of the dataset are described in Table 4 below. Females accounted for a little less than 60% of the cases in the final dataset, with approximately equal numbers between traditional and nontraditional high schools. Males accounted for 40.9% of the cases at traditional high schools and 42.8% at nontraditional high

schools. Most cases were from a primary school background, with 80% of the cases at traditional high schools being from a primary school background and 96.2% at nontraditional high schools. Most cases from a preparatory school background were at nontraditional high schools. This demographic information is not surprising given that students from a preparatory school background generally do better than those from a primary school background on GSAT and therefore are more likely to be placed at a traditional high school.

Table 4

Demographics for Final Dataset

Secondary School Type		GSAT: Sex			Primary School Type		
		Male	Female	Total	Primary	Preparatory	Total
Traditional High School	N	55,268	79,786	135,054	108,011	27,043	135,054
	%	40.9%	59.1%	100.0%	80.0%	20.0%	100.0%
Non-Traditional High School	N	130,142	174,198	304,340	292,678	11,662	304,340
	%	42.8%	57.2%	100.0%	96.2%	3.8%	100.0%
Total	N	185,410	253,984	439,394	400,689	38,705	439,394
	%	42.2%	57.8%	100.0%	91.2%	8.8%	100.0%

Note. GSAT Sex is the sex of the students who sat the Grade Six Achievement Test

Basic Descriptive Factors

The data reduction resulted in 251 schools, totaling 42 traditional high schools and 209 nontraditional high schools. Based on the remaining data, 80% of the students in traditional high schools are from a primary school background, compared to 20% being from a preparatory school. On the other hand, 96.2% of students in the dataset at nontraditional high schools are from a primary school background compared to 3.8% from preparatory school. A breakdown of the data is outlined in Table 5.

Table 5

Number of Traditional and Nontraditional High Schools

High School	*N*	%
Traditional	42	16.7%
Nontraditional	209	83.3%

Number of Students Sitting Five or More Subjects

Upon closer examination of the dataset, one of the curious findings was that a significant number of students did not take enough subjects to qualify to achieve the CSEC certificate. The number of cases in the dataset where students sat for fewer than five subjects was greater for nontraditional high schools than traditional high schools and greater for students from a primary school background than those from a preparatory school background. A chi-square test was conducted to verify the significance of the differences in this number between the two groups of students from traditional and nontraditional schools, and it proved to be significant. The results of the analysis are outlined in Table 6.

Table 6

Results of the Chi-Square Test of Students Taking Five or More Subjects

School Type	No		Yes	
	N	%	*N*	%
Primary	178,066	44.4	222,623	55.6
Preparatory	8,019	20.7	30,686	79.3
Total	186,085	42.4	253,309	57.6
Traditional HS	17,990	13.3	117,064	86.7
Nontraditional HS	168,095	55.2	136,245	44.8
Total	186,085	42.4	253,309	57.6

The CQS score served the dual role of indicating the overall quality of a student's CSEC results and whether the CSEC certificate was achieved. As can be seen by the frequencies cross-tabulated in Table 6, there is a significant relationship between the number of students who took five or more CSEC subjects for primary and preparatory schools, $\chi 2$ (1, N = 439,394) = 8,135.01, $p < .001$. The result was also significant for traditional and nontraditional high schools, $\chi 2$ (1, N = 439,394) = 67,303.27, $p < .001$. Given this information's statistical significance, the cases with less than five CSEC subjects could not be removed from the analysis, as explained in the methodology section. This finding created the rationale for the penalty approach used in calculating the CQS. As explained in the methods section, a penalty score of five was applied to each student with fewer than five subject scores. For example, where a student only sat three subjects, two 5s were included in the calculation of the CQS, reflecting a failing grade in two subjects. This decision was taken with the assumption that students who took fewer than five subjects are because school leaders assume that they cannot manage the academic load. It would result in them doing poorly overall if allowed to sit additional subjects. The penalty was added before the results were recoded and the regression models ran.

The remaining cases were examined for skewness and kurtosis and found to be within the acceptable range of normality.

Research Question 1

The first research question sought to answer the question: *What is the expected value that should be added by a school, given the profile of its students?* Three value-added models were built to generate a value-added score (VA), contextual value-added score (CVA), and school value-added score (SCVA) for each student. These scores were then rolled up to produce the

three value-added scores for each school. The formula for the regression models used in the three stages is outlined below. A detailed listing of the results of value-added scores for each school is shown in Appendix A.

VA Model

The formula represents the predicted value for stage one: $\hat{y} = \beta 0 + \beta 1x$ for a given value of x. Where: $\hat{y}$ is the predicted CQS, x is a given GSAT score, β0 is the y-intercept, and β1 is the slope. The VA score was then calculated using the formula: VA = CQS – predicted CQS. GSAT scores significantly predicted the CQS for students, b = .05, $t(411{,}877) = 597.2$, $p < .001$. GSAT scores also explained a significant proportion of the variance in CQS, $R^2 = .46$, $F(1, 411{,}876) = 356{,}647.64$, $p < .001$. Checks were conducted to verify that the assumptions of the regression (linearity, normality of errors, homoscedasticity, independence of errors, and model specification) were not violated. The assumptions were not violated. Details are in Tables 7 and 8 below.

CVA Model

The formula represents the predicted value for Stage 2: $\hat{y} = \beta 0 + \beta 1x1 + \beta 2x2 + \ldots + \beta nxn$, for a given value of x. Where: $\hat{y}$ is the predicted CQS, x1 is a given GSAT score, β0 is the estimated mean CQS when all the predictors are 0, and β1, β2… are the change in CQS per change in GSAT score and the contextual variables. The contextual variables are Sex, GSAT Cohort, and Parish. The CVA score was then calculated using the formula: VA = CQS – predicted CQS. GSAT scores, sex, and GSAT cohort also explained a significant proportion of the variance in CQS, $R^2 = .48$, $F(16, 411{,}861) = 23{,}466.58$, $p < .001$. Checks were conducted to verify that the assumptions of the regression (independence of observations, no outliers, model

specification, error of variance, and error terms normally distributed) were not violated. The assumptions held. The results are summarized in Tables 7 and 8 below.

SCVA Model

The predicted value for stage three was calculated at the school level and is represented by the formula: $\hat{y} = \beta 0 + \beta 1x1 + \beta 2x2 + \ldots + \beta nxn$, for a given value of x. The school contextual value-added (SCVA) score was then calculated using the formula: SCVA = $y - \hat{y}$. Mean GSAT scores and the mean percent of students with the CSEC certificate significantly predicted the CQS for students. Mean GSAT scores and the mean percent of students with the CSEC certificate also explained a significant proportion of the variance in CQS, $R^2 = .52$, $F(17, 411{,}860) = 26{,}194.95$, $p < .001$. Checks were conducted to verify that the assumptions of the regression (linearity, normality of errors, homoscedasticity, independence of errors, and model specification) were not violated. The assumptions generally held though there was a slight curving in the regression plots generated. See Tables 7 and 8 for the detailed results.

Table 7

Regression Results for VA, CVA, and SCVA

Models	R^2	*F*	*p*	*df*1	*df*2
VA	.46	356,647.64	<.001	1	411,876
CVA	.48	23,466.58	<.001	16	411,861
SCVA	.52	26,194.95	<.001	17	411,860

Note. VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

Table 7 shows the overall results of the regression models. All the models were significant. The VA model, based on its R2 value, accounted for 46% of the variability in the

prediction of the CQS. The CVA and SCVA models accounted for more of the variability in the prediction at 48 and 52%, respectively. The CVA model did not add much to the prediction, with no contextual factors accounting for any substantial change in the variability, as shown in Table 8 below.

Table 8

Coefficients of the Regression Analysis for Value-Added, Contextual Value-Added, and School Contextual Value-Added

Model	Variables	*B*	SEB	β	*t*	*p*
VA	GSAT: Avg Raw Score	0.052	0.000	0.681	597.20	<.001
CVA	GSAT: Avg Raw Score	0.053	0.000	0.686	587.04	<.001
	GSAT: Sex	0.191	0.002	0.089	78.71	<.001
	GSAT: Cohort	-0.007	0.000	-0.026	-22.62	<.001
	GSAT Parish Kingston	-0.125	0.006	-0.026	-21.12	<.001
	GSAT Parish St Thomas	-0.050	0.007	-0.009	-7.29	<.001
	GSAT Parish Portland	0.048	0.007	0.008	6.54	<.001
	GSAT Parish St Mary	0.057	0.006	0.011	8.89	<.001
	GSAT Parish St Ann	0.030	0.005	0.007	5.75	<.001
	GSAT Parish Trelawny	0.089	0.008	0.014	11.53	<.001
	GSAT Parish St James	-0.081	0.005	-0.020	-15.55	<.001
	GSAT Parish Hanover	-0.093	0.008	-0.014	-11.51	<.001
	GSAT Parish Westmoreland	-0.051	0.006	-0.011	-8.61	<.001
	GSAT Parish St Elizabeth	-0.037	0.006	-0.008	-6.45	<.001
	GSAT Parish Manchester	0.087	0.005	0.020	15.92	<.001
	GSAT Parish St Andrew	-0.073	0.004	-0.027	-18.49	<.001

Model	Variables	*B*	SEB	β	*t*	*p*
	GSAT Parish Clarendon	0.096	0.005	0.027	20.40	<.001
SCVA	GSAT: Avg Raw Score	0.032	0.000	0.411	225.73	<.001
	GSAT: Sex	0.213	0.002	0.100	91.74	<.001
	GSAT: Cohort	0.001	0.000	0.003	2.59	0.010
	GSAT Parish Kingston	-0.132	0.006	-0.028	-23.20	<.001
	GSAT Parish St Thomas	-0.020	0.007	-0.004	-3.07	0.002
	GSAT Parish Portland	0.082	0.007	0.013	11.58	<.001
	GSAT Parish St Mary	0.066	0.006	0.013	10.71	<.001
	GSAT Parish St Ann	0.031	0.005	0.007	6.05	<.001
	GSAT Parish Trelawny	0.095	0.007	0.015	12.90	<.001
	GSAT Parish St James	-0.078	0.005	-0.020	-15.77	<.001
	GSAT Parish Hanover	-0.029	0.008	-0.004	-3.68	<.001
	GSAT Parish Westmoreland	-0.013	0.006	-0.003	-2.26	0.024
	GSAT Parish St Elizabeth	-0.010	0.006	-0.002	-1.79	0.074
	GSAT Parish Manchester	0.064	0.005	0.015	12.20	<.001
	GSAT Parish St Andrew	-0.096	0.004	-0.035	-25.26	<.001
	GSAT Parish Clarendon	0.080	0.004	0.023	17.77	<.001
	% Achieving CSEC Cert	0.013	0.000	0.342	191.15	<.001

Note. VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

Summary of Findings for Research Question 1

The R^2 for VA, CVA, and SCVA regression models were .46, .48, and .52, respectively, indicating 46%, 48%, and 52%, accounting for the variability in the predicted scores observed. The three value-added models produced similar though slightly different results for each school

in terms of their value-added. VA and CVA had standard deviations of .18 and .16, respectively. In contrast, SCVA had a standard deviation of .09. The standard deviations between the three models are very close, making them practically similar. The summary of the overall results is shown in Table 9. The correlation between VA and CVA was r(251) = .93, $p < .001$, CVA and SCVA r(251) = .43, $p < .001$, and VA and SVA r(251)=.38, $p < .001$, as outlined in Table 10 below. These findings further confirm the strong positive correlation between the VA and CVA models and the moderate correlation between the VA and SCVA and the CVA and SCVA models. The strong positive correlation between the VA and CVA models is not surprising, given the contextual data used to create the CVA model based on what was available in the dataset. I will elaborate more on this in the discussion section. The similarity in the models is a major factor leading to using the VA model only in the analysis for Research Question 3, as the findings would be the same. The skewness and kurtosis data indicate the normality of the results. The value-added result for each school is displayed in Appendix A.

Table 9

Summaries of CQS and Value-Added Scores for Each of the Three Stages

Model	*N*	Min	Max	*M*	*SD*	Skewness	Kurtosis
CQS	251	2.53	5.53	3.31	.77	.81	-.23
VA	251	-.48	.64	.01	.18	.66	1.1
CVA	251	-.41	.66	.01	.16	.94	1.98
SCVA	251	-.28	.32	-.02	.09	.27	.66

Note. CQS is on a different scale than the value-added scores. CQS = Caribbean Secondary Examination Certificate; VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

Table 9 shows the results of the correlation analysis for the three value-added models indicating how the models interact with each other. For comparison, the table also includes the CQS, which is the average CSEC results for a school. The CQS can range from 2.53 being the lowest to 5.53 being the best result. A school with all students receiving the highest results in the school would have a CQS of 6.

Table 10

Correlation Between CQS and the Three Value-Added Models

Model	*N*	CQS	VA	CVA
CQS	251	1		
VA	251	.33**		
CVA	251	.37**	.93**	
SCVA	251	.32**	.38**	.43**

Note. **p < .001. CQS is on a different scale than the value-added scores. CQS = Caribbean Secondary Examination Certificate; VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

Sample results showing data for the top three high schools and lowest three high schools performing schools based on their CQS are shown in Table 10.

Table 11

CQS, VA, CVA, and SCVA for the Schools With the Top Three and Lowest Score Three CQS

School Name	HS Type	GSAT	CQS	VA	CVA	SCVA
Campion College	T	75.32	5.53	0.60	0.66	0.32
Immaculate Conception High School	T	73.17	5.46	0.64	0.60	0.19
St Andrew High School For Girls	T	70.00	5.24	0.58	0.55	0.08
Retreat Primary And Junior High	NT	24.11	2.38	0.12	0.09	-0.12
Norman Gardens Primary And Junior High	NT	25.10	2.37	0.07	0.18	0.00
Braeton Primary And Junior High	NT	22.28	2.35	0.20	0.23	-0.01

Note. HS Type = High School Type; T = Traditional; NT = Nontraditional high school; CQS = Caribbean Secondary Examination Certificate (it is on a different scale than the value-added scores); VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

Table 11 and the more detailed in Appendix A show the GSAT score, CQS, and value-added scores for each school in the study. The tables show the average value-added score for each school based on each of the value-added models. A 0 score indicates that a school's value-added was as expected, given the GSAT score or other predictors. In other words, the schools actual and predicted CQS scores were the same. A negative value-added score indicates that the school's overall predicted CQS was less than expected. In contrast, a positive value-added score indicated that the actual CQS was better than expected based on the model. For example, as seen in the positive value-added scores for the VA, CVA, and SCVA models, Campion College performed better than expected on all three value-added models. On the other hand, Breaton Primary and Junior High performed better than expected using the VA and CVA models, but as expected when the CQS outcome was considered using the SCVA model.

Research Question 2

To answer Research Question 2: *What is the value being added to student outcomes by traditional versus nontraditional high schools in Jamaica?*, a composite rank of the value-added scores for each school was calculated given the similarity in the value-added score for each model. An overall ranking of each school was done using the composite value-added scores for each model and the school's rank based on their CQS. The result of the rankings is shown in Appendix B, with schools ordered by high school type and the overall ranking. Tables 12 and 13 show the top five traditional and nontraditional high schools.

Table 12

Top Five High Schools Based on Overall Rank (OR)

School Name	HS Type	OR	RCQS	ORVA	RVA	RCVA	RSCVA
Campion College	T	1	1	1	2	1	1
Immaculate Conception High School	T	2	2	2	1	2	5
St Andrew High School For Girls	T	3	3	6	4	3	32
Montego Bay High School	T	4	4	7	6	4	33
Wolmers High School For Girls	T	5	9	3	8	6	14

Note. HS Type = High School Type; T = Traditional; NT = Nontraditional; OR = Overall Rank; HS Type = High School Type; T = Traditional; NT = Nontraditional high school; RCQS = Rank by Caribbean Secondary Examination Certificate; RVA = Rank by Value-Added; RCVA = Rank by Contextual Value-Added; RSCVA = Rank by School Contextual Value-Added Models.

The top five schools based on the overall ranking OR were all traditional high schools. The SCVA model tended to result in a more conservative value-added score than the VA and CVA models, as shown in Tables 12 and Appendix A. The SCVA model, having controlled for the percentage of CSEC certificates in the predicted score, resulted in bigger differences in the ranking of schools than the other two models. The ORVA ranks schools based on the average

ranking of the three value-added models. The difference in the rankings based on the SCVA is explained by the difference in ranking observed in the ORVA and the other rankings. For example, Wolmers has an RVA of 8, an RCVA of 6, and an RSCVA of 14. When averaged and ranked against the other schools, it had an ORVA of 3.

The top five nontraditional high schools are shown in Table 13. It is of note that the top five nontraditional high schools have an OR less than 42, indicating that these five nontraditional high schools and others do better than some traditional high schools in added value for their students. In other words, these nontraditional high schools performed better than expected compared to some traditional high schools when their CQS and value-added models were considered.

Table 13

Top Five Nontraditional High Schools Showing Overall Rank

School Name	OR	RCQS	OVA	RVA	RCVA	RSVCA
Holland High School	17	53	5	13	15	6
Dunbeholden High	20	65	9	23	26	4
St. Elizabeth Technical	22	34	41	87	58	36
Dinthill Technical	25	36	52	74	54	80
Guys Hill High	25	83	5	15	17	2

Note. HS Type = High School Type; T = Traditional; NT = Nontraditional; OR = Overall Rank; HS Type = High School Type; T = Traditional; NT = Nontraditional high school; RCQS = Rank by Caribbean Secondary Examination Certificate; RVA = Rank by Value-Added; RCVA = Rank by Contextual Value-Added; RSCVA = Rank by School Contextual Value-Added Models.

Summary of Findings for Research Question 2

An Independent Samples t-test was conducted on the value-added scores for each of the three models to compare the value-added between traditional and nontraditional high schools. Table 14 shows the summary of the findings.

Table 14

Summary of Results for Independent Samples t-test on CQS and the VA models

VA Model	*M*	*SD*	*t*	*p*	*df*	Cohen's *d*
CQS						
Traditional	4.62	0.41	21.69	< .001	69.88	3.15
Nontraditional	3.04	0.52				
VA						
Traditional	.18	.25	5.25	< .001	46.79	1.25
Nontraditional	-.02	.15				
CVA						
Traditional	.18	.21	6.23	< .001	46.75	1.48
Nontraditional	-.03	.12				
SCVA						
Traditional	-.01	0.1	.85	< .4	249	.14
Nontraditional	-.03	0.09				

Note. CQS = Caribbean Secondary Examination Certificate (it is on a different scale than the value-added scores); VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

The findings of the Independent Samples *t*-test suggest that, in general, traditional high schools performed better overall than nontraditional high schools when their CQS was considered. All three models suggest that nontraditional high schools were performing lower than expected, but this was also true only for the traditional high schools using the SCVA model. Levene's test for equality of variance was significant for the VA and CVA models, so the t values reported were for equal variance not assumed for those two models. The VA and CVA

models suggest that traditional high schools generally added more value to their student's outcomes than nontraditional high schools, with effect sizes ranging from 3.15 to 1.48, respectively. This finding indicates a statistically significant difference between the two types of schools with a relatively large effect size. However, when the percentage CSECC achieved was controlled for in the SCVA model, there was no statistically significant difference in the value-added to student outcomes between traditional and nontraditional high schools. This interesting finding requires further investigation, especially considering the many students who did not sit for enough subjects to qualify for a CSECC.

Research Question 3

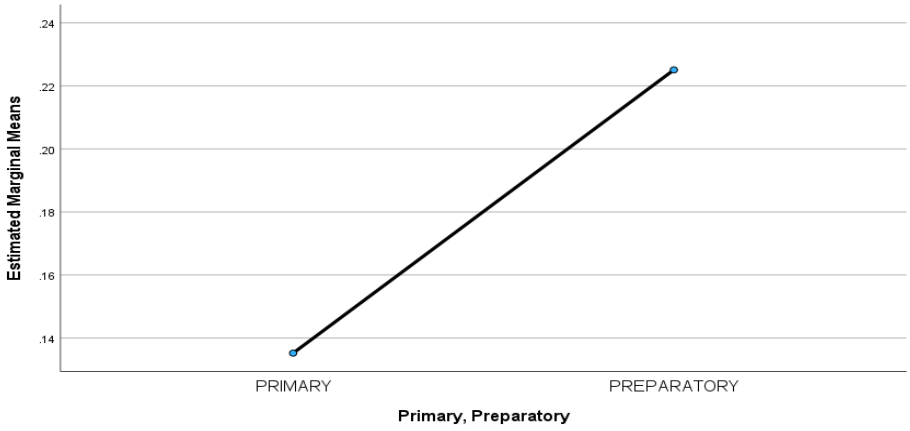
Research Question 3 sought to answer, *How do traditional high schools compare in their value-added between students from primary and preparatory schools?* To answer Question 3, a One-way ANOVA was used to compare the VA performance of the students from primary schools and those from preparatory schools. The analysis indicated that there is a statistically significant difference between the value-added to student outcomes for students from preparatory (M = .23, SD = .82) and those from primary schools (M = .14, SD = .80) at traditional high schools, $F(1, 125{,}324) = 249.73$, $p < .001$, $\eta^2 = .002$. The result suggests that traditional high schools generally added more value to preparatory school students than primary school students. However, the effect size was too small to be of any practical significance. There was a similar finding when the results of the top three traditional high schools were analyzed. For example, the ANOVA for Campion (the top ranked school) showed primary (M = .55, SD = .79), preparatory (M = .63, SD = .76), and $F(1, 2{,}634) = 7$, $p = .01$, $\eta^2 = .003$.

Figures 8 and 9 compare the mean value-added scores for students from a primary and preparatory school background using the VA and CVA models, respectively. The charts show

the consistency in the finding that students from a primary school background were likely to perform less than expected in terms of their predicted CQS compared to those from a preparatory school. The result was also the same when compared using the SCVA model. This result is not surprising given the correlation between the different models discussed in the subsection on Research Question 2.

Figure 8

Comparison of the VA Scores for Student Outcomes Based on Students' Primary Level School Backgrounds

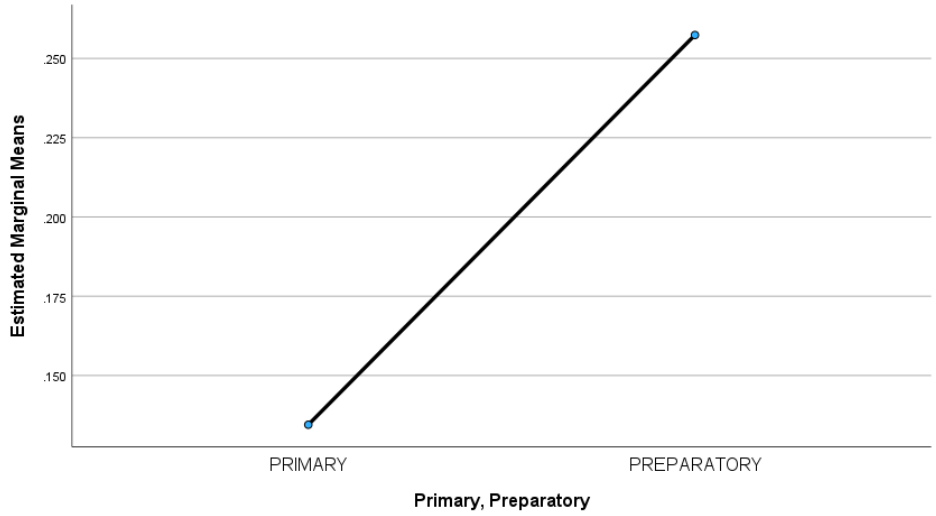


Note. VA is Value-Added.

The findings were similar when the contextual value-added scores were used in the ANOVA, $F(1, 125{,}324) = 488.03$, $p < .001$, $\eta^2 = .004$.

Figure 9

Comparison of the CVA Scores for Student Outcomes Based on Student's Primary Level School Backgrounds



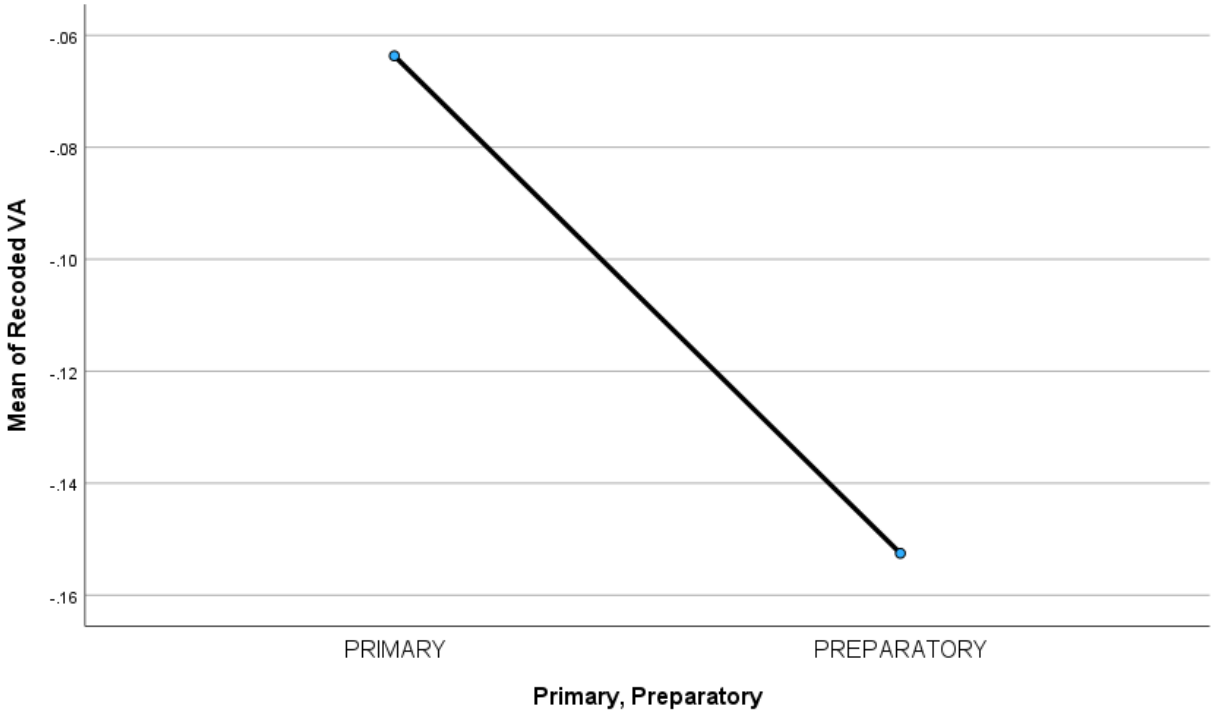
Note. CVA is Contextual Value-Added.

The results indicated that nontraditional high schools added more value to students from primary schools (M = -.06, SD = .74) over students from preparatory schools (M = -.15, SD = .78), $F_{Welch}(1, 11{,}675.8) = 135.54$, $p < .001$, $\eta^2 = .001$. Welch's robust test of equality of means was used as Levene's test for homogeneity was significant. The results suggest a statistically significant difference in the performance of students from a primary school background and those from a preparatory school background at nontraditional high schools. However, this instance's effect size is too small to have any practical significance. The finding that traditional high schools added more value to preparatory school students than primary school students was not surprising. The large dataset and massive difference in the number of cases relating to primary school students versus preparatory students might explain the statistically significant difference in the mean value-added scores. However, it is again important to point out the lack of

practical significance. I also analyzed the value-added scores of traditional versus non-traditional high school students from primary and preparatory backgrounds.

Figure 10

Comparison of the Contextual Value-Added Scores for Student Outcomes Based on Student's Primary Level School Backgrounds at Nontraditional High School



Note: VA = Value-Added

Figure 10 shows the mean value-added scores for students at nontraditional high schools from a primary school background versus those from a preparatory school background. The chart shows that regardless of the student's background, students at a nontraditional high school were likelier to have lower than expected predicted CQS based on the VA model.

Research Question 4

Research Question 4 asks, *How do traditional and nontraditional high schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?* An ANOVA was used to investigate this question. All three dependent variables were significant for Levene's test for homogeneity of variance. Results were therefore reported using Welch's robust tests. The summary of the results is displayed in Table 15. Diagrams of the mean plots are shown in Figures 11, 12, and 13.

Table 15

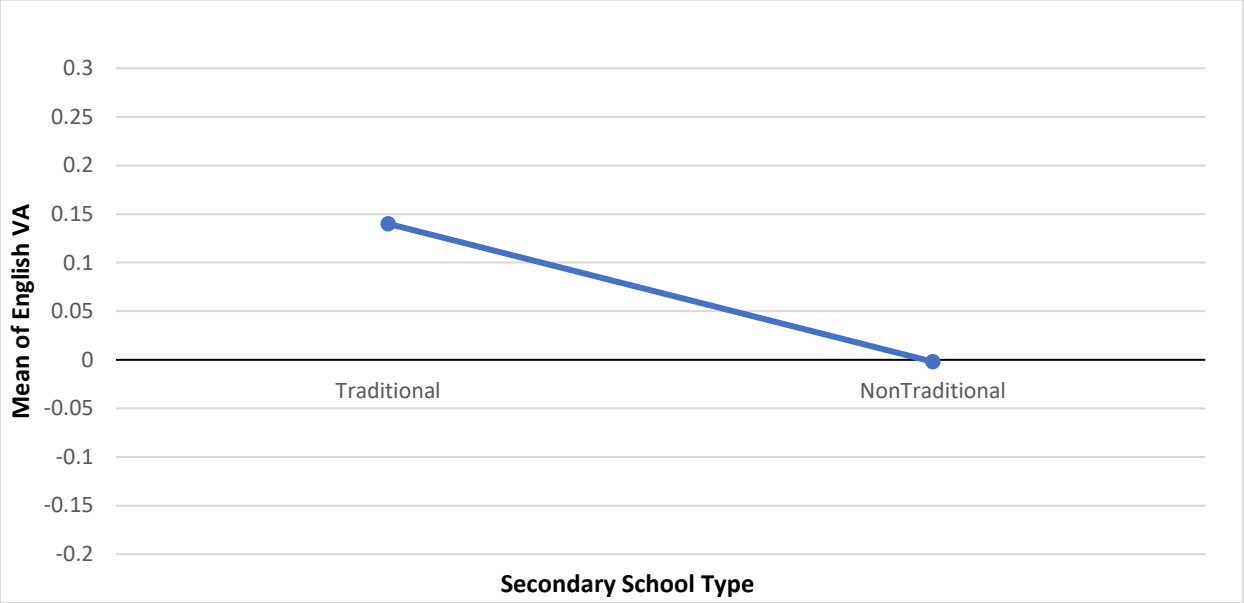
Summary of ANOVA Results for Comparison of Traditional and Nontraditional Schools Value-Added in Science, Mathematics, and English

VA Model	*M*	*SD*	F_{Welch}	*p*	*df*1	*df*2	η^2
VA English							
Traditional HS	0.14	0.21					
Nontraditional HS	-0.02	0.15	22.94	< .001	1	50.56	.12
VA Mathematics							
Traditional HS	.17	0.29					
Nontraditional HS	.03	0.21	8.69	.005	1	49.89	.05
VA Science							
Traditional HS	0.19	0.29					
Nontraditional HS	-0.11	0.21	40.39	< .001	1	50.28	.20

Note: HS = High School; VA = Value-Added; ANOVA = Analysis of Variance

Figure 11

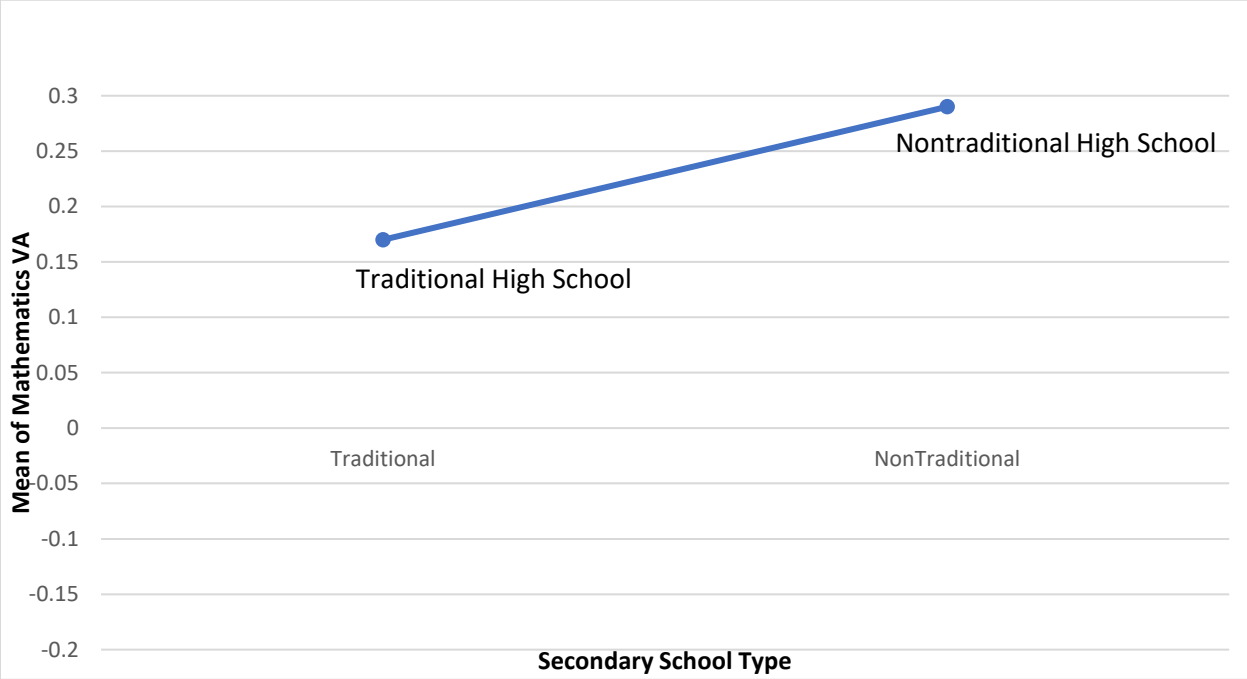
Comparison of the Value-Added Scores in English for Student Outcomes in Traditional and Nontraditional High Schools



Note: VA = Value-Added

Figure 12

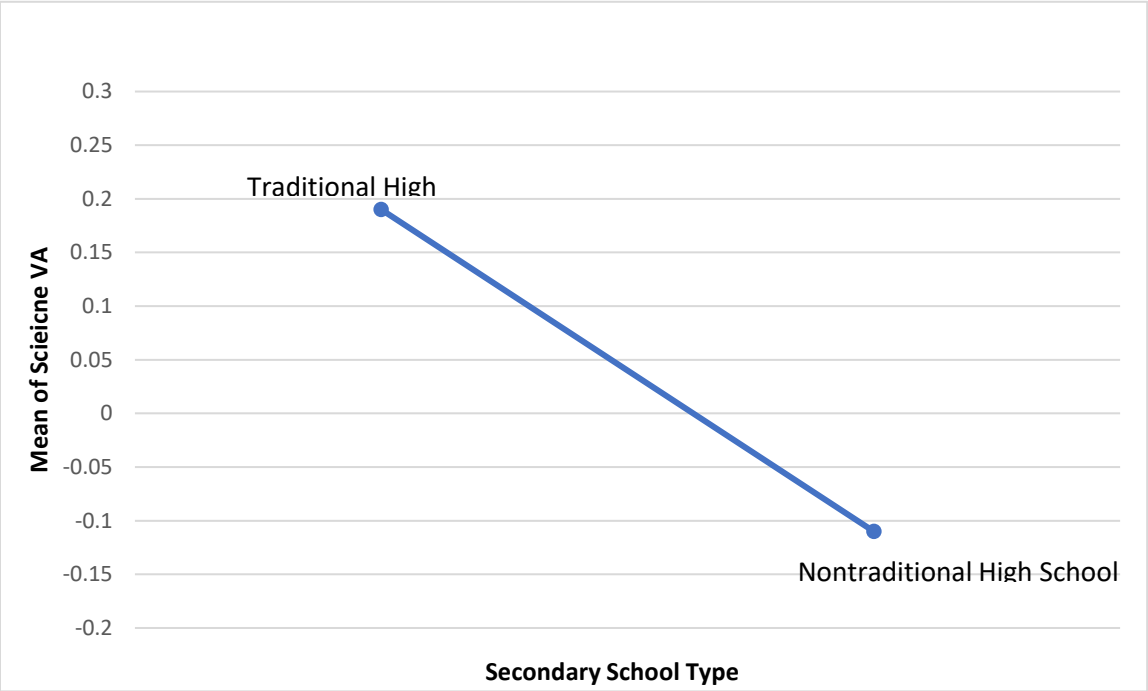
Comparison of the Value-Added Scores in Mathematics for Student Outcomes in Traditional and Nontraditional High Schools



Note: VA = Value-Added

Figure 13

Comparison of the Value-Added Scores in Science for Student Outcomes in Traditional and Nontraditional High Schools



Note: VA = Value-Added

The results indicate a statistically significant difference between traditional and nontraditional high schools' value-added to student outcomes in English, Mathematics, and Science. Traditional high schools generally added more value to English, Mathematics, and Science student outcomes. However, the effect size was small and therefore had little practical significance. Figures 11, 12, and 13 show that the value-added scores for nontraditional schools were below 0 for English and Science, with only Mathematics performing better than expected on the predicted CQS.

Research Question 5

Like Research Question 4, Question 5 sought to explore the value-added to outcomes in specific subject areas, but this time based on student background information. The question was, "How do students from preparatory and primary schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?" An ANOVA statistical test was again used to investigate this question. Similar to the test done in Question 4, all three dependent variables were significant for Levene's test for homogeneity of variance. Results were therefore reported using Welch's robust tests of equality of means. The summary of the results is displayed in Table 16. The regression mean plots are shown in Figures 14, 15, and 16.

Table 16

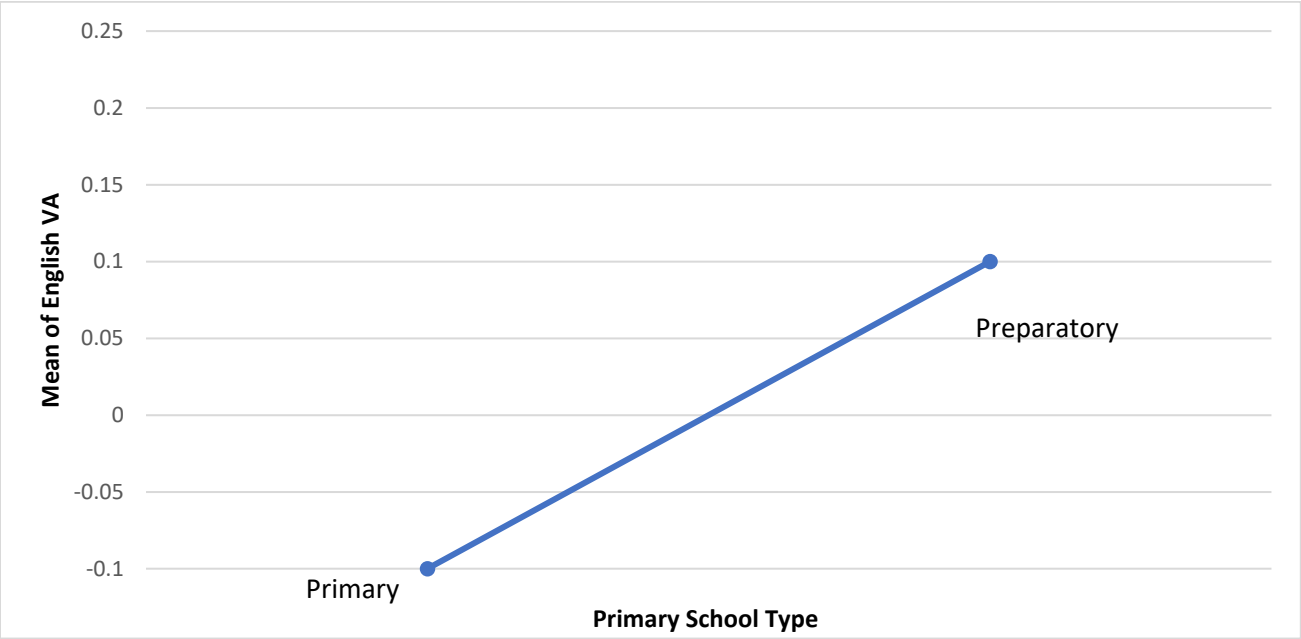
Summary of ANOVA Results for Comparison of Value-Added to Student Outcomes in Science, Mathematics, and English for Students from Primary and Preparatory Backgrounds

VA Model	*M*	*SD*	F_{Welch}	*p*	*df*1	*df*2	η^2
VA English							
Primary	-0.1	0.93	604.11	< .001	1	44,994.04	.001
Preparatory	0.10	0.80					
VA Mathematics							
Primary	-.02	1.05	1,771.52	< .001	1	43,369.29	.005
Preparatory	0.21	0.98					
VA Science							
Primary	-.01	.99	549.95	< .001	1	35,393.58	.002
Preparatory	.13	.97					

Note: VA = Value-Added; ANOVA = Analysis of Variance

Figure 14

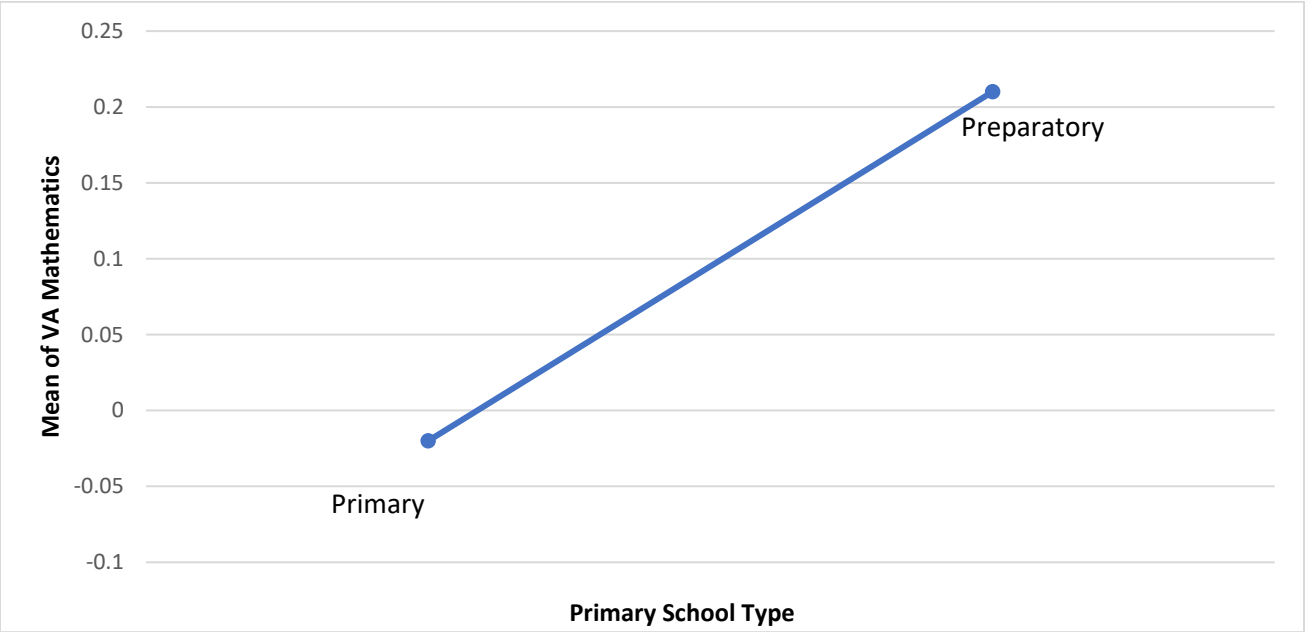
Graph of Value-Added Scores for English Based on the Primary School Background of the Students



Note: VA = Value-Added

Figure 15

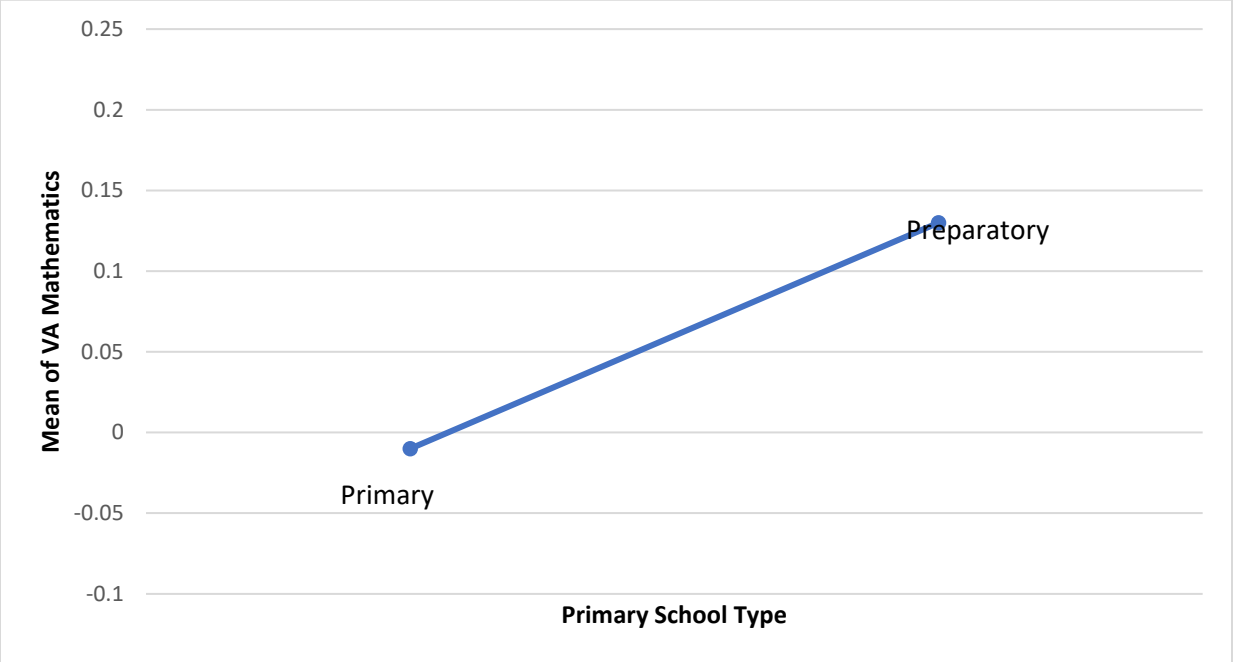
Graph of Value-Added Scores for English Mathematics on the Primary School Background of the Students



Note: VA = Value-Added

Figure 16

Graph of Value-Added Scores for Science Based on the Primary School Background of the Students



Note: VA = Value-Added

The results show that, generally, there was a statistically significant difference between the expected and actual outcomes of students from primary and preparatory schools in English, Mathematics, and Science, with students from preparatory schools generally perform better than expected. The eta square values were very small, thus, very little practical significance. Table 16 and Figures 14–16 show similar results for students from primary and preparatory school backgrounds and what was observed between traditional and nontraditional high schools. In this instance, however, the predicted CQS for students from a primary school background was lower than expected for Mathematics. In contrast, it was higher than expected for students at nontraditional high schools.

Summary of Findings

A statistically significant number of students, predominantly those from nontraditional high schools and those from a primary school background, did not sit for enough subjects to qualify for the CSEC certificate. Due to this fact, these students could not achieve the certificate even before taking the exams. This finding meant that the CQS could not be calculated directly for students as it would not account for the absence of the CQS in comparing the results.

Research Question 1

What is the expected value that should be added by a school, given the profile of its students?

The study calculated the value-added scores for each school in three stages based on (a) GSAT scores only; (b) GSAT score controlled by sex, GSAT cohort, and parish; and (c) GSAT score controlled by percentage CSEC certificate and percentage number of students who took five or more subjects. GSAT scores were calculated as the average of the result of all five subjects for a student [English, Mathematics, Language Arts, Science, and Composition (calculated as a percentage)]. The summary of results in Appendix A, indicates that 78.57, 80.95, and 42.86% of traditional high schools added value to their students when calculated using VA, CVA, and SCAV, respectively. On the other hand, 43.54, 38.76, and 41.15% of nontraditional high schools added value to their students. This was indicated by the positive value-added scores using the three models. The SCVA model with an R^2 value of .52 accounted more for the variability in the CQS than the other models. No contextual variable by itself made a large contribution to the variability seen in the CVA and SCAV models. The skewness and kurtosis values all lie within the range of -.23 to 1.98, indicating that the results are within range with no

obvious indication of outliers. The models all positively correlated with each other. The CVA and VA had the highest correction of $r = .93$.

Research Question 2

What is the value being added to student outcomes by traditional versus nontraditional high schools in Jamaica?

Traditional high schools had better student outcomes when the mean CQS was compared to that of nontraditional high schools. There is a statistically significant difference between the value-added to CQS student outcomes of traditional and nontraditional high schools. The differences had a large effect size except for the SCVA model. The mean differences and effect sizes were smaller when prior school performance (percentage CSECC) was included in the value-added model. The study found that the top three traditional high schools were Campion College, Immaculate Conception High School, and St. Andrew High School for Girls. Holland High, Dunbeholden High, and St. Elizabeth Technical were the top three nontraditional high schools ranked by CQS and a composite of the rank of the three VA models. See Tables B1 and B2 for the detailed ranking information.

Research Question 3

How do traditional high schools compare in their value-added between students from primary and preparatory schools?

Traditional high schools added more value to students from preparatory schools than primary schools using the VA model. This difference was statistically significant. However, the tiny eta square value indicates that the difference was not practically significant. On the other hand, the reverse was true for nontraditional high schools. Nontraditional high schools statistically added more value to students from a preparatory school background over those from

a primary school background. On average, the value-added on student outcomes was negative for nontraditional high schools. It is of note that though the difference in the performance of students from primary and preparatory school backgrounds at traditional high schools was not practically significant ($\eta^2 = .001$), the mean value-added for both groups was negative. This finding suggests that students from nontraditional high schools performed worse than expected regarding student outcomes on the CQS. In contrast, students at traditional high schools, regardless of primary school type, generally performed better than expected.

Research Question 4

How do traditional and nontraditional high schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?

Students from traditional high schools generally performed better than expected in CSEC English, Mathematics, and Science. In comparison, students from nontraditional high schools performed better than expected in Mathematics but worse than expected in English and Science. The results indicate that students from traditional high schools added more value to student outcomes in English, Mathematics, and Science. However, the effect size was too small to be of any practical value. See Appendices C and D for the detailed ranking information.

Research Question 5

How do students from preparatory and primary schools compare in terms of value added when the major subject areas of Mathematics, English Language, and Science are compared?

Students from a primary school background performed less than expected in all three subject areas. However, the difference in value-added scores for students from preparatory school backgrounds though statistically significant compared to students from primary schools, was not practically significant.

Chapter 5: Discussion, Implications, and Conclusion

Chapter 5 outlines the discussion, implications, and conclusions of the study. The discussion subsection explores the findings surrounding the number of students not taking enough subjects to qualify for a CSEC certificate. It also examines the findings of the value-added models and those related to comparing the outcomes between traditional and nontraditional highs and students from primary and preparatory backgrounds in the three major subject areas of the GSAT.

The implications subsection discusses the study's findings and their implications regarding policy, practice, and parental choice. Finally, the conclusion subsection explores the scope for future research and this study's limitations, delimitations, and assumptions.

Discussion

This subsection examines the study's major findings considering the literature. This subsection provides clarity around the implications that are later put forward.

Sitting Enough Subjects to Qualify for CSEC Certificate

The Ministry of Education set a target of 60% of the Grade 11 cohort to achieve CSEC certificates by 2015. As of 2022, only 40% of the Grade 11 cohort has achieved this objective (MOEYI, 2020). The result shows that not only has the 2015 objective not been achieved, but it has also not increased since then. The data shows that this objective is difficult to achieve given that only 44.8% of the students in the sample from nontraditional high schools sit the required number of subjects to qualify for the CSEC certificate. The finding means that most students

leaving high school at Grade 11 do not have the opportunity to achieve the minimum qualifications expected of them upon graduation. This issue accounts for the low number of students from traditional high schools, less than 25% of whom have achieved the CSEC certificate. Interestingly, approximately 20% of the students from preparatory schools do not sit enough subjects to qualify for the CSEC certificate compared to 44% of students from a primary school background.

The data show that students from a preparatory school background continue to experience greater advantage over students from a primary school background. Preparatory students are far more likely to be placed in a traditional high school and have a better chance of doing better on the CSEC examinations (CAPRI, 2012). The literature suggests that parents of students from a higher SES background tend to be better advocates for their children's success than those from a lower SES background (Garcia & Weiss, 2017; Muijs et al., 2004; Portes, 1998). The finding may explain why more students from traditional high schools are allowed to sit the requisite number of subjects to achieve the CSEC certificate. Preparatory students' parents may be more vigorous advocates for their children to be given the opportunity even if their grades are not up to par.

Even before a single exam is sat, the disparity in equity between the different groups of students is cemented by this school practice. Negative self-worth may be reinforced by many students not even given a chance to try to achieve the required number of subjects (Darnon et al., 2012; Gratz, 2006; Peters, 2021). The lack of access to the required number of subjects also means that some students, based on the judgments of teachers and school leaders, are shut out of the job market. This decision by school personnel has implications for the wealth gap and their

ability to have a better economic future for themselves and their families (Amadeo et al., 2021; CAPRI, 2014).

School administrators and teachers may argue that the reason for not allowing students to sit an exam is if they seem, in their opinion, likely to fail. Not allowing the students to sit a subject is to help them focus on those they can be successful in rather than split their energy across several focus areas resulting in even worse performance (CAPRI, 2012, 2014). A closer examination of the data is needed to ascertain why many students do not sit the required number of subjects. Limiting students only to do the number of subjects they are believed to be able to handle is consistent with the findings of some scholars. Some researchers believe that a focus on attainment measures encourages teaching to the test and marshaling students to areas perceived to be easier though the student might be uninterested in that area academically (Goldstein, 2004; R. C. Taylor, 2016; Wilson et al., 2006).

The VAMs

A caution of the findings is that though this study attempted to replicate certain aspects of the value-added models used in Patterson (2021), there are some key differences. The first key difference is that the outcome variable differs with this study using CQS as the outcome. In contrast, Patterson (2021) used attainment of the CSEC certificate at the individual level and percent CSEC Certificate (CSECC). The predictor and control variables used were the same for the SCVA in this study and the value-added model in Patterson (2021), as far as I could glean from the technical report produced. The specific technical details of how the statistical model in Patterson (2021) was created were unavailable. This fact should be considered when comparing the findings of the two studies. Another key difference is that the value-added model in Patterson

(2021) included the CAPE subjects, whereas the model in this study specifically focused on the CSEC results.

The construction of the value-added models created interesting challenges. The first challenge was due to the number of students not taking the expected number of subjects to qualify for the CSECC. This challenge created the need to calculate the CQS in such a way that it shows both the achievement of the CSECC and the quality of students' performance. The challenge was resolved by applying a penalty for the number of subjects less than the expected five CSEC subjects. When schools were ranked based on their overall CSEC performance quality, the result differed from the findings in Patterson (2021). For example, Campion College ranked first on CQS as it did on the percentage of CSECC in Patterson (2021). However, it was ranked first in overall value-added in this study compared to 22 in Patterson (2021) based on CSEC value-added ranking. Immaculate, ranked second in this study, was 16 in Patterson (2021).

Glenmuir High School was rated as the most effective traditional high school on the Patterson report, based on value added to the average percentage of students achieving CSECC. However, Glenmuir ranked 13th overall in this study, 5th on the VA, 7th on CVA, and 124th using the SCVA models. When the school-level data of percentage CSECC was included in the model, some schools saw a considerable change in their value-added compared to the other two models. This is because the percentage CSECC looks at the overall historical strength of a school's performance (Patterson, 2021). Therefore, when the longitudinal data of school performance over time were controlled, some schools, mainly traditional high schools, showed changes in VA scores, with some declining in the SCVA ranking compared to the VA and CVA ranking. This change could result from declining performance over time and requires further

examination of students' performance in these schools over the most recent 5-year data available compared to the previous years.

The Patterson report ranked Dinthill Technical as the most effective nontraditional high school, ranked first based on percentage CSECC. While Dinthill did better than some technical high schools, it was the 4th highest-ranking nontechnical high school. Dinthill had overall ranks of 36, 74, 54, and 80 when ranked on CQS, VA, CVA, and SCVA, respectively. Holland High School was the highest-ranked nontechnical high school, ranked 17th overall in this study and 17th on the CSECC value-added ranking in Patterson (2021). It is interesting that when value-added is considered from the perspective of the quality of the results, including whether a student has achieved the CSEC certificate and the grades received on the exams, the performance of some schools looks very different. These findings required further investigation, given that the penalty scores were added to the performance of many students who sat for less than five subjects.

The overall ranking results shown in Appendix A show that for some traditional high schools, students were performing much worse than expected, given the prior achievement of their students on the GSAT exam. Also, despite the reputation of traditional high schools being of higher quality than nontraditional high schools, some were seemingly performing worse. This finding highlights the importance of the third view of excellence discussed in the theoretical framework. The VA model allows consideration of the performance of a school based on improvement over what was expected (Best, 2008; Sergiovanni & Green, 2014). The models allow schools such as Holland High, Dunbeholden High, and Dinthill Technical High to shift the narrative and allow themselves to be rebranded as excellent schools.

Another interesting finding of the study is that some schools with a high number of students achieving the CSEC may have a lower CQS. The finding means that they would have fewer scores of one and two, the best scores on the exam. The results suggest that some traditional high schools may be faring well in terms of the percentage of their students achieving the CSEC certificate but not as well on the quality of the passes of their students especially considering the quality of the student's results. However, the quality of the passes should also be considered (Best, 2008). The quality of the CSEC passes gives these students a more competitive advantage for university admission, scholarship applications, and even access to competitive job positions. In addition, a greater focus on the quality of the CSEC results of the students will encourage greater focus on student performance leading to better overall results. The ranking information may provide helpful information for parents deciding which high schools to select for sending their child. These results are discussed further in the implications subsection.

The R^2 value of .48 for CVA and .52 for SCAV indicates that the contextual issues of sex, GSAT cohort, parish, and percentage certificate accounted for 48% and 52% of the variation in the expected student outcome related to their CQS. Previous research suggests that other contextual issues may be better factors (Sloane et al., 2013). These factors include SES, parents' academic background including mother’s educational status, and student attendance data (Ayub et al., 2021; Hernandez & Napierala, 2014; Tahir et al., 2021; Vidyakala & Vaishnavi Priya, 2017). However, the data available did not include those characteristics. Therefore, I could not explore the effects of some of these contextual factors on student outcomes within the Jamaican educational context. The VA and CVA models produced similar rankings as they were highly correlated (r - .93, $p < .001$). Variance in the rankings was very different when the SCVA was considered. Having other contextual data in keeping with the literature would allow for a better

evaluation of each school (Dearden et al., 2011; Gilleece & Clerkin, 2020; Goldstein, 2003; Leckie & Goldstein, 2009; Sloane et al., 2013). However, these kinds of data are not always available, particularly in some education systems (Leckie & Goldstein, 2017).

The use of ranks allowed for a more accessible side-by-side comparison with the results of the Patterson report and this study when discussing Research Questions 2 and 3, notwithstanding the caution mentioned in Chapter 4 about the differences in the approaches. The composition of ranks, though helpful, may not provide the best information to help parents decide on high school choices. Ranks fulfill the first and second view of excellence: there is a certain level of competition there (Best, 2008; Sergiovanni & Green, 2014). The ranking might have the effect of masking the excellent work being done by some schools, given the prior achievement of their students when their performance is being ranked against others (Hodes & Kelley, 2017). At the same time, we see where it may be beneficial to some schools such as Holland High, whose ranking is above that of some traditional high schools. The use of ranking was decided for the analysis in light of the complexity associated with evaluating the value-added information and the time constraint associated with completing the study. Limitations with ranking open the possibility for improvements to the study and are further discussed in the conclusion subsection of this chapter.

Performance of Traditional High Schools: Primary Versus Preparatory

From the analysis of the results associated with Research Question 3, in theory traditional high schools were doing better in student outcomes with students from preparatory schools than students from primary schools. The finding, however, had no practical significance given the small effect size ($\eta^2 = .002$). The reverse applied to the difference between students from a primary and preparatory school background at a nontraditional high school. Here again, in

theory, nontraditional high schools added more value to students from primary school backgrounds than those from a preparatory school background. The finding had no practical significance as the effect size was small ($\eta^2 = .001$). There was not much difference in students' performance from the different primary-level backgrounds. Nontraditional high schools did not do much to move the students beyond how they got them based on the GSAT exam. This finding correlates a bit with the work by B. Hart and Risley (2003), where nontraditional high schools have not been able to decrease the excellence gap between students in their schools and those in nontraditional schools. The study, therefore, heightens the need for nontraditional high schools to do more to help their students attain the expected CQS, given their GSAT scores. This goal is reasonable and should be attainable (Best, 2008; Strike, 1985).

The work of Kornrich and Furstenberg (2013) and Peters and Engerrand (2016) suggest that the economic background does make a difference in student excellence. However, using the primary school type could not provide a definitive answer to this in the Jamaican context. A positive finding from the study is that students from primary school backgrounds generally hold their own at traditional high schools. The finding warrants further study by looking at better contextual variables, including Programme of Advancement Through Health and Education data (a measure of poverty in Jamaica), to better analyze how well the most vulnerable students are doing in these elite schools.

Traditional high schools may help these students hold their own by implementing welfare and other support programs. It suggests that the schools were not abandoning their students from a primary school background in favor of those from a preparatory school background. The results may also provide some insight into the performance of these students at traditional high schools, given that they have less social capital available to provide the support they need

(Amadeo et al., 2021; Sewell & Henry-Wilson, 2021). The general expectation is that students at primary schools, not having the same level of support, may underperform in comparison to the preparatory school schools, given their social capital and the argument that elite schools tend to inflate their contribution to student success (Clerkin, 2016; Van De Gaer et al., 2009; Van Landeghem et al., 2002). So further exploration is needed.

Performance in English, Mathematics, and Science: Traditional Versus Nontraditional High Schools

The study found that traditional high schools added more value to student outcomes in English and Science than nontraditional high schools. The difference was not significant for Mathematics. Though the effect size was too small to be of any practical significance, it still raised the concern that students at nontraditional high schools were worst off for attending these schools as it relates to their performance in English and Science. Some value was added to student outcomes in Mathematics at nontraditional schools, but the mean VA score was also small. This issue creates some concern for the education system, given the importance of English and Science to the country's development goals (CAPRI, 2014; MOEYI, 2009; Sewell & Henry-Wilson, 2021). The performance of students at nontraditional high schools only serves to further the excellence gap and limit the earning potential of these students (Emmons et al., 2018; Guzman et al., 2014; Peters & Engerrand, 2016; Plucker & Peters, 2016).

Looking at the performance of specific schools, I saw a considerable problem where some traditional high schools perform less than expected. In contrast, some nontraditional high schools perform better than expected in English, Mathematics, and Science. This finding is of particular concern for some traditional high schools, given the prior attainment of GSAT performance. For example, Calabar High School, a traditional high school, is renowned for

excellence. However, it ranked 244th regarding the average value-added to student outcomes in Science and 224 in Mathematics. Calabar had a negative value-added score for English and Mathematics. Again, this is of concern because of the national desire for students to do well in the core subject areas to advance the Jamaica 2030 vision (Luton, 2015; MOEYI, 2009). The Ministry has an education task for Mathematics and Reading, but Science does not seem to be given the prominence it deserves as it does not have a similar focus.

The school-level data on how schools are doing compared to each other provides a picture to parents when selecting schools based on schools' rank in each of the three subject areas and the value-added in each subject area. See Appendix C and D. Campion College had the best performance in English, Mathematics, and Science generally but was ranked third in value-added in Science. Glenmuir High School ranked ninth, sixth, and seventh on VA scores for English, Math, and Science results but 10th, sixth and sixth on the average scores for each subject. The findings here encourage school leaders at traditional high schools to assess if there is room for improvement in student outcomes given their high performance in GSAT. The data suggest that traditional high schools have much room for improvement in helping students perform at the level expected based on their GSAT performance. The data also allows parents to assess school performance in key subjects such as English, Mathematics, and Science.

Performance in English, Mathematics, and Science: Primary Versus Preparatory Students

The study found a statistically significant difference in the value added to student outcomes in English, Mathematics, and Science between students from a primary school background and those from a preparatory school background. In theory, students from a preparatory school background received greater value-added in the core subject areas studied. However, it is important to note that the effect size was too small to be of any practical

significance. Even though the difference between the two groups is not of any practical significance, the results indicate that students from primary schools generally perform worse than expected in all three core subject areas based on their prior GSAT attainment. The result requires a closer examination by considering other contextual characteristics to see how the most vulnerable students feature in this data. Students from primary school backgrounds generally have a lower GSAT score than preparatory school students. So, if our high schools are not even getting them to perform better than expected, given this low prior achievement score, the wealth gap challenges will increase with each cohort we graduate (Amadeo et al., 2021). Although not definitive, the data suggest that nontraditional high schools where most students from a primary school background are located are unhelpful in making educational advancement in the core subject areas. The families of these students are often not in a position to provide the additional support needed, and the schools do not seem to be able to help them improve beyond how they got them (Amadeo et al., 2021; Auguste et al., 2009; Dumont & Ready, 2020; Smeding et al., 2013). The data suggest that many leave high school worse off.

Implications

Policy

One of the study's significant findings is that students at nontraditional high schools in Jamaica generally perform worse than expected regarding the quality of their CSEC results, given their prior GSAT achievement level. When the performance was considered using the SCVA model, both the traditional and nontraditional high schools performed below expectations. This result is of particular concern because not only does it indicate that the education system, in general, and many schools in particular, are underperforming based on achieving the CSEC certificate standard. We see that many schools are not meeting the expected outcomes of students

given their starting point based on GSAT. The CSECC is very helpful as a minimum standard for looking at quality in our schools. However, school leaders must go further in not just trying to get students to achieve a Grade 3 (a passing score) in five subjects but should focus more on the quality of the passes. Having a keener focus on the quality of the passes can have a pooling effect where the overall quality of performance and the number of CSECC can also improve. This new focus is an area of reform for the MOEJ to broaden its monitoring metric beyond the CSECC to include the quality of the certificate.

Another major finding of the study is that there is no practical significant difference between the performance of students from a primary and preparatory school background at traditional high schools. This finding demonstrates the importance of prior attainment in student performance and provides evidence that schools have a greater impact on student outcomes over their backgrounds. The performance of the 90/90/90 schools from the Reeves (2014) study suggests that low socioeconomic circumstance does not have to equate to poor achievement. However, the opportunity to learn, laser-like focus on academic achievement, good curriculum choices, and an emphasis on good assessment practices with students having multiple opportunities to learn are essential ingredients in students' success of students no matter their background (Brown, 2011; Organization for Economic Cooperation and Development, 2020; Reeves, 2014). Here is also where a greater focus on the quality of students' performance on results and not just achieving the CSECC can help propel schools towards more outstanding student achievement. Having a laser-like focus on academic achievement means moving towards raising the threshold for achievement and excellence beyond the CSECC to the quality of the CSECC.

The value-added measures are also helpful in helping school leaders, and MOEJ technocrats measure student outcomes in schools against expected outcomes. The policy shift in school evaluation, particularly from the National Education Inspectorate, should include these value-added measures. School leaders from traditional high schools may complain about the results of their students when compared to others, even if compared against other nontraditional high schools, because of the low prior attainment of their students on GSAT. However, when the evaluation is based on the starting point of their students, it brings the underperformance into sharper focus. It allows for a deeper conversation regarding how to address the challenges of the school.

The Jamaican Ministry of Education has to ensure that all schools allow students to be entered at least for the minimum number of subjects required to allow for the attainment of the CSEC certificate. The problem of students not sitting in enough subjects to qualify for the CSEC certificate is more prominent at nontraditional high schools. Therefore, keen monitoring of exam entries should be done for these schools. All school entries are submitted to the Overseas Examinations Commission, the local Registrar for CXC in Jamaica. Schools submit their examination entry through the Overseas Examinations Commission. The Overseas Examinations Commission should therefore be required to verify that all entries from public schools are for a minimum of five CSEC subjects for students in the Grade 11 cohort. Where a student is repeating a subject and therefore has prior CSEC subject passes and therefore does not require five, then this should be indicated. Sanctions should be applied to schools where students are blocked from being able to sit the minimum number of subjects required.

In keeping with the effort to improve student outcomes and ensure that students leave high school with the requisite qualification to be successful in society, the MOEYI needs to craft

some minimum standards or requirements for graduation. Students should be required to sit five subjects to graduate high school successfully. Students should also be allowed to repeat failed subjects if they are below a certain age. After a certain age, say 18 years, students should be allowed access to alternate programs to complete the subjects required to achieve the CSEC certificate or more based on their desired goals.

A third significant finding of the study with policy implication is that there was no practical significance difference in the outcomes of students from traditional and nontraditional high schools or those from primary and preparatory school backgrounds on the core subject areas of English, Mathematics, and Science. However, there should be some concern that students from a primary school background generally performed worse than expected regarding the quality of their CSEC results in all core subject areas. The MOEYI, through its Education Transformation Unit, has implemented many reforms to address the challenges that exist in the core subject areas of English and Mathematics. The unit was established in 2016 to address the quality outcomes of students and has done much work in this regard (MOEYI, 2022). Although this study did not look specifically at student outcomes after 2016, it is important to evaluate the impact of the transformation unit.

Given that students from nontraditional high schools are performing less than expected in English and Science while students from a primary school background are performing less than expected in all the three core subject areas. English and Mathematics receive much focus from the Education Transformation Unit. Though we see that students from nontraditional high schools generally perform better than expected in Mathematics, this is not the same for English, where they perform less than expected. Depending on the result of a closer evaluation of the impact of the Education Transformation Unit on student outcomes, it may further support the

examination of teaching English as a second language further boost student performance. The Jamaica Teachers Association presidents and many language scholars have long advocated for this (Dennis, 2013; Hardesty et al., 2014; Thomas, 2022; Williams, 2012). The MOEI may need to consider taking this as a curricular approach to teaching English at the primary and secondary levels.

Given the government's interest in building a knowledge economy and achieving the goals of the Vision 2030 development plan, the results put into sharp focus the need to have policies that are directly focused on student outcomes in science. Therefore, MOEYI should implement a science education and improvement program in schools. The performance of schools in science and the expected outcome based on their starting indicates serious cause for concern in schools generally but particularly at nontraditional high schools. Similar to the intervention program developed for Mathematics, Science needs direct attention to ensure the improvement of the school's performance in this area.

Practice

The value-added methodology's criticisms are considered unsuitable for high-stakes assessment and accountability measures for individuals (Gilleece & Clerkin, 2020; Leckie & Goldstein, 2017). Therefore, educational policymakers and bureaucrats are cautioned about incorporating such measures into performance-based pay and evaluations for teachers and school leaders. Many factors outside their control may lead to a school's value-added score. This point does not detract from the need to hold schools and school leaders accountable. The issue of accountability is crucial at traditional high schools, which receive some of the strongest performing students based on GSAT but have less than expected performance on their CSEC

results. It is also vital for nontraditional high schools. What is essential is to ensure that other key factors are also considered in any accountability measures while using value-added as a guide.

School administrators and teachers can still use the findings to challenge themselves to ask the tough questions that sometimes get ignored. This is true both for traditional and nontraditional high schools. For example, Campion College, which ranks number one on CQS and in Mathematics, English, and Science, is challenged to consider its students' performance on the CSEC exam given the outstanding GSAT performance of its intake. School leaders must consider the underperforming students and their demography to see how they can improve their performance.

Teachers and administrators at nontraditional high schools need to look seriously at their students' science performance. Along with any intervention programs developed by the Ministry of Education, school leaders may need to set up training programs for their teachers to improve student outcomes in science. Teachers should identify students struggling in the different science areas early and create a plan to help them progress and improve.

The study found no practically significant differences between students from primary school backgrounds compared to those from a preparatory background in traditional high schools. However, school leaders should keep key performance data for their students to ensure that all students have a fair chance of success, no matter their background or social standing. Some schools do a better job than others at ensuring their students do well regardless of their backgrounds, and the study raises the stake to encourage the school to keep an eye on this important data point.

The study highlights how value-added measures can benefit school leaders in taking a closer look at their schools in the three subject areas identified by the study and all their subject

areas. Hence, they have a sense of their student's overall performance in these areas and give a sense of areas they may need to consider for improvement or intervention.

Parental Choice

The study provides multiple data points to parents that were not previously available that can help parents be more informed when deciding on the high school for parents. Not only do parents have the performance of schools overall, but the study gives a better indication of the quality of the performance of students overall in CSEC (CQS) and their performance in the key subject areas of Mathematics, English, and Science. The study may serve as a starting point for considering how to provide more detailed information to parents so they can make better school choice decisions. Parents can also use the study's information to highlight to school administrators the need for greater intervention in key subject areas of English, Mathematics, and Science. Parents did not have much access to this kind of information before.

For example, Calabar High School has a rich history of academic excellence as a traditional high school. It boasts a long list of sporting greats, among others, in the professional fields. However, Calabar is one of the traditional high schools, along with Excelsior High, amongst the lowest ranked traditional high schools where students perform lower than expected. Parents can consider their children's performance on the Grade Four Literacy Test (G4LT), the first phase exams on the PEP, and internal exam performance to realistically determine their children's likelihood of getting into a traditional high school. From my experience, most reasonable parents know the likelihood of their children getting into a top-performing school like Campion College or Immaculate Conception High.

The study provides insight into school excellence that is not available using PEP data. Currently, high school placement in Jamaica is based on overall PEP performance and available

space. Although this study did not consider if there is a correlation between PEP and GSAT results, parents may be able to use the study results as they think about their choice for high school. Also, none of the students who sat the PEP exam have yet to take the CSEC exam. Parents may think about their high school choices similar to what many high school graduates in the US consider college applications. Colleges are often considered in terms of three types of choices for their students. They can select a dream as their top choice school or reach a school where the student has a low(er) chance of getting placed. The parent may then consider some safe schools where, based on prior performance, the student has a higher chance of getting placed. The ranking and VA results can help the parents think about which schools tend to add more value to student outcomes or which schools are students more likely to perform better than expected, given their prior performance. Rather than making selections based on name and reputation, the study provides parents with a more tangible metric for measuring excellence.

The third type of choice for parents with students who have lower PEP performance scores is that they can consider which schools provide better movement for students in the core areas, especially areas that matter more to the parent. For example, a parent may consider a school traditional or nontraditional high school that provides better outcomes for students in science if that is an area of weakness currently for the student or if that is an area of interest for the student's future. Parents are also asked to choose two schools close to the primary-level school that the student currently attends. These two schools are separate from their five priority choices. For these proximity schools, the VA scores and ranking tables provided by the student would be particularly helpful for parents to get a sense of the performance of the schools that they have to select. The two proximity schools are often nontraditional high schools, as the traditional high would have occupied the list. Many parents know little about the performance of

some of those schools and the great job they are doing in helping students make progress. These schools, such as Dinthill and Holland High, can further build their profiles and perhaps even become schools of choice.

The mindset of some in the education system can be changed to help them appreciate the hard work that many nontraditional high schools do in helping their students progress despite having a weak prior achievement GSAT score. It can also be beneficial for parents to look at the areas their child is weak and select the schools that add more value to student outcomes. Through the results of this study, parents are also empowered to ask for the CQS and value-added performance for schools they are interested in other subject areas. This perspective would be consistent with the third view of quality, where progress over time is measured (Best, 2008; Sergiovanni & Green, 2014).

Highlight of Some of the Key Implications

The large number of students at nontraditional high schools and those from a primary school background who sat less than the required number of subjects to qualify for the CSEC certificate is cause for concern. These students not sitting enough subjects had an impact on the result of this study, as shown by the significant Chi-Square results. It suggests that many students at traditional high schools are not eligible for college or many workplace jobs even before they write a single exam, as they have not had the opportunity to take the required subjects. My conversations with many principals from nontraditional high schools indicate that students at these schools sit for alternative exams outside of CSEC. However, the equivalence of these alternative exams regarding college and workplace acceptance should be studied to see if the alternatives are real alternatives in the practical sense. Also, despite these alternative exams to CXC, anecdotal evidence points to the fact that many students continue not to sit enough subjects

even when the alternatives are included. This anecdotal information supports the point that the Jamaican Ministry of Education needs to ensure that all students are given a chance to take the expected number of subjects, whether CSEC or an alternative.

Including a penalty score in the calculation of the outcome variable CQS may have affected the study's findings. The penalty score was included to allow for some consistency with the traditionally accepted view of using the CSEC certificate to measure excellence while taking it further by looking at the quality of the certificate. The application of the penalty score raises the question of whether the results would be any different if the students' performance were considered simply based on the subjects they sat. If the performance of students at nontraditional high schools, in particular, remained less than expected without applying the penalty scores, then it might indicate the need for even more urgent intervention in these schools. The study should be done without applying the penalty scores and the results compared with this current study.

Students' performance at traditional or nontraditional high schools was practically similar despite their backgrounds. This finding supports the importance of prior attainment on students' future performance and the continued work that must be exerted to ensure excellence at the early childhood and Primary Levels of the education system. Though the study indicates that some traditional high schools have lost some ground in terms of excellence, they generally performed better than expected overall and on each core subject area. The fact that most students from a preparatory school background end up in traditional high schools highlight issues of inequity in the system. It may also be necessary to explore the differences in how traditional high schools are funded versus nontraditional high schools and their impact on performance. Finally, in the case where some traditional high schools are performing below expectations, is the cost of relating to how these schools are funded worth it, given the results? Not many studies are

available that explore the actual cost of education in Jamaica, the difference in funding between traditional and nontraditional high schools, and its impact on performance.

The study also found that traditional and nontraditional high school students performed less than expected in English. This finding was also factual for students from a primary school background. Many of these students would be exposed to Jamaicans in their homes and communities (Williams, 2012). It may highlight the need for the MOEYI to officially include in their policy the teaching of English as a second language in order to improve the overall performance of Jamaican students in this important core subject area. The highly important work of the Education Transformation Unit should be modified to have this approach as one of its strategies.

The challenge also exists in science education. One of the biggest concerns for students' underperformance in science is that the best science score was chosen for all students in the study. The underperformance of many Jamaican students in science creates a challenge for the country's goals related to future development in STEM. The MOEI needs to have a sharper focus on improving students' performance in science across the country.

Finally, this study tried to be consistent in methodology as far as possible despite the difference in outcome variable used. Although Patterson (2021) looked at using the CSEC certificate as the outcome variable, this study went a bit further and looked at the quality of the CSEC certificate as the outcome variable. This study also went further than Patterson (2021) by not only looking at the value-added to student outcomes in schools it considered the difference between different types of schools (traditional and nontraditional) and the difference between students from different backgrounds (primary and preparatory) in the different types of schools. This study also explores the value-added in core subject areas not considered in Patterson (2021).

The two studies help provide multiple points of evidence for the quality of the education system and what excellence looks like in individual schools. The study highlights critical areas in the education system that the MOEI should place some focus on and additional resources as a step towards achieving the goal of 60% CSEC certificate attainment in a short timeframe. Given the concern about the penalty point that some school leaders may raise and the absence of better contextual variables, using the VA model alone may be helpful if only one model could be used. I, however, would recommend using the composite of all three models as this provides a more balanced perspective for decision-making.

Conclusions

The fact that entry into high schools is a merit-based system based on the strength of the student's performance on GSAT equally, the student's performance should be based on the quality of their CSEC results, given this is the acceptable standard for quality in the country. The study examines students' performance in Jamaica, considering the expected student outcomes given their prior GSAT scores. The study examined the problem using three value-added models and then ranked schools based on the value-added to student outcomes and the quality of the CSEC results of the students. The study found that students from traditional high schools generally perform worse than expected, while those from nontraditional high schools perform better. Also, students from primary schools perform at relatively the same standard as preparatory school students. The opposite is true for students at nontraditional high schools. Finally, the performance of schools in science suggests that much work is needed to improve the performance of schools in this subject area.

The study had its challenges in how it was designed and implemented. These challenges are discussed in future research, limitations, and assumptions of the study.

Future Research

Many areas were outside this study's scope but posed an important area for future consideration. The ranking of schools inherently is not a good approach for providing valuable data for school leaders and parents as it juxtaposes one school being better than another. A better approach would be to examine the performance of schools against the expected performance and derive a mechanism other than ranking to rate how well schools do against their expected performance. A report card rating, such as A, B, C, and D, could help parents know which schools are doing better in adding value to their students, including the overall quality of the student's results in each school. The mapping of GSAT results to CSEC performance is connected to this future research. A creating chart could be generated to indicate the expected CSEC performance in a subject given the GSAT score of the student. That is a grade between I to VI. This approach means that everyone can achieve excellence, and there is not just a single winner (Best, 2008; Sergiovanni & Green, 2014). It also recognizes excellence in the hard work some schools are exerting in helping their students to progress beyond expectation. The study should be repeated a few years later with PEP after these students have sat for their CSEC exams.

As discussed before, in theory, traditional high schools add more value to students from preparatory schools' student outcomes than those from primary schools. This finding should be explored further to see if the difference becomes practically significant when contextual variables aimed more specifically at socioeconomic indicators are included. A limitation of the study is that it assumes that students from primary schools are from low SES backgrounds and is representative of the poor. Students from a primary school background generally have lower SES than those from preparatory schools. However, using the Programme of Advancement Through

Health and Education data and assessing the results would provide better insight into poor students' performance, similar to how free and reduced-price lunch is used in the US.

The contextual variables used in the VA model to generate CVA figures did not show much difference in the value-added scores for students at traditional high schools. A longitudinal study is needed to assess school value-added using contextual variables more aligned to the literature but relevant to Jamaica, such as parent occupation, mothers' education level, and family income. Also, many students in Jamaica take private lessons to help improve their performance on the CSEC exam. Whether or not students get private tutoring should be included in the contextual issues considered in any future model.

There is much research on school climate, but not many studies have been done in Jamaica on its schools. A good area to explore for future studies is the relationship between other school characteristics and academic achievement. The National Education Inspectorate has created a metric for evaluating effective schools; exploring whether any of those metrics factored more in student performance and effectiveness, as it relates to student outcomes, would be helpful. The National Education Inspectorate report could explore school-level factors influencing excellence, such as a safe and orderly environment, resources, quality instruction, quality assessment, and well-prepared teachers (Caponera & Losito, 2016; M. O. Martin et al., 2013).

Jamaica has an extra lesson (private tutoring) culture for preparation for GSAT (now PEP) and CXC examinations. There is little evidence that the extent and impact of this on student performance has been explored. This gap in the literature deserves further exploration to build on our understanding of school excellence and effectiveness. Also, given the MOEJ's argument of the importance of PEP in developing students' critical thinking and reasoning skills,

studying the performance of students who have fully implemented PEP should provide fascinating insights into its impact on student performance Jamaican education system.

Finally, the study should be expanded to examine students' performance and subgroups in all subject areas, particularly the individual science areas such as Physics, Chemistry, and Biology.

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Appendix A

Results of the Three Value-Added Models

School Name	HS Type	CQS	VA	CVA	SCVA
Aabuthnott Gallimore High School	NT	3.52	0.04	0.00	0.12
Aberdeen Primary And Junior High	NT	2.98	0.08	0.13	-0.03
Aenon Town All Age	NT	2.54	0.32	0.24	0.03
Albert Town High School	NT	3.30	0.05	-0.05	0.02
Albion Primary And Junior High	NT	2.42	-0.11	-0.05	-0.14
Alston High School	NT	3.01	0.21	0.12	0.09
Anchovy High School	NT	3.56	-0.20	-0.14	0.05
Annotto Bay High School	NT	3.39	0.03	-0.02	0.03
Ardenne High School	T	5.09	0.33	0.38	0.03
Ascott High School	NT	3.09	-0.22	-0.23	-0.09
B B Coke High School	NT	3.34	-0.09	-0.09	0.02
Balaclava / Roger Clarke High	NT	2.99	0.05	0.06	0.04
Bamboo Primary And Junior High	NT	2.44	0.06	0.03	-0.13
Bath Primary And Junior High	NT	2.48	0.13	0.18	-0.01
Belair School	NT	4.25	-0.02	-0.06	-0.10
Bellefield High School	NT	3.68	-0.02	-0.11	0.06
Bethel Primary And Junior High	NT	2.41	-0.13	-0.08	-0.20
Beulah All Age	NT	2.49	0.02	-0.07	-0.16
Bishop Gibson High School	T	4.91	0.49	0.33	0.04
Black River High School	NT	4.00	-0.10	-0.08	0.02
Bluefields High / Belmont Academy	NT	3.91	-0.24	-0.17	-0.14
Bog Walk High School	NT	2.92	-0.08	-0.10	-0.04
Braeton Primary And Junior High	NT	2.35	0.20	0.23	-0.01
Bridgeport High School	NT	3.68	-0.21	-0.21	-0.02
Brimmer Vale High School	NT	2.83	0.16	0.10	0.02
Browns Town High School	NT	3.10	-0.15	-0.20	-0.11
Buff Bay High School	NT	3.19	-0.01	-0.07	-0.03
Bustamante High School	NT	2.87	0.11	0.00	-0.04
Calabar High School	T	4.03	-0.32	-0.18	-0.06
Calabar Primary And Junior High And Infant	NT	2.68	-0.20	-0.09	-0.05
Cambridge High School	NT	3.04	-0.17	-0.13	-0.05
Camperdown High School	T	4.12	-0.11	-0.03	-0.08
Campion College	T	5.53	0.60	0.66	0.32
Carron Hall High School	NT	2.97	0.18	0.14	0.10
Castleton Primary And Junior High	NT	2.60	-0.11	-0.17	-0.19
Cedric Titus High School	NT	2.90	0.05	-0.06	-0.08
Central High School	NT	3.31	-0.02	-0.12	-0.01
Chapleton All Age	NT	2.60	0.17	0.07	-0.05

School Name	HS Type	CQS	VA	CVA	SCVA
Charlemont High School	T	3.91	-0.06	-0.07	0.02
Charlie Smith High School	NT	2.76	-0.19	-0.11	-0.07
Christiana High School	NT	3.14	-0.11	-0.21	-0.08
Clan Carthy High School	NT	3.26	-0.19	-0.09	0.08
Claremont All Age St Ann	NT	2.50	0.05	0.01	-0.12
Clarendon College	T	4.34	0.09	-0.01	-0.08
Clarksonville All Age	NT	2.44	0.07	0.04	-0.11
Claude Mckay High School	NT	3.33	0.15	0.06	0.14
Cockburn Gardens Primary And Junior High	NT	2.54	-0.10	-0.03	-0.07
Constant Spring Primary And Junior High	NT	2.77	-0.28	-0.21	-0.12
Convent Of Mercy Academy Alpha	T	4.67	0.26	0.24	0.00
Cornwall College	T	4.37	-0.15	0.01	-0.06
Cross Keys High School	NT	3.09	0.13	0.05	0.05
Cross Primary And Junior High	NT	2.48	0.22	0.13	-0.06
Cumberland High School	NT	2.78	-0.08	-0.09	-0.08
Dallas Primary Junior High	NT	2.55	-0.14	-0.09	-0.11
Decarteret College	T	4.59	0.15	0.07	-0.17
Denbigh High School	NT	4.16	0.10	-0.01	-0.01
Denham Town High School	NT	2.85	-0.01	0.09	0.09
Dinthill Technical School	NT	4.28	0.09	0.10	0.02
Discovery Bay All Age	NT	2.42	0.06	0.04	-0.13
Donald Quarrie High School	NT	3.04	-0.15	-0.07	0.04
Dunbeholden High	NT	3.76	0.21	0.20	0.25
Dunoon Park Technical High School	NT	3.85	-0.23	-0.10	0.01
Edith Dalton James High School	NT	3.09	-0.20	-0.14	0.01
Edwin Allen High School	NT	3.88	0.07	-0.04	0.08
Elderslie Primary And Junior High	NT	2.51	-0.07	-0.05	-0.16
Eltham High School	NT	3.23	-0.04	-0.05	0.05
Enfield Primary And Junior High	NT	2.48	0.12	0.07	-0.11
Ewarton High School	NT	3.05	0.02	0.00	0.03
Excelsior High School	T	3.95	-0.32	-0.24	-0.15
Exchange All Age	NT	2.59	-0.01	-0.07	-0.12
Fair Prospect High School	NT	2.92	0.11	0.06	0.00
Farm Primary And Junior High	NT	2.41	-0.10	-0.05	-0.14
Fellowship Primary And Junior High	NT	2.50	0.11	0.07	-0.12
Ferncourt High School	T	4.08	0.02	-0.01	0.04
Flankers Primary And Junior High	NT	2.41	-0.04	0.01	-0.11
Foga Road High School	NT	3.47	0.14	0.06	0.07
Four Paths Primary And Junior High	NT	2.48	0.11	0.02	-0.12
Frome Technical High School	NT	3.82	-0.23	-0.19	-0.07
Garlands Primary And Junior High	NT	2.51	0.07	0.13	0.00
Garlogie Primary And Junior High	NT	2.68	0.18	0.09	0.00

School Name	HS Type	CQS	VA	CVA	SCVA
Garvey Maceo High School	NT	3.75	-0.04	-0.14	0.05
Gaynstead High School	NT	4.02	-0.09	-0.01	0.04
Glendevon Primary And Junior High	NT	2.51	0.13	0.18	0.04
Glengoffe High School	NT	2.85	-0.06	-0.05	0.00
Glenmuir High School	T	5.13	0.49	0.41	-0.02
Godfrey Stewart High School	NT	3.39	-0.06	-0.02	0.02
Gordon Town / Louise Bennett Coverley All Age	NT	2.64	-0.15	-0.08	-0.07
Goshen All Age	NT	2.70	0.08	0.09	-0.01
Grange Hill High School	NT	2.98	0.00	0.05	0.03
Granville All Age	NT	2.40	-0.04	0.01	-0.13
Greater Portmore High School	NT	3.06	-0.18	-0.18	-0.08
Green Island High School	NT	3.33	-0.22	-0.16	-0.03
Green Park Primary And Junior High	NT	2.47	0.09	0.06	-0.10
Green Pond High School	NT	3.35	-0.07	0.01	0.06
Guys Hill High School	NT	3.53	0.27	0.24	0.27
Haile Selassie High School	NT	2.86	-0.05	0.01	0.04
Hampton High School	T	5.13	0.44	0.37	-0.01
Happy Grove High School	NT	3.63	0.00	-0.02	0.11
Hatfield Primary And Junior High	NT	2.88	0.05	-0.04	-0.03
Hayes Primary And Junior High	NT	2.46	0.27	0.17	-0.04
Herbert Morrison Technical School	NT	4.42	-0.08	0.00	-0.12
Higgins Land Primary And Junior High	NT	2.54	0.06	0.04	-0.07
Highgate Primary And Junior High	NT	2.62	-0.01	-0.06	-0.12
Holland High School	NT	3.96	0.32	0.26	0.17
Holmwood Technical High School	NT	3.96	-0.27	-0.32	-0.27
Holy Childhood High School	T	4.67	0.19	0.14	-0.13
Holy Trinity High School	NT	2.90	-0.27	-0.17	-0.06
Hopewell Sandy Bay High	NT	2.84	0.01	0.10	-0.02
Hydel Group Of Schools St Andrew	NT	3.16	-0.22	-0.22	-0.06
Immaculate Conception High School	T	5.46	0.64	0.60	0.19
Innswood High School	NT	2.71	-0.08	-0.09	-0.12
Iona High School	NT	3.66	-0.16	-0.20	-0.07
Irwin High School	NT	3.83	-0.16	-0.07	0.05
Islington / Horace Clarke High	NT	2.92	0.06	-0.01	-0.03
Jamaica College	T	4.24	-0.19	-0.04	0.01
John Austin All Age	NT	2.59	0.05	-0.06	-0.12
John Mills Primary And Junior High And Infant	NT	2.64	-0.11	-0.02	-0.05
Jonathan Grant High School	NT	3.79	-0.05	-0.06	0.06
Jose Marti Technical School	NT	3.76	-0.08	-0.06	0.06
Kellits High School	NT	2.99	0.13	0.03	0.00
Kemps Hill High School	NT	3.13	0.13	0.03	0.09
Kingston College	T	4.46	-0.06	0.09	-0.07

School Name	HS Type	CQS	VA	CVA	SCVA
Kingston High School	NT	3.19	-0.23	-0.15	0.02
Kingston Technical High School	NT	3.98	-0.23	-0.13	-0.07
Kitson Town All Age	NT	2.42	0.24	0.27	0.03
Knockalva Technical School	NT	3.03	-0.16	-0.11	-0.05
Knox College	T	4.53	0.19	0.11	-0.16
Lacovia High School	NT	3.44	-0.11	-0.09	0.06
Leicesterfield Primary And Junior High And Infant	NT	2.66	0.08	-0.01	-0.10
Lennon High School	NT	3.29	0.03	-0.09	0.04
Lewisville High Vocational School	NT	3.03	0.02	0.04	0.05
Liberty Academy At The Priory	NT	3.95	-0.19	-0.15	0.10
Linstead Primary And Junior High	NT	2.40	0.09	0.10	-0.08
Little London High School	NT	3.00	0.04	0.08	0.02
Lowe River Primary And Junior High	NT	2.51	0.14	0.06	-0.08
Macgrath High School	NT	3.46	-0.03	-0.04	0.12
Maggotty High School	NT	3.40	-0.15	-0.13	0.03
Maldon High School	NT	3.13	-0.05	0.00	0.10
Manchester High School	T	4.69	0.16	0.09	-0.21
Mandeville Primary And Junior High	NT	2.88	-0.03	-0.11	-0.07
Mannings School	T	4.63	0.15	0.20	-0.01
Marcus Garvey Technical High School	NT	3.11	-0.11	-0.15	-0.05
Marymount High School	T	4.23	0.17	0.02	-0.03
Maud Mcleod High School	NT	3.25	-0.03	-0.01	0.05
Maverley Primary And Junior High	NT	2.52	-0.07	-0.02	-0.07
Mavis Bank Vocational School	NT	3.10	0.03	0.09	0.14
May Day High School	NT	3.90	0.09	-0.01	0.09
Meadowbrook High School	T	4.51	0.02	0.09	-0.08
Melrose Primary And Junior High	NT	2.50	-0.06	0.02	-0.05
Merl Grove High School	T	4.52	0.21	0.17	-0.09
Merlene Ottey High School Vocational	NT	3.22	-0.08	-0.01	-0.03
Mico Practising Primary And Junior High	NT	3.02	-0.48	-0.41	-0.15
Middle Quarters All Age	NT	2.51	0.03	0.04	-0.09
Mile Gully High School	NT	3.55	0.27	0.17	0.25
Mona High School	NT	3.99	-0.11	-0.04	0.05
Moneague Primary And Junior High	NT	2.59	-0.11	-0.14	-0.18
Montego Bay High School	T	5.22	0.49	0.47	0.08
Morant Bay High School	T	4.41	0.13	0.17	0.02
Mount Alvernia High School	T	4.90	0.42	0.39	0.05
Mount Grace Primary And Junior High	NT	2.41	0.02	0.05	-0.15
Mount Moreland Primary And Junior High	NT	2.42	0.08	0.10	-0.07
Mount Saint Joseph Catholic High School	NT	4.24	-0.08	-0.12	-0.28

School Name	HS Type	CQS	VA	CVA	SCVA
Mount Salem Primary And Junior High	NT	2.42	-0.10	-0.04	-0.13
Muirhouse Primary And Junior High	NT	2.48	0.09	0.08	-0.08
Munro College	T	4.71	0.08	0.21	-0.07
Muschette High School	NT	3.25	-0.16	-0.21	-0.05
Nain Primary Junior High	NT	2.61	-0.11	-0.09	-0.17
New Day Primary And Junior High	NT	2.80	-0.20	-0.14	-0.06
New Forest Primary And Junior High And Infant	NT	2.85	-0.26	-0.33	-0.22
New Green Primary And Junior High	NT	2.57	0.17	0.10	-0.02
New Hope Primary And Junior High	NT	2.52	-0.11	-0.06	-0.17
Newell High School	NT	3.00	0.01	0.03	0.02
Norman Gardens Primary And Junior High	NT	2.37	0.07	0.18	0.00
Norman Manley High School	NT	3.14	-0.33	-0.27	-0.07
Oberlin High School	NT	3.69	-0.16	-0.12	0.06
Ocho Rios High School	NT	3.61	-0.08	-0.13	0.05
Old Harbour High School	NT	3.70	0.02	0.00	0.06
Oracabessa High School	NT	3.00	-0.07	-0.13	-0.14
Osbourne Store Primary And Junior High	NT	2.57	0.07	-0.03	-0.13
Papine High School	NT	3.41	-0.27	-0.20	0.02
Paul Bogle High School	NT	2.78	-0.07	-0.03	-0.07
Pembroke Hall High School	NT	3.29	-0.29	-0.22	0.01
Penwood High School	NT	2.93	-0.18	-0.12	0.00
Petersfield High School	NT	3.28	-0.15	-0.12	0.00
Point Hill Leased Primary And Junior High	NT	2.60	0.20	0.20	0.06
Port Antonio High School	NT	3.27	-0.07	-0.13	-0.07
Port Morant Primary And Junior High	NT	2.57	-0.03	0.00	-0.10
Porus High School	NT	3.31	0.14	0.05	0.10
Retreat Primary And Junior High	NT	2.38	0.12	0.09	-0.12
Rhodes Hall Orange Bay High	NT	2.98	0.11	0.20	0.11
Robert Lightbourne High School	NT	2.75	0.10	0.14	0.01
Rock Hall All Age St Andrew	NT	2.66	-0.05	0.01	0.03
Rock River All Age	NT	2.52	-0.09	-0.19	-0.23
Rosemount Primary And Junior High	NT	2.46	0.17	0.19	-0.01
Runaway Bay All Age	NT	2.39	-0.04	-0.08	-0.21
Ruseas High School	T	3.96	-0.16	-0.10	-0.01
Sandy Bay Primary And Junior High	NT	2.78	0.02	-0.01	-0.05
Santa Cruz Primary And Junior High	NT	2.50	-0.06	-0.02	-0.15
Seaforth High School	NT	3.17	-0.20	-0.16	-0.04
Seaward Primary And Junior High	NT	2.45	-0.01	0.04	-0.07
Shortwood Practising Primary And Junior High And Infant	NT	2.73	-0.27	-0.21	-0.11

School Name	HS Type	CQS	VA	CVA	SCVA
Spaldings High School	NT	3.72	0.09	0.00	0.09
Spanish Town High School	NT	3.21	-0.16	-0.17	-0.01
Spot Valley High School	NT	3.08	-0.08	-0.01	0.01
Spring Gardens All Age	NT	2.48	0.20	0.21	0.02
St Andrew High School For Girls	T	5.24	0.58	0.55	0.08
St Andrew Technical High School	NT	3.74	-0.38	-0.27	-0.08
St Annes High School	NT	2.59	-0.01	0.08	0.01
St Catherine High School	T	4.27	0.05	0.04	-0.01
St Elizabeth Technical High School	NT	4.34	0.07	0.10	0.07
St Georges College	T	4.49	-0.03	0.13	-0.03
St Hildas Diocesan High	T	4.87	0.44	0.31	-0.04
St Hughs High School	T	4.47	0.09	0.05	-0.07
St Jago High School	T	4.80	0.24	0.24	-0.04
St James High School	NT	3.26	-0.19	-0.13	-0.01
St Mary High School	T	4.49	0.17	0.11	0.01
St Mary Technical High School	NT	3.74	0.02	-0.03	0.12
St Marys College	NT	3.71	0.01	0.03	0.15
St Thomas Technical High School	NT	3.49	-0.18	-0.13	-0.01
Steer Town High Mansfiel	NT	3.28	-0.05	-0.07	-0.06
Steer Town Primary And Junior High	NT	2.60	-0.09	-0.13	-0.16
Stony Hill Primary And Junior High And Infant	NT	2.58	-0.26	-0.18	-0.15
Swallowfield Primary And Junior High	NT	2.47	-0.09	-0.01	-0.09
Sydney Pagon Agricultural High School	NT	3.54	-0.16	-0.11	-0.15
Tacius Golding High School	NT	2.96	0.09	0.09	0.08
Tacky High School	NT	3.22	0.16	0.11	0.11
Tarrant High School	NT	3.46	-0.25	-0.18	0.03
The Cedar Grove Academy	NT	4.26	-0.05	-0.01	-0.20
The Queens High School	T	4.50	0.13	0.09	-0.10
Thompson Town High School	NT	2.87	0.21	0.11	0.05
Titchfield High School	T	4.31	0.13	0.08	0.03
Tivoli Gardens High School	NT	3.13	-0.17	-0.09	0.08
Tredegar Park All Age	NT	2.41	0.08	0.09	-0.08
Trench Town High School	NT	2.79	-0.16	-0.09	-0.02
Troja Primary Junior High	NT	2.55	0.18	0.19	0.02
Trout Hall All Age	NT	2.45	0.18	0.08	-0.10
Troy High School	NT	3.40	0.18	0.12	0.10
Vauxhall High School	NT	3.34	-0.29	-0.19	0.01
Vere Technical High School	NT	3.69	-0.02	-0.10	-0.07
Villa Road Primary And Junior High	NT	2.65	0.01	-0.07	-0.12
Waterford High School	NT	2.83	-0.04	-0.04	-0.04
Westwood High School	T	5.14	0.58	0.46	0.04
White Marl Primary And Junior High	NT	2.38	0.14	0.16	-0.06
William Knibb Memorial High School	NT	4.10	-0.01	-0.03	0.02

School Name	HS Type	CQS	VA	CVA	SCVA
Windsor Castle All Age	NT	2.53	0.05	-0.02	-0.17
Windward Road Primary And Junior High	NT	2.78	-0.29	-0.18	-0.10
Winston Jones High School	NT	3.32	0.13	0.04	0.13
Wolmers Boys School	T	4.90	0.19	0.34	0.04
Wolmers High School For Girls	T	5.03	0.46	0.43	0.12
Yallahs High School	NT	2.85	0.07	0.11	0.02
York Castle High School	T	4.60	0.25	0.22	0.10

Note. HS Type = High School Type; T = Traditional; NT = Nontraditional high school; CQS = Caribbean Secondary Examination Certificate (it is on a different scale than the value-added scores); VA = Value-Added; CVA = Contextual Value-Added; SCVA = School Contextual Value-Added Models.

Appendix B

School Rankings by Value-Added Models

Table B1

High Schools Sorted by Overall Rank

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Campion College	T	**1**	1	1	2	1	1
Immaculate Conception High School	T	**2**	2	2	1	2	5
St Andrew High School For Girls	T	**3**	3	6	4	3	32
Montego Bay High School	T	**4**	4	7	6	4	33
Wolmers High School For Girls	T	**5**	9	3	8	6	14
Westwood High School	T	**6**	5	11	3	5	57
Ardenne High School	T	**7**	8	14	12	9	67
Mount Alvernia High School	T	**9**	11	12	11	8	50
Bishop Gibson High School	T	**9**	10	13	7	12	63
Wolmers Boys School	T	**11**	12	18	32	11	56
York Castle High School	T	**11**	20	10	19	21	23
Hampton High School	T	**12**	7	25	10	10	114
Glenmuir High School	T	**13**	6	27	5	7	124
Convent Of Mercy Academy Alpha	T	**14**	18	27	18	16	102
St Hildas Diocesan High	T	**15**	13	36	9	13	142
St Jago High School	T	**16**	14	39	20	18	139
Holland High School	NT	**17**	53	5	13	15	6
Mannings School	T	**18**	19	47	46	27	122
St Mary High School	T	**19**	26	42	40	47	95
Dunbeholden High	NT	**20**	65	9	23	26	4
Morant Bay High School	T	**21**	31	44	61	36	86
St Elizabeth Technical High School	NT	**22**	34	41	87	58	36
Titchfield High School	T	**23**	35	49	55	74	74
Dinthill Technical School	NT	**25**	36	52	74	54	80
Guys Hill High School	NT	**25**	83	5	15	17	2
Munro College	T	**26**	15	73	82	22	160
Merl Grove High School	T	**27**	23	66	26	35	190
Mile Gully High School	NT	**28**	81	9	16	34	3
Holy Childhood High School	T	**29**	17	82	30	39	221
Troy High School	NT	**30**	91	21	34	46	22
Knox College	T	**31**	22	94	31	48	234
Marymount High School	T	**32**	42	77	41	103	129
May Day High School	NT	**34**	59	62	77	127	27

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Foga Road High School	NT	**34**	86	35	49	79	35
St Georges College	T	**35**	27	96	139	42	133
Spaldings High School	NT	**36**	70	56	75	120	24
The Queens High School	T	**38**	25	102	56	69	198
Claude Mckay High School	NT	**38**	99	28	47	83	8
St Catherine High School	T	**39**	37	92	102	96	111
St Hughs High School	T	**40**	28	102	76	86	161
St Marys College	NT	**41**	71	60	121	101	7
Ferncourt High School	T	**42**	46	86	112	132	58
Winston Jones High School	NT	**43**	100	32	54	91	10
Manchester High School	T	**45**	16	117	45	65	247
Denbigh High School	NT	**45**	43	90	69	122	116
Porus High School	NT	**46**	101	33	50	88	21
Edwin Allen High School	NT	**47**	60	76	88	153	29
Tacky High School	NT	**48**	114	22	43	50	15
Decarteret College	T	**49**	21	121	48	76	241
Meadowbrook High School	T	**50**	24	119	111	64	188
Aabuthnott Gallimore High School	NT	**51**	84	61	105	114	11
Old Harbour High School	NT	**52**	72	76	115	117	38
St Mary Technical High School	NT	**53**	69	79	118	146	12
Kingston College	T	**55**	29	127	157	59	169
Happy Grove High School	NT	**55**	78	78	124	135	16
Alston High School	NT	**56**	140	17	25	45	25
William Knibb Memorial High School	NT	**57**	45	114	130	144	79
Clarendon College	T	**58**	33	131	79	128	186
Carron Hall High School	NT	**59**	149	15	35	38	18
Mavis Bank Vocational School	NT	**60**	127	38	107	60	9
Kemps Hill High School	NT	**61**	123	44	53	102	28
Gaynstead High School	NT	**62**	48	120	175	129	60
Rhodes Hall Orange Bay High	NT	**63**	148	23	68	24	17
Macgrath High School	NT	**64**	88	84	138	147	13
Jonathan Grant High School	NT	**65**	64	111	148	166	37
Cross Keys High School	NT	**66**	131	48	58	87	52
Mona High School	NT	**67**	50	132	191	148	55
Thompson Town High School	NT	**68**	159	24	24	49	54
Tacius Golding High School	NT	**69**	150	34	71	61	30
Jose Marti Technical School	NT	**70**	66	123	173	165	40
Cornwall College	T	**71**	32	161	197	106	152
Annotto Bay High School	NT	**72**	93	100	108	140	72
Green Pond High School	NT	**73**	95	99	164	111	44
Charlemont High School	T	**74**	58	137	156	168	88
Bellefield High School	NT	**75**	75	122	133	198	42

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Black River High School	NT	**76**	49	153	181	176	82
Garvey Maceo High School	NT	**77**	67	137	144	217	51
Jamaica College	T	**79**	41	163	219	151	100
Maldon High School	NT	**79**	124	80	150	115	20
Herbert Morrison Technical School	NT	**81**	30	176	167	118	209
Point Hill Leased Primary And Junior High	NT	**81**	190	16	28	25	41
Irwin High School	NT	**82**	62	145	203	174	47
Maud Mcleod High School	NT	**84**	111	98	141	124	53
Lewisville High Vocational School	NT	**84**	138	71	117	92	48
Balaclava / Roger Clarke High	NT	**85**	145	65	101	84	61
Albert Town High School	NT	**86**	103	108	99	159	85
Little London High School	NT	**87**	143	68	106	72	77
Belair School	NT	**88**	39	174	134	161	195
Brimmer Vale High School	NT	**89**	168	46	44	55	89
Aberdeen Primary And Junior High	NT	**90**	146	68	84	41	130
Liberty Academy At The Priory	NT	**91**	55	161	217	219	19
Kellits High School	NT	**92**	144	72	60	100	103
Lennon High School	NT	**93**	105	114	109	180	64
Yallahs High School	NT	**94**	165	54	91	51	76
Ewarton High School	NT	**95**	134	86	113	119	70
Godfrey Stewart High School	NT	**96**	94	126	158	139	84
Denham Town High School	NT	**97**	164	58	132	68	26
Fair Prospect High School	NT	**98**	152	71	67	81	109
Eltham High School	NT	**99**	113	110	143	157	45
Ocho Rios High School	NT	**100**	79	146	171	205	49
Aenon Town All Age	NT	**101**	206	20	14	19	68
Camperdown High School	T	**102**	44	182	185	143	181
Grange Hill High School	NT	**103**	147	81	125	89	73
Robert Lightbourne High School	NT	**105**	177	52	70	40	98
The Cedar Grove Academy	NT	**105**	38	191	149	130	245
Oberlin High School	NT	**106**	74	157	209	199	39
Lacovia High School	NT	**108**	89	142	192	184	43
Garlogie Primary And Junior High	NT	**108**	181	50	36	63	106
Troja Primary Junior High	NT	**109**	203	29	33	28	78
Newell High School	NT	**110**	142	91	120	98	90
Ruseas High School	T	**111**	52	185	211	190	110
Glendevon Primary And Junior High	NT	**112**	211	31	57	30	65
Goshen All Age	NT	**114**	180	68	81	62	112
Vere Technical High School	NT	**114**	73	175	136	191	165
Dunoon Park Technical High School	NT	**115**	61	189	233	193	97

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Anchovy High School	NT	**116**	80	172	226	215	46
Hopewell Sandy Bay High	NT	**118**	166	87	123	57	123
Spring Gardens All Age	NT	**118**	223	30	27	23	91
B B Coke High School	NT	**119**	97	157	178	188	81
New Green Primary And Junior High	NT	**120**	200	57	42	52	127
Bustamante High School	NT	**122**	160	98	66	116	136
Kitson Town All Age	NT	**122**	238	20	21	14	66
Maggotty High School	NT	**123**	92	166	198	209	69
Merlene Ottey High School Vocational	NT	**124**	115	144	169	123	128
Clan Carthy High School	NT	**126**	110	151	220	183	31
Spot Valley High School	NT	**126**	132	129	166	133	93
Central High School	NT	**126**	102	159	135	202	115
Haile Selassie High School	NT	**128**	161	102	153	108	62
Buff Bay High School	NT	**129**	117	148	128	170	131
Islington / Horace Clarke High	NT	**130**	154	112	94	126	132
Chapleton All Age	NT	**131**	193	74	39	77	149
Rosemount Primary And Junior High	NT	**132**	229	40	38	29	113
Mount Saint Joseph Catholic High School	NT	**133**	40	230	170	203	251
Tivoli Gardens High School	NT	**134**	125	148	213	182	34
Kingston Technical High School	NT	**135**	51	223	234	206	166
Hayes Primary And Junior High	NT	**136**	230	46	17	33	138
Garlands Primary And Junior High	NT	**137**	214	63	89	43	101
Cross Primary And Junior High	NT	**138**	222	56	22	44	153
St Annes High School	NT	**140**	195	83	129	71	92
Steer Town High Mansfiel	NT	**140**	107	171	151	173	158
Bath Primary And Junior High	NT	**141**	226	53	59	32	120
Tarrant High School	NT	**142**	87	193	236	227	71
Calabar High School	T	**144**	47	235	247	228	159
Hatfield Primary And Junior High	NT	**144**	157	125	97	149	134
St Thomas Technical High School	NT	**145**	85	199	214	212	118
Donald Quarrie High School	NT	**146**	136	150	199	172	59
Petersfield High School	NT	**147**	106	181	200	200	104
Braeton Primary And Junior High	NT	**148**	251	37	29	20	117
Rock Hall All Age St Andrew	NT	**149**	184	106	152	110	75
Papine High School	NT	**151**	90	206	240	237	83
Bridgeport High School	NT	**151**	76	220	227	240	126
Frome Technical High School	NT	**152**	63	235	232	232	170
Port Antonio High School	NT	**153**	108	192	160	208	163

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Bluefields High / Belmont Academy	NT	**154**	57	244	235	224	226
Iona High School	NT	**155**	77	225	204	235	175
Excelsior High School	T	**156**	56	248	248	246	228
Holmwood Technical High School	NT	**157**	54	251	242	249	250
Glengoffe High School	NT	**158**	162	144	159	154	107
Sandy Bay Primary And Junior High	NT	**159**	173	133	119	125	151
St James High School	NT	**160**	109	198	218	204	119
Lowe River Primary And Junior High	NT	**161**	212	96	51	80	183
Vauxhall High School	NT	**162**	96	212	246	234	96
Norman Gardens Primary And Junior High	NT	**163**	250	59	92	31	105
Cedric Titus High School	NT	**164**	156	154	104	162	179
White Marl Primary And Junior High	NT	**165**	248	64	52	37	155
Kingston High School	NT	**167**	118	195	231	218	87
St Andrew Technical High School	NT	**167**	68	245	250	248	189
Green Island High School	NT	**167**	98	215	228	221	135
Sydney Pagon Agricultural High School	NT	**169**	82	233	207	194	230
Pembroke Hall High School	NT	**170**	104	214	245	244	94
Waterford High School	NT	**171**	167	152	147	150	141
Trout Hall All Age	NT	**172**	232	89	37	73	194
Spanish Town High School	NT	**173**	116	205	208	226	121
Higgins Land Primary And Junior High	NT	**174**	204	118	93	95	172
Leicesterfield Primary And Junior High And Infant	NT	**175**	183	141	85	131	200
Mount Moreland Primary And Junior High	NT	**176**	236	89	80	56	168
Edith Dalton James High School	NT	**177**	129	196	224	216	99
Marcus Garvey Technical High School	NT	**178**	126	200	184	220	145
Muirhouse Primary And Junior High	NT	**179**	224	104	78	70	178
Enfield Primary And Junior High	NT	**180**	221	108	63	75	205
Muschette High School	NT	**182**	112	221	206	241	148
Bog Walk High School	NT	**182**	153	180	174	192	137
Fellowship Primary And Junior High	NT	**183**	219	116	64	78	212
Seaforth High School	NT	**184**	119	216	223	222	140

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Mandeville Primary And Junior High	NT	**185**	158	179	140	197	162
Linstead Primary And Junior High	NT	**186**	245	93	72	53	187
Paul Bogle High School	NT	**187**	171	168	165	145	167
Knockalva Technical School	NT	**188**	137	203	210	196	146
Penwood High School	NT	**189**	151	191	215	201	108
Cambridge High School	NT	**190**	135	208	212	207	144
Middle Quarters All Age	NT	**192**	213	131	110	90	193
Green Park Primary And Junior High	NT	**192**	228	116	73	82	199
Tredegar Park All Age	NT	**193**	242	105	83	67	185
Christiana High School	NT	**194**	122	226	194	239	182
Four Paths Primary And Junior High	NT	**195**	225	125	65	105	210
Hydel Group Of Schools St Andrew	NT	**196**	120	231	229	243	154
Melrose Primary And Junior High	NT	**197**	218	135	154	104	143
John Mills Primary And Junior High And Infant	NT	**198**	187	168	189	138	150
Port Morant Primary And Junior High	NT	**200**	199	157	137	113	197
Claremont All Age St Ann	NT	**200**	217	139	98	109	207
Trench Town High School	NT	**201**	170	186	205	186	125
Osbourne Store Primary And Junior High	NT	**202**	201	157	86	142	219
Retreat Primary And Junior High	NT	**203**	249	109	62	66	216
Clarksonville All Age	NT	**204**	234	128	90	94	203
Norman Manley High School	NT	**206**	121	242	249	247	174
Oracabessa High School	NT	**206**	141	222	161	210	225
Villa Road Primary And Junior High	NT	**207**	185	179	122	169	208
Browns Town High School	NT	**208**	128	236	201	236	202
Seaward Primary And Junior High	NT	**210**	231	134	127	93	177
Greater Portmore High School	NT	**210**	133	232	216	230	184
John Austin All Age	NT	**211**	197	170	103	160	215
Cumberland High School	NT	**212**	174	194	168	187	180
Ascott High School	NT	**213**	130	240	230	245	191
Windsor Castle All Age	NT	**214**	207	165	100	134	240
Highgate Primary And Junior High	NT	**215**	188	185	131	163	217
Maverley Primary And Junior High	NT	**217**	209	164	163	137	171
Bamboo Primary And Junior High	NT	**217**	233	140	96	99	220
Discovery Bay All Age	NT	**218**	239	139	95	97	222
Exchange All Age	NT	**219**	196	183	126	171	213

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Cockburn Gardens Primary And Junior High	NT	**220**	205	177	183	141	173
Calabar Primary And Junior High And Infant	NT	**222**	182	201	225	179	147
Holy Trinity High School	NT	**222**	155	228	239	225	156
Gordon Town / Louise Bennett Coverley All Age	NT	**223**	186	198	202	175	164
New Day Primary And Junior High	NT	**224**	169	219	222	213	157
Mico Practising Primary And Junior High	NT	**225**	139	249	251	251	231
Innswood High School	NT	**226**	179	210	172	189	211
Mount Grace Primary And Junior High	NT	**227**	244	150	116	85	229
Charlie Smith High School	NT	**228**	176	219	221	195	176
Swallowfield Primary And Junior High	NT	**229**	227	173	176	121	192
Santa Cruz Primary And Junior High	NT	**230**	216	189	155	136	232
Flankers Primary And Junior High	NT	**231**	243	162	145	107	206
Beulah All Age	NT	**232**	220	187	114	167	237
Windward Road Primary And Junior High	NT	**234**	172	241	244	229	196
Nain Primary Junior High	NT	**234**	189	224	188	185	238
New Forest Primary And Junior High And Infant	NT	**234**	163	250	237	250	248
Granville All Age	NT	**236**	246	168	142	112	223
Dallas Primary Junior High	NT	**237**	202	213	196	181	201
Elderslie Primary And Junior High	NT	**238**	215	203	162	155	235
Shortwood Practising Primary And Junior High And Infant	NT	**240**	178	243	241	238	204
Constant Spring Primary And Junior High	NT	**240**	175	246	243	242	214
Steer Town Primary And Junior High	NT	**241**	192	230	177	211	236
New Hope Primary And Junior High	NT	**242**	210	217	186	164	239
Castleton Primary And Junior High	NT	**243**	191	238	190	223	243
Moneague Primary And Junior High	NT	**244**	194	237	187	214	242
Mount Salem Primary And Junior High	NT	**245**	237	203	182	152	218
Stony Hill Primary And Junior High And Infant	NT	**246**	198	247	238	231	233
Albion Primary And Junior High	NT	**247**	235	211	193	158	224

School Name	HS Type	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Rock River All Age	NT	**248**	208	239	179	233	249
Farm Primary And Junior High	NT	**249**	240	208	180	156	227
Runaway Bay All Age	NT	**250**	247	209	146	178	246
Bethel Primary And Junior High	NT	**251**	241	227	195	177	244

Note. HS Type = High School Type; T = Traditional; NT = Nontraditional; OR = Overall Rank; HS Type = High School Type; T = Traditional; NT = Nontraditional high school; RCQS = Rank by Caribbean Secondary Examination Certificate; RVA = Rank by Value-Added; RCVA = Rank by Contextual Value-Added; RSCVA = Rank by School Contextual Value-Added Models.

Table B2

Schools Sorted by Overall Rank and Grouped by School Type.

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Traditional High School						
Campion College	**1**	1	1	2	1	1
Immaculate Conception High School	**2**	2	2	1	2	5
St Andrew High School For Girls	**3**	3	6	4	3	32
Montego Bay High School	**4**	4	7	6	4	33
Wolmers High School For Girls	**5**	9	3	8	6	14
Westwood High School	**6**	5	11	3	5	57
Ardenne High School	**7**	8	14	12	9	67
Mount Alvernia High School	**9**	11	12	11	8	50
Bishop Gibson High School	**9**	10	13	7	12	63
Wolmers Boys School	**11**	12	18	32	11	56
York Castle High School	**11**	20	10	19	21	23
Hampton High School	**12**	7	25	10	10	114
Glenmuir High School	**13**	6	27	5	7	124
Convent Of Mercy Academy Alpha	**14**	18	27	18	16	102
St Hildas Diocesan High	**15**	13	36	9	13	142
St Jago High School	**16**	14	39	20	18	139
Mannings School	**18**	19	47	46	27	122
St Mary High School	**19**	26	42	40	47	95
Morant Bay High School	**21**	31	44	61	36	86
Titchfield High School	**23**	35	49	55	74	74
Munro College	**26**	15	73	82	22	160

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Merl Grove High School	**27**	23	66	26	35	190
Holy Childhood High School	**29**	17	82	30	39	221
Knox College	**31**	22	94	31	48	234
Marymount High School	**32**	42	77	41	103	129
St Georges College	**35**	27	96	139	42	133
The Queens High School	**38**	25	102	56	69	198
St Catherine High School	**39**	37	92	102	96	111
St Hughs High School	**40**	28	102	76	86	161
Ferncourt High School	**42**	46	86	112	132	58
Manchester High School	**45**	16	117	45	65	247
Decarteret College	**49**	21	121	48	76	241
Meadowbrook High School	**50**	24	119	111	64	188
Kingston College	**55**	29	127	157	59	169
Clarendon College	**58**	33	131	79	128	186
Cornwall College	**71**	32	161	197	106	152
Charlemont High School	**74**	58	137	156	168	88
Jamaica College	**79**	41	163	219	151	100
Camperdown High School	**102**	44	182	185	143	181
Ruseas High School	**111**	52	185	211	190	110
Calabar High School	**144**	47	235	247	228	159
Excelsior High School	**156**	56	248	248	246	228
Nontraditional High Schools						
Holland High School	**17**	53	5	13	15	6
Dunbeholden High	**20**	65	9	23	26	4
St Elizabeth Technical High School	**22**	34	41	87	58	36
Dinthill Technical School	**25**	36	52	74	54	80
Guys Hill High School	**25**	83	5	15	17	2
Mile Gully High School	**28**	81	9	16	34	3
Troy High School	**30**	91	21	34	46	22
May Day High School	**34**	59	62	77	127	27
Foga Road High School	**34**	86	35	49	79	35
Spaldings High School	**36**	70	56	75	120	24
Claude Mckay High School	**38**	99	28	47	83	8
St Marys College	**41**	71	60	121	101	7
Winston Jones High School	**43**	100	32	54	91	10
Denbigh High School	**45**	43	90	69	122	116
Porus High School	**46**	101	33	50	88	21
Edwin Allen High School	**47**	60	76	88	153	29
Tacky High School	**48**	114	22	43	50	15
Aabuthnott Gallimore High School	**51**	84	61	105	114	11
Old Harbour High School	**52**	72	76	115	117	38

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
St Mary Technical High School	**53**	69	79	118	146	12
Happy Grove High School	**55**	78	78	124	135	16
Alston High School	**56**	140	17	25	45	25
William Knibb Memorial High School	**57**	45	114	130	144	79
Carron Hall High School	**59**	149	15	35	38	18
Mavis Bank Vocational School	**60**	127	38	107	60	9
Kemps Hill High School	**61**	123	44	53	102	28
Gaynstead High School	**62**	48	120	175	129	60
Rhodes Hall Orange Bay High	**63**	148	23	68	24	17
Macgrath High School	**64**	88	84	138	147	13
Jonathan Grant High School	**65**	64	111	148	166	37
Cross Keys High School	**66**	131	48	58	87	52
Mona High School	**67**	50	132	191	148	55
Thompson Town High School	**68**	159	24	24	49	54
Tacius Golding High School	**69**	150	34	71	61	30
Jose Marti Technical School	**70**	66	123	173	165	40
Annotto Bay High School	**72**	93	100	108	140	72
Green Pond High School	**73**	95	99	164	111	44
Bellefield High School	**75**	75	122	133	198	42
Black River High School	**76**	49	153	181	176	82
Garvey Maceo High School	**77**	67	137	144	217	51
Maldon High School	**79**	124	80	150	115	20
Herbert Morrison Technical School	**81**	30	176	167	118	209
Point Hill Leased Primary And Junior High	**81**	190	16	28	25	41
Irwin High School	**82**	62	145	203	174	47
Maud Mcleod High School	**84**	111	98	141	124	53
Lewisville High Vocational School	**84**	138	71	117	92	48
Balaclava / Roger Clarke High	**85**	145	65	101	84	61
Albert Town High School	**86**	103	108	99	159	85
Little London High School	**87**	143	68	106	72	77
Belair School	**88**	39	174	134	161	195
Brimmer Vale High School	**89**	168	46	44	55	89
Aberdeen Primary And Junior High	**90**	146	68	84	41	130

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Liberty Academy At The Priory	**91**	55	161	217	219	19
Kellits High School	**92**	144	72	60	100	103
Lennon High School	**93**	105	114	109	180	64
Yallahs High School	**94**	165	54	91	51	76
Ewarton High School	**95**	134	86	113	119	70
Godfrey Stewart High School	**96**	94	126	158	139	84
Denham Town High School	**97**	164	58	132	68	26
Fair Prospect High School	**98**	152	71	67	81	109
Eltham High School	**99**	113	110	143	157	45
Ocho Rios High School	**100**	79	146	171	205	49
Aenon Town All Age	**101**	206	20	14	19	68
Grange Hill High School	**103**	147	81	125	89	73
Robert Lightbourne High School	**105**	177	52	70	40	98
The Cedar Grove Academy	**105**	38	191	149	130	245
Oberlin High School	**106**	74	157	209	199	39
Lacovia High School	**108**	89	142	192	184	43
Garlogie Primary And Junior High	**108**	181	50	36	63	106
Troja Primary Junior High	**109**	203	29	33	28	78
Newell High School	**110**	142	91	120	98	90
Glendevon Primary And Junior High	**112**	211	31	57	30	65
Goshen All Age	**114**	180	68	81	62	112
Vere Technical High School	**114**	73	175	136	191	165
Dunoon Park Technical High School	**115**	61	189	233	193	97
Anchovy High School	**116**	80	172	226	215	46
Hopewell Sandy Bay High	**118**	166	87	123	57	123
Spring Gardens All Age	**118**	223	30	27	23	91
B B Coke High School	**119**	97	157	178	188	81
New Green Primary And Junior High	**120**	200	57	42	52	127
Bustamante High School	**122**	160	98	66	116	136
Kitson Town All Age	**122**	238	20	21	14	66
Maggotty High School	**123**	92	166	198	209	69
Merlene Ottey High School Vocational	**124**	115	144	169	123	128
Clan Carthy High School	**126**	110	151	220	183	31
Spot Valley High School	**126**	132	129	166	133	93
Central High School	**126**	102	159	135	202	115
Haile Selassie High School	**128**	161	102	153	108	62

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Buff Bay High School	**129**	117	148	128	170	131
Islington / Horace Clarke High	**130**	154	112	94	126	132
Chapleton All Age	**131**	193	74	39	77	149
Rosemount Primary And Junior High	**132**	229	40	38	29	113
Mount Saint Joseph Catholic High School	**133**	40	230	170	203	251
Tivoli Gardens High School	**134**	125	148	213	182	34
Kingston Technical High School	**135**	51	223	234	206	166
Hayes Primary And Junior High	**136**	230	46	17	33	138
Garlands Primary And Junior High	**137**	214	63	89	43	101
Cross Primary And Junior High	**138**	222	56	22	44	153
St Annes High School	**140**	195	83	129	71	92
Steer Town High Mansfiel	**140**	107	171	151	173	158
Bath Primary And Junior High	**141**	226	53	59	32	120
Tarrant High School	**142**	87	193	236	227	71
Hatfield Primary And Junior High	**144**	157	125	97	149	134
St Thomas Technical High School	**145**	85	199	214	212	118
Donald Quarrie High School	**146**	136	150	199	172	59
Petersfield High School	**147**	106	181	200	200	104
Braeton Primary And Junior High	**148**	251	37	29	20	117
Rock Hall All Age St Andrew	**149**	184	106	152	110	75
Papine High School	**151**	90	206	240	237	83
Bridgeport High School	**151**	76	220	227	240	126
Frome Technical High School	**152**	63	235	232	232	170
Port Antonio High School	**153**	108	192	160	208	163
Bluefields High / Belmont Academy	**154**	57	244	235	224	226
Iona High School	**155**	77	225	204	235	175
Holmwood Technical High School	**157**	54	251	242	249	250
Glengoffe High School	**158**	162	144	159	154	107

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Sandy Bay Primary And Junior High	**159**	173	133	119	125	151
St James High School	**160**	109	198	218	204	119
Lowe River Primary And Junior High	**161**	212	96	51	80	183
Vauxhall High School	**162**	96	212	246	234	96
Norman Gardens Primary And Junior High	**163**	250	59	92	31	105
Cedric Titus High School	**164**	156	154	104	162	179
White Marl Primary And Junior High	**165**	248	64	52	37	155
Kingston High School	**167**	118	195	231	218	87
St Andrew Technical High School	**167**	68	245	250	248	189
Green Island High School	**167**	98	215	228	221	135
Sydney Pagon Agricultural High School	**169**	82	233	207	194	230
Pembroke Hall High School	**170**	104	214	245	244	94
Waterford High School	**171**	167	152	147	150	141
Trout Hall All Age	**172**	232	89	37	73	194
Spanish Town High School	**173**	116	205	208	226	121
Higgins Land Primary And Junior High	**174**	204	118	93	95	172
Leicesterfield Primary And Junior High And Infant	**175**	183	141	85	131	200
Mount Moreland Primary And Junior High	**176**	236	89	80	56	168
Edith Dalton James High School	**177**	129	196	224	216	99
Marcus Garvey Technical High School	**178**	126	200	184	220	145
Muirhouse Primary And Junior High	**179**	224	104	78	70	178
Enfield Primary And Junior High	**180**	221	108	63	75	205
Muschette High School	**182**	112	221	206	241	148
Bog Walk High School	**182**	153	180	174	192	137
Fellowship Primary And Junior High	**183**	219	116	64	78	212
Seaforth High School	**184**	119	216	223	222	140
Mandeville Primary And Junior High	**185**	158	179	140	197	162
Linstead Primary And Junior High	**186**	245	93	72	53	187
Paul Bogle High School	**187**	171	168	165	145	167

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Knockalva Technical School	**188**	137	203	210	196	146
Penwood High School	**189**	151	191	215	201	108
Cambridge High School	**190**	135	208	212	207	144
Middle Quarters All Age	**192**	213	131	110	90	193
Green Park Primary And Junior High	**192**	228	116	73	82	199
Tredegar Park All Age	**193**	242	105	83	67	185
Christiana High School	**194**	122	226	194	239	182
Four Paths Primary And Junior High	**195**	225	125	65	105	210
Hydel Group Of Schools St Andrew	**196**	120	231	229	243	154
Melrose Primary And Junior High	**197**	218	135	154	104	143
John Mills Primary And Junior High And Infant	**198**	187	168	189	138	150
Port Morant Primary And Junior High	**200**	199	157	137	113	197
Claremont All Age St Ann	**200**	217	139	98	109	207
Trench Town High School	**201**	170	186	205	186	125
Osbourne Store Primary And Junior High	**202**	201	157	86	142	219
Retreat Primary And Junior High	**203**	249	109	62	66	216
Clarksonville All Age	**204**	234	128	90	94	203
Norman Manley High School	**206**	121	242	249	247	174
Oracabessa High School	**206**	141	222	161	210	225
Villa Road Primary And Junior High	**207**	185	179	122	169	208
Browns Town High School	**208**	128	236	201	236	202
Seaward Primary And Junior High	**210**	231	134	127	93	177
Greater Portmore High School	**210**	133	232	216	230	184
John Austin All Age	**211**	197	170	103	160	215
Cumberland High School	**212**	174	194	168	187	180
Ascott High School	**213**	130	240	230	245	191
Windsor Castle All Age	**214**	207	165	100	134	240
Highgate Primary And Junior High	**215**	188	185	131	163	217
Maverley Primary And Junior High	**217**	209	164	163	137	171

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Bamboo Primary And Junior High	**217**	233	140	96	99	220
Discovery Bay All Age	**218**	239	139	95	97	222
Exchange All Age	**219**	196	183	126	171	213
Cockburn Gardens Primary And Junior High	**220**	205	177	183	141	173
Calabar Primary And Junior High And Infant	**222**	182	201	225	179	147
Holy Trinity High School	**222**	155	228	239	225	156
Gordon Town / Louise Bennett Coverley All Age	**223**	186	198	202	175	164
New Day Primary And Junior High	**224**	169	219	222	213	157
Mico Practising Primary And Junior High	**225**	139	249	251	251	231
Innswood High School	**226**	179	210	172	189	211
Mount Grace Primary And Junior High	**227**	244	150	116	85	229
Charlie Smith High School	**228**	176	219	221	195	176
Swallowfield Primary And Junior High	**229**	227	173	176	121	192
Santa Cruz Primary And Junior High	**230**	216	189	155	136	232
Flankers Primary And Junior High	**231**	243	162	145	107	206
Beulah All Age	**232**	220	187	114	167	237
Windward Road Primary And Junior High	**234**	172	241	244	229	196
Nain Primary Junior High	**234**	189	224	188	185	238
New Forest Primary And Junior High And Infant	**234**	163	250	237	250	248
Granville All Age	**236**	246	168	142	112	223
Dallas Primary Junior High	**237**	202	213	196	181	201
Elderslie Primary And Junior High	**238**	215	203	162	155	235
Shortwood Practising Primary And Junior High And Infant	**240**	178	243	241	238	204
Constant Spring Primary And Junior High	**240**	175	246	243	242	214
Steer Town Primary And Junior High	**241**	192	230	177	211	236
New Hope Primary And Junior High	**242**	210	217	186	164	239

School Name	**OR**	RCQS	ORVA	RVA	RCVA	RSCVA
Castleton Primary And Junior High	**243**	191	238	190	223	243
Moneague Primary And Junior High	**244**	194	237	187	214	242
Mount Salem Primary And Junior High	**245**	237	203	182	152	218
Stony Hill Primary And Junior High And Infant	**246**	198	247	238	231	233
Albion Primary And Junior High	**247**	235	211	193	158	224
Rock River All Age	**248**	208	239	179	233	249
Farm Primary And Junior High	**249**	240	208	180	156	227
Runaway Bay All Age	**250**	247	209	146	178	246
Bethel Primary And Junior High	**251**	241	227	195	177	244

Note. HS Type = High School Type; T = Traditional; NT = Nontraditional; OR = Overall Rank; HS Type = High School Type; T = Traditional; NT = Nontraditional high school; RCQS = Rank by Caribbean Secondary Examination Certificate; RVA = Rank by Value-Added; RCVA = Rank by Contextual Value-Added; RSCVA = Rank by School Contextual Value-Added Models.

Appendix C

Schools' Value-Added Scores and Rank for English, Mathematics, and Science

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
Aabuthnott Gallimore High School	3.87	95	-0.16	211	0.01	99
Aberdeen Primary And Junior High	3.19	167	0.19	66	-0.02	115
Aenon Town All Age	2.65	242	0.29	38	0.10	56
Albert Town High School	3.65	118	-0.09	173	0.19	29
Albion Primary And Junior High	2.94	196	-0.02	152	-0.08	142
Alston High School	3.17	171	0.37	21	-0.07	139
Anchovy High School	4.29	68	-0.40	249	-0.17	166
Annotto Bay High School	3.71	107	0.15	75	0.09	62
Ardenne High School	5.45	3	0.49	11	0.20	28
Ascott High School	3.68	113	-0.11	188	-0.24	192
B B Coke High School	3.79	102	-0.13	197	-0.10	149
Balaclava / Roger Clarke High	3.27	159	-0.13	198	0.04	87
Bamboo Primary And Junior High	2.71	229	0.03	130	-0.16	165
Bath Primary And Junior High	2.78	220	0.24	52	0.07	74
Belair School	4.84	34	0.03	128	0.18	32
Bellefield High School	4.21	71	0.08	107	0.10	57
Bethel Primary And Junior High	2.88	207	-0.17	215	-0.12	154
Beulah All Age	2.76	225	0.25	50	0.02	91
Bishop Gibson High School	5.10	21	0.16	72	0.44	10
Black River High School	4.63	51	-0.15	206	0.00	102
Bluefields High / Belmont Academy	4.55	57	-0.01	145	-0.28	201
Bog Walk High School	3.32	154	-0.11	190	-0.01	113
Braeton Primary And Junior High	2.56	250	0.20	63	-0.28	199
Bridgeport High School	4.38	62	-0.28	237	-0.19	172
Brimmer Vale High School	3.12	177	0.15	81	0.14	45
Browns Town High School	3.65	117	-0.27	231	-0.28	200
Buff Bay High School	3.59	129	0.16	73	0.01	101
Bustamante High School	3.06	183	0.29	39	0.00	105
Calabar High School	4.92	32	-0.22	224	-0.49	244
Calabar Primary And Junior High And Infant	3.34	149	0.07	113	-0.21	180
Cambridge High School	3.60	127	-0.17	213	0.07	75
Camperdown High School	4.79	40	-0.08	171	-0.22	184
Campion College	5.59	1	0.89	1	0.65	3
Carron Hall High School	3.18	170	0.10	97	0.07	72
Castleton Primary And Junior High	3.07	182	-0.02	149	-0.10	144
Cedric Titus High School	3.22	164	-0.03	156	0.15	42
Central High School	3.69	111	0.19	65	0.04	86
Chapleton All Age	2.71	230	0.33	27	0.16	36

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
Charlemont High School	4.50	58	-0.15	201	0.05	81
Charlie Smith High School	3.43	141	-0.30	240	-0.41	235
Christiana High School	3.65	119	0.06	115	-0.11	151
Clan Carthy High School	3.88	93	-0.20	222	-0.29	202
Claremont All Age St Ann	2.82	215	0.00	139	-0.08	140
Clarendon College	4.82	36	-0.01	146	0.24	26
Clarksonville All Age	2.71	231	0.23	55	0.06	77
Claude Mckay High School	3.50	138	0.18	70	0.10	58
Cockburn Gardens Primary And Junior High	3.01	192	0.05	120	-0.37	227
Constant Spring Primary And Junior High	3.45	139	-0.05	161	-0.33	217
Convent Of Mercy Academy Alpha	5.02	27	0.06	118	0.08	66
Cornwall College	5.16	14	-0.16	208	-0.21	178
Cross Keys High School	3.36	148	0.03	125	0.07	73
Cross Primary And Junior High	2.62	244	0.52	8	0.15	43
Cumberland High School	3.26	161	-0.06	166	-0.23	188
Dallas Primary Junior High	3.07	181	0.07	110	-0.27	197
Decarteret College	5.06	25	0.18	68	-0.01	108
Denbigh High School	4.62	52	0.08	106	0.32	16
Denham Town High School	3.40	143	0.00	143	-0.34	223
Dinthill Technical School	4.66	46	-0.12	195	0.05	80
Discovery Bay All Age	2.67	239	0.07	111	-0.13	158
Donald Quarrie High School	3.65	116	-0.28	235	-0.33	220
Dunbeholden High	3.95	88	0.27	45	0.30	18
Dunoon Park Technical High School	4.47	60	-0.18	218	-0.69	250
Edith Dalton James High School	3.70	109	-0.16	209	-0.31	212
Edwin Allen High School	4.26	69	0.02	133	0.08	68
Elderslie Primary And Junior High	2.92	198	0.07	114	0.15	44
Eltham High School	3.61	125	0.00	144	-0.05	134
Enfield Primary And Junior High	2.70	236	0.35	23	0.04	88
Ewarton High School	3.37	147	-0.09	172	-0.03	122
Excelsior High School	4.80	39	-0.25	229	-0.19	173
Exchange All Age	2.98	193	0.08	105	-0.06	135
Fair Prospect High School	3.13	176	0.09	98	-0.21	176
Farm Primary And Junior High	2.88	205	-0.10	178	-0.32	215
Fellowship Primary And Junior High	2.87	208	0.47	12	-0.11	152
Ferncourt High School	4.60	53	-0.32	241	0.08	69
Flankers Primary And Junior High	2.77	221	0.08	100	-0.10	148
Foga Road High School	3.63	121	0.15	82	-0.01	107
Four Paths Primary And Junior High	2.72	228	0.40	19	0.00	103
Frome Technical High School	4.59	54	-0.18	220	-0.33	222
Garlands Primary And Junior High	2.85	211	0.13	88	0.30	19
Garlogie Primary And Junior High	2.85	212	0.75	3	0.26	22

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
Garvey Maceo High School	4.25	70	-0.11	193	0.16	37
Gaynstead High School	4.64	50	-0.16	210	-0.17	167
Glendevon Primary And Junior High	2.80	217	0.14	85	0.32	17
Glengoffe High School	3.29	157	-0.10	179	-0.15	162
Glenmuir High School	5.29	9	0.60	6	0.52	7
Godfrey Stewart High School	3.86	96	-0.08	168	-0.29	203
Gordon Town / Louise Bennett Coverley All Age	3.10	178	0.25	49	-0.45	239
Goshen All Age	2.93	197	0.42	18	0.24	24
Grange Hill High School	3.34	150	-0.10	185	-0.23	189
Granville All Age	2.77	223	-0.04	159	-0.22	187
Greater Portmore High School	3.63	122	-0.16	212	-0.27	198
Green Island High School	3.96	86	-0.35	246	-0.21	179
Green Park Primary And Junior High	2.73	227	0.19	67	-0.05	131
Green Pond High School	3.81	99	-0.22	225	0.03	90
Guys Hill High School	3.61	124	0.07	112	0.24	25
Haile Selassie High School	3.33	152	-0.13	199	-0.37	228
Hampton High School	5.35	7	0.49	10	0.57	5
Happy Grove High School	4.04	81	-0.01	148	-0.03	121
Hatfield Primary And Junior High	3.23	163	0.34	26	0.16	39
Hayes Primary And Junior High	2.58	248	0.54	7	0.11	50
Herbert Morrison Technical School	5.08	22	-0.06	164	-0.10	150
Higgins Land Primary And Junior High	2.76	226	0.29	37	0.15	40
Highgate Primary And Junior High	3.01	191	0.35	24	0.15	41
Holland High School	4.04	83	0.08	104	0.09	64
Holmwood Technical High School	4.57	55	-0.09	177	-0.23	190
Holy Childhood High School	5.14	15	0.08	101	0.08	67
Holy Trinity High School	3.58	131	-0.30	239	-0.52	246
Hopewell Sandy Bay High	3.18	168	-0.34	243	-0.33	218
Hydel Group Of Schools St Andrew	3.78	103	-0.34	245	-0.52	245
Immaculate Conception High School	5.50	2	0.76	2	0.63	4
Innswood High School	3.04	186	-0.10	181	-0.31	206
Iona High School	4.29	67	-0.08	170	-0.19	171
Irwin High School	4.48	59	-0.42	250	-0.04	129
Islington / Horace Clarke High	3.20	165	0.01	134	0.18	31
Jamaica College	5.04	26	-0.02	150	-0.31	211
John Austin All Age	2.81	216	0.28	42	0.11	53
John Mills Primary And Junior High And Infant	3.15	174	0.00	141	-0.30	205
Jonathan Grant High School	4.36	63	-0.09	175	-0.01	109
Jose Marti Technical School	4.31	66	-0.18	217	-0.13	156
Kellits High School	3.27	158	0.30	36	0.00	104
Kemps Hill High School	3.30	155	0.13	89	0.13	48
Kingston College	5.10	20	0.15	78	-0.01	112

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
Kingston High School	3.88	94	-0.22	226	-0.31	213
Kingston Technical High School	4.74	43	-0.10	182	-0.53	247
Kitson Town All Age	2.53	251	0.07	108	0.11	49
Knockalva Technical School	3.66	115	-0.18	219	-0.08	143
Knox College	4.93	31	0.32	28	0.06	76
Lacovia High School	3.95	89	-0.07	167	-0.06	136
Leicesterfield Primary And Junior High And Infant	2.88	206	0.32	31	0.09	63
Lennon High School	3.63	123	0.15	79	0.10	55
Lewisville High Vocational School	3.38	146	0.15	80	0.02	92
Liberty Academy At The Priory	4.79	41	-0.11	191	-0.03	124
Linstead Primary And Junior High	2.60	247	0.27	44	-0.06	138
Little London High School	3.33	151	-0.10	180	-0.22	185
Lowe River Primary And Junior High	2.71	232	0.31	33	0.02	94
Macgrath High School	3.89	92	-0.19	221	0.05	82
Maggotty High School	3.93	90	-0.23	227	-0.02	116
Maldon High School	3.67	114	-0.12	196	0.05	83
Manchester High School	5.16	13	0.37	20	0.01	98
Mandeville Primary And Junior High	3.27	160	0.36	22	-0.02	117
Mannings School	5.11	19	0.05	119	0.39	12
Marcus Garvey Technical High School	3.57	132	-0.34	244	-0.31	209
Marymount High School	4.65	49	0.03	129	0.44	9
Maud Mcleod High School	3.72	106	-0.05	160	-0.04	127
Maverley Primary And Junior High	2.91	200	0.16	74	-0.20	174
Mavis Bank Vocational School	3.50	137	-0.01	147	0.11	51
May Day High School	4.34	64	-0.06	163	0.02	95
Meadowbrook High School	5.14	17	0.07	109	-0.14	160
Melrose Primary And Junior High	2.90	202	0.26	46	-0.31	207
Merl Grove High School	4.93	30	0.13	86	0.08	70
Merlene Ottey High School Vocational	3.71	108	-0.03	155	0.01	97
Mico Practising Primary And Junior High	3.96	87	0.00	140	-0.22	186
Middle Quarters All Age	2.79	219	0.32	29	0.05	79
Mile Gully High School	3.68	112	0.03	127	0.16	38
Mona High School	4.65	48	-0.15	204	-0.32	214
Moneague Primary And Junior High	3.03	188	-0.08	169	-0.03	126
Montego Bay High School	5.42	4	0.47	13	0.68	2
Morant Bay High School	4.84	35	0.08	102	0.19	30
Mount Alvernia High School	5.12	18	0.16	71	0.45	8
Mount Grace Primary And Junior High	2.76	224	-0.10	186	-0.42	238
Mount Moreland Primary And Junior High	2.70	235	0.29	40	-0.15	161
Mount Saint Joseph Catholic High School	4.46	61	0.20	62	-0.67	249
Mount Salem Primary And Junior High	2.92	199	-0.11	192	-0.13	157
Muirhouse Primary And Junior High	2.69	237	-0.06	165	-0.15	163

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
Munro College	5.28	11	0.20	64	0.13	46
Muschette High School	3.85	97	-0.27	232	0.06	78
Nain Primary Junior High	3.03	189	0.18	69	-0.03	123
New Day Primary And Junior High	3.39	145	0.04	122	-0.29	204
New Forest Primary And Junior High And Infant	3.51	135	0.11	94	0.02	96
New Green Primary And Junior High	2.70	233	0.29	41	-0.04	128
New Hope Primary And Junior High	3.07	180	0.09	99	-0.38	231
Newell High School	3.30	156	0.01	137	-0.01	110
Norman Gardens Primary And Junior High	2.61	246	0.10	95	-0.40	234
Norman Manley High School	3.90	91	-0.17	216	-0.46	240
Oberlin High School	4.32	65	-0.37	248	-0.14	159
Ocho Rios High School	4.18	72	-0.34	242	-0.05	130
Old Harbour High School	4.12	77	0.06	117	0.04	85
Oracabessa High School	3.39	144	0.21	60	-0.03	125
Osbourne Store Primary And Junior High	2.84	213	0.42	17	0.11	52
Papine High School	4.15	76	-0.28	238	-0.31	210
Paul Bogle High School	3.16	173	0.01	138	-0.22	183
Pembroke Hall High School	4.04	84	-0.37	247	-0.33	219
Penwood High School	3.54	134	-0.17	214	-0.40	233
Petersfield High School	3.84	98	-0.11	189	-0.35	224
Point Hill Leased Primary And Junior High	2.90	201	0.31	32	0.17	34
Port Antonio High School	3.69	110	0.12	90	0.01	100
Port Morant Primary And Junior High	2.90	203	0.23	57	-0.06	137
Porus High School	3.56	133	0.21	59	0.24	27
Retreat Primary And Junior High	2.63	243	0.12	91	0.08	71
Rhodes Hall Orange Bay High	3.18	169	0.01	136	-0.26	193
Robert Lightbourne High School	2.94	195	0.27	43	-0.27	196
Rock Hall All Age St Andrew	3.07	179	0.45	14	-0.18	168
Rock River All Age	2.85	210	0.23	56	-0.10	145
Rosemount Primary And Junior High	2.67	240	0.35	25	-0.01	114
Runaway Bay All Age	2.80	218	0.00	142	-0.23	191
Ruseas High School	4.67	45	-0.28	236	-0.08	141
Sandy Bay Primary And Junior High	3.05	184	0.21	61	0.10	59
Santa Cruz Primary And Junior High	2.89	204	0.30	35	-0.18	169
Seaforth High School	3.77	104	-0.04	158	-0.21	175
Seaward Primary And Junior High	2.77	222	0.08	103	-0.18	170
Shortwood Practising Primary And Junior High And Infant	3.41	142	-0.12	194	-0.32	216
Spaldings High School	4.06	79	0.12	92	0.08	65
Spanish Town High School	3.80	101	-0.14	200	-0.22	181
Spot Valley High School	3.58	130	-0.15	205	-0.39	232
Spring Gardens All Age	2.61	245	0.14	84	-0.02	120
St Andrew High School For Girls	5.34	8	0.64	5	0.38	13

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
St Andrew Technical High School	4.56	56	-0.44	251	-0.66	248
St Annes High School	3.03	187	-0.15	202	-0.48	241
St Catherine High School	4.81	38	-0.10	187	-0.05	133
St Elizabeth Technical High School	4.81	37	-0.20	223	-0.05	132
St Georges College	5.14	16	0.13	87	0.03	89
St Hildas Diocesan High	5.07	24	0.32	30	0.53	6
St Hughs High School	5.07	23	0.02	132	0.17	33
St Jago High School	5.20	12	0.25	51	0.04	84
St James High School	3.80	100	-0.28	234	-0.49	242
St Mary High School	4.90	33	-0.02	151	0.25	23
St Mary Technical High School	4.18	73	-0.10	183	0.09	60
St Marys College	4.16	75	-0.10	184	-0.21	177
St Thomas Technical High School	4.04	82	-0.03	157	-0.11	153
Steer Town High Mansfiel	3.65	120	-0.03	154	-0.41	237
Steer Town Primary And Junior High	3.04	185	-0.02	153	-0.02	118
Stony Hill Primary And Junior High And Infant	3.16	172	-0.15	203	-0.37	229
Swallowfield Primary And Junior High	2.86	209	0.04	123	-0.49	243
Sydney Pagon Agricultural High School	3.98	85	0.45	15	-0.79	251
Tacius Golding High School	3.20	166	0.10	96	0.28	20
Tacky High School	3.50	136	0.03	126	0.11	54
Tarrant High School	4.16	74	-0.28	233	-0.41	236
The Cedar Grove Academy	4.76	42	-0.15	207	-0.26	195
The Queens High School	5.01	28	0.03	124	0.13	47
Thompson Town High School	2.96	194	0.30	34	-0.12	155
Titchfield High School	4.70	44	0.05	121	0.35	15
Tivoli Gardens High School	3.73	105	-0.09	176	-0.26	194
Tredegar Park All Age	2.70	234	0.06	116	-0.36	226
Trench Town High School	3.33	153	0.01	135	-0.31	208
Troja Primary Junior High	2.67	238	0.24	54	-0.10	146
Trout Hall All Age	2.66	241	0.15	76	-0.01	111
Troy High School	3.60	128	0.12	93	0.02	93
Vauxhall High School	4.06	80	-0.26	230	-0.33	221
Vere Technical High School	4.08	78	0.15	77	-0.02	119
Villa Road Primary And Junior High	3.01	190	0.26	47	-0.10	147
Waterford High School	3.25	162	0.02	131	-0.16	164
Westwood High School	5.29	10	0.68	4	0.72	1
White Marl Primary And Junior High	2.58	249	0.15	83	-0.38	230
William Knibb Memorial High School	4.65	47	-0.24	228	0.17	35
Windsor Castle All Age	2.82	214	0.24	53	-0.01	106
Windward Road Primary And Junior High	3.43	140	0.26	48	-0.35	225
Winston Jones High School	3.60	126	-0.05	162	0.09	61
Wolmers Boys School	5.38	5	0.44	16	0.27	21

High School	VA Eng	RVA Eng	VA Math	RVA Math	VA Sci	RVA Sci
Wolmers High School For Girls	5.37	6	0.50	9	0.39	11
Yallahs High School	3.13	175	0.22	58	-0.22	182
York Castle High School	4.96	29	-0.09	174	0.37	14

Note. The Data is sorted by school name. VA = Value-Added Score; RVA = Rank on Value-Added score; Math = Mathematics; Eng = English; Sci = Science.

Appendix D

Schools Ranked by CSEC Quality Scores and Subject Value-Added Scores

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
Aabuthnott Gallimore High School	NT	101	95	100	211	83	99
Aberdeen Primary And Junior High	NT	118	167	141	66	122	115
Aenon Town All Age	NT	209	242	217	38	184	56
Albert Town High School	NT	122	118	122	173	74	29
Albion Primary And Junior High	NT	230	196	236	152	211	142
Alston High School	NT	138	171	125	21	157	139
Anchovy High School	NT	78	68	85	249	84	166
Annotto Bay High School	NT	102	107	87	75	86	62
Ardenne High School	T	7	3	4	11	14	28
Ascott High School	NT	129	113	126	188	145	192
B B Coke High School	NT	106	102	114	197	102	149
Balaclava / Roger Clarke High	NT	149	159	183	198	127	87
Bamboo Primary And Junior High	NT	222	229	242	130	237	165
Bath Primary And Junior High	NT	206	220	212	52	200	74
Belair School	NT	31	34	40	128	21	32
Bellefield High School	NT	69	71	64	107	57	57
Bethel Primary And Junior High	NT	239	207	249	215	218	154
Beulah All Age	NT	241	225	210	50	175	91
Bishop Gibson High School	T	11	21	23	72	13	10
Black River High School	NT	58	51	50	206	45	102
Bluefields High / Belmont Academy	NT	46	57	53	145	58	201
Bog Walk High School	NT	164	154	179	190	138	113
Braeton Primary And Junior High	NT	249	250	237	63	248	199
Bridgeport High School	NT	70	62	72	237	71	172
Brimmer Vale High School	NT	176	177	177	81	142	45
Browns Town High School	NT	117	117	149	231	153	200
Buff Bay High School	NT	128	129	103	73	115	101
Bustamante High School	NT	173	183	157	39	162	105
Calabar High School	T	51	32	37	224	69	244
Calabar Primary And Junior High And Infant	NT	142	149	147	113	174	180
Cambridge High School	NT	132	127	138	213	94	75
Camperdown High School	T	47	40	38	171	54	184
Campion College	T	1	1	1	1	1	3
Carron Hall High School	NT	163	170	160	97	130	72
Castleton Primary And Junior High	NT	204	182	209	149	191	144
Cedric Titus High School	NT	183	164	191	156	120	42

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
Central High School	NT	105	111	84	65	96	86
Chapleton All Age	NT	207	230	207	27	169	36
Charlemont High School	T	56	58	54	201	47	81
Charlie Smith High School	NT	177	141	184	240	214	235
Christiana High School	NT	112	119	109	115	123	151
Clan Carthy High School	NT	100	93	115	222	132	202
Claremont All Age St Ann	NT	221	215	230	139	208	140
Clarendon College	T	37	36	36	146	24	26
Clarksonville All Age	NT	243	231	229	55	186	77
Claude Mckay High School	NT	125	138	96	70	98	58
Cockburn Gardens Primary And Junior High	NT	195	192	206	120	230	227
Constant Spring Primary And Junior High	NT	152	139	144	161	179	217
Convent Of Mercy Academy Alpha	T	19	27	24	118	33	66
Cornwall College	T	30	14	28	208	39	178
Cross Keys High School	NT	148	148	143	125	111	73
Cross Primary And Junior High	NT	231	244	198	8	194	43
Cumberland High School	NT	156	161	189	166	205	188
Dallas Primary Junior High	NT	187	181	194	110	223	197
Decarteret College	T	20	25	19	68	30	108
Denbigh High School	NT	44	52	45	106	25	16
Denham Town High School	NT	157	143	169	143	213	223
Dinthill Technical School	NT	36	46	46	195	35	80
Discovery Bay All Age	NT	224	239	241	111	235	158
Donald Quarrie High School	NT	137	116	150	235	155	220
Dunbeholden High	NT	82	88	74	45	53	18
Dunoon Park Technical High School	NT	64	60	58	218	121	250
Edith Dalton James High School	NT	133	109	133	209	152	212
Edwin Allen High School	NT	67	69	59	133	52	68
Elderslie Primary And Junior High	NT	203	198	219	114	151	44
Eltham High School	NT	124	125	129	144	116	134
Enfield Primary And Junior High	NT	223	236	213	23	200	88
Ewarton High School	NT	147	147	161	172	137	122
Excelsior High School	T	49	39	44	229	51	173
Exchange All Age	NT	227	193	216	105	188	135
Fair Prospect High School	NT	174	176	165	98	193	176
Farm Primary And Junior High	NT	248	205	247	178	243	215
Fellowship Primary And Junior High	NT	199	208	172	12	227	152
Ferncourt High School	T	55	53	63	241	43	69
Flankers Primary And Junior High	NT	217	221	243	100	224	148

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
Foga Road High School	NT	89	121	95	82	104	107
Four Paths Primary And Junior High	NT	226	228	204	19	212	103
Frome Technical High School	NT	61	54	57	220	77	222
Garlands Primary And Junior High	NT	203	211	228	88	143	19
Garlogie Primary And Junior High	NT	158	212	108	3	136	22
Garvey Maceo High School	NT	74	70	73	193	49	37
Gaynstead High School	NT	52	50	52	210	56	167
Glendevon Primary And Junior High	NT	218	217	235	85	144	17
Glengoffe High School	NT	182	157	197	179	170	162
Glenmuir High School	T	10	9	6	6	6	7
Godfrey Stewart High School	NT	87	96	91	168	131	203
Gordon Town / Louise Bennett Coverley All Age	NT	166	178	151	49	240	239
Goshen All Age	NT	162	197	145	18	146	24
Grange Hill High School	NT	161	150	168	185	167	189
Granville All Age	NT	220	223	250	159	239	187
Greater Portmore High School	NT	121	122	137	212	150	198
Green Island High School	NT	92	86	119	246	107	179
Green Park Primary And Junior High	NT	234	227	221	67	207	131
Green Pond High School	NT	109	99	111	225	81	90
Guys Hill High School	NT	93	124	112	112	67	25
Haile Selassie High School	NT	172	152	175	199	222	228
Hampton High School	T	8	7	10	10	5	5
Happy Grove High School	NT	80	81	80	148	78	121
Hatfield Primary And Junior High	NT	127	163	136	26	117	39
Hayes Primary And Junior High	NT	245	248	201	7	203	50
Herbert Morrison Technical School	NT	32	22	27	164	37	150
Higgins Land Primary And Junior High	NT	220	226	202	37	160	40
Highgate Primary And Junior High	NT	171	191	154	24	140	41
Holland High School	NT	59	83	69	104	64	64
Holmwood Technical High School	NT	48	55	48	177	65	190
Holy Childhood High School	T	17	15	20	101	28	67
Holy Trinity High School	NT	145	131	166	239	219	246
Hopewell Sandy Bay High	NT	189	168	225	243	188	218
Hydel Group Of Schools St Andrew	NT	99	103	162	245	178	245
Immaculate Conception High School	T	2	2	2	2	3	4
Innswood High School	NT	196	186	218	181	228	206

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
Iona High School	NT	68	67	68	170	82	171
Irwin High School	NT	63	59	70	250	50	129
Islington / Horace Clarke High	NT	178	165	176	134	118	31
Jamaica College	T	42	26	25	150	44	211
John Austin All Age	NT	190	216	192	42	164	53
John Mills Primary And Junior High And Infant	NT	179	174	188	141	217	205
Jonathan Grant High School	NT	62	63	61	175	63	109
Jose Marti Technical School	NT	65	66	71	217	68	156
Kellits High School	NT	143	158	118	36	141	104
Kemps Hill High School	NT	154	155	139	89	110	48
Kingston College	T	34	20	14	78	29	112
Kingston High School	NT	110	94	116	226	147	213
Kingston Technical High School	NT	43	43	41	182	93	247
Kitson Town All Age	NT	233	251	238	108	201	49
Knockalva Technical School	NT	141	115	142	219	112	143
Knox College	T	26	31	18	28	31	76
Lacovia High School	NT	88	89	81	167	90	136
Leicesterfield Primary And Junior High And Infant	NT	198	206	159	31	154	63
Lennon High School	NT	131	123	97	79	91	55
Lewisville High Vocational School	NT	150	146	127	80	124	92
Liberty Academy At The Priory	NT	54	41	49	191	46	124
Linstead Primary And Junior High	NT	247	247	227	44	234	138
Little London High School	NT	159	151	164	180	158	185
Lowe River Primary And Junior High	NT	205	232	199	33	197	94
Macgrath High School	NT	90	92	110	221	79	82
Maggotty High School	NT	103	90	99	227	76	116
Maldon High School	NT	136	114	134	196	101	83
Manchester High School	T	14	13	11	20	26	98
Mandeville Primary And Junior High	NT	120	160	121	22	139	117
Mannings School	T	25	19	22	119	12	12
Marcus Garvey Technical High School	NT	139	132	178	244	165	209
Marymount High School	T	38	49	47	129	20	9
Maud Mcleod High School	NT	114	106	106	160	108	127
Maverley Primary And Junior High	NT	210	200	203	74	226	174
Mavis Bank Vocational School	NT	140	137	132	147	106	51
May Day High School	NT	60	64	66	163	59	95
Meadowbrook High School	T	24	17	21	109	38	160
Melrose Primary And Junior High	NT	213	202	195	46	242	207

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
Merl Grove High School	T	22	30	30	86	34	70
Merlene Ottey High School Vocational	NT	126	108	105	155	92	97
Mico Practising Primary And Junior High	NT	86	87	82	140	114	186
Middle Quarters All Age	NT	229	219	185	29	181	79
Mile Gully High School	NT	91	112	102	127	85	38
Mona High School	NT	53	48	51	204	70	214
Moneague Primary And Junior High	NT	201	188	224	169	173	126
Montego Bay High School	T	3	4	9	13	2	2
Morant Bay High School	T	35	35	32	102	27	30
Mount Alvernia High School	T	13	18	17	71	10	8
Mount Grace Primary And Junior High	NT	244	224	251	186	249	238
Mount Moreland Primary And Junior High	NT	235	235	215	40	231	161
Mount Saint Joseph Catholic High School	NT	28	61	34	62	60	249
Mount Salem Primary And Junior High	NT	236	199	248	192	220	157
Muirhouse Primary And Junior High	NT	216	237	246	165	238	163
Munro College	T	15	11	12	64	16	46
Muschette High School	NT	115	97	131	232	80	78
Nain Primary Junior High	NT	184	189	196	69	166	123
New Day Primary And Junior High	NT	144	145	146	122	176	204
New Forest Primary And Junior High And Infant	NT	134	135	128	94	103	96
New Green Primary And Junior High	NT	200	233	208	41	209	128
New Hope Primary And Junior High	NT	197	180	200	99	241	231
Newell High School	NT	165	156	152	137	133	110
Norman Gardens Primary And Junior High	NT	246	246	244	95	251	234
Norman Manley High School	NT	113	91	93	216	156	240
Oberlin High School	NT	77	65	79	248	72	159
Ocho Rios High School	NT	79	72	98	242	75	130
Old Harbour High School	NT	72	77	67	117	62	85
Oracabessa High School	NT	153	144	117	60	126	125
Osbourne Store Primary And Junior High	NT	208	213	174	17	168	52
Papine High School	NT	85	76	88	238	109	210

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
Paul Bogle High School	NT	180	173	182	138	185	183
Pembroke Hall High School	NT	98	84	113	247	125	219
Penwood High School	NT	155	134	158	214	191	233
Petersfield High School	NT	116	98	107	189	149	224
Point Hill Leased Primary And Junior High	NT	181	201	193	32	163	34
Port Antonio High School	NT	95	110	89	90	99	100
Port Morant Primary And Junior High	NT	192	203	181	57	204	137
Porus High School	NT	94	133	92	59	73	27
Retreat Primary And Junior High	NT	251	243	239	91	210	71
Rhodes Hall Orange Bay High	NT	151	169	186	136	206	193
Robert Lightbourne High School	NT	185	195	167	43	232	196
Rock Hall All Age St Andrew	NT	170	179	148	14	195	168
Rock River All Age	NT	188	210	180	56	188	145
Rosemount Primary And Junior High	NT	225	240	214	25	221	114
Runaway Bay All Age	NT	240	218	245	142	244	191
Ruseas High School	T	57	45	55	236	48	141
Sandy Bay Primary And Junior High	NT	191	184	187	61	148	59
Santa Cruz Primary And Junior High	NT	212	204	190	35	216	169
Seaforth High School	NT	108	104	101	158	128	175
Seaward Primary And Junior High	NT	232	222	231	103	236	170
Shortwood Practising Primary And Junior High And Infant	NT	160	142	171	194	196	216
Spaldings High School	NT	75	79	62	92	61	65
Spanish Town High School	NT	104	101	120	200	134	181
Spot Valley High School	NT	130	130	140	205	180	232
Spring Gardens All Age	NT	237	245	234	84	229	120
St Andrew High School For Girls	T	4	8	3	5	8	13
St Andrew Technical High School	NT	66	56	65	251	113	248
St Annes High School	NT	211	187	220	202	245	241
St Catherine High School	T	41	38	42	187	42	133
St Elizabeth Technical High School	NT	40	37	43	223	40	132
St Georges College	T	27	16	15	87	23	89
St Hildas Diocesan High	T	9	24	16	30	9	6
St Hughs High School	T	18	23	26	132	18	33
St Jago High School	T	16	12	13	51	22	84
St James High School	NT	107	100	130	234	159	242
St Mary High School	T	29	33	33	151	17	23
St Mary Technical High School	NT	71	73	78	183	55	60

High School	Type	REng	RVA Eng	RMath	RVA Math	Rsci	RVA Sci
St Marys College	NT	76	75	77	184	97	177
St Thomas Technical High School	NT	83	82	76	157	87	153
Steer Town High Mansfiel	NT	96	120	123	154	161	237
Steer Town Primary And Junior High	NT	186	185	223	153	171	118
Stony Hill Primary And Junior High And Infant	NT	193	172	205	203	225	229
Swallowfield Primary And Junior High	NT	214	209	222	123	246	243
Sydney Pagon Agricultural High School	NT	50	85	75	15	88	251
Tacius Golding High School	NT	146	166	156	96	100	20
Tacky High School	NT	123	136	135	126	105	54
Tarrant High School	NT	81	74	83	233	129	236
The Cedar Grove Academy	NT	23	42	31	207	41	195
The Queens High School	T	21	28	29	124	32	47
Thompson Town High School	NT	194	194	163	34	198	155
Titchfield High School	T	39	44	39	121	19	15
Tivoli Gardens High School	NT	119	105	104	176	135	194
Tredegar Park All Age	NT	242	234	233	116	247	226
Trench Town High School	NT	175	153	153	135	192	208
Troja Primary Junior High	NT	215	238	232	54	233	146
Trout Hall All Age	NT	238	241	226	76	216	111
Troy High School	NT	97	128	86	93	89	93
Vauxhall High School	NT	84	80	90	230	119	221
Vere Technical High School	NT	73	78	60	77	66	119
Villa Road Primary And Junior High	NT	167	190	173	47	183	147
Waterford High School	NT	168	162	170	131	177	164
Westwood High School	T	6	10	8	4	4	1
White Marl Primary And Junior High	NT	250	249	240	83	250	230
William Knibb Memorial High School	NT	45	47	56	228	36	35
Windsor Castle All Age	NT	228	214	211	53	182	106
Windward Road Primary And Junior High	NT	135	140	94	48	172	225
Winston Jones High School	NT	111	126	124	162	95	61
Wolmers Boys School	T	12	5	5	16	11	21
Wolmers High School For Girls	T	5	6	7	9	7	11
Yallahs High School	NT	169	175	155	58	202	182
York Castle High School	T	33	29	35	174	15	14

Note. T = Traditional High School; N = Nontraditional High School; VA = Value-Added Score; RVA = Rank on Value-Added Score; Math = Mathematics; Eng = English; Sci = Science. The Data is sorted by school name.

VITA

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EDUCATION

College of William and Mary – Williamsburg, VA May 2023

- Ph.D. in Educational Policy, Planning, and Leadership – K-12 Leadership

University of Bristol, Bristol, UK August 2016

- M.Sc. in Educational Policy and Leadership

University of the West Indies – Kingston, Jamaica November 2010

- M.Sc. in Computer Science

University of the West Indies – Kingston, Jamaica November 2001

- Post Graduate Diploma in IT Education

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- B.Sc. in Computer Science

WORK EXPERIENCE

College of William & Mary – Williamsburg, VA

- Graduate Assistant in the School of Education Centers: School and University Resources Network and Center for Gifted Education August 2020 May 2023
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Campion College – Kingston, Jamaica

- Assistant Principal September 2009 - present