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**CHOICE AND PERFORMANCE IN  
CSEC AND CAPE TVET SUBJECTS:  
A Comparison With More Conventional Subjects**

*Stafford A. Griffith*

The study was undertaken to ascertain the extent to which students in their last years of schooling in the Caribbean were opting to pursue technical vocational education and training (TVET) courses of study and examinations, compared with more traditional academic offerings, and whether it was the poor-performing students who were taking TVET courses of study and examinations. The research utilized examinations data from the total population of students in the 16 member countries of the Caribbean Examinations Council (CXC) over a five-year period. The study found that a rather small number of students were opting to pursue TVET courses of study, compared with the number opting to pursue more traditional subjects, such as the natural sciences. The study posited that the small number entering for TVET subjects might well be a consequence of the lack of a large enough range of TVET offerings in schools, the continuing low status accorded to TVET subjects in the employment sector, and the perception that much of the emphasis of the CXC programmes is on providing the theoretical foundations for further education and training rather than on providing employable skills. The findings of the study did not support the view that it is the poor-performing students who are pursuing TVET courses of study and examinations.

**Introduction**

Currently, the term *technical vocational education and training* (TVET) is popularly used to refer to any subset of experiences that provides occupationally related knowledge and skills to participants (Netherlands Organization for International Cooperation in Higher Education (NICHE), 2010; Unesco, 2001; Unesco, 2010, p. 5). The Caribbean Examinations Council (CXC), which is well known for its role in standard setting and examinations in the Caribbean (Griffith, 2008), provides a limited number of secondary and post-secondary subjects that qualify as TVET offerings. Under the Caribbean Secondary Education Certificate (CSEC), it offers four Technical Proficiency subjects

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(Building Technology – Construction; Building Technology – Woods; Electrical and Electronic Technology; and Mechanical Engineering Technology) and one General Proficiency subject (Technical Drawing). The Technical Proficiency offerings of CXC were conceived as an end-of-secondary-school examination with more practical orientation than the General Proficiency scheme and the now discontinued Basic Proficiency scheme (CXC, 1991; Griffith, 1999). Each of these subjects requires two years of preparation, normally in the last two years of the secondary education programme.

Students completing the CSEC TVET subjects are able to proceed to post-secondary studies in related areas offered under the CXC Caribbean Advanced Proficiency Examination (CAPE). CAPE offerings are defined in terms of subject Units, each of which would normally require one year of post-secondary preparation leading to an examination. Where a subject consists of two Units, a student may, in most instances, opt to take Unit 1 or Unit 2 in the first year and proceed to the second Unit in the next year or at a later date. The CAPE TVET offerings include Electrical and Electronic Technology Units 1 and 2, and Geometrical and Mechanical Engineering Drawing Units 1 and 2.

### **Perspectives of TVET in the Education System**

TVET has had lukewarm support in the Caribbean. This is due, in part, to its heritage, grounded in the British education system with all the colonial prejudices that accompanied its introduction. Sanderson (1993) puts forward a number of reasons why, historically, non-vocational or liberal education has had more prestige than vocational training in Britain. One of these is that the UK universities in the 19<sup>th</sup> century were best classified by three main traditions in liberal education: the study of classics at Oxford, mathematics at Cambridge, and philosophy in the Scottish universities. These subjects were pursued because of the belief in their capacity “to train the mind and cultivate the intellect rather than for the usefulness of the content” (Bagnall, 2000, p. 462). Another consideration cited by Sanderson was that, compared to vocational education, non-vocational or liberal education was not expensive. The overheads were low, and the classics that comprised much of the foundation for that education could be reproduced and made accessible to students at low cost.

It is this educational focus that was transferred to the colonies and, as was the practice with colonial endowment in the early years, came to be much valued in establishing social standing, gaining social mobility, and obtaining privileged employment. This perspective of education was the

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centrepiece for the model of early colonial education in Caribbean countries and contributed to the perception of TVET as second-class education, fit only for low achievers.

Didacus Jules, Registrar and Chief Executive Officer of CXC, provides an apt summation of the perspective on TVET in the region. According to Jules (2011):

TVET has not taken root in Caribbean education systems because notwithstanding the discourse, it is still treated by planners and seen by the public as a compensatory device. It is seen as something that is to be provided to students who – in the words most frequently used – are not “academically minded”. Thus it is consequently relegated to second class status; providing a compensatory alternative that will supposedly guarantee some skilled work for this category of student. (p. 6)

The experience in Jamaica, the most populous of the English-speaking Caribbean countries and a significant member country of CXC, is illustrative of what transpired in the Caribbean. Despite the inclusion of TVET as an important dimension of the education thrust of Jamaica in the early 1970s, the students who were sent to the schools where such programmes were implemented, that is, the Junior High, New Secondary, or Comprehensive High schools, were drawn from among those who performed at the lower levels at the end of primary school examinations (Petgrave, 2011). TVET programmes were less a feature in the Traditional High schools than in those schools. This view of TVET as an area of study for low-performing students predominates in Caribbean countries.

Referring to prevailing circumstances in Jamaica, Griffith (2011) pleaded for proper recognition to be given to the skills which secondary school graduates acquire through the study of subjects that provide them with employable skills, including TVET subjects. Griffith was of the view that while government policies may be calling for more secondary school graduates with employable skills, little value is placed on such qualifications, as evidenced in public discussions.

There is some indication that the tide of negativity about TVET is gradually turning. A number of studies have debunked the myth of TVET as an area of study for poor-performing students destined for manual occupations. The research evidence shows that an increasing number of students with TVET concentrations are enrolling in post-secondary education (Levesque, Lauren, Teitelbaum, Alt, & Librera, 2000; Ko, 2005). There is also some evidence in the United States that TVET graduates are enrolling in the more competitive four-year college

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programmes rather than the shorter two-year programmes. This was certainly the case in the state of Missouri, where Ko (2005) found that 53% of graduates from TVET schools tend to enrol in four-year college programmes, compared with 47% who enrol in two-year programmes. Awareness of these developments is contributing to the shifting of views about TVET as an area of study for poor-performing students.

Increasing awareness and ventilation of models that seek to mainstream TVET is contributing, further, to a less negative view of TVET. In a research article comparing vocational secondary and general secondary schooling in France and Australia, Bagnall (2000) lauded the French model that increased the options open to students studying at the post-compulsory years of schooling, by offering the *Bac Pro* as a genuine vocational qualification that does not restrict later movements of students into higher education. According to Bagnall, by doing so, the French had effected a double play: “Those who wish to begin work immediately have a qualification that allows for a transition directly into the workforce. Those who do not may continue on with a higher education course of study” (Bagnall, 2000, p. 472).

Bagnall (2000) concluded that it is necessary for education provisions to move away from stereotypes that have evolved over centuries. He argued that we can no longer give status and prestige to one system of education, namely, general education, and not another, namely, vocational education. He took the position that such a restriction in the provision of status would be “undermining and irrevocably damaging the future pathways of not only the youth cohort but also the ‘life courses’ of many adults” (Bagnall, 2000, p. 473).

More recently, Griffith (2009) pointed to the need for articulation between post-secondary programmes of TVET institutions and more advanced levels of certification offered at higher education institutions. Griffith, in fact, suggested the need for a systems-wide alignment of TVET programmes so that students are able to move smoothly from secondary school, through the programmes of TVET tertiary institutions, and into programmes of higher education that culminate in advanced technical degrees or similar advanced professional certification. This, in his view, should help to remove any lingering perception that TVET programmes are aimed only at poor-performing students. He expressed the view that if we could give the seriousness of attention to TVET in the Caribbean that the Japanese have long given it (Yamamoto, 1995), we could look forward to attracting more of the best and the brightest to TVET, with the prospect of even more extensive innovations in TVET to accelerate national development.

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Similar sentiments were echoed in other recent publications, including that of Dare (2000), where it was argued that “it is imperative to provide both academic and vocational courses that allow student to pursue post secondary education and work without limits to their opportunities” (p. 322), and that of Kotamraju (2007), who made a related plea for increased secondary and post-secondary collaboration in career and technical education programmes, without which a smooth transition of secondary school students to college would not be accomplished. It would be useful to explore whether the developments and sentiments reflected more recently about TVET are reflected in a change in practice among students in the Caribbean with respect to choice of courses of study.

#### **Purpose of the Study**

The study sought to ascertain the extent to which students in their last years of schooling in the Caribbean were opting to pursue TVET courses of study and examinations, compared with more traditional academic offerings, and whether it is the poor-performing students who take these courses of study and examinations, compared with the type of students who take courses and examinations in the more academic subjects.

#### **Research Questions**

Two research questions guided the investigation:

1. *To what extent does the number and proportion of students taking TVET subjects at the CSEC and CAPE levels differ from those taking more traditional subjects?*
2. *To what extent does the proportion of students taking TVET subjects at the CSEC and CAPE levels who obtain acceptable grades differ from those taking more traditional subjects?*

These two research questions were explored to ascertain (a) the extent to which students were choosing to do TVET subjects, and (b) the quality of performance of students in these subjects.

#### **Definition of Terms**

For this study, the industrial technology offerings at the CSEC and CAPE levels were used to represent the TVET subjects. These were the core TVET subjects offered by CXC at these two levels. The subject offerings in the natural sciences at the CSEC and CAPE levels were used

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to represent the more traditional subjects. These were subjects on which high value has been placed, traditionally, in the region.

### **Data for the Study**

#### **The TVET Subjects**

All five CSEC TVET subjects offered by CXC were included in the study. These were:

- Building Technology – Construction (BldT-C)
- Building Technology – Woods (BldT-W)
- Electrical and Electronic Technology (ElecT)
- Mechanical Engineering Technology (MechE)
- Technical Drawing (TD)

The four subject Units from the CAPE offerings, which are linked to the Industrial Technology syllabus offerings at the CSEC level, were included in the study. These were:

- Electrical and Electronic Technology Unit 1: Electrical Theory and Communications (ElecT-1)
- Electrical and Electronic Technology Unit 2: Energy Converters and Logic Circuits (ElecT-2)
- Geometrical and Mechanical Engineering Drawing, Unit 1: Geometrical and Engineering Drawing (GMED-1)
- Geometrical and Mechanical Engineering Drawing, Unit 2: Mechanical Engineering Drawing and Design (GMED-2)

#### **The More Traditional Subjects**

As noted earlier, the more traditional subjects will be represented by the subjects in the natural sciences, commonly referred to as Science subjects. These Science subjects were selected because they form critical offerings in the traditional secondary education programme at the more prestigious schools in the Caribbean, and because they are generally regarded as subjects that high-performing students are likely to pursue. They should, therefore, serve as a good basis for comparison with the TVET subjects that have traditionally occupied the lower end of the value spectrum.

For CSEC, these subjects were:

- Biology (Bio)

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- Chemistry (Chem)
- Physics (Phys)

The related subjects at the CAPE level were:

- Biology – Unit 1: Biomolecules, Reproduction and Development (Bio-1)
- Biology – Unit 2: Bioenergetics, Biosystems and Applications (Bio-2)
- Chemistry – Unit 1: Chemical Principles and Applications I (Chem-1)
- Chemistry – Unit 2: Chemical Principles and Applications II (Chem-2)
- Physics – Unit 1: Mechanics, Waves and Properties of Matter (Phys-1)
- Physics – Unit 2: Electricity and Magnetism, A.C. Theory and Electronics, and Atomic and Nuclear Physics (Phys-2)

#### **Candidates**

The total population of candidates who took the selected CSEC and CAPE TVET and Science subjects in the 16 CXC member countries over the five-year period 2007–2011 were included in the study. The aggregated candidate entries across the 16 CXC member countries for each of the five years were extracted from a soft copy of CXC's *Statistical Bulletin 2011*. The grades obtained by candidates in each of the selected TVET and Science subjects were also extracted from the *Bulletin*. For the CSEC subjects, Grades I to III are regarded as acceptable grades, while for CAPE subjects, Grades I to V are regarded as acceptable. The candidate entries and the grades obtained by candidates formed the primary sources of data for the study.

#### **Procedures**

The data in the *CXC Statistical Bulletin 2011* is a database that the Council provided to its member countries. It contains, inter alia, subject entries and results for the current and past years. With the use of Excel Pivot Tables, the reports required for the study were generated and exported into Microsoft Word, where the refined titles, and column and row labels were inserted. The reports generated through the use of Excel Pivot Tables were used to generate graphs that summarized the findings and helped to enhance data analysis.

## Findings

### Number and Proportion of Students Taking TVET and Science Subjects at the CSEC and CAPE Levels

The first research question was concerned with the number and proportion of students in the region who take TVET subjects at the CSEC and CAPE levels, compared with those who take Science subjects. The findings are presented, first, for the CSEC subjects and, subsequently, for the CAPE subjects.

#### *CSEC subjects*

Table 1 presents a comparison of the number and percentage of candidates who took CSEC TVET subjects and those who took CSEC Science subjects in CXC member countries. The table shows that, for the five CSEC TVET subjects, there was a total of 93,892 candidate entries over the five-year period, giving a mean of 18,778 entries annually. For the three CSEC Science subjects, candidate entries totalled 213,254 over the same period, giving a mean of 42,651 annually.

It is evident that the number of candidate entries for the CSEC TVET subjects was much smaller than the number of candidate entries for the CSEC Science subjects. Based on the data for the five CSEC TVET subjects in the study, the mean subject entry annually was 3,756, compared with the mean subject entry of 14,217 annually for the three CSEC Science subjects. More students were evidently entering for CSEC Science subjects than for CSEC TVET subjects—nearly 4 times (3.79) the mean number per subject entering TVET. None of the TVET subjects in any of the five years had entries comparable to the Science subjects; not even the ones with the lowest entries.

Table 1 shows that the annual CSEC TVET subject entries, as a percentage of the total candidate entries for the examinations at that level, ranged from 2.88 to 3.03% over the five-year period, with an annual mean of 2.98%, while the CSEC Science subject entries ranged from 6.49 to 7.29%, with an annual mean of 6.73%.

The range for the annual percentage of subject entries for CSEC TVET subjects over the five-year period was very small; no more than .15. These percentages were lowest in the last two years, that is, 2010 and 2011. The range of .80 for the annual percentage of subject entries for CSEC Science subjects over the five-year period, though small, was much larger than that for the CSEC TVET subjects (more than 5 times larger). Also, for the CSEC Science subjects, the annual percentage of subject entries was highest in the last two years, compared with the CSEC TVET subjects where they were the lowest in those two years.

**Table 1. Comparison of Number and Percentage of Candidate Entries for CSEC TVET and Science Subjects**

TVET Subjects	2007		2008		2009		2010		2011		Overall	
	No	%	Total	Mean								
BldT-C	1,469	0.25	1,554	0.26	1,707	0.28	1,919	0.28	2,101	0.31	8,750	1,750
BldT-W	2,140	0.37	2,284	0.38	2,232	0.36	2,361	0.35	2,581	0.38	11,598	2,319
ElecT	3,806	0.65	3,644	0.60	3,800	0.62	3,893	0.57	3,912	0.58	19,055	3,811
MechE	1,849	0.32	1,786	0.30	2,033	0.33	2,205	0.32	2,047	0.30	9,920	1,984
TD	8,467	1.45	8,792	1.46	8,774	1.43	9,316	1.36	9,220	1.37	44,569	8,914
<b>Total</b>	<b>17,731</b>	<b>3.03</b>	<b>18,060</b>	<b>2.99</b>	<b>18,546</b>	<b>3.02</b>	<b>19,694</b>	<b>2.88</b>	<b>19,861</b>	<b>2.96</b>	<b>93,892</b>	<b>18,778</b>
<b>Science Subjects</b>												
Bio	14,779	2.52	15,048	2.45	15,048	2.45	17,510	2.56	18,151	2.70	80,536	16,107
Chem	12,159	2.08	12,475	2.07	12,902	2.10	14,344	2.10	16,236	2.42	68,116	13,623
Phys	11,620	1.98	11,895	1.97	12,479	2.03	14,086	2.06	14,522	2.16	64,602	12,921
<b>Total</b>	<b>38,558</b>	<b>6.58</b>	<b>39,418</b>	<b>6.49</b>	<b>40,429</b>	<b>6.58</b>	<b>45,940</b>	<b>6.72</b>	<b>48,909</b>	<b>7.29</b>	<b>213,254</b>	<b>42,651</b>

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***CAPE subjects***

Table 2 presents a comparison of the number and percentage of candidates who took CAPE TVET subjects and those who took CAPE Science subjects in CXC member countries. The table shows that, for the four CAPE TVET subjects, there was a total of 4,590 candidate entries over the five-year period, giving a mean of 918 entries annually. For the six CAPE Science subjects, candidate entries totalled 89,086 over the same period, giving a mean of 17,817 annually.

As was the case for the CSEC subject entries, the number of candidate entries for the CAPE TVET subjects was much smaller than the number of candidate entries for the CAPE Science subjects. Based on the data for the four CAPE TVET subjects in the study, the mean subject entry annually was 230 compared with the mean subject entry of 2,970 annually for the six CAPE Science subjects. As in the instance of CSEC, more CAPE students were evidently entering for the Science subjects than for TVET subjects. In fact, for CAPE, the mean subject entry in Science was nearly 13 times (12.91) the mean subject entry for the TVET.

Table 2 shows that the annual CAPE TVET subject entries, as a percentage of the total candidate entries for the examinations at that level, ranged from 0.92 to 1.03% over the five-year period, with an annual mean of 0.97%, while the CAPE Science subject entries ranged from 17.63 to 19.91, with an annual mean of 18.78%. As in the case of the CSEC subjects, it is evident that CAPE Science subjects had a larger proportion of subject entries compared with the CAPE TVET subjects.

The range for the annual percentage of subject entries for CAPE TVET subjects over the five-year period was very small, no more than .11. These percentages fluctuated over the five-year period. The range of 2.28 for the annual percentage of subject entries for CAPE Science subjects over the five-year period was much larger than that for the CAPE TVET subjects. In fact, this range was larger than those for all the other groups of subjects in this investigation, that is, CSEC TVET, CSEC Science, and CAPE TVET subjects. As was the case for the CSEC Science subjects, the annual percentage of subject entries was highest in the last two years.

**Table 2. Comparison of Number and Percentage of Candidates Entries for CAPE TVET and Science Subjects**

TVET Subjects	2007		2008		2009		2010		2011		Overall	
	No	%	Total	Mean								
ElecT-1	75	0.09	117	0.14	117	0.12	163	0.16	131	0.12	603	121
ElecT-2	62	0.08	26	0.03	92	0.10	60	0.06	76	0.07	316	63
GMED-1	407	0.50	444	0.51	458	0.49	513	0.50	558	0.51	2,380	476
GMED-2	214	0.26	205	0.24	255	0.27	312	0.31	305	0.28	1,291	258
<b>Total</b>	<b>758</b>	<b>0.93</b>	<b>792</b>	<b>0.92</b>	<b>922</b>	<b>0.98</b>	<b>1,048</b>	<b>1.03</b>	<b>1,070</b>	<b>0.99</b>	<b>4,590</b>	<b>918</b>
<b>Science Subjects</b>												
Bio-1	2,702	3.30	3,092	3.58	3,651	3.89	4,261	4.19	4,594	4.24	18,300	3,660
Bio-2	1,740	2.12	2,193	2.54	2,485	2.64	2,798	2.75	3,042	2.81	12,258	2,451
Chem-1	3,778	4.61	3,485	4.03	4,041	4.30	4,812	4.73	4,702	4.34	20,818	4,164
Chem-2	1,784	2.18	2,385	2.76	2,710	2.88	2,961	2.91	3,283	3.03	13,123	2,625
Phys-1	2,753	3.36	2,527	2.92	2,972	3.16	3,181	3.13	3,392	3.13	14,825	2,965
Phys-2	1,685	2.06	1,886	2.18	1,785	1.90	2,229	2.19	2,177	2.01	9,762	1,952
<b>Total</b>	<b>14,442</b>	<b>17.63</b>	<b>15,568</b>	<b>18.02</b>	<b>17,644</b>	<b>18.78</b>	<b>20,242</b>	<b>19.91</b>	<b>21,190</b>	<b>19.55</b>	<b>89,086</b>	<b>17,817</b>

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**Proportion of Students With Acceptable Grades in TVET and Science Subjects at the CSEC and CAPE Levels**

The second research question was concerned with the proportion of students in the region taking TVET subjects at the CSEC and CAPE levels who obtain acceptable grades, compared with those who take Science subjects. The findings are presented, first, for the CSEC subjects and, subsequently, for the CAPE subjects.

*CSEC subjects*

Table 3 presents a comparison of percentage of candidates who obtained acceptable grades for CSEC TVET subjects and CSEC Science subjects in CXC member countries. As noted earlier, for CSEC, Grades I to III are regarded as acceptable. Table 3 shows that the percentage of candidates who obtained acceptable grades annually in CSEC TVET subjects over the five-year period ranged from 54.89 to 61.36, with an annual mean of 57.09; while the percentage for the CSEC Science subjects ranged from 58.83 to 69.70, with an annual mean of 64.32%. The CSEC Science subjects had a slightly larger proportion of candidates obtaining acceptable grades compared with the CSEC TVET subjects (a difference of 7.23 percentage points in the annual mean percentage obtaining acceptable grades).

**Table 3. Percentage of Candidates Obtaining Acceptable Grades for CSEC TVET and Science Subjects**

<b>TVET Subjects</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
BldT-C	62.15	77.28	67.90	71.29	74.63
BldT-W	56.12	48.69	62.23	68.32	64.66
ElecT	57.28	56.64	42.63	54.30	40.16
MechE	47.21	53.14	50.86	52.97	47.19
TD	58.40	52.85	59.39	62.48	58.03
<b>Overall</b>	<b>57.03</b>	<b>54.89</b>	<b>56.15</b>	<b>61.36</b>	<b>56.01</b>
<b>Science Subjects</b>					
Bio	67.64	70.43	69.48	64.41	65.83
Chem	58.61	62.37	70.92	62.35	55.33
Phys	47.85	70.44	68.69	63.12	64.06
<b>Overall</b>	<b>58.83</b>	<b>67.88</b>	<b>69.70</b>	<b>63.37</b>	<b>61.82</b>

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The variability in the annual percentage of candidates with acceptable grades was much smaller for CSEC TVET subjects than for CSEC Science subjects. For the former, the range was 6.47 compared with 10.87 for the latter. For both CSEC TVET subjects and CSEC Science subjects, the percentage of candidates who obtained acceptable grades fluctuated across the five years. Both the variability and the fluctuations in the proportion of candidates with acceptable grades for CSEC TVET subjects and CSEC Science subjects across years, and overall, can be easily discerned and compared in Figure 1.

In addition, the graph highlights the fact that the percentage of candidates obtaining acceptable grades in CSEC TVET Building Technology - Construction (BldT-C) far exceeded the percentage of candidates who obtained acceptable grades in the other CSEC TVET subjects in each of the five years, as well as in the CSEC Science subjects for three of the five years. The figure also highlights how comparable the percentage of candidates obtaining acceptable grades was with the percentage obtaining those grades in the CSEC Science subjects.

### *CAPE subjects*

Table 4 presents a comparison of the percentage of candidates who obtained acceptable grades for CAPE TVET subjects and CAPE Science subjects in CXC member countries. As noted earlier, for CAPE, Grades I to V are regarded as acceptable. Table 4 shows that the percentage of candidates who obtained acceptable grades annually in CAPE TVET subjects, overall, over the five-year period ranged from 61.74 to 70.45, with an annual mean of 66.68%; while the percentage for the CAPE Science subjects ranged from 84.93 to 89.36, with a mean of 87.28%. The CAPE Science subjects, therefore, had a much larger proportion of candidates obtaining acceptable grades compared with the CAPE TVET subjects (a difference of 20.60 percentage points in the annual mean percentage obtaining acceptable grades).

The statistics from Tables 1 and 2, taken together, show that, overall, the proportion of candidates who obtained acceptable grades in CAPE TVET subjects was higher than the proportion who obtained acceptable grades in the case of CSEC TVET subjects. The annual mean percentage of candidates, over the five-year period, who obtained acceptable grades in CSEC TVET subjects was 57.09, compared with 66.68 for the CAPE TVET subjects. A similar position was observed for the Science subjects. While the annual mean percentage of candidates, over the five-year period, who obtained acceptable grades in CSEC Science subjects was 64.32%, that for the CAPE Science subjects was 87.28. The larger

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proportion of candidates obtaining acceptable grades at the CAPE level is in keeping with what might be reasonably expected, given that it is the better performers in CSEC who tend to proceed to do CAPE in the related subjects. It should be noted, though, that there was a wider percentage difference for Science subjects than for TVET subjects.

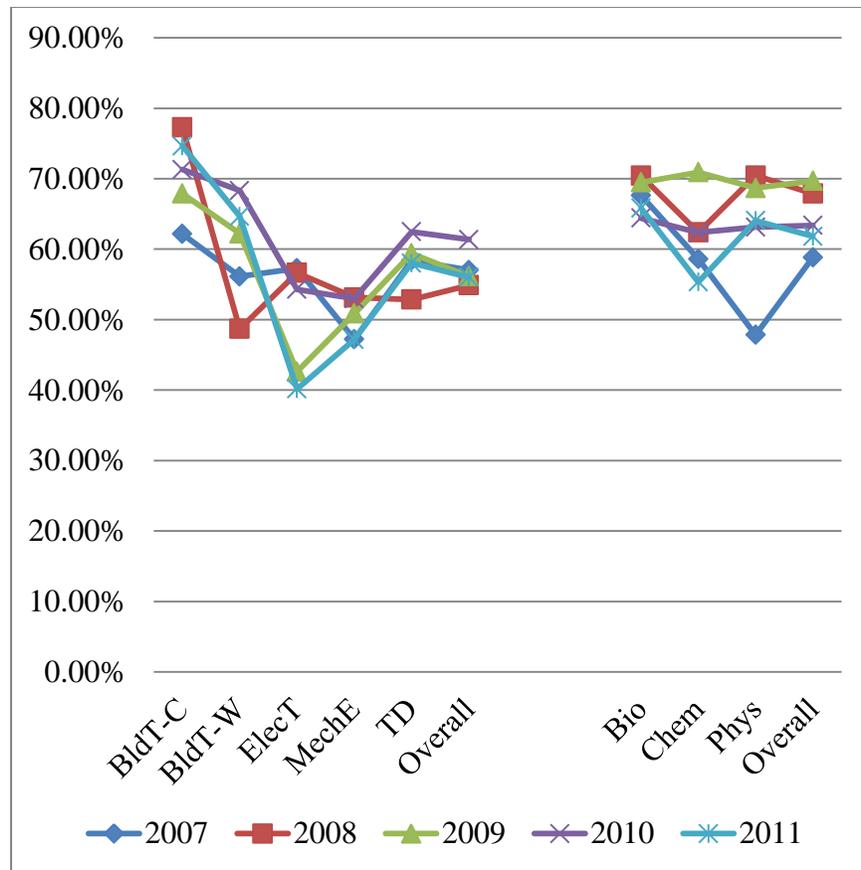


Figure 1. Percentage of CSEC TVET and Science candidates obtaining acceptable grades.

**Table 4. Percentage of Candidates Obtaining Acceptable Grades for CAPE TVET and Science Subjects**

<b>TVET Subjects</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
ElecT-1	52.00	59.83	71.79	33.13	51.15
ElecT-2	85.48	80.77	69.57	60.00	68.42
GMED-1	67.57	66.22	60.48	66.28	62.37
GMED-2	78.04	74.63	75.69	69.55	79.34
<b>Overall</b>	<b>70.45</b>	<b>67.93</b>	<b>67.03</b>	<b>61.74</b>	<b>66.26</b>
<b>Science Subjects</b>					
Bio-1	86.16	87.35	86.14	80.29	75.53
Bio-2	94.71	93.30	94.12	90.39	92.11
Chem-1	87.74	83.47	80.65	80.76	76.73
Chem-2	95.52	91.49	86.64	88.75	86.75
Phys-1	84.74	87.61	82.40	85.57	88.35
Phys-2	93.59	90.19	86.61	89.95	88.06
<b>Overall</b>	<b>89.36</b>	<b>88.34</b>	<b>85.50</b>	<b>84.93</b>	<b>88.26</b>

Contrary to the findings for the CSEC subjects, there was much less variability across the five years in the proportion of candidates who obtained acceptable grades for CAPE Science subjects than for CAPE TVET subjects. For the CAPE Science subjects, the range in the annual percentage of candidates with acceptable grades was 4.43, while for CAPE TVET subjects it was 8.71. For both CAPE TVET subjects and CAPE Science subjects, the percentage of candidates who obtained acceptable grades fluctuated across the five years. Both the variability and the fluctuations in the proportion of candidates with acceptable grades for CAPE TVET subjects and CAPE Science subjects across years, and overall, can be easily discerned and compared in Figure 2.

The difference in proportion of candidates obtaining acceptable grades in CAPE Science subjects is evident from the graph. The year 2010 seemed to have been a year of particularly poor performance of candidates for most CAPE TVET subjects.

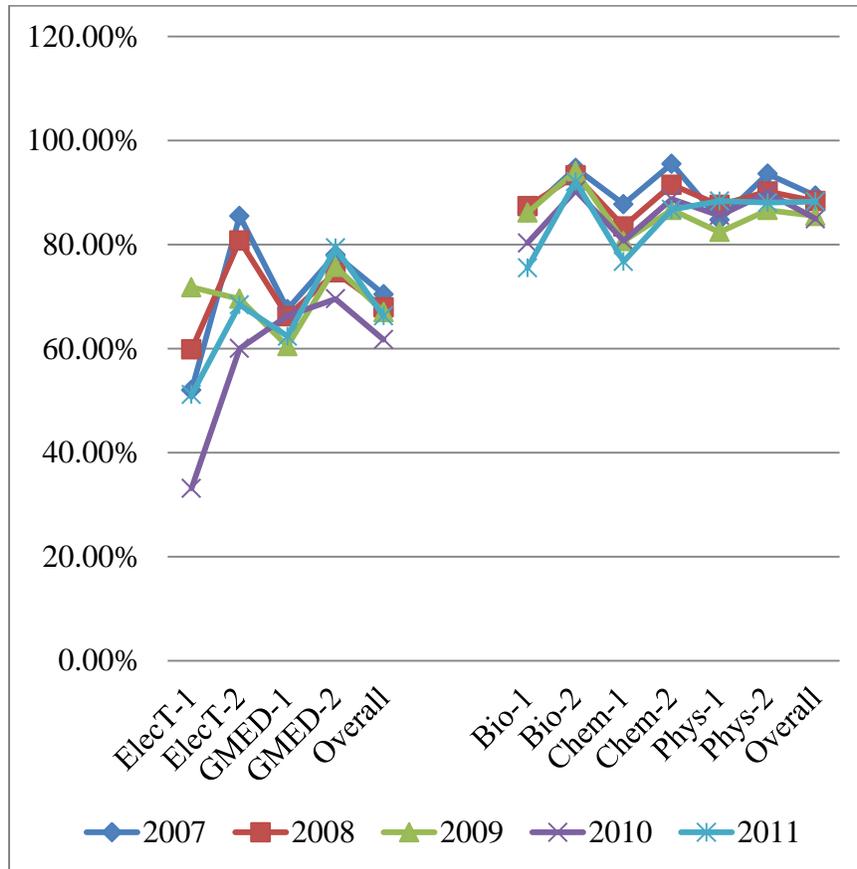


Figure 2. Percentage of CAPE TVET and science candidates obtaining acceptable grades.

### Discussion

This study sought to ascertain the extent to which students in their last years of schooling in the Caribbean were opting to pursue TVET courses of study and examinations, compared with more traditional academic offerings, and whether it is the poor-performing students who take these courses of study and examinations, compared with the type of students who take courses and examinations in the more academic subjects. In this study, the Science subjects were used to represent the more traditional subjects. The research utilized examinations data from the CXC database to probe the two related research questions. The total population of students entering for the TVET and Science subjects over a five-year period was used for both CSEC and CAPE.

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With respect to the question of the number and proportion of students who pursue TVET subjects, compared with the more traditional Science subjects, it was found that a larger number and proportion of students were registering for both CSEC and CAPE Science subjects than for CSEC and CAPE TVET subjects. The disparity in number and proportion was much greater at the CAPE level than at the CSEC level. Nearly four times the mean number of students per subject registered for CSEC Science subjects than for CSEC TVET subjects. At the higher CAPE level, the mean entry was nearly 13 times greater for Science subjects than for TVET subjects.

The proportion of candidate entries for CSEC TVET subjects in the five years included in this study did not vary much. These remained very small (mean ranging from 2.88 to 3.03%) and, in fact, declined over the last two years covered by this study. The proportion taking CSEC Science subjects varied much more across the five years (mean ranging from 6.49 to 7.29%) and, unlike the case of TVET subjects, increased over the last two years.

There was even less variation in the proportion of candidate entries for CAPE TVET subjects in the five years covered by the study (mean ranging from 0.92 to 1.03%). As in the case of CSEC, the variation in the proportion of entries for the CAPE Science subjects was much larger (mean ranging from 17.63 to 19.91%) than for CAPE TVET subjects.

It may therefore be concluded that the proportion of students entering for CSEC TVET subjects was generally small, stagnated, and declining; while entries for CSEC Science subjects were larger and increasing. With respect to the CAPE level, it may be concluded that the proportion of students entering for TVET subjects was even smaller and equally stagnated, while the proportion of students entering for Science subjects was much larger.

There was a notable decline in candidate entries for both CAPE TVET and Science subjects, compared with entries for CSEC TVET and Science subjects, respectively. This is understandable given the number of students who do not perform satisfactorily enough at the CSEC level to be able to proceed directly to the more advanced CAPE programme. Even when students have performed satisfactorily in the CSEC examinations, their prospect of enrolling in this post-CSEC programme is constrained by the limited number of CAPE places available in schools. Often, only those with the higher grades (invariably Grade 1 only) in the related subjects are able to access these places. Also, some of those who perform satisfactorily pursue other destinations. Many enter the workforce while others pursue further education and training in tertiary institutions.

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Despite this understandable decline in the number of entries for both CAPE TVET and Science subjects, compared with entries at the CSEC level, it is evident that at the CAPE level, the Science entries as a proportion of the total CAPE entries in CXC member countries increased notably (from 6.73% at the CSEC level to 18.78% at the CAPE level); while the TVET entries as a proportion of the total CAPE entries decreased sharply (from 2.98% at the CSEC level to 0.97% at the CAPE level). It may be concluded, therefore, that the proportion of the CSEC cohort opting for advanced studies was very small and that students pursuing studies at this level were more likely to pursue the more traditional Science subjects.

These findings highlight the fact that, in the Caribbean, a rather small number of students are opting to pursue TVET courses of study compared with the number opting to pursue more traditional subjects, such as the natural sciences. The small number of students who enter for both CSEC and CAPE TVET subjects might well be a consequence of the lack of a large enough range of TVET offerings in schools to encourage students to take a concentration in TVET, by pursuing a cluster of TVET subjects that is linked to options that they may pursue upon completing their schooling.

The small number opting for TVET subjects might well be related to a low status accorded to those subjects in the employment sector. In pointing to challenges faced by students who pursue CXC TVET offerings, Hamilton Jemmott, a lecturer in Technical and Vocational Studies in the Barbados Community College, made the point that “some of this particular group may achieve the CXC qualification, but the question arises as to what extent they are able to use the qualification for entry into the labour force” (Jemmott, 2011, p. 26). This challenge of using the CXC TVET qualifications to enter the labour force might be due, at least in part, to the perception that much of the emphasis of the CXC programmes is on providing the theoretical foundations for further education and training rather than on providing employable skills.

CXC is currently reviewing its TVET offerings at both the CSEC and CAPE levels. The organization has also initiated the certification of a range of vocational qualifications under a Caribbean Vocational Qualifications (CVQ) framework, with significant private sector involvement. The review of the CSEC and CAPE TVET offerings, coupled with the initiation of the CVQs, might well provide the opportunity to create a sufficiently comprehensive set of TVET offerings, which will allow students to take clusters of TVET subjects that will not merely make them eligible for further education and training

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but will provide them with valuable employable skills. This should, in turn, assist in raising the status of TVET in the employment sector.

Such an extension of TVET offerings will have cost implications, which must be addressed by CXC and its member countries. Several authors have called attention to the higher cost of TVET programmes, compared to more traditional education programmes (Bagnall, 2000; Sanderson, 1993; Sharma, 1999). However, given the acknowledged benefits of TVET education (Bagnall, 2000; Griffith, 2009; Petgrave, 2011), the financing of such programmes should be a critical policy consideration in assuring the skilled workforce necessary for the region's development.

All students should, at the very least, be encouraged to include some TVET subjects in their courses of study, not only because the majority of students graduating from school are likely to go directly into the workforce, but also because of the value of TVET for other destinations, as pointed out by Silverberg, Warner, Fong, and Goodwin (2004). Based on their research, these authors contend that students should be encouraged to take a balanced mix of subjects. Their findings suggest that when high school students increase the number of academic courses and TVET courses taken simultaneously, they are better prepared for college than those students who focus only on academics.

The issue of whether it is the poor-performing students who pursue TVET courses of study and examinations, compared with the type of students who take courses and examinations in the more academic subjects, was explored through an assessment of the proportion of students taking TVET subjects at the CSEC and CAPE levels who obtain acceptable grades, compared with those taking the more traditional Science subjects.

It was found that, generally, the CSEC Science subjects had only a slightly larger proportion of candidates obtaining acceptable grades, compared with the CSEC TVET subjects (a mean percentage of 57.09 for TVET subjects and 64.32 for Science subjects over the five-year period of the study). However, in one CSEC TVET subject, CSEC TVET Building Technology - Construction (BldT-C), the proportion of students who obtained acceptable grades far exceeded the proportion who obtained acceptable grades in the CSEC Science subjects for three of the five years covered by this study.

At the CAPE level, the difference between the proportion of students with acceptable grades in TVET subjects and Science subjects was much more pronounced (a mean percentage of 87.28 for Science subjects over the five-year period, compared with 64.32 for TVET subjects). There was little variation across the five years of the study in the proportion of

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candidates who obtained acceptable grades in CSEC TVET (54.89 to 61.36%) and Science subjects (58.83 to 69.70%). A similar observation was made with respect to the CAPE subjects (61.74 to 70.45% for TVET and 84.93 to 89.36% for Science).

A notable observation is that the proportion of students who obtained acceptable grades at the CAPE level was higher in the case of both the TVET subjects and the Science subjects (an annual mean of 57.09% for the CSEC TVET subjects compared with 66.68% for CAPE TVET subjects; and 64.32% for the CSEC Science subjects compared with 87.28% for CAPE Science subjects). This higher proportion of students at the CAPE level with acceptable performance is in keeping with reasonable expectation, given that, as noted earlier, it is the better performers at CSEC who successfully compete for the limited opportunities to proceed to the CAPE programme.

Taking into account that CXC syllabuses and examinations are constructed to assure equivalence of demand among subjects at each of the two levels, the results indicate that, at the CSEC level, there was no marked difference in the performance of students taking TVET subjects and those taking the more traditional Science subjects. At the CAPE level, there was a greater disparity in performance between those who entered for Science subjects and those who entered for TVET subjects, with those in the former category demonstrating better performance than those in the latter. The quality of performance across the years was relatively stable at the CSEC and CAPE levels for both the TVET subjects and the more traditional Science subjects.

From the results of the study, it cannot be concluded that it is the poor-performing students who are pursuing TVET courses of study and examinations, compared with those who take courses and examinations in the more academic subjects. The closely related performance of students who take Science subjects and TVET subjects at the CSEC level does not support such a view. The results for the CAPE subjects require further examination. The achievement of acceptable grades by 67% of TVET students, while markedly different from the 87% of Science students who achieved such grades, is by no means a reflection of poor performance on the part of TVET students. That performance is at least moderately good. The gap is not sufficiently pronounced to come to the conclusion that it is the weaker CAPE students who are taking the TVET subjects.

A further probe of the proportion of CAPE candidates in relation to CSEC candidates over the five-year period of the study revealed that the cumulative CAPE Science entries over the five years represent 41.78% of the CSEC Science entries, while the CAPE TVET entries represent

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only 4.89% of the CSEC TVET entries. While this phenomenon requires further research, the numbers might well be indicating that those who complete CSEC TVET subjects are pursuing options other than continuing TVET studies at the CAPE level. It is possible that this is the result of limited opportunities to pursue a complete suite of TVET subjects at the higher CAPE level, and the better-performing TVET students may be opting for CAPE programmes that provide them with more comprehensive offerings in certain areas of concentration. In order to have the increased enrolment in TVET subjects in the Caribbean that was noted elsewhere (Levesque et al., 2000; Ko, 2005), it is necessary to increase the suite of offerings in TVET subjects at both the CSEC and CAPE levels, so as to encourage students to see the TVET subjects as permitting viable areas of concentration at both levels.

In this regard, the French model commended by Bagnall (2000) is worth considering. According to Bagnall, the French model increased the options open to students by offering the *Bac Pro* as a genuine vocational qualification that does not restrict later movements of students into higher education. Bagnall further pointed out that the *Bac Pro* allowed those who wish to begin work immediately to have a qualification that allows for a transition directly into the workforce, while allowing others to continue with a higher education course of study if they wish to pursue that option. A programme of study at the CSEC and CAPE levels, conceptualized along the same lines, would provide greater opportunities for students to pursue TVET courses of study at both the CSEC and CAPE levels.

### **Conclusion**

While it is evident that a larger number and proportion of students pursue the more traditional Science subjects at both CSEC and CAPE levels than the number and proportion who pursue TVET subjects at these levels, the evidence does not suggest that it is the poor-performing students who pursue TVET courses of study and examinations, compared with the type of students who take courses and examinations in the more traditional subjects.

This study was based on the performance of students in a few selected subjects over a five-year period. A more comprehensive study utilizing data over a longer period, involving all subjects offered by CXC at both the CAPE and CSEC levels, may shed further light on the nature of the population of students pursuing TVET subjects and examinations. In such a study, the TVET concept may be expanded to include subjects such as the business offerings and food and nutrition offerings of CXC,

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which, in a broader conceptualization of TVET, would be included in that group.

In this study, high-performing and low-performing students were defined in relation to group data for TVET and science subjects, considered separately. An analysis of how the same students performed in the two types of subjects would provide more definitive evidence on the matter of whether it is lower-ability students who pursue TVET subjects. The data set used in this study could not respond to the issue of ability of students taking the two types of subjects. This is a matter that requires further research.

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