

FEMALE STUDENTS' PERCEPTION OF PURSUING A  
CAREER IN ELECTRICAL AND ELECTRONIC TECHNOLOGY

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Career in Electrical and Electronic Technology

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### Abstract

Female students have not been subscribing to the Electrical and Electronic Technology discipline as much as their male counterparts. Thus the purpose of this qualitative phenomenological study was to explore the degree to which female students from the Panoptic Secondary School in South Trinidad, view it as a viable discipline, and to identify their concerns in pursuing it as a career. By using interviews and a theoretical framework based on Bandura's conception of reciprocal determinism, it sought to get from five female students, their views in pursuing a career in the field of electronics.

*Keywords:* Science Technology Engineering Math, female students, gender-stereotyping, technical and vocational education and training, androcentric, meta-stereotyping, triadic reciprocal causation model, self-efficacy beliefs, planned behaviour

Female Students' Perception of Pursuing a  
Career in Electrical and Electronic Technology

**Background to the Study**

Electrical and Electronic Technology (EET) by nature is a course of study that can be classified as belonging to the group of Science Technology Engineering and Math (STEM) (Deffree, 2012; Terrell, 2007), and in many jurisdictions worldwide, especially those in the United States, Canada and Britain, there is concern that a gender disparity exists in the enrolment of students in the universities in STEM fields of study (AAUW, 2010). Last year, the Organization for Economic Cooperation and Development (OECD) reported that in these nations, 15-year-old boys around the world outperform their female counterparts in science (Keller, 2013). Together with STEM, EET is also considered to be a Technical and Vocational Education and Training (TVET) subject worldwide, which was designed to bridge the gap between the outputs from the secondary school level to the world of work, provided that no further education and training is first sought at the tertiary level (Shakes, 2011). However, it is also considered to be a traditionally androcentric TVET undertaking (CXC, 2011; Thiam, 1999).

At the 'Panoptic' co-educational secondary school in south Trinidad, female students were allowed to choose EET as a course of study for the first time in 1999, one year after I began teaching the programme there. Throughout the years, the programme have always attracted more male applicants than females, either by the sole, deliberate discretion of the school's administration responsible for streaming the students, or by the students' own unadulterated choice, or even by choices influenced by their peers, teachers or families. The career choices for all these students begin at the end of form three, at an average age of 15 years, where they were allowed to choose their preferred area of study based on the career cluster of subjects offered for

forms four and five, and then again at the end of form five, at an average age of 17, for the form six groupings. As time progressed however, it was observed that the number of girls choosing EET at the school has increased, reaching closer in parity with the boys, and to a point where the programme is attracting more female students as a core option of study than any other traditionally male dominated TVET subjects. Traditional TVET subjects offered at the school included machine shop, welding, cabinet making, plumbing, auto-mechanics, and masonry, and have since been converted from the National Examinations Council (NEC) to equivalents in the Caribbean Vocational Qualifications from 2008. However, when one looks at the number of registered students in the region that are writing EET for the Caribbean Secondary Education Certificate (CSEC) in form five and even the Caribbean Advanced Proficiency Examination (CAPE) in form six, there is a wider gender gap in favour of the number of males who are writing this examination conducted by the Caribbean Examinations Council (CXC).

CXC began offering industrial technology subjects, such as Building Technology, Mechanical Engineering Technology and EET, in secondary schools, as part of a regional strategy for the development and improvement of TVET (Shakes, 2011). Results from CXC's reports (see Appendix IA) confirms that EET is a male dominated TVET subject area in the Caribbean, with the same pattern of a lower distribution of girls than boys attaining passing grades of I to III at the CSEC level and I to V at the CAPE level (CXC, 2011). Available data from UWI, St. Augustine, which is the most established in Trinidad and Tobago and sixth highest ranked in the Caribbean region (Cybermetrics Lab, 2014), also suggest that in terms of participation, around a quarter of the total enrolment for the Bachelor of Science (BSc) in Electrical and Computer Engineering in the Caribbean, for which EET students are qualified to pursue, are females (see Appendix IB). If the number of graduates from engineering programmes

at UWI is an indication of the performance of students, then boys outnumber girls, albeit due to a larger pool of boys. However, when compared to the number of enrolments (see Appendix IB; 1C), the ratio of males to females graduating is lower than the ratio of males to females admitted for any given year (UWI, 2013).

Girls however, in a general sense, are outperforming boys in schools in the Caribbean, to the point where intervention strategies such as the joint World Bank and the Commonwealth secretariat's regional Caribbean initiative on keeping boys out of risk, are aimed at, among other issues, analysing and activating a plan of action that deals with boys' underachievement in education and the "rapidly growing gap between boys' and girls' participation and performance levels in education that affects boys negatively" (Regional Caribbean Conference, 2009, p. 2). In Trinidad and Tobago, consultancy was set up to recommend strategies in rectifying what they refer to as the perceived underperformance of boys at the primary level, although they report that it is highly debateable on whether this is a real concern or not and that stakeholders should focus on the specific needs of all students (George, 2009). Even in the Ministry of Education of Trinidad and Tobago's Education Sector Strategic Action Plan for 2011 to 2015, of the identified "major challenges and issues impacting the quality of and access to education today, include ...gender concerns, especially low academic achievement of boys" (Trinidad and Tobago, 2012, p. 11).

Conrad (as cited in Bissessar, 2011) found that there are inroads in the field of medicine as the only STEM area that girls are increasingly enrolling into, at the University of the West Indies (UWI), thereby reducing the gender disparity in that specific area. This appears to be the trend globally, as the OECD notes that girls will very rarely choose physics as a major subject in school, and at the tertiary level, they are under-represented in computer science, physical

sciences and engineering and instead prefer STEM areas leading into medicinal and environmental science (OECD as cited in Kessels & Hannover, 2008), which translates to an interest in biology and geography as science subjects at the secondary level. This can be partly attributed to either the empathic nature of medical science (Keller, 2013), or because it provides a clearer social purpose (Drew, 2011; Gibbons as cited in AAUW, 2010), but can also be due to the influence of stereotypes as well (OECD, 2011). It should be noted however, that although girls are reluctant to pursue physics at the CSEC level in Trinidad and Tobago, they still generally outperform the boys. In mathematics however, boys outperform the girls, despite (the boys) being in the minority (George, 2009).

At the occupational level, the OECD claims that while gender gaps are narrowing in the STEM and technical areas, there is still an earnings differential in favour of the men due to “women’s reluctance to choose technical and male dominated occupations, although the foundations for their career choices are certainly laid much earlier, i.e. during education” (OECD as cited in Schneeweis & Zweimüller, 2012, p. 482). Therefore, the women resort to jobs that are generally characterized by lower pay, lower prestige and inferior working terms and conditions although they may have comparable or even higher education than their male counterparts (OECD, 2011; Schneeweis & Zweimüller, 2012; Sookram & Strobl, 2008;). This hindrance to women’s careers, the OECD claims, deserves a comprehensive intervention since it deprives economies of a source of talent and innovation and therefore is an inefficient use of investment in education, especially because there are more women than men in most societies (OECD, 2011).

In Trinidad and Tobago, however, it is observed that there is no programme specifically tailored to encourage girls to pursue careers in these technical and outlined STEM areas, such as

EET, yet at the Panoptic secondary school, there is an apparent interest of them pursuing it at the CSEC and CAPE level at a higher ratio, when compared to the other centres in the region, and in terms of achievement, these girls are also performing reasonably well, although unrepresented at the top of the class or at CXC's merit list for this subject. Even when students successfully complete EET at the CSEC level, not all of them continue in it at the tertiary level or as a career. However, the female students who have evidently circumvented this stereotype and have successfully participated in the EET programme at the secondary school level will possess a rich resource in assessing the EET course of study and will also be able to articulate their perspective in considering it as a potential career path. It is still possible that these students have not restricted stereotyping influences, or may not as yet allowed it to hinder their career goals, if it exists.

### **Statement of the Problem**

The EET area of study has not attracted as much female students as their male counterparts at any of the educational or occupational domains, and hence follows the stereotype of it being both a STEM based and a traditionally male dominated TVET pursuit. There is therefore a gap in the knowledge as to how female students view EET as a viable career option and to what extent is their perceptions based on gender stereotypical beliefs and experiences, as it does in other STEM areas, since according to (Samuels, 1999), the stereotyping and meta-stereotyping of science as a male endeavour prevents the participation of girls in these fields. Studies also suggest that environmental and social factors, such as the stereotypical influences from society or discriminatory practices can persuade female students to believe that STEM based subjects are not for them (AAUW, 2010).

Research also shows that biologically, males and females are wired differently and that they perceive and analyse data in gender-specific ways, where the stereotyping and meta-stereotyping can be reinforced (Brizendine, 2006; Sax, 2009). What this means is that both nurture and nature can have a persuasive effect of perception of gender-biased subjects, and eventually gender-specific career choices as well. Consequently, girls begin to think and behave in ways that hinders them from participating or performing well in these classes, especially where the number of successful female role models in STEM areas that they can look to, or learn from, is unconvincingly low (AAUW, 2010; IMACS, 2011; McCrea, 2010). Getting first-hand accounts of these students can give an awareness of the nature of gender-role attitudes and behaviours, so that any stigmatisation associated with EET can be better understood, so that future students both males and females can accept it as gender-neutral.

### **Purpose of the Study**

Thus the purpose of this qualitative phenomenological study was to explore the degree to which female students who have successfully completed CSEC EET in 2012, at the Panoptic Secondary School in South Trinidad, view it as a viable discipline, and as a career option. The study consolidated the views of such students to get a better understanding of their evaluation of the EET program and also their overall outlook in pursuing it as a career. This cohort of students was purposively chosen and number five female students in all. By allowing these students to reflect on their journey beginning from their entrance into the EET programme, through the two-year programme itself and also their intended career path, it sought to get their views on whether they think that a career in EET has limiting factors, such as perceived or factual gender stereotyping, meta-stereotyping, discrimination, or biological inhibitions or whether they consider it to have encouraging factors such as gender-neutrality, social factors, or empathy. It

will look at influences that affect their behaviour, which, it will be shown, are also the areas that their behaviour has influenced, specifically from social-environmental factors, and also personal determinants such as from self-efficacy beliefs and also from biological factors. However the study has the potential of uncovering other views that may not have not been considered, which is responsible for either limiting or encouraging girls in the field of EET.

### **Research Questions**

The Study will therefore attempt to find out from female students, who have already experienced EET at the CSEC level at the Panoptic Secondary School, answers to following overarching research question, with sub-questions, all of which will be operationalised:

1. What are female students' view in pursuing a career in the field of EET?
  - a. How do they view the EET programme at the CSEC level within a school to work transitional framework?
  - b. What are their views of the school to work opportunities in the field of EET?
  - c. To what extent does gender factor in, with female students' perception of the EET discipline?

### **Expected Outcomes**

The study seeks to analyse the perception of the EET programme at the CSEC level, and also their views about EET as a career option for them. By assessing students' perceptions and self-belief in EET, educators, including parents can "empathize with or at least better understand how they interpret and perceive the world in which they live." (Zimmerman & Cleary, 2006). The findings will therefore inform all EET teachers in teaching for gender differences in their classrooms, and in giving female students an equal opportunity and guidance in pursuing EET as a career choice. It also has the potential of helping teachers, parents and policy-makers work

towards the elimination of gender-role stereotyping, not just in EET, but in the other occupational and STEM based fields as well, especially throughout the world where the problem appears to be even more acute than here (Mndebele, 1999). The Study can also inform teachers and administrators of the value that female students place on EET as a career choice, inform curriculum officers of the approaches that their respective teachers can take in covering the syllabus to keep students interested in their field of study, give students and parents guidance in choosing EET as a career path, as they will know what it entails, and it can also make prospective employers and administrators of higher education institutions aware of female students' views of pursuing EET as a career.

### **Literature Review**

Although the female's brain is responsible for the way girls perform in communication, as compared to mathematics or science, it is still genetically structured and shaped by evolution, biology, and culture, and therefore determine their childhood gender identity development and subsequent attitudes and behaviours (Brizendine, 2006; Dragowski, Río, & Sandigorsky, 2011). This paper is grounded by three major areas that determine these attitudes and consequently, the behaviours of both males, and more specifically, the females, as they think and perform academically, and build confidence in selecting and pursuing their careers specifically those that are STEM based and the traditionally male based TVET. The first area are the personal factors such as the biological makeup of the individual in relation to their brain, or their cognitive skills and attitudes, such as their gender-based self-efficacy beliefs, the second area is the social environment, especially those formed from gender discrimination, stereotyping from society, and meta-stereotyping by students, and the third is the behaviours or intended behaviours of these students. It will later be revealed that there seems to be triadic relationship in these factors, where

the changes in the personal factors affect behaviour and behaviour affects the environment, and changes in the environment can change behaviour, which changes the personal factors of the students (Brizendine, 2006; Bussey & Bandura, 1999; Halpern et al., 2007; MacKenzie, 2013).

### **The Biological Argument**

Boys and girls develop differently and at different rates, which can be observed at the physiological dimension. Activities in the brain cannot be seen, however with improvements in non-invasive brain-imaging technology such as magnetic resonance imaging (MRI), which visualise brain connections, together with advancements in genetic science, studies carried out on the nervous system and the brain have progressed significantly throughout the years (Brizendine, 2006; MacKenzie, 2013). Neuroscientists now realise that in humans, there is no unisex brain, that is, until eight weeks in the embryonic stage. Before that, every foetal brain looks female, but just about that time, the prevalence of testosterone occurs only in the male brain, and will eventually destroy some of the brain cells in the communication regions, but at the same time, will grow more cells in the sex and aggression regions (Brizendine, 2006). The male and female brain is thus considered to be wired differently and therefore reflect that of the stereotypes, according to MacKenzie (2013).

In the female's brain, the hemispheres of the cortex are much more connected than the male, whilst in the male's brain, each cerebellum have more connections to the cortex on the opposite side. What this means is that males will generally have faster coordinated movement, and females will have improved communication propensity, understand others' intentions and have a better predisposition in processing their emotions (Brizendine, 2006; MacKenzie, 2013). The increased cortical areas in the female brain for the verbal-emotive functions, has an indirect relation to the number of cortical areas for abstract and physical-spatial relations such as mental

rotations, spatial perception and the understanding of abstract mechanical concepts (Gurian & Stevens, 2004; James, 2009). Although James (2009) believes that there is no major issue on whether these gender differences actually affect performance in mathematics and science, Gurian and Stevens (2004), believes that it is one of the causes of the discomfort in females toward computer science and hence accounts for less females pursuing fields in physics, industrial engineering, and architecture, because it gives them fewer personal stimulation or pleasure than it does for boys.

Sax (2009) in referring to the work of twelve neuroscientists from the National Institute of Mental Health (NIMH), reports that there are different developmental trajectories between boys and girls, where their brain develops at different sequence and at different rates. For instance, the report shows that the area of the brain responsible for processing information into different sensory modalities, shows that the girls are two years ahead, although the trajectories are similar to that of the boys. Likewise, the region for the spatial perception and object recognition is slightly faster in boys although the trajectory in this area is similar to that of the girls. However the researchers found that in other parts of the brain, such as the occipital grey matter-visual cortex, girls and boys show no overlap in the trajectories of brain development, where after the age of fourteen, this region diminishes slightly in girls, whilst it grows at a rapid pace with their male counterparts with the same age. This, however, does not suggest that these teenage boys and girls are any smarter or denser than the other per se, but it just implies that boys and girls are just different, with no superiority or inferiority to each other, just as there are observable biological differences (Sax, 2009). Eliot (2013) agrees that on average, with current scientific understanding, males and females have more or less, the same level of intelligence, which makes the effect of biological differences irrelevant to classroom learning.

It should be noted however, that biology, according to Brizendine (2006), together with evolution and culture, genetically affects the brain. The representation of people's personalities and behavioural tendencies, are affected biologically by sex hormones and other factors. At the teen years, oestrogen floods the female brain and testosterone takes over the male brain which results in a dominant focus on the emotions and on communication in the girls, whilst the boys become less communicative, but more focussed on their sex drive. This effect of biology on the brain however, doesn't mean that males and females cannot change their behaviour and destiny, since intelligence and determination can also change the effects of sex hormones on brain structure (Brizendine, 2006). Even exposure and experiences of children in certain environments can affect certain abilities. Fausto-Sterling (as cited in Bussey & Bandura, 1999) found that when children are given opportunities to operate in spatially complex environments, such as when they play outdoors, they are given more opportunities that will develop their spatial skills, despite their gender. Therefore, since boys are allowed to play outdoors more than girls, they develop their spatial skills better, which is needed in math and math-based programmes later.

### **The Social Environmental Argument**

Generally speaking, stereotyping is the stigmatising of persons from a specific social group into specific typesets by others outside that group, and is therefore referred to as other-stereotyping. Meta-stereotyping however, refers to a person's beliefs about the stereotypes that out-group members have about their in-group members (Kim & Oe, 2009; Vorauer, Main, & O'Connell, 1998). When translated in terms of gender, the implication is that meta-stereotyping refers to the process of female students' beliefs of how others view them. It is these stereotypes that say English is for girls and Maths is for boys (Samuels, 1999), but this does not mean that girls necessarily strive to behave in accordance with them (Bandura as cited in Bussey &

Bandura, 1999). In-group members may act deliberately in modifying their behaviour so as to avoid confirming any stereotype of their group (Wakefield, Hopkins, & Greenwood, 2012), or if they are evaluated on a stereotype-relevant task, they may perform badly because of the pre-occupation with fears of failure. This is known as stereotype threat (Steele, as cited in Wakefield et al., 2012). However, the stereotypical beliefs of educators and parents, together with any gender discriminatory practices that they may exercise, will influence the learning environment of female students. It will therefore have the effect of limiting them, and negatively affecting their abilities and interest in STEM and traditionally male dominated TVET areas. Studies show that negative stereotypes such as 'boys are better in STEM areas than girls', have shown to lower girls test scores. Conversely, female students perform better when given the assurances by teachers and family that they can perform despite the stereotypes (AAUW, 2010). It should be noted that any negative meta-stereotype that girls may have of their parents and teachers will also be dispelled by these assurances.

According to math tests results conducted on fifteen year olds by the Program for International Student Assessment (Pisa), Keller (2013) reports that genetically, girls are extremely capable mathematicians, since in a number of countries, they scored the same or even higher than their male counterparts. She ascribes the poor performance in girls to be environmental, since research shows that countries that demonstrate poor levels of gender equality have an inversely proportional gap in the performance of girls when compared to the performance of boys. What this means is that if biology had been a factor, then the phenomenon of gender differences in underachievement would have been worldwide and hence intervention measures would have had to be implemented universally. Instead, there is contradictory assessments of the phenomenon where, on one hand, it is described as being a serious threat to

the stability of society, and on the other hand, as just undue attention by the media, politicians, and some educational professionals, thereby causing moral panic (George, 2009).

The curriculum can also be an agent of being gender-biased, as textbooks can be considered gender-insensitive to female students pursuing math, science and technical studies (Njeng, 1999). An example in Trinidad and Tobago of a gender-biased curriculum was the junior secondary schools, where Home Economics was done by girls only, and Industrial Arts, which comprised of Metalwork, Woodwork and Technical Drawing were only done by the boys. Eventually, teachers, parents and then students were conditioned to accept the stereotyping of TVET. Today however, this practice have been replaced by Technology Education where all students, male and female, are expected to be exposed to different occupational areas. The National Report on the Development of Education in Trinidad and Tobago (as cited in George, 2009), reaffirms the steps taken by the Ministry of Education in providing equal opportunities for males and females, eliminating gender discrimination from the curricula and textbooks and making all subjects accessible to both genders. It's not surprising that UNESCO's Education for all (EFA) initiative that was framed in 2000, shows that many countries are still far from the 2015 target in reaching the six EFA goals, where the fifth one is gender parity and equality. It should be noted however, that Trinidad and Tobago has more or less reached this goal according to the EFA survey, which confirms the Ministry's assertion (UNESCO, 2014).

The American Association of University Women, AAUW (2010), have also noted that both implicit and explicit bias exists against females in science and engineering fields, to the point where overt discrimination is practiced in these jobs. In the UK, occupational segregation is reported to be mainly pronounced in the vocational and technical jobs and apprenticeship schemes, and is being blamed for the reinforcement of gender discrimination, despite offering an

opportunity to close the skills gap. The two occupational fields with the lowest percentage of females in any apprenticeship program and coincidentally are the higher paid as well, are electro-technical and engineering, which shows one percent and three percent respectively being females (Firth, 2012). The United Nations reports from online participants around the world, that in TVET, because of the entrenched traditional perceptions, girls and women are discriminated against, which mostly continues unchallenged (UNESCO-UNEVOC, 2011). They also found that gender discrimination on females is attributed to society's notion that females are inferior to males, which is not perpetuated by biological attributes alone, but also by culture and religion, even to the point where their independence and human rights are undermined. Fighting gender discrimination can prove to be a difficult task because of the entrenched local traditions. The main agents for change, it is reported, is not on laws, which is a start, but in the communities, workplaces, and in families as well (Firth, 2012; UNESCO-UNEVOC, 2011).

Even segregationists, advocating for single-sex schools, have been blamed for reinforcing the stereotype by misrepresenting how boys and girls are "hardwired" differently and based on this, should be segregated and treated differently. A review of literature on single-sex education and the brain done by Eliot (2013) shows that research done by segregationists suggesting that the boys and girls are categorically different to warrant gender-based learning environments and educational methods, is not only misleading, but even promotes the gender stereotyping. This also creates the effect of what is known as the self-fulfilling prophecy, whereby educators and families who anticipates the expected gender outcomes, and thereby reinforce the stereotype through indirect statements and stereotypical remarks (James, 2009). Even children, by learning their gender roles early in their upbringing, begin to understand that it is linked to their physical and behavioural characteristics and then transmit this concept to others (Dragowski et al., 2011).

This can have a domino effect of girls learning only in the areas where their strengths lie, and not learning in areas that they are weaker in, which denies the opportunity in strengthening the regions in their brain that they are inherently weak in, and thus allowing them to remain perpetually in a gender-typical typeset (Eliot, 2013).

### **Girls Self-Efficacy Beliefs**

It is also found that societal gender-typing determines, to a great extent, how girls realise their talents, how they view themselves and others, and on which career path they should pursue. Social outcomes, such as those produced by the behaviors of females, are influenced mainly through informational and motivational functions (Bandura as cited in Bussey & Bandura, 1999), and affect, among other things, the development of sociocognitive regulators, which include gender roles, self-evaluative standards, and self-efficacy beliefs. Self-efficacy beliefs are the beliefs derived from the subjective judgements of one's capabilities in pursuing a course of action, for accomplishing one's goals (Bandura as cited in Zimmerman & Cleary, 2006). Once students believe that they are capable, their beliefs will promote motivation, well-being, confidence, and personal accomplishment in all areas of life. It will therefore become a vital incentive for them to persevere in the face of difficulties and will subsequently determine the successes that they attain (Bussey & Bandura, 1999; Pajares, 2006). Conversely, if they lack confidence in their academic and social skills, and they envision failure on exams, and on rejection or ridicule with social encounters, their self-efficacy beliefs will produce a negative outcome (Pajares, 2006). Self-efficacy beliefs can therefore predict the outcomes of students in their social and occupational endeavours, and hence gives substance to the self-fulfilling prophecy (Pajares, 2006).

Even Research in neuroscience show that the brain grows new synaptic connections when new learning is taking place, and hence boys and girls need to modify their beliefs and not limit themselves by gender stereotyping or discrimination brought about by society (Halpern et al., 2007). In fostering these sentiments educators are encouraged to use this concept to instil in children that believing in their own malleability and to promote their self-efficacy regardless of their gender and other demographics. To this end, the notion of single-sex schools, just to teach girls based on their gender strengths should be rejected because this inclination will neglect the weaker areas and eventually will widen the academic gaps between boys and girls, and concretise their self-perceptions in a negative way (Eliot, 2013).

The kind of careers that students choose is also determined by their perceived occupational self-efficacy and would normally follow a gender specific course. An example of this is where boys relate a higher sense of efficacy through science and technical careers, and girls still prefer careers in social, educational and health services, even when the gender gaps in their abilities in math and science have shown to be reducing (Betz as cited in Bandura, 2006). Even reports from the US Department of Education, in reinforcing the theory of self-efficacy beliefs suggested that if educators were to improve girls' self-concept and beliefs about their abilities, that is their self-efficacy, against the stereotypes, in maths and science, then they will be more likely to consider and perform better throughout their educational and occupational pursuits (Keller, 2013; Okeke, 1999). One way that educators can encourage girls in non-traditional vocational and science education, is therefore to alter their attitudes and perceptions, and thereby alter their self-efficacy beliefs of the traditional gender-typical roles as well, since attitudes can be changed with education (Mndebele, 1999).

### **Behaviour Begets Behaviours**

The behaviour of students has already been shown to change with the kind of attitudes they possess, their self-efficacy beliefs, the effect of the environment that they are exposed to, and on biological factors. Even if students choose not to respond, to such stimuli, it is still considered to be behaviour. Behaviour, according to behavioural biologists is “the internally coordinated responses (actions or inactions) of whole living organisms (individuals or groups) to internal and/or external stimuli, excluding responses more easily understood as developmental changes” (Levitis, Lidicker Jr, & Freund, 2009, p. 108). Therefore, normal changes in biological development, such as getting taller for example, is not considered as behaviour, but any developmental changes in the brain will cause certain cognitive behaviours, since cognitive events are neural occurrences (Bandura, 1989; Brizendine, 2006; Halpern et al., 2007; MacKenzie, 2013), a phenomenon that is now being validated by contemporary neuroscience research and was once considered unclear, unestablished, and conflicting. (Bussey & Bandura, 1999; MacKenzie, 2013). What is clear though, is that heritability does not ordain the destiny of students, but there is a multi-causality, with an interdependence of behavioural variance of unequal proportions on biology, their self-efficacy beliefs and on environmental factors (Bussey & Bandura, 1999). But to measure behaviour with reference to this study, from just a biological standpoint will prove to be a complex task, as it would require to be more of a longitudinal study, observing the students for actual behaviour in terms of action or inaction in tandem to what they say that they have experienced in the field of EET and their intentions taken from their responses in the interview.

However, social and personality psychologists, specifically Ajzen (1991), in mediating the effects of biological and environmental factors on behaviour, has offered a dispositional

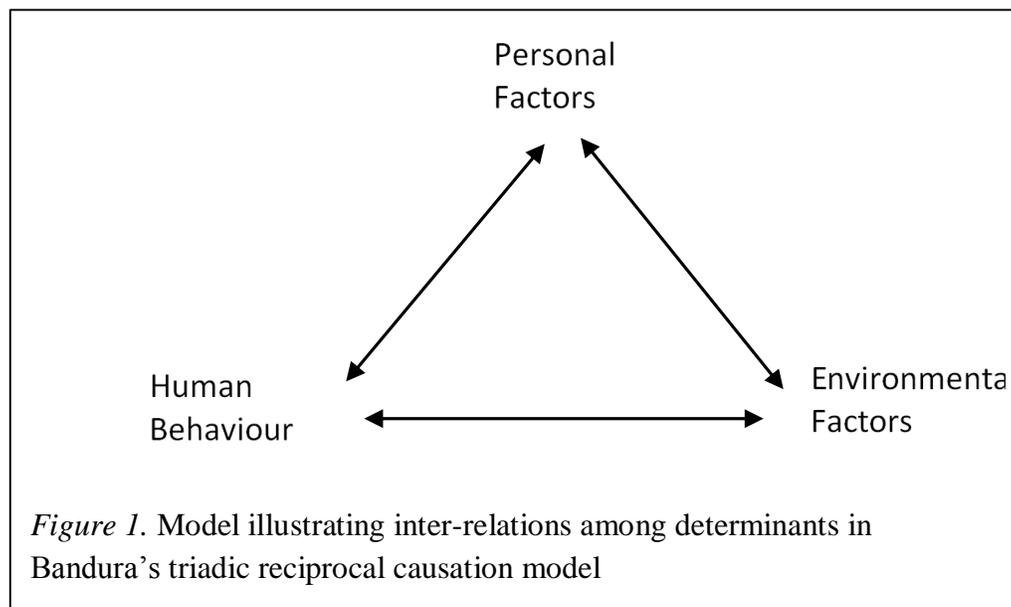
approach, so that behaviour can be measured to a high degree by prediction. In his theory of planned behaviour, Ajzen (1991) claims that “perceived behavioral control, together with behavioral intention, can be used directly to predict behavioral achievement...[and]can often be used as a substitute for a measure of actual control” (p. 184). The perceived behavioral control is the self efficacy beliefs of the students, whereas actual control is their actual ability and behavioral achievement. Thus when a student intends to behave in a certain way, according to the theory of planned behaviour, once that student has self efficacy beliefs, there is a high predictability to a high degree that they will actually perform that behaviour (Ajzen, 1991).

### **Theoretical Framework**

In attempting to find out female students' perceptions of pursuing a career in EET, a theoretical framework that encapsulates behavioural, biological, environmental and self-efficacy concepts was used in the literature review, because factors that influence girls' self-efficacy beliefs include their perceptions of ability and perceived importance (Schunk & Pajares, 2002). Therefore, the study is grounded on Bandura's conception of reciprocal determinism (Bandura as cited in Pajares, 2006; Wood & Bandura, 1989), where behaviour, personal factors such as cognition and biological events, and environmental events operate bi-directionally in a triadic reciprocity to explain human psychosocial functioning and gender development (Bussey & Bandura, 1999; Wood & Bandura, 1989).

In this triadic reciprocal causation model, as illustrated in figure 1, personal factors such as self-efficacy beliefs or biological events causes and is caused by both environmental factors, for instance, the social influences encountered in everyday life, such as teachers and peers, and by human behaviour such as students' actual academic skills and self-regulatory practices (Pajares, 2006), or their intentions to pursue a related career (Ajzen, 1991). In the same way,

behaviour is caused by and causes personal factors and changes to the environment, and the environmental effects change and is changed by personal factors and behaviour. The percentages or proportional variance of the effects of each determinant is unequal and may fluctuate over time, and there is no fixed pattern for reciprocal interaction (Bussey & Bandura, 1999).



### Summary

The review of the literature demonstrated what other researchers found in terms of linking female student' perception of pursuing a career in EET to some of the causes and effects. It also serves as a guide in this research as to what to look for, and of what theoretical framework to be used in getting to know how female students will evaluate EET as a career and what can be some of the prohibitive as well as the encouraging factors. From the biological perspective, it is expected that because the female brain is wired differently, they will tend to operate and think based on the stereotypes according to (MacKenzie, 2013), and hence EET would give displeasure according to them (Gurian & Stevens, 2004). From the environmental perspective, stereotypical undertones or overtones will be influential, if any exists. From the self-efficacy and planned behaviour model, such as encouragement or confidence emerging from the actual EET

training or for example can change their attitudes and thereby predict behaviour. The method in collecting data from these students can best be done using interviews with semi-structured questions in probing students' thoughts, intentions and experiences, while allowing them to speak freely with little or no prompting.

### **Methodology**

The purpose of this study was to explore the degree to which female students consider EET as a viable discipline, and to identify their concerns in pursuing it as a career. By using Bandura's conception of reciprocal determinism, the study sought the views of female students who have already experienced EET at the CSEC level in determining to what extent is pursuing a career in this field is related to personal or environmental factors and how has it affected their overall behaviour. This chapter presents the methodology, and therefore gives the type and design of research needed in order to get from the students the necessary data for answering the research question, namely, what are female students' views in pursuing a career in the field of EET? It will present the participants and the method of their selection, the data collection and data analysis instruments and methods respectively, and describes the timeline utilised throughout the research. It shows the ethical and research bias issues, and culminates with how the study is delimited and also gives the limitations of the research.

### **Research Type**

In order to get a comprehensive understanding of these female students on their views concerning pursuing a career in the EET field, instead of relying on second-hand information (Creswell, 2007), which proved to be inadequate in this context, a qualitative approach was adopted. This made allowances for a system of inquiry that sought to build a holistic, largely narrative, description to inform an understanding of the inclusion of phenomenon within a

natural setting (Creswell, 2013). The research is further shaped by a relativism, also known as social constructivism paradigm according to Creswell (2007), since the subjective meanings of the experiences of the female students, which are formed through interaction with others, are sought, and there is a reliance on their views of the situation in finding meaning. So that interactions with peers, parents, teachers and other personnel that have influenced them, in terms of forging their views on pursuing EET as a career, is captured by an interview process with me, based on specifically guided semi-structured questions.

In getting the essence from the views of female students in relation to pursuing a career in EET using a qualitative research methodology, the central phenomenon, that is, the key concept, idea, or process (Creswell, 2012) has been identified. A phenomenon in a qualitative research is the object of human experience or abiding concern that needs to be made manifest or brought to light (Creswell, 2007; Larsson & Holmström, 2007). What I principally sought from these students, is their views on EET as a career option, so that “EET as a career option” becomes the central phenomenon.

### **Research Design**

The research design in this study is a phenomenological one and is based on a philosophical assumption on ontology, where descriptions of the meanings from a first-order perspective of the girls' experiences or perception of reality is extracted. This means that from a philosophical perspective, the nature of reality is constructed in the girls minds (Creswell, 2007), and the design will allow for proper sampling and data collection procedures, using the proper instruments, so that a proper decoding, analysis and reporting can be done. I also contemplated the phenomenographic design, but that approach would consider, from a second-order perspective, the variation of the girls' conceptions of the phenomenon. That means, what do the

female students, that is, the participants, think about girls concepts of EET as a career, whereas the phenomenological approach considers the meaning, from a first-order perspective of their everyday experiences of the phenomenon (Larsson & Holmström, 2007). The case study design was also considered, but that allowed for a collection strategy from more sources, and the context and setting would had to be common. However, in this study, the girls are now in different settings as three of them have moved to other areas than EET, whilst two of them were completing their CAPE studies in EET at the time of this research. The data collection method in this study is also singular, that is, by interviews, especially since bracketing is a criteria in phenomenological research, so that observations, for example, was not warranted.

### **Sampling Procedure and Participants**

The students in the population under study was purposively chosen in terms of the year that they were selected from, but in terms of the class in that year, they represent the full population of females that the I had taught at the Panoptic Secondary School, in order to get a first-hand perspective of their experiences and outlook in EET. This cohort was sampled because they were the most accessible, their number was high enough from the same class, so that any unnecessary variables were limited. Additionally, that that year matched available data that was accessible from CXC and UWI to give a snapshot of the total amount of females writing and passing EET. It was also recommended that in doing a phenomenological research, there should be at least five participants who have all experienced the phenomenon. The girls chosen have all experienced EET as a career option at some time and they number five in all.

These girls came from a CSEC class of which 36% were females, giving 64% as those who constitute the males and wrote the examinations in 2012. They are now over 18 years of age and are transitioning from school to work, where two of them have just completed the second

unit in the CAPE in EET, one is pursuing nursing at a government training institution, one is pursuing nursing at a private institution, and one is currently working at a retail outlet outside the EET field. Pseudonyms are used to identify each of the participants in this study. These pseudonyms were derived from famous female electrical engineers on a first name basis and are Andrea, Caroline, Claire, Edith and Esther (Ranker, 2014).

### **Data Collection Method**

The method of collecting data for this study was by conducting through personal interviews carried out in a semi-structured way, where twelve open-ended, predetermined questions were utilised (see Appendix II), but were not too rigid, and also allowed for follow-up questions to be answered as well (Kothari, 2004). The students were contacted and appointments were made to conduct the interview. Each interview session lasted around twenty-five to forty minutes, and after participants gave written informed consent, the interview was audio recorded and transcribed verbatim. This was done so as to maintain as much as possible the “essence” of the conference, without loss in translation.

### **Data Collection Instrument**

The questions in the interview allowed me to get a grasp from the students of their views on the central phenomenon of EET as a career option, and hence it attempted to address the overarching research question by finding out female students' views in pursuing a career in the field of EET, as they journeyed from the time before they started the CSEC program to their experiences of the EET program, and their thought of pursuing a career in that field. To do this, open-ended questions were formatted for use in the interview. A pilot interview was also carried out with another female student from another year, in order to modify any questions or interview

procedure that may need tweaking. However, questions were not kept in a rigid format and still had to be modified as necessary on-the-fly.

These questions follows a semi-structured interview protocol and stems from the sub-research questions, such as, “why did you chose EET as a course option?” and “what do you think of the EET programme as it relates to the world of work?” which related to the sub question, “how do female students view the EET programme at the CSEC level within a school to work transitional framework?” Two other interview questions were, “after learning that you had passed EET at CSEC, what were your thoughts career-wise?” and give me some of the options that you can take in pursuing a career in EET”, which makes the second sub-research question of “what are their views of the school to work opportunities in the field of EET?” operational. To answer the third sub-research question in finding “to what extent does gender factor in, with female students’ perception of the EET discipline”, I relied on the responses of the students in all twelve interview questions. This was also done to view their responses through a lens within the three determinants of personal, environmental and behavioural of the theoretical framework of the triadic reciprocal causation model, and will be discussed after the presentation of the research findings.

### **Ethical and Research Bias Issues**

An inherent problem with a phenomenological research study in that in an interview there can be influential bias from researchers. These students know me very well, because I have taught them at the CSEC level. Thus, I was aware that it was possible that they could have given responses that was either deliberately trying not to disappoint me on one end, or give responses purposefully thinking it will hurt me, one the other end, which could have affected the validity of the results. I also had to suspend all presuppositions and judgements so that a fresh perspective

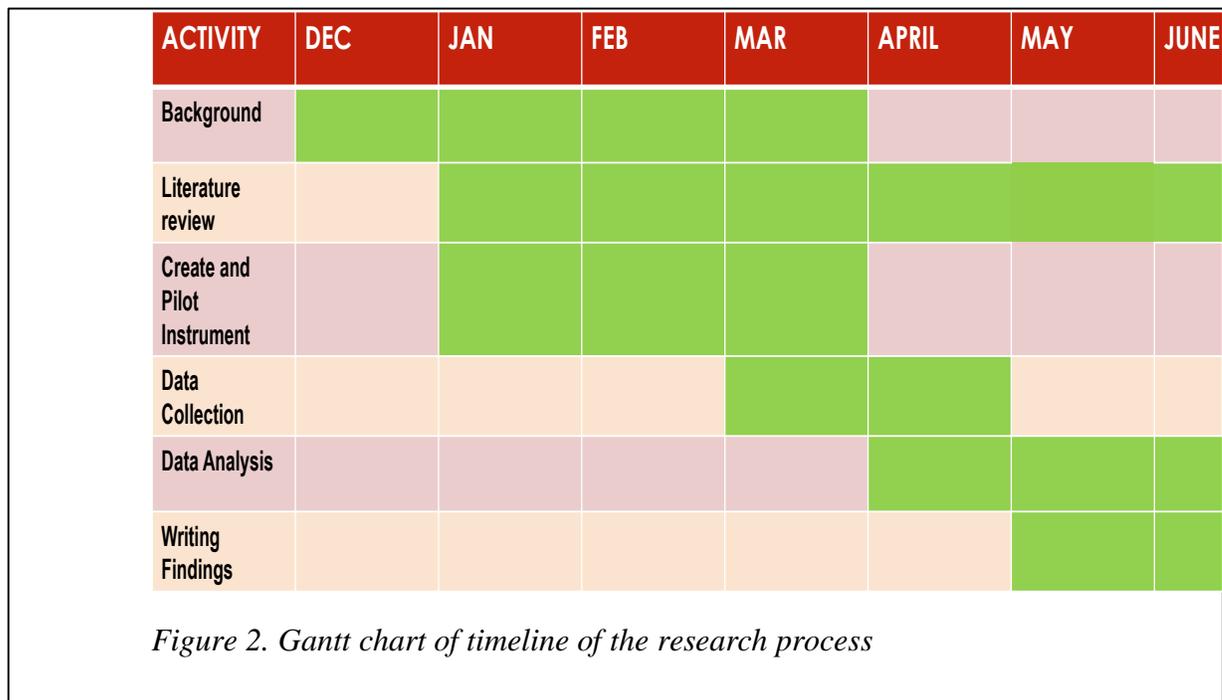
can be retrieved, a process called epochal or “bracketing” of personal bias (Creswell, 2007; Richardson, 1999), and also tried to be as neutral and open-minded as much as possible in retrieving and analysing the data in order to get an unprejudiced result.

Other ethical considerations that was observed include approval from the ministry of education to use the school and two of the students to conduct the interview (Appendix III), and consent from parents was also granted. Steps were also taken to ensure the confidentiality and anonymity of students in this research, such as using pseudonyms as mentioned earlier. The students were also assured that they had the right to stop the interview process, refuse to answer any of the questions, were not coerced, had the liberty to withdraw at any time and also had the option to review their transcripts or to refuse them for analysis if they desire.

### **Timeline**

Although the time to submit proposals for the study commenced before September 2013, it was not until December that I began conceptualising the research into its present format, which was catalysed by a lecturer’s review of research at UWI, and fuelled by my own curiosity as to what are some of the concerns that female students may have in the field of EET and how do they actually view it as a career, especially since they have always been in the marginal minority at my school. However it was not until January 2014 that mention was made to the Programme Coordinator and Secretary, and a formal request to my immediate Supervisor to change the research topic. As depicted in figure 2, the majority of the background was done from December 2013 to March 2014, the literature review began in January 2014 to April 2014, but the quest for a theoretical framework changed as new material was found. Other frameworks included Bronfenbrenner’s Ecological System Theory or Ambivalent Sexism Theory (Fields, Swan, & Kloos, 2010), but the present one was adopted since it embraced the former within the

environmental determinant and the latter within the personal determinant of Bandura's triadic reciprocal causation model. The literature review was therefore an ongoing process and lasted until June 2014. The instrument which was the open-ended questions for the interview was rationalised from January to February and a one-hour pilot was done in March, with only



minimal changes to the original questions.

The majority of the data collection from the interviews was collected in March, with transcripts being done in April. Each transcript took an average of 20 continuous hours, which translates into 4 days, if 5 hours per day was allocated. This sums up to be 100 continuous hours or twenty 5-hour days. Once transcripts were done, and even from the interviews, data analysis was being realised, however data analysis continued towards the end of the findings which began in May, until the final write up in June. With additional time requested, finalising of the project, together with technical formatting and editing was done in early July (not shown).

### Method of Data Analysis

The approach in conducting this phenomenological data analysis follows procedures from Moustakas and Polkinghorne (as cited in Creswell, 2007), where the data within the transcripts were analysed by looking for and highlighting any significant statements that provided clues as to how the female students perceived or experienced the phenomenon of “EET as a career”, and themes developed from clusters of meanings from these significant statements. A textural description was then written to signify what the girls experienced or perceived, based on the research questions and the theoretical framework, guided by my own experiences and contexts, although bracketing needed to be suspended for this to take place. Finally I wrote a description that signifies the “essence” of a better understanding of the phenomenon experienced by all.

What do you think about the EET programme as relates to the real world of work, or as relates to outside the classroom? What do you think of the EET itself?	Like in school or...?
The EET course, how it helped you then?	Oh, well to understand about electronics and the whole theory behind it and like how we built circuits and stuff like – I would never imagine myself doing that and as a girl nah, you know boys does do them kind of thing, yeah
<i>Figure 3. Excerpt of transcript showing one theme consisting of gender stereotyping.</i>	

In helping to organise the transcripts better, they were done in tabulated format where the interviewer is on the left side and the responses are on the right side. This allowed a cleared and quicker scope of identifying content (see Appendix IV). An example is shown in figure 3, where one theme is highlighted that refers to the third research sub-question, “to what extent does gender factor in with female students’ perception of the EET discipline?” Further management of the data was accomplished by organising the significant responses of the girls into segments

based on the interview questions and colour coded to match the research questions, which is subdivided into the sub-research questions, where pink represents sub-question 1, blue represents sub-question 2 and green represents sub-question 3 (see Appendix V). With this approach, themes can easily be recognised, so that generalities can be made and the essence of the girls' experiences and their feelings can be readily identified.

### **Delimitations (Scope)**

The research is limited to only female students who have done EET at the CSEC level at the Panoptic secondary school, and hence no generalisations can be made of how all female students may think or behave. The scope is only to those students who have successfully completed the EET examination in 2012 and are now at various stages of pursuing their careers. Two advantages of using students who have just concluded EET at the CSEC level is that firstly, they will have a better memory than older students of recalling why they chose EET in the first place and secondly, they will also be more settled in their resolve than the newer students of what they think of EET as it relates to educational and occupational opportunities.

### **Limitations of the Study**

One limitation of the study was getting a control group from a wider female demographic, where I had no prior influence, as in this case, as a past teacher. This would have made bracketing easier and reduce any validity issues due to bias that may arise and conflicts of interest. Getting a representative sample of female students in EET from other schools, within the specified timeframe for a 45 minute, audio-recorded, confidential and relatively undisturbed interview, where a male researcher that they, nor their parents have not met, nor heard of previously, is interviewing them, would have proven to be more challenging. There are not large contingents of female students who have pursued or considering to pursue EET from the CSEC

level, which can be considered for a research project such as this. One disadvantage of using these students from the 2012 cohort is that they have not yet concretised their career path sufficiently in knowing what direction to pursue, as they are still in transition, when compared to older students.

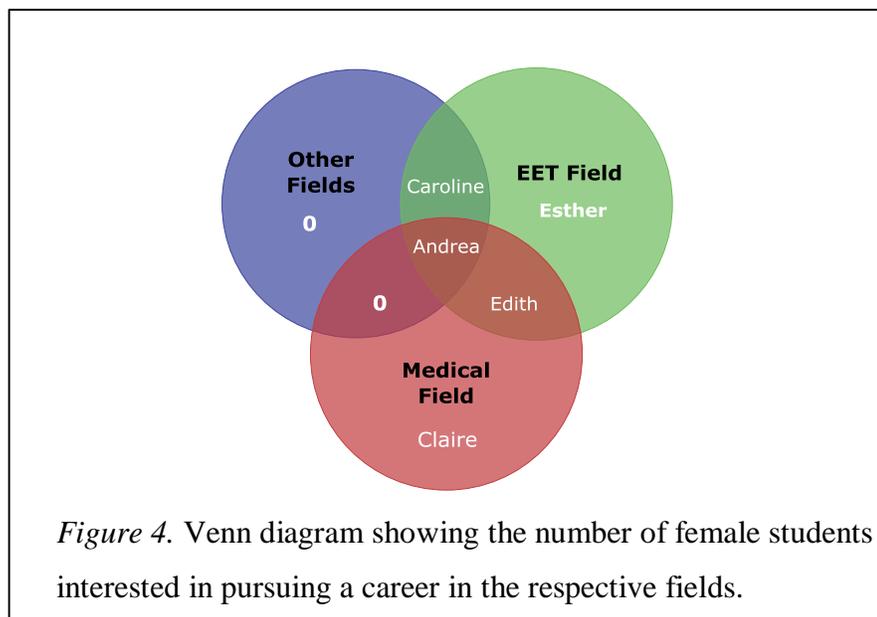
### **Data Analysis and Presentation of findings**

The aim of the analysis in this study was to identify and describe female students' concepts, perceptions and experiences of the phenomenon of "EET as a career", through the coding of categories informed by the research question specified, and presented into a proper descriptive format. Since the research question is broken down into three sub-questions, an attempt was made to organise the findings in this format for its presentation. That is, participants' views of the EET course itself, their views on the opportunities it presents and on any stereotypical beliefs that have arisen. Steps was taken however to give an idea of the girls' general deportment and to identify each of their position at the onset.

### **Participants' Overall Disposition and Outlook**

The participants in the study all showed gratitude in pursuing EET at the CSEC level, indicating the benefits of the programme, although four of them expressed their gender stereotypical beliefs of EET being an androcentric TVET area, and only a few of them showed a desire to continue a career in that field. Of the five female students, only one of them, Esther, who have just completed the EET programme at the CAPE level, gave explicit intentions that she will pursue EET as a career, and has already signed up to a tertiary institution to continue her studies there. Three others also gave an indication that they will consider furthering their studies in EET, however, they were still contemplating whether to go into another career field instead. Of these three, one of them, Claire, was considering a career option in the medical field, another,

Caroline, has interest in any field in engineering, and the third one, Andrea, who had also just completed EET at the CAPE level, was still undecided and was contemplating among EET, medical or another career path, as she was “still searching”. The fifth student, Claire, has already begun a career in the medical field and expressed her desire to remain there, though acknowledging that her experiences of EET at the CSEC level gives her “a technical advantage



over the rest of the girls” in her chosen field. These representations are illustrated in figure 4, and which also gives an indication of the high probability of the participants indicating a desire to pursue EET as a career, and where the other alternative option for the majority of them, is to go into the medical field.

### **Views of the EET Programme**

With reference to the first sub-research question on how do female students view the EET programme at the CSEC level within a school to work transitional framework, it was observed that they all had benefited from the program due to the practical nature of the TVET component. They all referred to the SBA component of the programme, where they were exposed to building

actual circuits or making replicas of house wiring switching systems. This made their view of the EET programme unanimously as “interesting”. One of them, Caroline, even reminded me that I had exposed them to problem-based learning (PBL), where they were required to solve real life problems using given clues and library resources, where group members strategized in finding the practical solution in a systematic way. She also mentioned that the programme sparked her curiosity of how technical work is done, and together with Esther, they claim that it has broadened their knowledge and understanding of how things work”.

### **Initial Reasons for CSEC EET as a Course of Study**

The participants’ initial grounds for pursuing the course however, ranged from intrinsic reasons such as “thinking about it, is sounding kind of cool”, “I like working with my hands” and “I still wanted to know” to extrinsic ones, such as a family member, such as a brother or a father first being in it and therefore influenced them in pursuing it too. It is also worthwhile to note that some of the reasons put forward for starting a career in EET was for the mere reason that it was not as popular as other areas for their peers, so that it would have been something unorthodox and novel for them.

### **Relating CSEC EET to the Real World of Work**

There can be some courses that students do, where they do not appreciate their value as they relate to the world of work. The participants however, acknowledged the utility of the EET programme in helping one’s career, despite whatever pathway they may choose later on. As already mentioned, Claire, who is the one currently pursuing nursing, has stated that she has a technical advantage over her peers, where she is able to read medical instruments or do adjustments by tacit knowledge. Another student, Caroline, has noted that the programme has broadened her knowledge base and sparked her curiosity in wanting to know how things work.

Another student, Esther, had similar sentiments of EET helps her to understand how things work, where she felt “more like independence” and she could do “something electrical-wise and stuff”. Edith joins her in mentioning that the EET programme has empowered them to help their fathers in doing electronics and electrical work such as TV repairs and wiring respectively. Andrea was the only one who thought that the programme “could help you out, but not in like real life”, but then contradicts her statement by acknowledging the safety aspects of electricity, starting from being “safe around wires and stuff”. All of the four other students remembered the two-way and three-way switching from their SBAs and have indicated that they can use this skill in real life.

### **The Selling Point of CSEC EET as a Career Path**

From the participants' point of view, the practical component in the EET programme is the highlight of making the course interesting and applicable to the world of work. Caroline however went a little further by describing in more detail what this means to her. She claims that “it was more interactive”, “more exciting than boring” and it allows you to “learn faster by seeing”. This was her supporting statements of learning the practical way, where “you seeing it you know what to do” instead of learning from a textbook, where “you have to mentally picture it”.

### **The Sore Point of CSEC EET as a Career Path**

It has be found to be clear that Caroline is a hands-on person and a visual learner, based on her responses, so it is not surprising for her, that things “started to get a little frustrating” when there were no visual aids, or where aspects of the course depended on their spatial ability. The other girls gave similar feedback, where Esther declared that EET “have a lot of theory in it”, and Claire exclaimed that “it had aspects like maths, chemistry, physics, everything...roll in one...my brain more for English Because I don't really like maths...so yeah I tried (to like it)...it

don't like me". Continuing this same thread, Andrea mentioned that her low-point of EET was the most theoretical topic of transistors, whilst Edith summed it up as having "just too much work at times".

### **Educational and Occupational Opportunities in EET**

This section discusses the second sub research question of presenting the participants' views of the school to work opportunities that they believe that there is in the field of EET. It will address their views on the academic opportunities as well as those in TVET and workforce development. It will then give an indication of the likelihood of these students choosing a career in the field of EET based on how they view the strengths, weaknesses, opportunities and threats in considering it as a career.

#### **Thoughts on the Career Choices in the EET Field**

When the girls had realised that they had passed EET at the CSEC level, they had a good idea of their next option, although only two of them, Esther and Andrea, began charting out a course in the EET field by signing up for EET, mainly because the others performed poorly in the other subject areas and had to rewrite them. Two of the students mentioned that they found out about the career and educational opportunities by searching for themselves, while one of them depended on her both parents, which had differing views, while another had the opportunity of learning of the choices at a career fair hosted by the Ministry of Tertiary Education and Skills Training (MTEST) in collaboration with the ministry of education.

All of these girls knew of the opportunities at UWI and the University of Trinidad and Tobago (UTT), and also Kensions of which I have no knowledge of, up to the time of this research, and the careers that the training at higher institutions can bring, such as technicians or electrical engineers at the Trinidad and Tobago Electricity Commission (TTEC) or at the

Petroleum Company of Trinidad and Tobago (Petrotrin). Surprisingly, there was a unanimous declaration that the benefits of pursuing a career in EET is specifically due to a high monetary reward, although Caroline, who was not pursuing EET at the time of the interview was quick to mention that in addition to money, EET will allow her to be part of something where she can say “I designed that” or “I helped fix that”, and as mentioned before, it gave Claire a technical advantage. However, the girls were still uncertain as to whether they wanted to go into an EET career pathway, and as already shown in figure 4, some students are still contemplating another career pathway.

### **Girls' Outlook in Pursuing EET as a Career**

The reasons that the participants gave as limiting factors in pursuing a career in EET were varied, where only two of them, Edith and Esther indicating that there are no limitations, which suggests that they are strongly considering it as a career, although Edith is not sure of her move in the next five years, and Esther believes that she will be “hopefully working and pursuing studies still”. However Claire believes that this field is “overpopulated” when compared to nursing. She sums it by saying, “all throughout the world people need nurses right, and all throughout the world people waiting to have engineering jobs. So which one you'll prefer?” Andrea too lamented that she “don't feel comfortable doing EET like a job” and is “still looking”, which suggest that both of them will most likely not consider a career in EET. However, Andrea's outlook for the next five years is to write over some subjects, finish her studies and then look for a job. Caroline on the other hand gave strong indications of her desire to pursue EET, such as having a thirst for knowledge and that she can learn very fast, but she also gave many limiting factors as well, such as the dilemma of the experience-to-get-a-job loop, not being able to afford further education, “personal reasons” of having to be a bread winner as a

child, and it's a male dominated area, where there is not much job options for females in this field,. Her outlook for the next five years is to pursue one of the fields in engineering, once her contract is up with the retail company that she is currently in.

### **Gender Stereotypes**

The final sub-research question attempts to find out the extent which gender stereotyping factor in with female students' perception of the EET discipline. Whilst there was not an interview question that asked the students of their stereotypical beliefs, the research method was deliberate in extracting from the participants' expressions of gender, based on how they responded to the interview questions. Thus a natural, and not a coerced approach was taken, which increased the validity of the research. While some fragments of gender stereotypical beliefs have already been discussed in the preceding sections, because it was found to be interwoven in the discourse, this section treated the issue separately for emphasis on highlighting the stereotypical beliefs of the participants.

The only participant that did not overtly express any gender stereotypical beliefs was Edith, so that the majority of the girls are of the opinion that gender plays a role in how EET is viewed as career path for females. Both Claire and Caroline had explicitly stated, in order to justify their claim that EET is in a male dominated area, that from the field trip to an electrical company that we visited, they did not find one female worker "with coverall" in the control room or the yard as technicians or engineers. Both of them observed that all the females were either security guards, cleaners or worked in the administrative offices "for more like secretarial work...desk jobs". Furthermore Caroline, on her desire to sign up at the company as a trainee, asked around and got the same responses from the company representatives. She laments, "We want to be a part of it, but it's unfair to us, we are discriminated by our gender, and we can do it

better than a man”. Claire shows an agreement to this in her discourse by saying that the girls can do just as the men, and can work in these companies. In proving her point, a recent visit from an electrician to her home made her realise that she know what he was doing based on what she learnt from school, and although she does not believe it’s a “men thing”, she quips that “men still see it as their thing... because that is still the men’s mentality”, so that in these two girls’ minds, there is overt discrimination against them, and it is not just limiting themselves by preconceived beliefs, but to them, it is by environmental factors, of which they have no control of.

The other two girls however, accepts EET as belonging to the male arena, although they too do not allow this conviction to hinder their abilities in EET. For Andrea, she acknowledges that as a girl, she would never imagine herself building electronic circuits, because “boys does do them kind of thing... boys always experimenting with stuff they see”. Esther on the other hand in making a case that girls can pursue EET, differentiates between two types of girls, that is the “girly girl” and the “girls not so girly”. She explains that “the girly girl will think ‘ok, that is not my thing because that is a boy thing’ and over and over and over they wouldn’t choose to do that”. Esther believes that she is in the “not so girly” category so that anything’s possible, especially having passed EET at CSEC level, and at CAPE unit one, and has just completed unit two. She also believes that from her observation, the girly girls are in the majority and are “doing doctoring or lawyer”, and “very rare you will hear a girl say they going into engineering”.

### **Essence of the Phenomenon – A Summary**

The findings from the descriptions of girls’ views of EET as a career option produced the essence from a phenomenological perspective. Namely, the participants appreciate the practicality of the EET programme at the CSEC level, they believe that it has helped them in some way to enhance their employability skills, and that a career in EET will bring high financial

benefits. However, many of them believe that EET is in a male dominated area, and this can pose as a deterrent in pursuing a career in this field, and that the medical field is a strong alternative for them.

### **Discussion**

When looked through the lens of the theoretical framework of triadic reciprocal causation model, there is evidence to suggest from the findings of the girls' views of EET as a career influences and is influenced by personal, environmental and behavioural perspectives, as mentioned from the literature. Although steps have been made to organise the discussion in a sequential arrangement, there will be overlap, because of the cyclic, reciprocating, cause and effect nature of the triadic reciprocal causation model.

#### **Perspective from Personal Factors**

From the biological perspective, some of the girls expressed views to suggest that their brain were not 'wired' the same way as the boys, which was demonstrated by Caroline mentioning that there is a mental toll in trying to work without diagrams, which suggest that this is due to the indirect relationship of the increased cortical areas in the female brain for the verbal-emotive functions, and the number of cortical areas for abstract and physical-spatial relations as mentioned earlier. This is further evidenced by Claire's confession that her "brain is for English", and in her dislike and discomfort particularly for mathematics, and in the other sciences that EET represents as well. Although it can be argued that this is learnt behaviour due to poor self-efficacy beliefs, which is still considered as a personal determinant in Bandura's reciprocal determinism, it can also be attributed to environmental factors such as stereotypical beliefs as well. Conversely, according to Bandura, it can reinforce those beliefs and behaviours.

The girls' self-efficacy beliefs also belong to the personal determinant of the triadic reciprocal causation model, and was demonstrated in most of the girls' confession of them gaining specific skills and attitudes, or a "technical advantage" credited to the EET field. Other examples of the subjective judgements of their capabilities was Edith and Esther's admission of being able to actually work with their parents in meaningful ways due to their training in EET, and on Esther's feelings of independence, which is aiding her in continuing her studies in EET. Even Claire, who has not continued in her career choice as yet, has indicated that she is good with her hands, can work just as men or better in troubleshooting equipment, and yearns for the day where she is able to say that she has designed or repaired something.

### **Perspectives from Environmental Factors**

Family influences represents social environmental factors, but in this case, this social institution actually helped some students in making a choice to initially pursue EET. However, one student, Claire, started in EET against her mother's desire, and has now begun her career in the medical field according to her mother's desideration. Other environmental factors are gender discrimination, and according to the views of at least two of the students, there exists discriminatory practices in leading electricity industries that prevent women from furthering their careers in that field. Another environmental determinant that I observe is from their peers, who have been following the stereotyped behaviour. In this case, female friends of the participants would choose career fields that leads to medicine or business. All of the girls noticed it but in spite of this, they did not allow it to hamper their choice of EET. One even acknowledge that to do so would to make her a "girly girl".

### **Behavioural Perspectives**

Behaviour is easier measured in this study by the overt responses of the participants, and within the theoretical framework, it could either be a cause or an effect of the other determinants already mentioned. Generally, as an effect of the intervention of EET in their lives, they have shown that the programme has helped them in practical ways, such as knowing, for example safety, understanding, for example identifying electrician's work, and actually doing EET related tasks, such as wiring or soldering. Other behavioural effects for most of them is the desire to pursue EET as a career, or at least contentiously consider it. Behavioural causes means that personal factors and environmental events are the effects, and one instance is the increased self-efficacy beliefs that is reinforced by the students' practical abilities. One of them has even shown to go against her own stereotypical beliefs and her successes is helping her change that notion.

### **Conclusion**

From this group of students, there was not a 100% consensus that any model such as the one outlined here is totally responsible for affecting how girls view EET as a career option. However, there was sufficient evidence to adopt this model in evaluating their perceptions and views, since the factors were more on the rule rather than on the exceptions. In the girl's minds, gender stereotyping was prominent in their discussions, just as reported in the literature on the probable reasons that they do not subscribe as much as they should to it. It was also evident that an alternative in sections of STEM fields of study is girls preferring medicine instead. Students who would normally consider medicine will not consider being admitted into an EET programme, yet these girls are still strongly considering it, where two of them have already begun.

Because this study focuses on human behavior and psychology, its very nature makes it somewhat unpredictable in coming to terms with the girls planned behavior and their actual progression, however it still appears to be a good guide in determining how and why these students view EET as a career and more importantly, what can be done by all stakeholders in ensuring that female students are not discriminated against based on gender stereotyping and meta-stereotyping in any form, that their self-efficacy beliefs are enhanced positively and that the educational system, including the home, is gender neutral.

### **Recommendations**

Some of the ways that would encourage girls to have a positive perception in pursuing EET based on the findings in this research is firstly for parents to be liberated in their stereotypical beliefs of their daughters entering into STEM, TVET or engineering fields. It has already been shown that both parents and teachers must give assurances to the students to perform despite any stereotypes. Teachers of traditionally male dominated subject areas need to make their subject area interesting for girls, spark curiosity, and be gender sensitive in their curriculum delivery (Brizendine, 2006; Gurian & Stevens, 2004; James, 2009). They must ensure that stereotype threats are eliminated when given stereo-relevant tasks, such as mathematical or abstract mechanical concepts, but at the same time, find opportunities to develop them in innovative ways.

Administrators must allow female students and even encourage them in pursuing non-traditional areas as well. As the word gets around, and presuming that they experienced successes in these areas, more females will be attracted, which serves as a good advertising tool. This will have the effect of breaking any gender-stereotypic cycles, starting from that centre outward throughout the community.

An important aspect that came out from the findings as perceived by the female students is gender discrimination practices in places of employment. These industries will do well in promoting perception of gender equality and equal opportunity in their places of employment, and give more women the opportunity to have high paying jobs in the energy sector. It will also help in triggering the concept to girls that EET is a viable career option to them and is therefore worth enrolling into, at the various levels of education and training. The girls in the study recognised that it is a financially rewarding career path, so that this can be an additional attraction for them.

Policy makers in Trinidad and Tobago and the Caribbean have done well, according to UNESCO's EFA policy where they (the Caribbean) have demonstrated relatively excellent levels of gender equality, thereby setting the stage for reducing the gap between the performances of girls compared to boys. However, there is a lot of attention currently placed on the poor achievement of boys, and rightly so, but there is currently no known intervention for girls' low enrolment in EET at CXC and engineering courses at UWI, which have been discussed already as having a potential threat to their and by extension, the nation's economic development.

Reflecting on my own approach to teaching, it is important to develop the areas that female students may feel uncomfortable in, such as their spatial abilities, math skills and physics. It is important to note that the skills that are required in EET can help in other areas as well, and that students may not pursue a course in EET, but will still tap into those skills in whatever career they choose and even as a part of their lives. One thing is certain, that the girls view EET favourably, both in terms of the subject itself and for its practicality. However, from the deliberations on whether to choose a career in another field instead, or the negative experiences

in attempting to further their career in EET, the girls' views of EET as a career is mixed, although the propensity in remaining in EET outweighs the propensity in choosing another field, especially one that is not STEM or TVET based.

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## Appendices

### Appendix I: Student Statistics in the Caribbean

#### A: CXC Performance for EET at CSEC and CAPE in 2012

	TOTAL [T&T] CSEC ENTRY	TOTAL [T&T] CSEC PASSING (I - III)	TOTAL [T&T] CSEC WITHIN OWN GENDER	CAPE UNIT 1 [UNIT 2] ENTRY	CAPE UNIT 1 [UNIT 2] PASSING (I - V)	TOTAL CAPE WITHIN OWN GENDER
MALES	<b>3602</b> [402]	<b>1,426</b> [252]	<b>39.6%</b> [62.7%]	122 [69]	63 [49]	51.6% [71.0%]
FEMALES	<b>310</b> [27]	<b>143</b> [18]	<b>46.1%</b> [66.7%]	9 [7]	4 [3]	44.4% [42.9%]
TOTAL	<b>3912</b> [429]	<b>1,569</b> [270]	<b>40.1%</b> [62.9%]	131 [76]	67 [52]	51.1% [68.4%]

Source: CXC (2011); NIHERST (2012);

Note: square brackets denote Trinidad and Tobago, otherwise the Caribbean

#### CSEC:

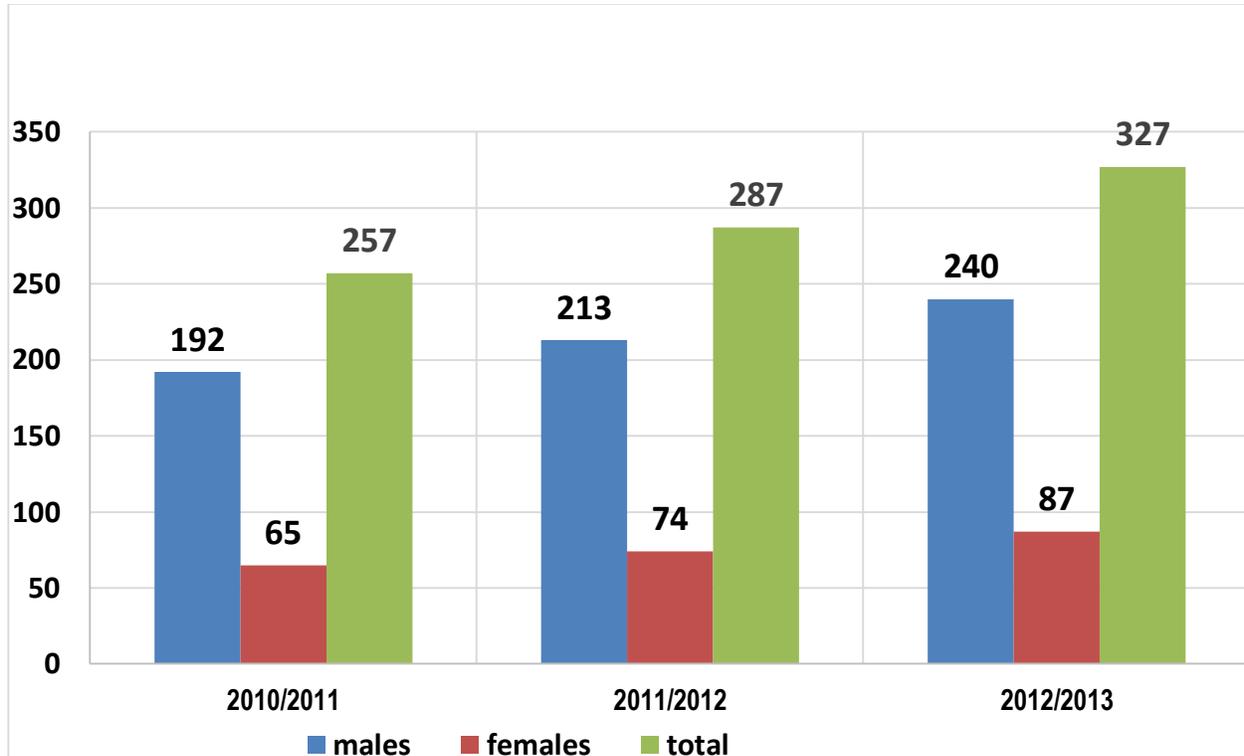
- Total females ACTUALLY writing CSEC is 8% IN Caribbean [but 6% in T&T alone]
- Total females passing (grades I, II, III) CSEC EET = 9% of the total number of candidates [6.7% in T&T]

However,

- Pass rate in EET for CSEC is 40% [63% in T&T]
- Of the females, **46%** got grades I, II, III CSEC EET; i.e. almost half [67% in T&T or two thirds]
- Whilst of the males, **40%** got grades I, II, III CSEC EET [63% in T&T]
- This suggests that although it is numerically less 143 vs 1,426, [18 vs 252]
- there is a higher ratio of high performing girls passing than boys in both T&T and Caribbean

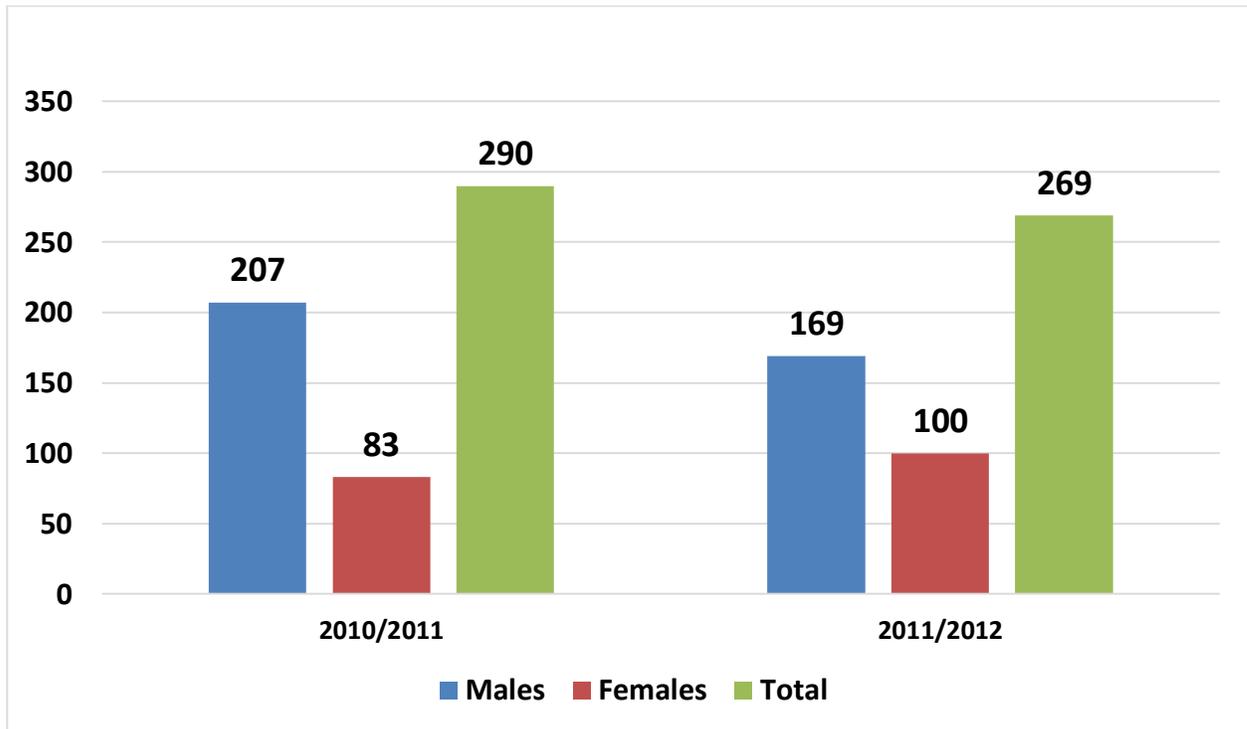
#### CAPE:

- 9/131=6.9% are females ADMITTED to write the exams in unit 1; and 7/76=9.2% writing Unit 2
- % passing (**grades I to V, the acceptable grades at CAPE**) = 4/67 = 6% in unit 1 and 3/52=6% in Unit 2
- Of the females passing (grades I to V), its 4/9 or **44.4%** in unit 1 and 3/7 or **43%** in unit 2
- Of the males passing (grades I to V) its 63/122= **52%** in unit 1 and 49/69= **71%** in unit 2

**B: UWI Registration for BSc in Elect. & Comp. Eng. (T&T) 2010-2013**

Source: UWI. (2012, 2013). Student statistics 2011/2012/2013. St. Augustine, Trinidad and Tobago: The University of the West Indies. Retrieved from <http://sta.uwi.edu/news/reports/default.asp>

Around 25.3%; 25.8%; 26.6% respectively of students registering in BSc in ECE (for which EET students are qualified) are females for each year

**C: UWI Graduates from Undergraduate Engineering Programme Total**

Source: UWI. (2013). Student statistics 2012/2013. St. Augustine, Trinidad and Tobago: The University of the West Indies. Retrieved from <http://sta.uwi.edu/news/reports/default.asp>

- 28.6% of successful students in 2011 are females
- 37% of successful students in 2012 are females

•ENGINEERING COURSES INCLUDE:

- BSc in Chemical & Process Engineering
  - BSc in Petroleum Geoscience
  - BSc (Hons) Civil Engineering
  - BSc (Hons) Civil with Environmental Engineering
  - **BSc in Electrical & Computer Engineering**
  - BSc Geomatics
  - BSc in Land Management (Valuation)
  - BSc in Industrial Engineering
  - BSc in Mechanical Engineering
  - BSc in Mechanical Engineering with a Minor in Biosystems
- $418/1254 = 33 \frac{1}{3}\%$  of students registering in engineering undergraduates (for which EET students are qualified) are females;
  - There are marginally more female students than males in the faculty of Science and Technology (54%) than in Engineering to which EET belongs (taken from Table 10(1) and 10(6) of UWI 2013 Student Statistics)

**Appendix II: Interview Questions****Pre-determined Open-Ended Interview Questions**

1. Why did you chose EET as a course option?
2. What do you think of the EET programme as it relates to the world of work?
3. What aspects of the course interested you the most, in pursuing EET as a possible career choice?
4. What aspects of the course sometimes made you think that EET is not for you?
5. After learning that you had passed EET at CSEC, what were your thoughts career-wise?
6. What are some of the options that you can take in pursuing a career in EET
7. How did you find out of the options that you can pursue, having done CSEC EET?
8. What are the benefits of pursuing EET as a career for you?
9. What additional action do you have to take to pursue a career in EET
10. What are the limiting factors in pursuing EET as a career for you?
11. What are the plans that you have in pursuit of your career?
12. Where do you see yourself in the next 5 years in terms of reaching your career goals?

**Appendix III: Permission to Conduct Research in School****GOVERNMENT OF THE REPUBLIC OF TRINIDAD AND TOBAGO  
MINISTRY OF EDUCATION****APPLICATION FORM – PERMISSION TO CONDUCT RESEARCH IN SCHOOLS**

- For one school only, the application is submitted through the Principal of the school who endorses it, and submits to the School Supervisor III of the District.
- For national or District scope, the application is submitted directly to the School Supervisor III who will engage in extensive consultation with other Units/ Divisions of the Ministry of Education for investigation, comments and recommendations. Criteria being met, reservation approval is granted.
- All applications will be evaluated according to the criteria laid down by the Ministry of Education.
- Applicants are advised to submit their application at least two months in advance of their intended programme implementation.
- Approved users should have their copy of their signed approval and agreement for presentation to school officials upon request.
- ***The contact person given in this form must be the legal entity that will be offered the agreement with the MOE, should the application be successful.***

Please provide full answers to the following questions in complete sentences with no acronyms or other abbreviations.

**1 Applicant Details**

a) Name of Student conducting Research: **MR TRACY BAPTISTE**

b) University/ Educational Institute & Department: **The University of the West Indies  
Faculty of Humanities and Education / School of Education / Master of Arts in Leadership  
In Technical Vocational Education and Training and Workforce Development**

c) Name of Research Study: **FEMALE STUDENTS' PERCEPTION OF PURSUING A CAREER IN  
ELECTRICAL AND ELECTRONIC TECHNOLOGY**

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## d) Contact Information

Address	18 Desert Rose Crescent, Union Hall Gardens, La Romain
Phone Number	7601477
Email:	baptistetracy@hotmail.com

## e) Department Head/ Research Supervisor/ Course Facilitator

**Phaedra Pierre,**

**PhD**

SIGN \_\_\_\_\_

## 2 Rationale

What are the underlying reasons for developing this study?

- 
- To evaluate the methods and approaches that teachers can take in delivering the Electrical and Electronic Technology (EET) CSEC and CAPE subject as a career path option, especially to female students, since this subject, being in TVET and part of Science Technology Engineering and Math (STEM), is traditionally considered to be in a male dominated field of study;
- To discover the degree to which these students believe that there is sufficient equal opportunity and career guidance available in pursuing a career in this field;
- To inform curriculum officers of the approaches that their respective teachers can take in covering the syllabus and in keeping students interested in this field of study;
- To provide feedback in giving students and their parents proper guidance in choosing EET as a career path;
- To provide feedback so that prospective employers and administrators of tertiary level institutions can be made aware of female students' concerns in pursuing EET as a career.

## 3 Objectives

What are the intentions of the study?

- To explore the degree to which female students who completed the Electrical and Electronic Technology programme at the CSEC level, view it as a viable vocation
- To identify their concerns in pursuing EET as a career

## 4 Target Group(s)

Study Targets?

Stakeholder group – <i>tick one</i>	✓ Students	Teachers	Parents
Level (students only)	<b>CAPE (Upper 6)</b>		
Gender	<b>Females</b>		
Group size	<b>Two Students</b>		
Number of schools	<b>One (BWSS)</b>		

**5 Duration (dates and times)**

During the week of Monday 24<sup>th</sup> to Friday 28<sup>th</sup> March 2014, for approximately 45 minutes for each student

**6 Expected Outcomes**

Learning	To develop skills in conducting research that meets the criteria set out by the University of the West Indies in Post Graduate studies, and the demands of effective research standards.
Psychosocial	To be able to work with others during the research process, namely, supervisors, administrators, colleagues and other stakeholders of the research.
Behavioural	To foster discipline in conducting research, by meeting constraints of limited resources such as time and of information accessibility and interpretation, while also working full-time.

**7 Methodology**

Give a brief description of the implementation process.

1. Interview students using a semi-structured questionnaire (attached)
2. Transcription of interview
3. Proper coding and categorizing
4. Proper interpretation and communication of findings

**8 Man Activities**

To conduct interviews with two female students that have successfully completed the CSEC level in EET and are now pursuing CAPE in the second year.

**9 Monitoring and Evaluation Plan**

Please list the method(s) that will be used for the monitoring and evaluation of your study/research to ensure its success.

1. SEMI-STRUCTURED QUESTIONNAIRE (attached)
2. INTERVIEWS

### **10 Expected input from School/ Ministry**

What input does your study need from the School or Ministry? (e.g. Supervision, Security, Equipment)

- **NIL**

### **11 Other Relevant information**

- The study will be conducted at the Barrackpore West Secondary School
- The researcher was the EET teacher of the students at the CSEC level and is currently one of the EET teachers for the unit 2 level for CAPE
- Three other past female students that were from the same CSEC class, but now has left school, will also be part of the research
- The semi-structured questionnaire is attached
- Anonymity and confidentiality of students will be maintained

### **12 Declaration – Agency Representative (Contact Person)**

I declare that:

- The information given by me in this application is complete and correct
- I will notify MOE, in writing, of any changes to this information, within seven (7) days of that change occurring.

I understand that:

- The information on this form allows MOE to assess the proposed initiative for access to schools

I understand that:

- Giving false or misleading information is a serious offence.
- Any information obtained (about any individual participant/school) through this study is to be held in strict confidence.

- All findings of this study are to be made available to the Ministry of Education on completion of the research study.

<b>13 Signature</b>	
Name of Applicant (PLEASE PRINT)	MR TRACY BAPTISTE
Signature	
Course Facilitator/ Research Supervisor (PLEASE PRINT)	PHAEDRA PIERRE, PHD
Signature	
Date	

## Appendix IV: Sample Transcript

Why did you choose to do EET as a course option in form 3?	Because it's interesting. I like working with my hands. Anything that I can do with my hands I am good at. I can take apart something and build it back. As you see for yourself I use to do good in practical better than theory. I like to do those kinds of thing that's why I choose EET
Well why you didn't do mechanical...	I wanted to do mechanical but...
Or TD or something	I was doing TD in thing but the mechanical...the class was full when I chose to...I didn't know that I could switch...and at the time...when I do find out that that we could switch, I couldn't switch ...
Ok	And I wanted to do mechanics in the first place
Ok. So what do you think about pursuing EET as a career?	I think it's a very prosperous area, but as a female there aren't very much job options. It's a more male dominated area and there should be more women in the field because we do very well
yeah	I mean we want to participate but...look I was going to sign up to TTEC...and I asked different people about it, and it's like it doesn't have much female, what I want to do, the technician like, they does drive around and fix the lamp post and all of them thing, check the lines and thing, I wanted to do that. But from what I've heard, there aren't, if any, much women in the field, mostly men. When we did the project in Powergen...
Yeah	When we visited, there wasn't a single woman in sight with coverall. There wasn't. I looked. The only women it had was the guard and the cleaning lady. So I think it's unfair to us. We want to be a part of it, but it's unfair to us, we are discriminated by our gender, that we can do it better than a man.
So you think this male domination is real or is something people tell you...	No, it is real, it is real, from what I see, it is real.
So you think women could...if they given a chance they could...	I would think they could be better than men at it. Because a woman would see more to detail than a man. A man would just fix...come to do his job, but a woman would see to detail, she would take her time...given a certain amount of time, she would take her time, make sure everything is done in detail, nothing is left unturned
The men you think would operate more mechanical...	Yeah, they just vish-vash, would do whatever they want.
How did the EET help you outside of the classroom?	Well...
Outside of school how it helped you	.... it has broadened my knowledge base. Things that I would have not even looked at. I am curious about it now like "how do they do that". Even some things that I see people doing like "I know how to do that" "I could do that"
Any examples?	Wiring in the junction box. When they fixing the light poles, the wiring of it, the house, the running of the cables, all those things
Alright. What aspect of the course interested you the most	The practical
The SBAs?	Yes. The SBAs. Working on the actual thing not the book part of it. The actual working with your hands, I like that more. Because to see something...It gives you a broader...you learn faster by seeing, rather than hearing it from a book. You hear it, you giving it to write down, you have to mentally picture it, where as you seeing it you know what to do. If I see this and you tell me something is wrong with it, you can fix it. You could take it apart, you what is wrong with it. But to hear you have to imagine. Imagining is not... I'm not saying is a bad thing, but having a visual aid it's much better than just...
Okay. What aspect of the course you didn't like. It made you feel like EET is not for you	[Laughs] the standing up when you get something wrong.no in all seriousness, at a certain point, the practical work, it started to get to you when you don't have the visual aid, much visual aid to help. It

	started to get a little frustrating, you don't know what you're dealing with, so yeah, it started to get...
You all had a privilege when I was doing dip ed to do PBL, and to build motor	Yes
And using the projector to teach.	Umhmm
What you thought about those thing?	It was very helpful. It was actually very very helpful. It was more enjoyable. The class was...you know you learn more out of it than sitting down in a class, and you're bored, you're sleeping away on yourself.
Chalk and talk	[laughs] yeah it was more interactive, when you gave us time to do a certain problem and [two males members called] fighting to answer the first question and [third male called] right in the middle there, it was exciting. For me EET more exciting than boring.
Ok. So you'll recommend that approach....	Yes
To teaching it, to girls?	Yes
After you learnt that you passed EET, what was your thought career wise?	TTEC
And what happened?	Well personal issues.
Umhmm	So I couldn't further it. I wanted to come back to school and finish my education but when miss....ok I wont say the name, when a certain teacher saw my grades, she automatically dismissed me, and it kind of discouraged me, so I just left it alone...
What you wanted to do As or repeat?	I wanted to do As
Ok	Because some of the other students had worst grades than me, some of them failed and they get to do CXC, um CAPE
Yeah they should have gave you a chance..	If I get the opportunity now to do it I would go and do it. If I could start from September and do it I would glad to be doing able to do it
Yeah but how that would help you with your job now. That you wouldn't be working and...?	A higher level....that's the thing.
So you're in a kind of trap?	Yeah. Because I need to work in order to pay my bills, but I need to go...I would...I've been sacrificing my education for almost 2 years now and I want to be able to finish it to move ahead because to be in the situation as I am in, patience is very low, and to deal with things I have to deal with...it's not very nice. And at my age, it's not...a child should be able to be a child
That's correct, it unfair	And I have to be an adult before my time and provide for myself because I don't have anyone to provide for me
So, you have to work?	I have to work.
You have to care of your mom or something?	I have to work, because I don't have support...
Nobody taking care of you?	No I don't have... because my mom...I have bills to pay. I have my light bill to pay, my WASA bill to pay. I have market to do, grocery to do. I pay all my bills. WASA bill and TTEC bill, when it comes I pay it. I do market every week. If I can't do it every week, I do it every other week. Grocery, I contribute too. If something finish in the house I do it but...
How difficult to do, it would be to do it part-time?	What school?
Umhmm	If it's a possibility that I can work during the day and do it in the night, it's not a problem. Or if I can find a job that I can do in the night, I am totally fine...I am willing to make the sacrifice to do it in the night. To work in the night and study during the day because your mind is a little bit more, when you wake up in the morning, you can go through the day, studying. Working in the night is not a problem because I could work all night. If an opportunity comes along like that, I would jump at it. What is my problem? I applied to companies I applied to team industry in la romain, it's not electrical but its testing gasline

	and what is my downfall is I don't have experience in the area. If it's a programme that trains...I'm a fast learner. You can give me a week and teach me how to do something... I can do it
I know you're in a trap. I try to tell students try to avoid that trap. Students who have their parents taking care of them, use that....	Exactly...
Because it will not be forever. Take advantage of that.	I am such a big example of that. When I was in form 4, I had to work to send myself to school
Yes, I remember that. Well you have done well, your grades wasn't so bad, just to [inaudible]. The longer it take to go back...	It gets harder.
It will get harder	It get harder. Now I applied to UTT but....
It will come a time when you wouldn't even think about doing anything again, you feel like you can't do it	That's a thing, thank God I don't have that. I want...I have the thirst for the education. I want it but I can't afford it.
Yeah. Alright what are the options you have as a female in the field of EET? What options it have there? TTEC is not an option?	It is, but it's for more like secretarial work...
Yeah...	desk jobs
Not on the engineering thing	No
You know of anything that is...out there that you can do?	I'm not sure.
So pursuing EET don't make sense then. That's what you are saying in a nutshell?	[Laughs] if there are more opportunities, it's a definite yes. But I don't know of any, so it's difficult to say, make a...
So you looked at any other place besides TTEC?	I looked at some other companies but everybody wants experience. You have to have at least 3, 4 years' experience. No one is offering a training position. I was considering going through OJT to do it. I know I should listen to people and just do it. When you sign up for OJT, you does take a long while for you to get through. Because it have some people waiting 2, 3 years to get in. so I'm really get caught in-between a rock and a hard place...
You know the salary of OJT now?	I don't know
Well find out the...I can't remember what it is, it was on the papers, they got increase recently. But if that's on par for what you are working for now, still apply for it	Yeah, no....
Cause at that time whenever it come you'll decide if you're going or not	You see it's the experience is what
That's the next thing too...	Exactly. I looking for the experience
Although the OJT, there not doing what they're supposed to do, so a lot of OJTs just doing secretarial work and all kind of...	Yeah
Filing thing and thing for the school. Like we have OJTs here in the workshop...	I want to do the actual...
And they have them doing....	Thing in the office
Photocopying stuff	I want to actually be...
But it have any benefits in pursuing EET?	Lots of...
For you?	Yeah. Money is one. The education is one. Being a part of something is one. You could say, you could put your name on something, or "I helped design that" or "I helped fix that". You can be a part of something
Yeah that's a good feel [15.15]. do you have a dream career? If you had a choice, and everything was put into place, what would be your dream career?	Well an engineer. To have my own company....engineering company
So what are the steps to be an engineer?	Well, education basically.
How? What do you mean? Where?	Basic knowledge in school. Degree....and just take it from there.
Do you know the qualifications to do your degree?	Well something I didn't have. When I went to sign up, so they tell me I have to start at the ground level, diploma or something like that. But

	you have to have CXC subjects. CAPE subjects and something else, I can't remember what it was
What is the limiting factors in pursuing it? What keeping you back?	Personal reasons? keeping me back
YOUR reasons	Oh my reasons for not pursuing it....a lack of knowledge
What do you mean?	Knowing opportunities and not open to what opportunities there are out there
You have any plans?	Plan?
...to pursue your career?	Yes I do have, but, again I have to consider my personal issues. If is just for 1 year that I can met....don't have to worry about my bills and what not, I could do something with that 1 year
Yeah but in your circumstances now, you ever think about some way you could do something somehow? Or it just will be like this, and just hope that...	No. I actually want to do something about it....
You putting anything in place to begin now...	Yeah I did sign up for a couple, send in my resume to a couple places, but...
But you say education you need?	Experience is...I have...is not a matter of...
You want to pursue your dream career, or you putting that on hold?	I want to
You doing anything to.....any steps you're taking to reach them?	As I say, I did apply to UTT, I still waiting for them to call me
When that was?	I signed up September.
Ok.	So you have to wait before the year to know...
Sign up again, I think around this time they does have a [inaudible], go online and sign up	Yeah. I did forward the form and thing already
And mention the...but then you have to do these things part-time?	Yeah
But you have no problems travelling late?	No, I put things in place to do it
What about working shift, you ever considered that? You could work on shift?	Yes I have considered it, it's just the opportunity to do so. If I can work shift and go to school, I'm glad to do it.
It does be hard. I did it when I use to work shift. It's not impossible. Sometimes you have to work double, so someone hold on for you in the daytime or whenever, on their shift and your own and things like that	Working is not a problem for me. I is a person I can't sit down
You see travelling is a next concern, as for a female...[inaudible].	Umhmm
Ok where do you see yourself in the next 5 years, in reaching that career? You're 18 now	18 years and I'll be like 23
Where do you see yourself, working at [name of present employer]?	Definitely not [laughs] definitely not. I'm looking to get out of there as soon as my contract up
Oh you're on contract?	Yeah I'm on contract. Bitches and them don't want to pay money, so they signed me on contract.
Yeah that's not a good place...but that's how the world coming to eh	Yeah, true
Even though they will make teachers on contract one day. So job security will become a myth. you'll gain experiences from this...	What I signed up for in UTT, I signed up to do civil engineering. Now when I do civil engineering, I can disperse in any one of the fields. I can do petroleum, I can do mechanics, I can do EET. I will have the knowledge of all of them. So this problem that I have now with job, I wouldn't have it. If it is that I can't get one in electrical, I could always get one in petroleum or mechanical...anywhere that I can work, that is why I want to do the civil engineering...
So you want to be an engineer?	Yeah, engineer
Well this is the end of the interview. Thanks so much for your time	That's alright, it wasn't bad...

**Appendix V: Sample Organisation of Transcripts for Coding**

Q#	Interview Question	Caroline	Esther	Andrea	Claire	Edith
1	<p>Why did you chose EET as a course option?</p> <p>Research Question1</p>	<p>Because it's interesting. I like working with my hands. Anything that I can do with my hands I am good at. I can take apart something and build it back. As you see for yourself I use to do good in practical better than theory. I like to do those kinds of thing that's why I choose EET; I wanted to do mechanics in the first place</p>	<p>I just find it was interesting; Because thinking about it, is sounding kind of cool, so, I didn't wanted to do what everybody else doing, you know ;</p>	<p>Well, cause my brother was in it, [name called]. And I didn't wanted to go into business. So is like I chose – I really wanted to go in science – and then I just choose EET like you know na. I signed up, I wasn't really thinking about it. I just choose it;; Because it interesting and it's not something that everybody do. You're learning about components and all these theories and thing but the only-ist thing is the work But now I like EET</p>	<p>Because I wanted to do engineering at the time; Because I always liked the computer aspect of it; No, I changed my mind; Because I still wanted to know [electronics]... because like what day it was, we opened up we surround sound DVD system, and I was actually watching the diodes and the resistors and stuff and I was like [whispers]'I know what that is'</p>	<p>I guess it was something I would of liked doing; well actually out of all I really, really wanted to go into EET; actually it was interesting you know, well, it like open up your mind to more things through, actually see things differently to how it is....so...so it was good ; Yeah, that is how I ended up really liking it too you know, because he (daddy) used to do these things And like soldering out these things. Is he who teach me how to do them thing But he like more electronic-wise, like with TV and radio and...it like - whatever them stuff</p>
10	<p>What are the limiting factors in pursuing EET as a career for you?</p>	<p>as a female there aren't very much job options. It's a more male dominated area; So I couldn't further it. I wanted to come back to school and finish my education but when miss....ok I wont say the name, when a</p>	<p>Nope</p>	<p>Well I guess is my mind. Knowing that I don't feel comfortable doing it, like as a job, like</p>	<p>And the fact that so much people...it kind of overpopulated ...in my opinion</p>	<p>Nothing</p>

	<p>Research question 2</p>	<p>certain teacher saw my grades, she automatically dismissed me, and it kind of discouraged me, so I just left it alone...;  <b>personal issues;</b>                  And I have to be an adult before my time and provide for myself because <b>I don't have anyone to provide for me</b>                  I have to work.                  I have to work, because I don't have support...;                  I am such a big example of that. When I was in form 4, <b>I had to work to send myself to school</b>                  It gets harder;                  I have the thirst for the education. I want it <b>but I can't afford it;</b>                  I looked at some other companies but everybody wants experience. You have to have at least 3, 4 years' experience. No one is offering a training position. I was considering going through OJT to do it. I know I should listen to people and just do it. When you sign up for OJT, you does take a long while for you to get through. Because it have some people waiting 2, 3 years to get in. so <b>I'm really get caught in-between a rock and a hard place...</b>                  Personal reasons? keeping me back;  <b>Knowing opportunities and not open to what opportunities there are out there</b></p>		<p><b>a career</b> nah;</p>	<p>When I was looking to it as a career;                  Umhmm..because nursing...like how...as I say I find engineering overpopulated , like <b>a lot of people doing engineering</b> now and it have nursing, you can get a career anywhere in the world. It have more opportunities for me;                  So like right throughout the world. <b>All throughout the world people need nurses right,</b> and all throughout the world people waiting to have engineering jobs. So which one you'll prefer;</p>	
<p>0</p>	<p><b>Gender Stereotypical beliefs</b></p>	<p>as a female there aren't very <b>much job options.</b> It's a more male dominated area and there should be more women in the field because we do very well;                  I mean we want to participate but...look I was going to sign up to TTEC...and I asked different people about it, and it's like it doesn't have much female, what I want to do, the technician like, they does</p>	<p>I was like maybe it's not so bad after I could probably <b>actually make it out there in the field of electronics as a girl,</b> like if I can understand it now and pass it not be that hard;                  I don't know, because most girls is mostly go for like, doctoring and lawyer, I just think that, ok, "so I am a girl and is</p>	<p>how we built circuits and stuff like – <b>I would never imagine myself doing that and as a girl nah,</b> you know <b>boys does do them kind of thing, yeah;</b></p>	<p>I see in some...but the woman I see in TTEC, they more have <b>them in the office;</b> No I don't think it's a men thing but I think that <b>men still see</b></p>	

		<p>drive around and fix the lamp post and all of them thing, check the lines and thing, I wanted to do that. But from what I've heard, there aren't, if any, much women in the field, mostly men. When we did the project in Powergen...; When we visited, there wasn't a single woman in sight with coverall. There wasn't. I looked. The only women it had was the guard and the cleaning lady. So I think it's unfair to us. We want to be a part of it, but it's unfair to us, we are discriminated by our gender, that we can do it better than a man; No, it is real, it is real, from what I see, it is real; I would think they could be better than men at it. Because a woman would see more to detail than a man. A man would just fix....come to do his job, but a woman would see to detail, she would take her time...given a certain amount of time, she would take her time, make sure everything is done in detail, nothing is left unturned; Yeah, they just vish-vash, would do whatever they want.; It is, but it's for more like secretarial work...; desk jobs</p>	<p>electrical stuff" "I can't do this" you know? Cause that is how girls does think Because they, they – it's ok. You know it have some girly girl and it have some girls not so girly. The girly girl will think "ok, that is not my thing because that is a boy thing" and over and over and over they wouldn't choose to do that. But I not girly girly so [inaudible] anything possible I probably think girls like that so you know Seeing how they does operate, yeah Is from what you see you know. That is what you seeing. Everybody, that is what they doing. Anybody you ask "I'm doing doctoring" or "lawyer" or something or the other Yeah Very rare you will hear a girl say they going into engineering;</p>	<p>Because boys always experimentin g with stuff they see and...;</p>	<p>[giggles] it as their thing Because that is still the men's mentality. The women might be better but they still...; They (girls) could do what they want...they could work the Powergen they could work the TTEC. What else it does have? They could do the house wiring and stuff because the stuff we learn in school, that is the...we building a new house now and when the electrician come, I know what he was doing because I know it from school [chuckles].</p>	
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