

**UNIVERSIDAD DON BOSCO**  
**FACULTAD DE HUMANIDADES**



**TRABAJO DE GRADUACIÓN:**  
**THE GENDER GAP IN ACADEMIC ACHIEVEMENT IN SEVENTH,  
NINTH, AND ELEVENTH GRADE STUDENTS AT THE ACADEMIA  
BRITANICA CUSCATLECA**

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## Abstract

This research looked at the relationship between gender and academic performance in students of secondary school at the Academia Britanica Cuscatleca -ABC-. Studies and literature on academic achievement, stereotypes, and self-efficacy in education suggest that there is a persistent trend of female students outperforming male students in a majority of subjects. This paper explored self-efficacy characteristics and classroom dynamics, which may have influenced female and male students differently regarding their levels of academic achievement. Data collected from 284 surveys and average grades were analyzed, applying two statistical tests: t-test and ANOVA to discover significant differences between boys' and girls' results. In addition, classroom observations allowed us to quantify the number and quality of teacher-student interactions happening in the school. Results revealed the following: (1) girls achieved higher grades than boys in all three courses and grade levels studied; (2) gender had an impact in both the final Science and English grade averages; and (3), overall, self-efficacy was proven not to have any impact whatsoever on academic achievement. Some recommendations stemming from this investigation include strengthening values of collectivity and concepts of self-regard and preparedness for learning among the student body. Professional development sessions for teachers in regards to how students see themselves in relation to their gender should also be considered. Finally, teachers should be encouraged to identify and examine their own gender biases, paired with sessions that could help them make the shift from biased classroom interactions to more inclusive ones.

*Keywords:* Academic Achievement, Achievement Gap, Gender roles, Self-efficacy, Teacher-student interaction

## Resumen

La presente investigación analizó la relación entre género y rendimiento académico en estudiantes de secundaria de la Academia Británica Cuscatleca (ABC). Estudios previos sobre logros académicos, estereotipos y autoeficacia en la educación sugieren que existe una tendencia en la cual los estudiantes del género femenino superan a los del género masculino en la mayoría de las asignaturas cursadas. Este estudio exploró las características de autoeficacia y la dinámica del aula que podían haber afectado a estudiantes de ambos sexos de manera diferente en lo que respecta a sus niveles de rendimiento académico. Los datos recopilados de 284 encuestas y calificaciones promedio se analizaron aplicando dos pruebas estadísticas: prueba t y ANOVA para descubrir diferencias significativas entre los resultados de los estudiantes. Además, las observaciones de las dinámicas dentro del aula permitieron cuantificar el número y la calidad de las interacciones profesor-alumno que ocurrían en el aula. Los resultados revelaron lo siguiente: (1) las niñas alcanzaron calificaciones más altas que los niños en los tres cursos y niveles de grado estudiados; (2) el género tuvo un impacto tanto en los promedios finales de ciencias como en los de inglés; y (3), en general, se demostró que la autoeficacia no tiene ningún impacto en el rendimiento académico. Algunas de las recomendaciones derivadas de esta investigación incluyen fortalecer valores de colectividad entre el cuerpo estudiantil, así como sus percepciones en cuanto a sus destrezas académicas y llevar a cabo sesiones de desarrollo profesional con el fin de crear conciencia entre el personal docente sobre sus propios prejuicios de género para trascender a dinámicas más inclusivas dentro del aula.

*Palabras clave:* Logro académico, brecha de logros, roles de género, autoeficacia, interacción profesor-alumno

## **Chapter I: General Approach**

### **1.1 Introduction**

Over the last decades, much has been debated regarding schools being systems that favor male students over female students. In the early 1990s, the American Association of University Women published a report in which they assured that schools treated girls unfairly, bringing forth topics such as gender bias and equity for girls. However, the conversation has changed over time, with publications like “The War Against Boys” by Christina Hoff Sommers (2000), aiding in shifting the previous rhetoric, questioning whether gender bias in schools has actually hurt male students as opposed to having favored them.

What is evident, though, is that far from being shortchanged by boys, girls are achieving higher attainment levels than ever anticipated. In 2017, in the United States alone, out of 16.8 million students enrolled in undergraduate degree programs, 56% were females (NCES, 2019). Likewise, reports conducted by the World Economic Forum (WEF) have proven that this is not just a trend within the United States. Women have been outnumbering men in tertiary education institutions in countries such as Panama, Argentina, Sri Lanka, Tunisia, and Iceland, just to name a few (WEF, 2015).

Simultaneously, initiatives like the Program for International Student Assessment (PISA) have made the gender gap in academia even more evident. Their most recent results for the 2018 examinations, once again, shone a light on education systems that have allowed access to unequal opportunities for their students. While countries and economies that undergo these examinations are mostly preoccupied with how they rank globally when compared to other nations, more concerning is the clear gender gap in the scores achieved by 15-year-olds worldwide. The gap in

scores garnered by male and female students has been apparent in PISA results since 2009 (OECD, 2019). In their latest publication, girls outperformed boys in reading and science, while the opposite occurred in mathematics (OECD, 2019). This is particularly troublesome because, in traditional school settings where the curriculum is still divided between text-based subjects and non-text-based subjects, this gender gap could imply overall higher scores for female students in the majority of subjects, if not all.

Levels of academic achievement at a school level may be significantly impacted by a series of factors such as a child's immediate environment, socio-economic factors, and homelife, among others (Rivkin, Hanushek & Kain, 2005). However, when taking a closer look at apparently more homogenous school environments like the Academia Britanica Cuscatleca of El Salvador (ABC), it is equally important to explore any possible gender biases that might have influenced student academic achievement. The fact that humans have inherent biases in regards to how they engage with boys and girls inside the classroom may be affecting learning experiences and, therefore, the academic outcomes of students in general.

## **1.2 Justification**

The present study was relevant from two perspectives: pragmatic and social. There is a clear and evident gender gap in academic achievement at the ABC at a secondary school level, specifically in grades seven, nine, and eleven. Data analyzed from the 2018-2019 academic year showed that female students are reaching overall higher scores than male students. On average, girls are scoring 0.4 of a grade higher across the board. Even though the differences in scores might fluctuate as students move on to higher grade levels, female students continue to earn higher grades throughout. When looking at the differences in grades achieved, it is also important

to take into account that the same students undergo a cognitive abilities test, CAT4, used to measure their levels in four key areas: (1) verbal reasoning, (2) quantitative reasoning, (3) non-verbal reasoning, and (4) spatial ability (GL Assessment, 2017). The results for the test administered in February 2018 showed no significant differences in students' abilities based on gender. On average, the sum of all four individual scores showed that boys and girls stayed within the 100 mark. Note that any student scoring between 100 and 110 is considered to have an average level of abilities.

After dismissing a significant disparity in cognitive abilities, it was necessary to explore further other possible aspects to identify characteristics that have impacted female and male students differently, and which have accounted for the current gender gap in academic achievement. This study focused on three grade levels key in the ABC student's educational journey: grade seven (the first year after the primary to secondary transition), grade nine (the halfway point of secondary school), and grade eleven (after the completion of the International General Certificate of Secondary Education - IGCSE).

Therefore, from the pragmatic perspective, the results obtained here may contribute to a further understanding of academic factors that influence students differently in relation to how they perform and the levels they are able to attain. In addition, from a social perspective, it was intended to ignite the discussion revolving student and teacher behavior in regards to pre-established societal norms in the form of gender roles. Finally, from a practical perspective, the results of this investigation will help suggest changes to the current teaching-learning practices of the school.

### **1.3 Research Questions**

- Are there any differences between male and female students' levels of self-efficacy at the ABC?
- Are there any differences between male and female students' academic achievement based on the level of self-efficacy?
- Could teacher-student interactions in classroom activities be a factor to consider in this context?

### **1.4 Objectives**

#### **1.4.1 General Objective.**

Discover participants' levels of self-efficacy to determine if such levels may have influenced female and male students, grades seven, nine, and eleven, differently in regards to their levels of academic achievement, taking into consideration the classroom dynamics in order to improve their learning experiences and help reduce the gender gap in academic achievement at the ABC.

#### **1.4.2 Specific Objectives**

- Understand participants' self-efficacy characteristics and classroom dynamics, which may have influenced female and male students in grades seven, nine, and eleven, differently in regards to their levels of academic achievement.
- Establish the impact that teacher-student interactions within the classroom have on academic achievement.
- Make recommendations that allow for the bettering of teaching-learning experiences at the ABC based on the obtained results.

## CHAPTER II: THEORETICAL FRAMEWORK

### 2.1 Stereotypes

Stereotypes, first introduced to the world of social sciences by Walter Lippmann, refer to the preconceived notions and beliefs held about a specific group of people (cited by Gerster, 2006). Stereotypes, in other words, reduce people to categories based on characteristics they have in common with others, e.g., gender. While these beliefs and expectations provide humans with the means to categorize and compartmentalize others, they also allow self-assertion of identity, personality, and behavior to take place (Endeholpes-Ulpes, 2012).

Deaux and LaFrance (1998) established that the “constructs of ‘agency v. communion’ characterize men as independent, assertive, and initiating, and women as caring, emotionally expressive, and responsive to others” (p. 795). In other words, the perceptions of gender are responsible for what is considered to be masculine or feminine. Likewise, these constructs seem to have transcended into the grouping of professions as being suitable for men or women. On the one hand, careers within the fields of Science, Technology, Engineering, and Mathematics (STEM) are traditionally seen as agentic or strongly associated with the male gender. Social lines of work, on the other hand, are considered to be communal, or as being appropriate for females (Endeholpes-Ulpes, 2012).

### 2.2 Stereotypes in education

Because children engage in the process of socialization from a very young age, it is not surprising that schools reinforce gender-specific expectations amongst their pupils. Education as a system has helped maintain and pass down the accepted values, beliefs, and norms of a society, including the specific sex roles its members are expected to conform to (Levine & Ornstein,

1981). While such roles may vary depending on culture, they are developed through repetition and reinforcement; this is why “the preschool boy is ridiculed for playing with dolls and girls are expected to be ‘feminine’ ” (Levine & Ornstein, 1981). David Lynn, the author of “Sex Role and Parental Identification” and of “Divergent Feedback and Sex-Role Identification in Boys and Men,” explained that children establish their identities and sex roles in two ways: first, by identifying the personality characteristics of their parents, and second, by coming to terms with how a given sex is seen in a specific culture or society (Cited by Levine & Ornstein, 1981). Because mothers tend to be the primary caretakers, boys and girls initially identify with a female role model. For girls, having access to a same-sex model before being confronted with societal views and expectations makes it easier, and almost natural, to grasp their own feminine identity. Boys, in contrast, because they only see their fathers briefly during the day, and in some cases never at all, must form their identity and masculine role from what they are able to access through society, much of which might be an already stereotyped role in itself. This means that because children spend most of their formative years cultivating their identities around one gender, girls will grow up to work assiduously and cooperate with teachers fulfilling their self-concept of being female. Conversely, boys will avoid such activities that contradict their adopted preconceived social male self-concept.

Lynn’s argument suggests that the initial way through which young boys establish their identities and sex roles causes learning issues for them in the long run. That, paired with “*female* norms of politeness, cleanliness, and obedience and activities that deter *male* behavior” (Levine & Ornstein, 1981), it is not surprising that children, in general, might become conflicted since their early academic careers as to what their sex appropriate behavior should be. This may



eventually lead to differentiated student-teacher interactions, inevitably having an impact on the learning process and the academic results achieved by students. In addition, the feminization of the teaching profession and the apparent lack of female role models in the fields of STEM further encourage students to engage in activities and behaviors in supposed accordance with their gender. All these factors have contributed to schools becoming systems of discrimination towards one gender or the other, feeding the existing academic gender gap.

### **2.3 The gender gap in academic achievement**

The Early Childhood Longitudinal Study, ECLS, is a program comprised of four different studies aimed at evaluating “child development, school readiness, and early school experiences” (National Center for Education Statistics, n.d.). The birth cohort of such study, Early Childhood Longitudinal Study Birth Cohort (ECLS-B), is a sample of children representing approximately four million children born in the United States in 2001. The ECLS-B was designed to provide insight on their experiences leading up to and including entry to kindergarten. Results showed that levels of skills and knowledge upon entry, specifically reading and mathematical abilities, varied according to race or ethnicity, family type, economic status, primary home language, and whether the child had had access to any prior care and education, but *not*<sup>1</sup> by gender (Denton Flanagan & McPhee, 2009). In other words, children born in the United States in 2001 did not enter kindergarten with different skills and abilities based on their gender, suggesting that students who come from similar socio-economic backgrounds begin their educational endeavors with the same abilities to succeed in reading and mathematical tasks, regardless of their gender.

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<sup>1</sup> Emphasis added.

Certainly, early schooling is begun with the same cognitive skills, yet we can observe a worldwide gap in the academic performance achieved by students based on their gender. According to the most recent report by the Program for International Student Assessment (PISA) published in 2019 by the Organization for Economic Cooperation and Development (OECD), girls outperform boys significantly. PISA examines students' reading, mathematics, and science skills and what they can do with them (OECD, 2019).

Across the OECD countries who participated in PISA 2018, girls significantly outperformed boys. Just in reading, girls scored 30 points higher than boys on average. The smallest differences in scoring occurred in Argentina, China, Chile, Colombia, Costa Rica, Mexico, Panama, and Peru with girls scoring 20 points higher than boys; the widest gap was observed in Finland, Jordan, the Republic of North Macedonia, Qatar, Saudi Arabia, and the United Arab Emirates, where girls outperformed boys by 50 points. Boys, on the other hand outperformed girls in mathematics by an average of five points across participating OECD countries. Nonetheless, in the majority of participating countries, girls outperform boys in science by an average of two points (OECD, 2019). In schools where curricula design is still divided between text-based subjects and non-text-based subjects, this global trend suggests that girls will attain higher scores in the majority of courses taken when compared to their male counterparts.

The 2018 PISA results indicate that students succumb to academic expectations placed on them based on gender. Male students are exceeding in the area they are *meant* to, i.e., mathematics, while girls are being true to their feminine selves by becoming good readers. However, when the science portion of the evaluation is taken into account, the gap in points earned is much smaller. It would be valid to suppose that two gender stereotypes have found

themselves at odds here: girls are not good at science, but they are good at reading, with the latter prevailing when completing the assessment. This reasoning could also allow for the strengthening of another gender-based perception: girls are seen as *better* students by their teachers, and so they reach higher levels of academic achievement when compared to boys.

## **2.4 Gender bias and classroom interactions**

While it may be argued that most teachers believe and attest to treating both female and male students equally in the classroom, different investigations suggest the opposite. Alice Christie (2005), from Arizona State University, completed a descriptive study with the hopes of identifying whether gender biases were being perpetuated or disallowed in her classroom. In order to conduct her research, she offered technology workshops to a total of twenty-five students enrolled in second, third, fourth, and fifth grades. Half of the participants were male, and half were female. The workshops were free of charge, and enrollment was based on personal interest. Two groups were created, with group A participating for 60 hours and group B for 45 hours. A total of 750 pages of teacher-student emails were examined, alongside 100 hours of videotaped classroom dynamics.

As a result, the author of this study came across four assertions: 1) preferential treatment via email was given to male students; 2) established gender roles were perpetuated by asking female students to be classroom assistants; 3) during personal interactions, preferential treatment was once again given to boys, and 4) the teacher had different behavior expectations of her students based on gender.

An average of 8.9 messages was sent to girls and an average of 8.3 to boys, meaning both boys and girls were interacted with almost equally. However, the teacher found herself messaging

boys regarding their learning three times more frequently than girls. The male subjects of this study were usually encouraged, and communication regarding their learning process was always initiated by the teacher. The electronic interaction with girls, by contrast, was initiated by the pupils themselves. “I *responded* to the girls about their learning, and I *initiated* the topic with the boys” (Christie, 2005). Furthermore, classroom footage made another gender bias evident: students were provided with very different levels of in-class support from the teacher. Boys were given additional instructions in order to help them complete tasks individually, while the teacher completed the tasks for her female students without any further guidance that would allow for independent completion of the work. Lastly, the author acknowledged that when her male students behaved accordingly, they were congratulated and praised. Girls, however, were simply expected to be “smart, focused, and well behaved” (Christie, 2005).

Christie’s preferential treatment for one gender over the other raises the concern of whether the idea of male supremacy in the classroom is learned and accepted by pupils from a very young age. Furthermore, teaching strategies within the context of this study, which supported boys in completing difficult tasks while finishing them for girls, inevitably add to the perception that only males can succeed in STEM-related subjects and/or careers. Lastly, praising boys for meeting behavior expectations but not girls most likely enhances a sentiment of invisibility and deficient ability amongst female students.

Studies have shown that differences in classroom interactions based on gender not only occur at the elementary school level but also at the secondary school level. A study conducted in 2000 by the National Chiao Tung University in the Republic of China, assessed and analyzed the

relationship between a Taiwanese teacher's beliefs, her teaching practices, and the gender-based student-teacher interactions within her seventh-grade biology classroom.

Hsiao-Ching She (2000) interviewed the teacher twice during this study; the first interview took place prior to any observations in order to identify the teacher's beliefs on both pedagogical issues and learning characteristics based on gender. The second interview was done after the classroom observation period to recapitulate on the differences in learning styles, participation, and interaction with male and female students.

In terms of the teacher's educational and pedagogical beliefs, the study evidenced a desire to strengthen "students' higher-order thinking, learning, problem-solving, and decision-making skills" (She, 2000). Despite this desire, the interview process also showed the teacher believed boys were able to grasp scientific concepts at a much higher speed than girls, which was also confirmed later during the observations.

The observation period of this study was divided into two groups: class A and class B. Boys seemed to participate in class activities more than their female counterparts. Of a total of 355 questions asked during class A, 79.7% were answered by boys, while 21.3% were answered by girls. In class B, a total of 581 questions were asked, with 78.5% being answered by boys and 21.5% by girls. At the same time, boys called out more answers than girls in class A and class B, 57%, and 60% of the time, respectively. Ultimately, 81% of feedback was given to boys in class A, while in class B boys received 77% of the feedback.

The data collected through this study showed that classroom dynamics are influenced by teaching and gender beliefs while suggesting that characteristics attributed to students based on

their gender play an important role in dictating, and therefore maintaining, the trend of male dominance within the classroom.

Evidence of male dominance in the classroom can certainly be traced several decades back. Dale Baker's study "Sex Differences in Classroom Interactions in Secondary Science" examined high school student-teacher interactions in the late 1980s, specifically in the biology, chemistry, and physics classrooms. His research was conducted in three different high schools, where a total of 196 students and six male teachers were observed. Baker's efforts quantified and categorized student-teacher interactions, making evident that male and female students indeed had different educational experiences despite being in the same classrooms together (Baker, 1987).

Baker's results were similar to those reported by She (2000) over a decade later. Male students received more academic interactions on behalf of their teachers. Female students, on the other hand, were the recipients of social interactions relating to dates, weekend activities, school dances, etc. At the same time, female students received less academic attention than male students, who were asked more instructional and procedural questions regarding their subject. Consequently, it was the male students who received more feedback over their female counterparts.

## **2.5 Efficacy beliefs and academic achievement**

Considering the previous literature, it would not be unreasonable to suggest that a teacher's classroom behavior determines students' perceptions of their own abilities, affecting their levels of academic achievement as a result. Bernard Weiner's Attribution theory (2010), states that in a learning environment, people attribute their success or failure to one of four

things: a) ability, b) luck, c) effort, or d) difficulty of a task. In other words, from the students' perspective, both casualty and expectations can play a part in their levels of success or failure. An investigation conducted in conjunction by Barba and Cardinale (1991) from San Diego State University and Old Dominion University, respectively, showed that female students tend to have fewer interaction counts with their science teachers and so receive less attention from them. Because the female students that participated in this study conformed to classroom expectations and behavior, they were asked fewer questions and beyond, primarily low-level ones. Their male counterparts, in contrast, received higher levels of teacher interaction and attention, resulting in more questions being directed towards them, specifically high-level ones.

The authors of this study claimed that as teachers interacted more with disruptive male students, they were strengthening the belief that low levels of male attainment were a consequence of little effort, not a lack of ability. Similarly, by allowing more male students to answer more questions, especially high-level ones, teachers once again reinforced the perception of male supremacy in the classroom, particularly in the field of Science. It is safe to say then, that as female students conform to what is expected of them within the classroom, they interact less with their teachers, which might indicate to them that they have lower abilities when compared to male students, resulting in less effort over time on their behalf, and thus, in lower levels of attainment in this particular subject area. After all, not much can be achieved by students who have little faith in their own academic abilities.

Over the last forty years, researchers have suggested that beliefs on efficacy determine both an individual's and a group's motivation in regards to academic achievement. Bandura (1997), for example, coined the term *self-efficacy* to explain how and why humans achieve not

only academic success, but success in general. As a result, researchers Pina-Neves, Faria and Raty (2013) stated: “Self-efficacy was first defined by Bandura in the 1970s as the belief that one can produce desired results and succeed in achieving goals through one’s own actions” (p. 455). In other words, self-efficacy highlights what an individual believes itself to be capable of accomplishing. According to Pina-Neves et al. (2013), belief in one’s self ability can be found at different levels. Figure 1 details such levels.

Additionally, other researchers such as Pajares (cited in Pina-Neves, et al., 2013), have made emphasis on the idea that self-efficacy beliefs at a more specific field or area (i.e., the domain level), like mathematics, are able to provide more insight on academic achievement than general levels of beliefs can.

Self-efficacy constructs	Levels of specification	Definitions
General self-efficacy	General level (no specification)	Belief that one is able to successfully accomplish tasks and activities in general
Academic self-efficacy	Setting level	Belief that one is able to successfully accomplish academic tasks and activities
Self-efficacy in Mathematics	Domain level	Belief that one is able to successfully accomplish academic tasks and activities
Self-efficacy for the performance in a Mathematics exam	Situation level	Belief that one is able to do well in a certain Mathematics exam
Self-efficacy for solving a certain Mathematics problem	Task level	Belief that one is able to successfully solve a certain Mathematics problem

*Figure 1.* Levels of self-efficacy (Taken from Pina-Neves, et al. 2013)

While much of the literature considered has taken into account student gender and levels of self-efficacy as separate factors that have an impact on academic achievement, other authors such as Meece and Jones (1996) and Skaalvik (1990) have suggested that gender differences are



already present in self-efficacy beliefs. This is most likely why boys show more confidence in tasks relating to STEM and spatial reasoning, and why girls are more confident when it comes to verbal and language-related tasks.

The literature did, however, present a study in which female students were perceived to be quite visible and engaged learners. The study was conducted in eight different schools across England and Wales, focusing solely on grade 11 students, and suggested: “that growing numbers of teachers may be increasingly defining their ‘ideal student’ as female.” (Younger, Warrington & Williams, 1999). A total of 48 focus groups with 200 students, all further divided into smaller groups of four based on gender and levels of academic ability, were studied. Teaching staff participated through interviews, and different classroom observations also took place. Younger et al. (1999) were concerned with explaining the relationship between teacher-student interaction in the classroom and the teaching-learning process, which in turn has an impact on a student’s level of attainment at the General Certificate of Secondary Education (GCSE) level.

Evidence showed that in all schools sampled, the teaching staff acknowledged academic differences among male and female students. However, they also concluded that some of these differences could stem from generalizations based on gender. For example, girls were often considered to be more organized, having stronger communication skills, and mastering independent learning. In comparison, teaching staff perceived male students as unorganized and not motivated enough to prioritize their academic work. Boys were described as being more energetic, less advanced for their age, more easily unfocused than girls (Younger et al., 1999).

Overall, student-teacher interaction across all four schools was dominated by male students over female ones, 54% to 46%, respectively. More specific results revealed that boys

were reprimanded 76% of the time, with girls accounting for 24% of the time. Further gender differentiation was also made evident through the number of questions directed to boys versus girls: 62% of the questions were directed to males and 38% females. Finally, expected classroom dynamic patterns were broken when it came to questions directed to teachers on behalf of their students. During whole-class work sessions, 70% of the questions or requests were made by girls. In addition, 58% of the questions or requests made during individual work also came from females. It was girls who seemed to show higher levels of curiosity when it came to actual learning.

At a simple glance, this study could be taken as incongruent in regards to the initial claim pinning classroom biases as a factor impacting academic achievement. Yet, the results obtained by Younger et al. parallel what Christie discovered in her own study: teachers *initiate* interactions with male students, yet only *respond* to female students' requests that might further their learning experiences. So even if teachers' concepts of the ideal student have become feminized, their behavior in the classroom remains biased towards male students.

Thus, the bibliographical review revealed that the gender gap in academic achievement in STEM-related subjects might be a result of females becoming invisible to male students who garner the majority of their teachers' attention. Equally important is the concept of self-efficacy, and how a disparity in teacher-student interactions based on gender might have led girls to believe themselves carriers of low cognitive abilities when it comes to science and mathematics.

While past studies have considered and analyzed different contributing factors to the gender gap in academic achievement, such as socioeconomic status, home life conditions, school quality, and placement, among others, the present study focused solely on teacher-student

interactions and levels of student self-efficacy. The research conducted aims to understand participants' characteristics and dynamics, which may have influenced female and male students differently in regards to their levels of academic achievement in order to improve their learning experiences and help reduce the gender gap in academic achievement in the context of a Salvadoran private bilingual school.

## **CHAPTER III: METHODOLOGY**

### **3. 1 Study approach**

The study had a quantitative approach. The research originated from a desire to understand participants' characteristics and dynamics, which may have influenced female and male students differently in regards to their levels of academic achievement. The questions that guided this study were: Are there any differences between male and female students' levels of self-efficacy at the ABC?, Are there any differences between male and female students' academic achievement based on the level of self-efficacy?, Could teacher-student interactions in classroom activities be a factor to consider in this context? The quantitative approach of this study was appropriate to answer such research questions because it allows for the relationship between one or more variables to be measured. This relationship, once established, can be used to identify links when trying to understand a phenomenon (Robson, 2011).

This research was designed as a small-scale study with a descriptive scope, as it was intended to describe the patterns of relationships among the studied variables (Robson, 2011). More specifically, the study was non-experimental cross-sectional because the focus was on the relationships among variables within the group of students.

While the institution studied seemed to conform to a worldwide trend of disparity in levels of academic achievement, these findings had no intention of representing the world, but the immediate reality and context of the school in question. The literature review completed during the present study provided the means to explore one independent variable, namely, students' level of self-efficacy, and evaluate their impact on the dependent variable: academic achievement.

### **3.2 Hypotheses and Variables**

#### **3.2.1 Alternative Hypotheses**

**H1:** Students with higher levels of self-efficacy garner higher academic achievement than students with lower levels of self-efficacy.

**H2:** Female students with higher levels of self-efficacy garner higher academic achievement than female students with lower levels of self-efficacy.

**H3:** Female students with higher levels of self-efficacy garner higher academic achievement than male students with lower levels of self-efficacy.

**H4:** Male students with higher levels of self-efficacy garner higher academic achievement than male students with lower levels of self-efficacy.

#### **3.2.2 Null Hypotheses**

**H<sub>0</sub>1:** Students with lower levels of self-efficacy do not garner higher academic achievement than students with higher levels of self-efficacy.

**H<sub>0</sub>2:** Female students with lower levels of self-efficacy do not garner higher academic achievement than female students with higher levels of self-efficacy.

**H<sub>0</sub>3:** Female students with lower levels of self-efficacy do not garner higher academic achievement than male students with higher levels of self-efficacy.

**H<sub>0</sub>4:** Male students with lower levels of self-efficacy do not garner higher academic achievement than male students with higher levels of self-efficacy.

### **3.2.3 Independent variables.**

*Level of believed self-efficacy.* Self-efficacy, in accordance with Bandura's (2000, 2006) work, is defined as what an individual believes itself to be capable of accomplishing.

### **3.2.4 Dependent variable.**

*Academic achievement.* Academic achievement can be defined as the level of proficiency in scholastic work (American Psychological Association, 2018). Within the context of this study, academic achievement is the averaged sum of all assessments completed by participants during the first trimester of the academic year 2019-2020, which ran from August to November/2019. In the context of this school, they are known as "cals"; CAL1, during the rest of this investigation.

## **3.3 Context and participants**

This study was conducted at the ABC due to the availability of participants and the accessibility to the teaching staff. "The ABC is a selective, mixed, bilingual, and bicultural school," offering an academic program running from Pre kinder to Grade 12 (Academia Britanica Cuscatleca, 2019). Attended predominantly by Salvadorans, the school does have a number of international students. At a whole school level, "approximately one-third of the teaching staff is native English Language expatriate" (Academia Britanica Cuscatleca, 2019).

The secondary school currently consists of 632 enrolled students. A total of 284 students participated in this study. These students were non-randomly chosen by judgment as they were the students enrolled in grades seven, nine, and eleven, which were considered to be the key points in the student's educational journey: they have completed their first year in secondary

school (grade 7); the midpoint in their secondary education (grade 9); and they have completed their IGCSE courses (grade 11) (Patwari, 2013).

### **3.4 Data sources**

Data collection for this study involved three different sources of information: a student survey, classroom observations, and final CAL1 grade averages for the current academic school year.

#### **3.4.1 Student survey**

The Pupil Attitude to Self and School (PASS) survey measures students' attitudes in relation to their academic achievements. The PASS survey was created by GL Assessment, the leading provider of formative assessments to the UK and British bilingual international schools (GL Assessment, 2017). The instrument "was established by educational psychologists and standardized on 600,000 children, so the results are statistically reliable in measuring highly subjective and sensitive issues" (GL Assessment, 2017).

The survey consists of 50 statements further categorized into nine specific factors (See Figure 2). The measurement of these nine factors allows schools to assess the following areas: (1) learner self-regard; (2) engagement with learning experiences; and (3) impact of external contextual issues (GL Assessment, 2017). This instrument is administered at the ABC every academic year to all students who are part of the secondary school. The secondary school is comprised of grades six, seventh, eighth, ninth, tenth, eleventh, and twelve. The data was provided by the schools' administration for research purposes only. For the purpose of this study, and due to its delimitations, only those factors concerned with student sense of academic

competence and engagement were taken into consideration; that is, factors two, three, four, and seven. Figure 2 provides an explanation for what each attitudinal factor measures.

<b>1</b>	<b>Feelings about school</b>	Explores whether a pupil feels they belong to or are alienated from their learning community. A low score in this measure can indicate feelings of social exclusion and potential bullying.
<b>2</b>	<b>Perceived Learning Capability</b>	Offers a snapshot of a pupil's unfolding impressions of self-efficacy and can reveal early warning signs of demoralisation and disaffection
<b>3</b>	<b>Self regard</b>	Equivalent to self-worth, this measure is focused quite specifically on learning and shows a strong correlation with achievement.
<b>4</b>	<b>Preparedness for learning</b>	Highly correlated with pupils at risk of behavioural difficulties, this measure explores whether a pupil feels they have the tools in place to learn. It covers areas such as study skills, attentiveness and concentration.
<b>5</b>	<b>Attitudes to teachers</b>	Provides an invaluable insight into a pupil's perception of the relationship they have with school staff.
<b>6</b>	<b>General work ethic</b>	Highlighting pupils' aspirations and motivation to succeed in life, this is the first of two motivational measures. It focuses on purpose and direction, not just at school but beyond.
<b>7</b>	<b>Confidence in learning</b>	Identifies a pupil's ability to persevere when faced with a challenge.
<b>8</b>	<b>Attitudes to attendance</b>	Correlating very highly with actual attendance 12 months later, this measure enables teachers to intercede much earlier with strategies to reduce the likelihood of truancy in the future.
<b>9</b>	<b>Response to curriculum demands</b>	This second motivational measure focuses more narrowly on school-based motivation to undertake and complete curriculum based tasks.

Figure 2. PASS survey attitudinal factors (Taken from GL Assessment, 2017)

### 3.4.2 Classroom observation

Additionally, the present study considered *teacher-student interaction* as a possible factor that may be affecting the participants' academic achievement. An interaction, according to the online Merriam-Webster dictionary (2020), is a "mutual or reciprocal action or influence" between two parties. For the purposes of this study, teacher-student interaction was any communication or verbal transaction between the teacher and the student in the form of a question posed by the teacher and answered by any student.

Classroom dynamics consisted of teachers asking questions to the whole class in a plenary style, followed by individual work time. In all lessons, students answered questions in one of three ways: (1) raising their hands and being called upon; (2) shouting out the answers; or

(3) being directly called on by the teacher. Male and female students in all subjects were equally distributed for the most part, with some classes having one or two more female students. The only exception to this last point was in both English classes (grade nine and grade eleven) where only three boys were present on the days the observations took place.

In order to obtain data from classroom observations, and in an attempt to identify gender bias in teacher-student interactions, a tally sheet for classroom observations was created (see Figure 3). Based on the literature reviewed, specifically Barba and Cardinale's (1991) study, the tally sheet took into account the following variables: the gender of the participating student, the level of question being answered, high or low based on Bloom's taxonomy; whether answers were on or off task, regardless of the answer being correct or not; and what method was used to draw the teacher's attention, i.e., hands were raised, or answers were simply shouted out. Drawing upon Barba and Cardinale's investigation on whether female students become invisible in the science and math classrooms because of a bias towards male students, the frequency count also considered what they defined as *target students*, or those students who had four or more interactions with the teacher during one class period.

Teacher-student interaction tally sheet for classroom observations						
School: _____			Date: _____			
Teacher gender: _____			Subject: _____			
STUDENT	QUESTIONS		RESPONSES		ATTRACTION	
<u>GENDER</u>	<u>LOW</u>	<u>HIGH</u>	<u>ON-TASK</u>	<u>OFF-TASK</u>	<u>HANDS</u>	<u>OTHER</u>

Figure 3. Teacher-student interaction tally sheet for classroom observations



### **3.4.3 CAL1 grade averages**

Participants' CAL1 grade averages consisted of the average sum of all assessments completed by participants during CAL1 in each of the courses chosen for this study. The data was provided by the schools' administration for research purposes only.

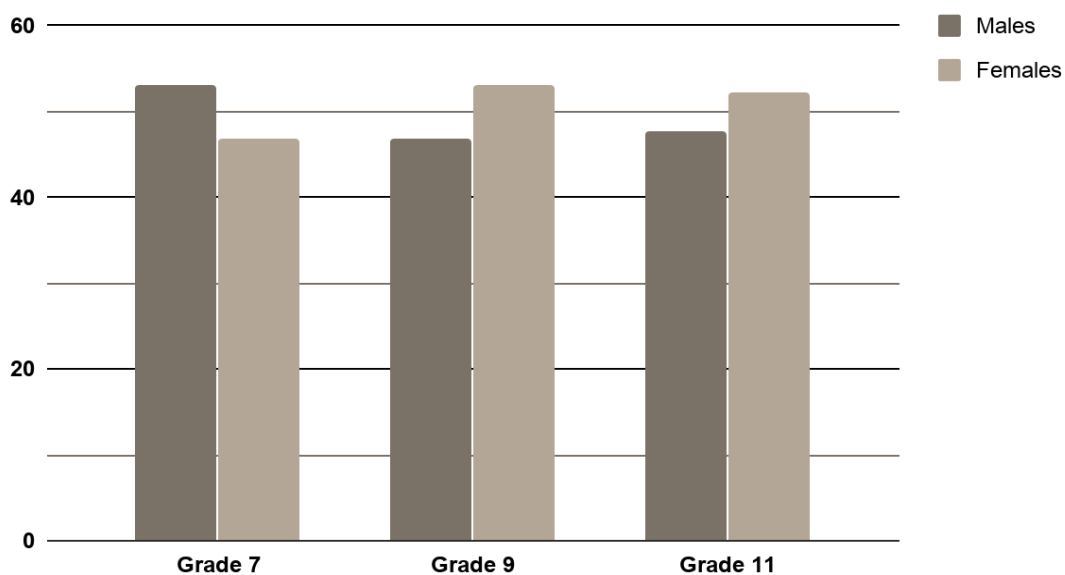
### **3.5 Data analysis**

The data collected from the survey and grade averages was analyzed using Statistical Package for the Social Studies (SPSS). The initial analysis was intended to visualize the data from a descriptive perspective by presenting the results organized by gender, level, average grade, and self-efficacy level. Next, an inferential analysis was performed applying two validating statistical analysis: the t-test and ANOVA in order to test hypotheses and determine whether the differences in averages between male and female students were significant or not. Finally, the data gathered through the observation tally sheet was processed with Microsoft Excel.

## **CHAPTER IV: RESULTS**

### **4.1 Participants**

A total of 284 students from grades seven, nine, and eleven completed the PASS survey towards the end of November 2019; 49.3% were males and 50.7% were females. In grade seven, 53.06% of students were males and 46.94% females; in grade nine, 46.88% were males and 53.13% females; and in grade eleven, 47.78% were males and 52.22% females (see Figure 4).



*Figure 4.* Participants per grade level in percentages.

#### **4.2. Gender, grade, and subject**

The following figures show the final grades achieved by gender, grade, and subject at the end of CAL1 in November 2019. Each figure combines all three grade levels (seven, nine, and eleven), the grade scale, and gender. The evaluation system at the ABC calculates a minimum grade of 2.0 to a maximum grade of 7.5 for grades seven and nine and a maximum grade of 7.0 for grade eleven. They have been combined by subject and grade level. As Figure 5 shows, the majority of final averages in Mathematics for male students in grades seven, nine, and eleven ranged between 4.5 and 5.0, while the majority of female scores ranged between 5.0 and 6.5. Overall trends for Mathematics in all three grade levels seemed to remain within a similar range.

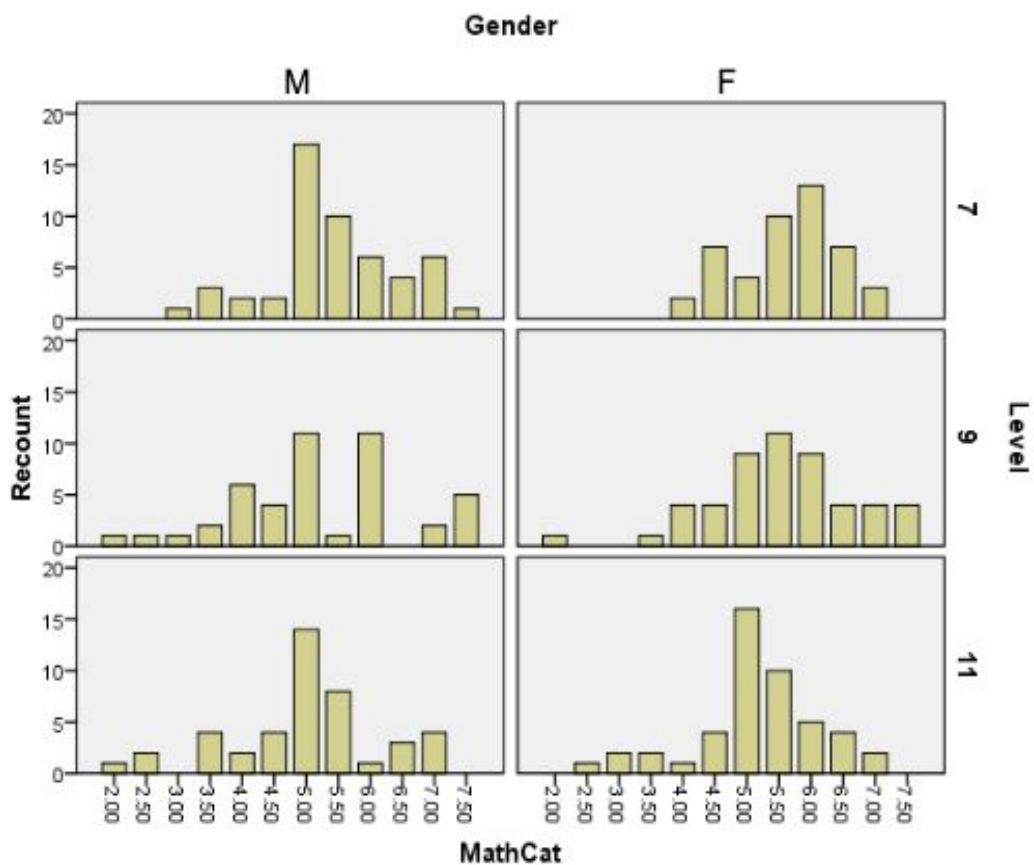


Figure 5. Males' and females' final averages for Mathematics by grade level.

Science's final averages, however, showed a different trend. While the majority of scores for male students in grade seven stayed within the 4.5 and 5.0 marks, scores in grades nine and eleven seemed to be equally distributed between a larger range (3.5 to 5.5). Averages for females in both grades seven and eleven can be seen mostly between the 5.0 and 6.0 marks., while scores in grade nine are mostly between 5.0 and 7.5 (See Figure 6).

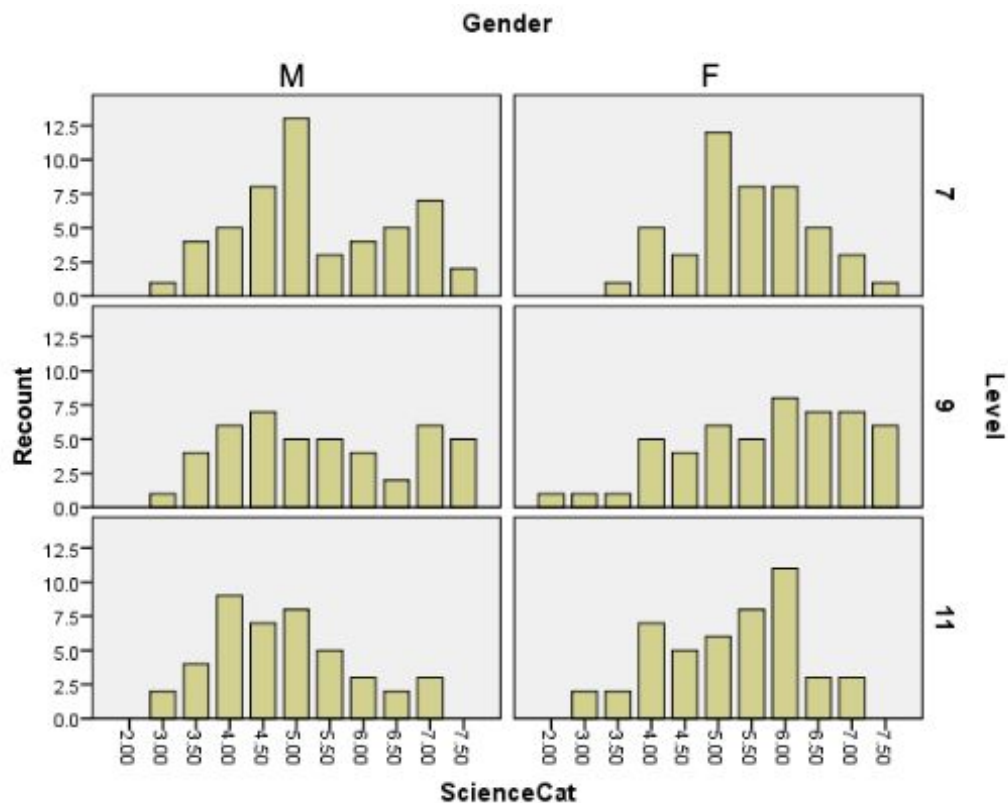


Figure 6. Males' and females' final averages for Science by grade level.

In English, the majority of males of grade seven and eleven ranged between 5.0 and 5.5, while the majority of grade nine boys saw an increase in scores (5.5 to 6.5). Female students in grade seven English saw an increase in scores, ranging between 6.0 and 6.5, while the remaining girls from the other two grades stayed within the 5.0 and 6.0 marks (See Figure 7).

In regards to the total average of all three subjects, the majority of grade seven boys stayed within the 4.75 and the 5.50 mark, while females averaged between 5.20 and 6.20. In grade nine, male averages mostly stay within 4.75 and 5.20, with a group reaching averages of 6.75. Female averages, on the other hand, are distributed somewhat equally, ranging from a 4.80 average to a 6.20 average. Last but not least, male averages in grade eleven are found mostly in the 4.80 and 5.20 range, while female averages are spread throughout the 4.50 and 5.50 range

(See Figure 8).

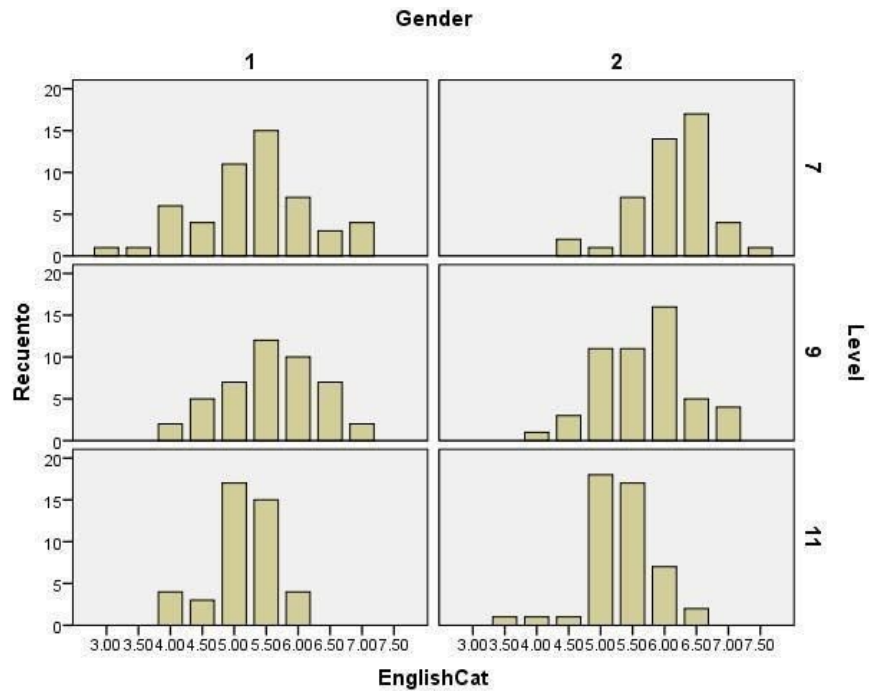


Figure 7. Males' and females' final averages for English by grade level.

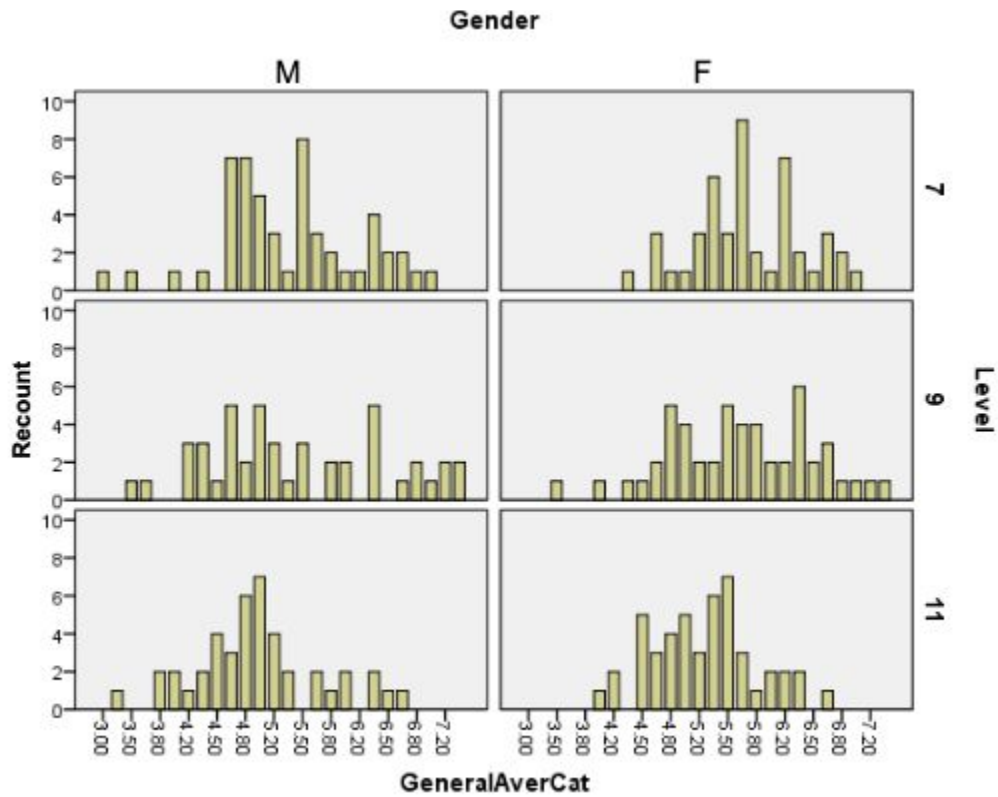


Figure 8. Males' and females' total general averages by grade level.

**4.3 Students' levels of self-efficacy**

The following figures show the levels of self-efficacy among students of grades seven, nine, and eleven at the end of CAL1 in November 2019. Similar to the figures illustrating final averages, these figures also combine gender and grade level along with the different self-efficacy factors taken into consideration. In regards to factor 2, students' perceived learning capability, grade seven, and nine males show a range of 53.6% to 78.6% satisfaction, while grade eleven males seem to be more spread within the 28.5% and 78.5% marks. Female satisfaction for grade seven is spread between 28.5% and 78.5% marks. Female satisfaction for grade nine is spread between 28.6% and 78.6%, while the same measurement for grade eleven females can be seen within the 53.6% and 78.6% range (See Figure 9).

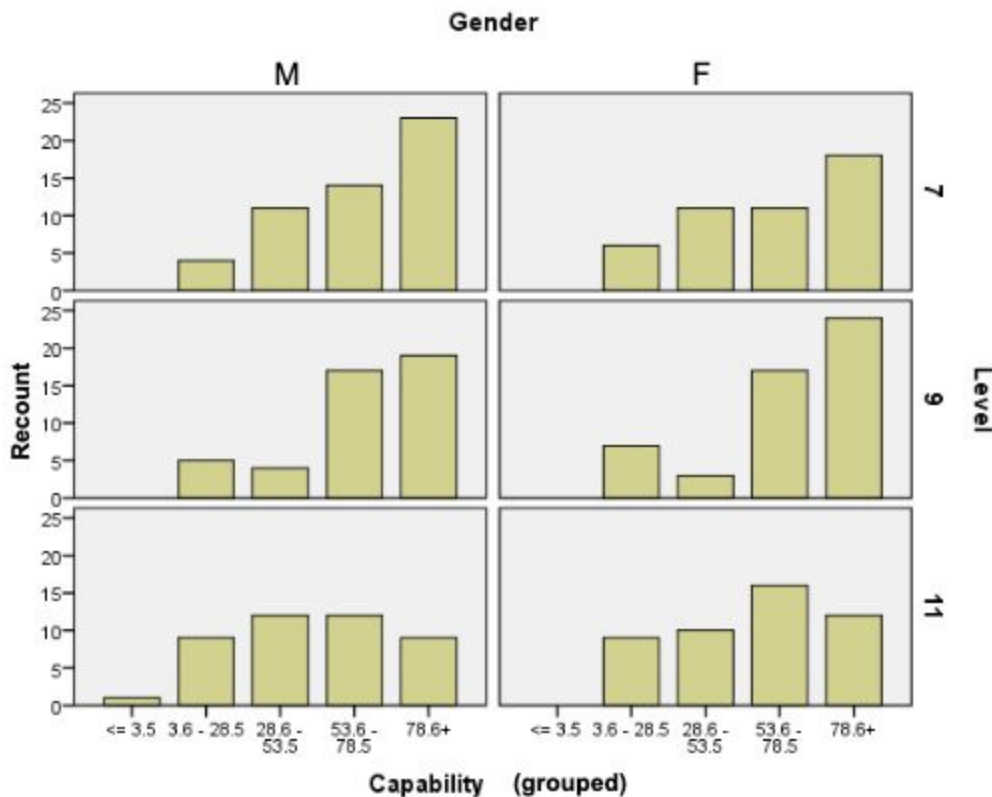


Figure 9. Male and female levels of total perceived learning capability.

Satisfaction levels for factor 3, student self-regard, seem to be once again grouped similarly in grades seven and nine, with the majority of percentages staying with the 29% and 79% mark. Grade eleven male self-regard, on the other hand, is quite low, with the majority of pupils expressing a satisfaction percentage of 4.1% to 29.0%. For female students in all three grade levels, satisfaction percentages in relation to their self-regard as learners stay within 4.1% and 54.0% for the most part, with some grade eleven girls venturing into higher percentages (54.1% to 79.0%) (See Figure 10).

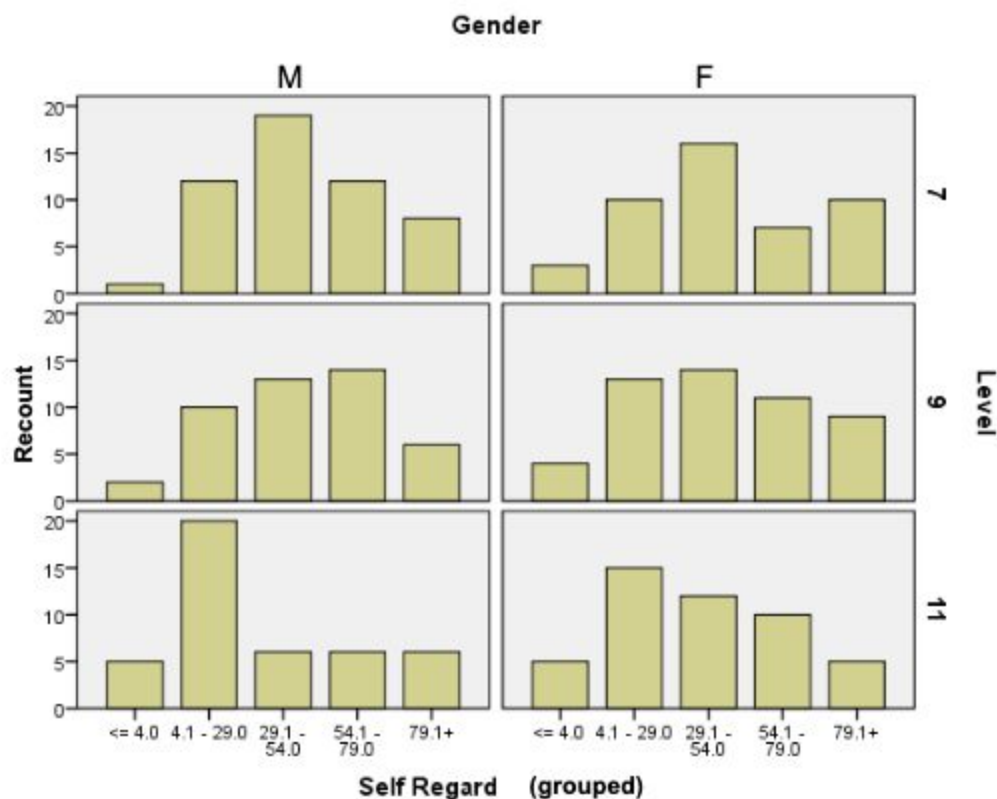
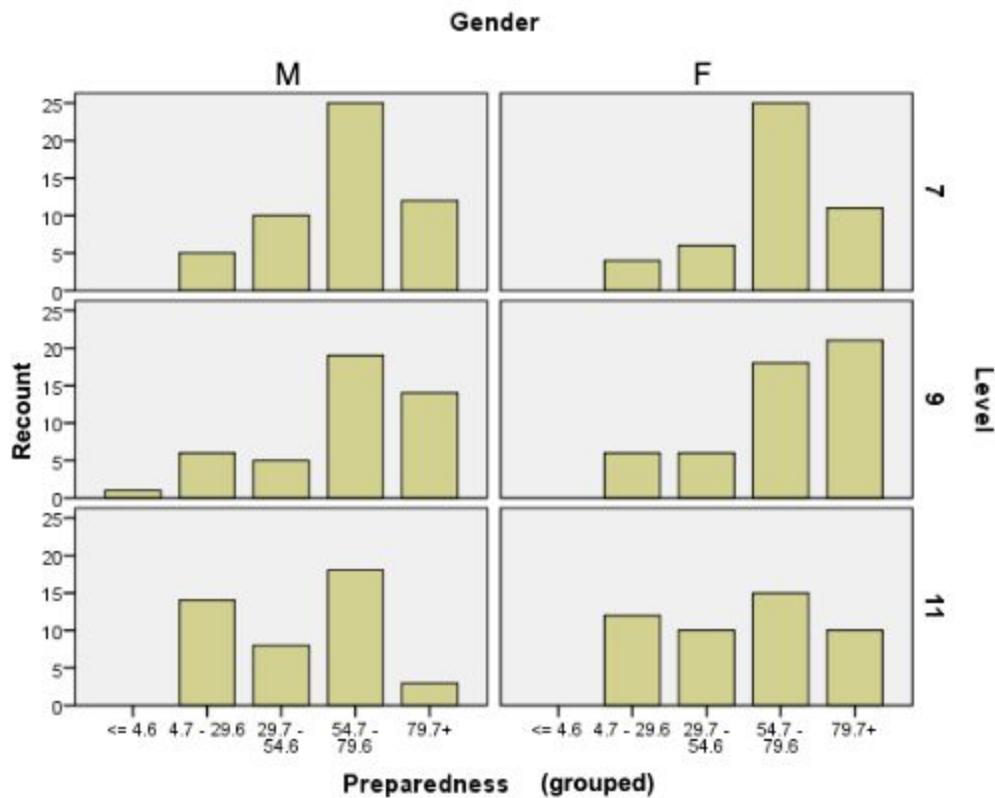


Figure 10. Male and female levels of self-regard.

Satisfaction levels concerning factor 4, preparedness for learning, boys in both grades seven and nine ranged between 54.7% and 79.7%. Grade eleven boys, on the other hand,

expressed lower levels of satisfaction when it came to this factor; a noteworthy group ranged between 4.7% and 29.6%, while another group stayed between 54.7% and 79.6%. Girls in all three grades expressed a level of 54.7% satisfaction or above, reaching percentages above 79.7%. An amount of grade seven girls, however, did remain between 54.7% and 79.6% (See Figure 11).



*Figure 11.* Male and female levels of perceived preparedness for learning.

In relation to factor 7, students' confidence in learning, grade seven and grade nine boys are mostly grouped within the 51.01% and 76.01% level of satisfaction, and although the count for grade eleven boys goes down by a few numbers, they find themselves for the most part within range when compared to the previous grades. Girls in grade seven show lower levels of confidence when compared to the rest of females in the other two grades, their satisfaction levels ranging between 1.01% and 76%. The majority of grade nine girls showed a 76.01% or above



level of confidence, while the same factor for grade eleven girls went down to the 26.01% to 76.00% range (See Figure 12).

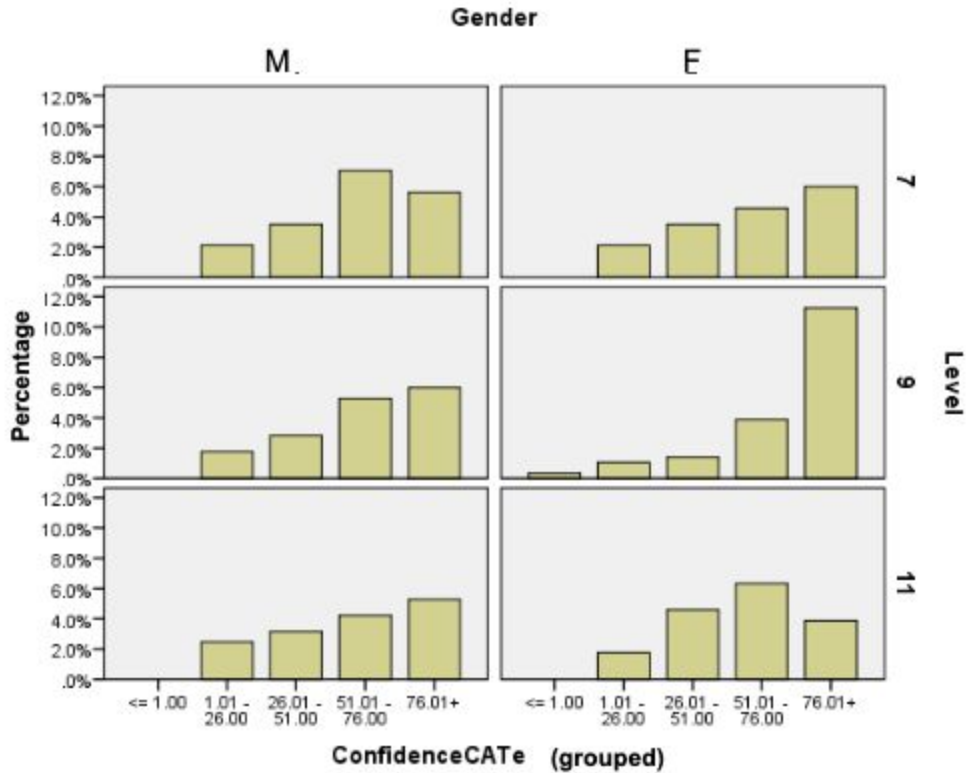


Figure 12. Male and female levels of perceived confidence.

The percentages obtained from all four factors were combined to generate an average of student self-efficacy. In that sense, satisfaction levels of males in grades seven and nine mostly fell within the 53.01% and 78.00% range, while grade eleven males seem to be grouped in the 28.01% to 53.00% for the most part. Similarly, female students enrolled in grades seven and nine stayed in the 53.01% and 78.00% range, while grade eleven girls ranged between 28.01% and 78.00% (See Figure 13).

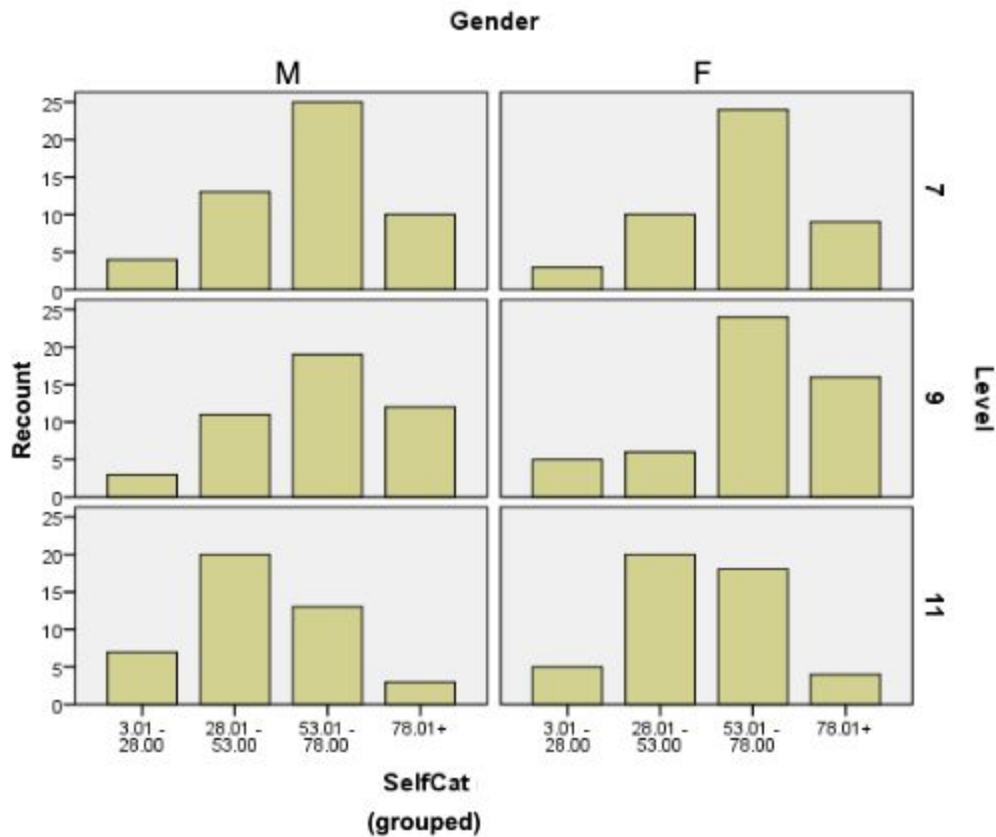


Figure 13. Male and female total averages of self-efficacy.

#### 4.4 Hypothesis testing

Results from the statistical t-test are shown in the following chart. In all three subjects and the final average, there is a mean difference favoring female students. The differences in average scores are as follows: English .37; Mathematics .22; Science .28; and in general average scores (the sum of all three subjects) .28. The group statistics also show us the differences in terms of the PASS survey scores. In capability, there is a mean difference of .44; a .81 difference in terms

of learner's self-regard; a 4.44 difference in preparedness; a 2.04 difference in confidence; and a 1.89 difference in self-efficacy in general (See Table 1).

Table 1.

*Group statistics t-test.*

	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>
English Grade	Male	140	5.339	.7734	.0654
	Female	144	5.712	.7036	.0586
Math Grade	Male	140	5.221	1.1833	.1000
	Female	144	5.448	.9942	.0829
Science Grade	Male	140	5.168	1.2198	.1031
	Female	144	5.455	1.1280	.0940
General Average	Male	140	5.254	.8859	.0749
	Female	144	5.540	.7358	.0613
Capability	Male	140	63.886	25.4652	2.1522
	Female	144	64.334	26.3067	2.1922
Self -regard	Male	140	44.397	28.7132	2.4267
	Female	144	43.578	28.8989	2.4082
Preparedness	Male	140	58.837	25.9539	2.1935
	Female	144	63.278	25.8252	2.1521
Confidence	Male	140	62.533	26.5390	2.2430
	Female	144	64.581	25.0480	2.0873
Self -efficacy	Male	140	57.055	20.8979	1.7662
	Female	144	58.946	1.0359	1.7530

The independent samples t-test resulted in the following table chart, showing statistical significance of .000 for English, .040 for Science, and .003 in the general average (See Table 2).

Table 2.

*Independent samples t-test.*

		Test for equality of means			
		Significance	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference
					Inferior
English Grade	Equal variances assumed	*.000	-.3725	.0877	-.5451
	Equal variances not assumed	*.000	-.3725	.0878	-.5454
Math Grade	Equal variances assumed	.082	-.2265	.1296	-.4815
	Equal variances not assumed	.082	-.2265	.1299	-.4822
Science Grade	Equal variances assumed	*.040	-.2870	.1394	-.5613
	Equal variances not assumed	.041	-.2870	.1395	-.5616
General Average	Equal variances assumed	*.003	-.2853	.0965	-.4753
	Equal variances not assumed	*.003	-.2853	.0968	-.4758
Capability	Equal variances assumed	.884	-.4483	3.0735	-6.4983
	Equal variances not assumed	.884	-.4483	3.0721	-6.4955
Self-regard	Equal variances assumed	.811	.8187	3.4192	-5.9116
	Equal variances not assumed	.811	.8187	3.4189	-5.9110
Preparedness	Equal variances assumed	.149	-4.4413	3.0727	-10.4897
	Equal variances not assumed	.149	-4.4413	3.0729	-10.4902
Confidence	Equal variances assumed	.504	-2.0484	3.0615	-8.0746
	Equal variances not assumed	.504	-2.0484	3.0640	-8.0797
Self-efficacy	Equal variances assumed	.448	-1.8908	2.4887	-6.7896
	Equal variances not assumed	.448	-1.8908	2.4885	-6.7892

Note: \* Significance at the level of  $p < .05$  (one tail test).

For a result to be considered statistically significant, the Standard Deviation must be less than .05

The independent samples t-test was further validated by the one-way ANOVA test, which can be seen in Table 3 (See Table 3).

Table 3.

*One-way ANOVA table*

		Sum of Squares	df	Mean Square	F	Sig.
General Average	Between Groups	5.778	1	5.778	8.736	*.003
	Within Groups	186.512	282	.661		
	Total	192.290	283			
Self-efficacy	Between Groups	253.792	1	253.792	.577	.448
	Within Groups	123983.184	282	439.657		
	Total	124236.976	283			

Note: \* Significance at the level of  $p < .05$ .

These significances seem to indicate that final academic achievements for both English and Science seem to be influenced by gender, yet not by levels of perceived self-efficacy, unlike the predictions made by our original hypothesis.

**H1:** Students with higher levels of self-efficacy garner higher academic achievement than students with lower levels of self-efficacy.

Results indicate that that level of perceived self-efficacy was not associated with higher academic achievement. Therefore, the null hypothesis is accepted.

**H2:** Female students with higher levels of self-efficacy garner higher academic achievement than female students with lower levels of self-efficacy.

**H3:** Female students with higher levels of self-efficacy garner higher academic achievement than male students with lower levels of self-efficacy.

**H4:** Male students with higher levels of self-efficacy garner higher academic achievement than male students with lower levels of self-efficacy.

Regarding hypotheses two, three, and four in which gender was considered as a predicting factor associated with self-efficacy and academic achievement, the results indicate again that self-efficacy was not associated with higher academic achievement. Therefore, the corresponding null hypotheses were accepted.

Although the independent variable self-efficacy as a whole seems not relevant when it comes to predicting academic achievements of male and female students, there are two factors within it that could: factor 3 - learner self-regard and factor 4 - preparedness for learning. This was evident through a univariate analysis that allowed to identify that the  $p$  value was of .000 and .003, respectively, and .003 for gender (See Table 4).

Table 4.

*Univariate analysis of self-efficacy factors.*

Test of Between-Subjects Effects					
Dependent Variable: General Average					
Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Corrected model	38.680 <sup>a</sup>	6	6.447	11.625	.000
Intersection	669.560	1	669.560	1207.398	.000
F2 Perceived Learning Capability	.232	1	.232	.418	.518
F3 Learner Self Regard	9.558	1	9.558	17.235	*.000

F4 Preparedness for Learning	4.874	1	4.874	8.789	*.003
F7 Confidence in Learning	.011	1	.011	.020	.888
PASS Average	.588	1	.588	1.061	.304
Gender	5.143	1	5.143	9.274	*.003
Error	153.610	277	.555		
Total	8470.490	284			
Corrected Total	192.290	283			

Note: \* Significance at the level of  $p < .05$ .

#### 4.5 Teacher-student interaction

As an additional factor, teacher-student interactions within the classroom were measured in an attempt to identify gender biases ingrained in classroom dynamics. These interactions consisted of questions being posed by the teachers and answered by any of the students. Table 5 shows the results of the observations, separated by grade level, subject, and gender. Overall, it is clear that female students accounted for the majority of teacher-student interactions; 46% of all interaction counts (IC) were completed by male students in all three grades, the remaining 54% by female students. Similarly, 43% of low-level questions (LQ) across all three grade levels were answered by boys and 57% by girls. In regards to high-level questions (HQ), all three grade levels and subjects show different trends. Overall, male students answered 51% of all HQ, with females answering a total of 49%. In grade seven Math, there was an equal amount of HQ answered by both genders, while the difference in Science was 75% males and 25% females. Grade nine Math however, shows a larger difference between genders, with 67% of high-level questions answered by boys and only 33% by females. Science and English for this same grade level were quite similar; 33% of males and 67% of females in Science, and 31% of males and 69% of females in English. While grade eleven Science also showed an equal amount of HQ answered by both genders, differences in HQ percentages in English showed boys answering

58% of the questions and girls answering 42% (See Table 4).

## CHAPTER V: DISCUSSION

From the review presented above, key findings emerged: (1) girls achieved higher grades than boys in all three courses and grade levels studied; (2) gender had an impact in both the final Science and English grade averages; and (3), overall, self-efficacy was proven not to have any impact whatsoever on academic achievement.

Table 5.

*Teacher-student interaction.*

Level	Subject	Gender	IC	LQ	HQ	AVERAGE
7	Math	Male	56%	57%	50%	<b>54%</b>
		Female	44%	43%	50%	<b>46%</b>
	Science	Male	33%	25%	75%	<b>44%</b>
		Female	67%	75%	25%	<b>56%</b>
9	Math	Male	52%	36%	67%	<b>52%</b>
		Female	48%	64%	33%	<b>48%</b>
	Science	Male	38%	40%	33%	<b>37%</b>
		Female	62%	60%	67%	<b>63%</b>
	English	Male	37%	45%	31%	<b>38%</b>
		Female	63%	55%	69%	<b>62%</b>
11	Science	Male	52%	53%	50%	<b>52%</b>
		Female	48%	47%	50%	<b>48%</b>
	English	Male	52%	20%	58%	<b>43%</b>
		Female	48%	80%	42%	<b>57%</b>



<b>AVERAG E</b>	<b>Male</b>	<b>46%</b>	<b>43%</b>	<b>51%</b>	<b>47%</b>
	<b>Female</b>	<b>54%</b>	<b>57%</b>	<b>49%</b>	<b>53%</b>

### 5.1 Final grade averages

Higher general scores on behalf of girls in both Science and English are consistent with the most recent PISA results, where girls outperformed boys by 2 and 30 points, respectively. In Mathematics, however, and differing from the trend observed in the 2018 PISA results, girls in all three grade levels also achieved higher final scores than their male counterparts. This is an important finding in the understanding of how gender relates to these subject areas around the world. Despite El Salvador not being part of the OECD countries that undergo the PISA examinations, students in this study seem to not only have fallen in line with the discussed gender trend but have also marked their own in relation to one subject. These findings further validate Baker's (1987) claim that, indeed, male and female students are being exposed to different learning experiences in spite of being inside the same classrooms. The unquestionable gender gap in academic achievement sparks questions about the teaching-learning experiences currently happening at the ABC and whether students are, in fact, receiving equal support in order for them to succeed in their academic ventures. It also gives way to the possibility that if male students are being steered towards answering high-level questions, they might no longer be paying attention during low-level questions directed at female students, further deepening the achievement gap.

### 5.2 Gender and self-efficacy

While the independent samples t-test confirmed that final academic achievements in both Science and English are influenced by gender, results also indicated that general levels of

self-efficacy were not associated with academic achievement. This contradicts Meece and Jones' (1996) and Skaalvik's (1990) review of Bandura's (1997) work on general self-efficacy. Unlike claims made by such authors, perceptions of self-efficacy at a general level had no impact on a student's final grades. However, when looking at the more specific factors of the PASS Survey, further analysis proved factors three - learner self-regard -, and four - preparedness for learning - are indeed relevant when predicting or determining student academic achievement (See Table 4). According to Pina-Neves et al. (2013), both of these factors can be further categorized as *Academic self-efficacy*, which takes place at a setting level (See Figure 1). It could be inferred that factors three and four take place at a more specific level within a student's psyche and, thus, have a more pressing impact on their overall academic achievements than general beliefs of self-efficacy can.

In terms of efficacy amongst students, boys in grades seven and eleven account for the lowest levels of learner self-regard and preparedness for learning, which might account for their low levels of classroom interaction and academic achievement. In grade nine, however, these two factors seem to level out among both genders, implying that students, in general, feel the most comfortable during the halfway point of their academic journey. This is reasonable as they have dealt and overcome any issues arising from their transition period into secondary school; they have begun identifying themselves in more specific areas of academic interest, and in general, have settled into their school setting. Considering that it was grade eleven boys who expressed the lowest levels of satisfaction around these two factors, it becomes pressing that how students see themselves in relation to their academic abilities is strengthened at this precise grade level. This, in turn, would prevent students from experiencing a drop in perceived academic

self-efficacy as they work to complete their IGCSEs and start the International Baccalaureate Diploma Programme (IBDP).

Consequently, teachers at ABC could ensure access to stronger study, organizational, and revision skills on behalf of the students at this age. Truly embedding revision strategies inside the classroom that could then be put into practice at home would be one way of achieving this.

Teachers could also plan for classroom tasks that allow students to manage their own time in hopes of good habits having a lasting effect on how students learn and see themselves as learners.

### **5.3 Classroom observations of teacher-student interaction**

**5.3.1 Mathematics class interactions.** Classroom dynamics in the grade seven Mathematics lesson conformed to much of the arguments and findings published by Younger et al. (1999). Girls, on the one hand, had lower levels of teacher-student interactions and struggled to get going with their individual work. This was evidenced by the higher number of inquiring questions on behalf of students towards the teacher being asked by girls during the initial stages of the individual work, within the next five minutes or so after the teacher had explained the task and commanded the students to begin working. It seemed female students needed much reassurance and validation as they initiated the task. Boys, on the other hand, were confident, accounted for most of the teacher-student interactions, and when it came to individual work, got on with it. Much in accordance with Younger et al. (1999), boys only interacted with the teacher when prompted; the few inquiries made by them happened about 10 minutes into the task when they were at odds in relation to a specific problem or exercise.

Observations for grade nine Mathematics were similar to those in grade seven. Once again, males accounted for the majority of interaction counts, answering most of the high-level

questions. Throughout this class period, boys were much more talkative; the teacher had to call on their behavior a few times. Equally, males were very confident when answering questions, usually shouting them out, not even waiting to be called on. Conversely, girls, like much of the literature suggested, conformed to expected classroom behavior, only answering questions after having been called on (Barba & Cardinale, 1991). Much like the grade seven Mathematics class, the majority of inquiring questions on behalf of the students towards the teacher were mainly asked by girls, this time during the entirety of individual work time.

**5.3.2 Science class interactions.** In the grade seven Science class, girls were highly engaged and enthusiastic during teacher-student interactions. It is important to note that this lesson was the only lesson where all the students raised their hands before answering any questions at all. Even though female students did not answer as many high-level questions as the boys did, they were constantly raising their hands, eager to participate. In that sense, girls seemed much more confident than boys when it came to not only the subject but also the task at hand. Although much of the questions during this session involved recalling information, with few questions prompting student analysis and critical thinking, it was female students who dominated the classroom dynamic, answering most of the questions asked. Nonetheless, an inference can be made in which a bias towards male students was evident, as it was they who were chosen to answer the majority of the high-level questions.

In regards to grade nine Science, classroom dynamics resembled those of the grade seven classroom. Females accounted for most of the total teacher-student interaction count, with them answering the majority of the high-level questions. Much like the grade seven girls, grade nine girls were confident, eager to participate, and answer questions. Female students were once again

on task throughout this lesson, with many of the boys called on for not meeting behavior expectations.

While classroom dynamics for grades seven and nine Science were very similar, that wasn't the case for grade eleven. Male students accounted for the majority of teacher-student interaction counts, and although boys and girls answered an equal amount of high-level questions, girls only participated when called upon. For the majority of the class period, girls in this class were almost invisible, as suggested by Barba & Cardinale (1991) in the literature reviewed. With the exception of one girl who constantly participated, classroom dynamics were dominated by male students. It is important to clarify, though, that while female students might have seemed unengaged with whole group discussions, they were constantly annotating in their books and work booklets; girls were very much focused on completing the assigned tasks.

Based on these results, both mathematics and science teachers could encourage a growth mindset with the students, allowing them to believe that being good at STEM-related subjects is something that they can further develop and strengthen, as opposed to it being something inherent to their gender. At the same time, by having teachers focus on praising characteristics such as risk-taking, curiosity, resilience, and hard work, can help students stray away from the perception that one gender might be better than the other when it comes to grasping concepts within these types of subjects.

**5.3.3. English class interactions.** Due to the fact that there were more female students than male students, it was expected that both grade nine and grade eleven girls would account for the majority of interaction counts in English class. However, that was only the case in grade nine, where it was the girls who had the highest IC and answered the majority of HQ.

In contrast, in grade eleven, in spite of there only being three males enrolled in the class, most of the IC and of the HQ were completed by males. It is relevant to point out, though, that the majority of male participation was carried out by one single student. Out of the three boys in the class, this particular student was engaged, actively discussing with his classmates and teacher. At the same time, even if female participation was lower, they didn't trail behind by a large difference, neither in participation nor in the number of high-level questions answered. In fact, it was the girls who engaged the most during group work, prompting discussion among their peers, revising each other's work, and making suggestions here and there. The remaining boys were unfocused and engaged only when the teacher called them out.

Therefore, boys were prompted with further questions most of the time during whole group discussions, meaning, responses provided by male students were validated and challenged by the teacher, to the point where they were always asked to elaborate further. Perhaps this was done with the intention of encouraging more male participation in a class where it seemed boys were drowned out by larger amounts of females. However, when it came to female responses being validated, they were only done so by using phrases such as "I can see why you'd think that," but with no further encouragement for discussion.

The observed teacher-student interactions in this subject seem to indicate that teachers follow a pattern of validating male participation over female participation. In that sense, it would be best for teachers to actively try alternating between genders when conducting classroom dynamics which involve discussion, while also ensuring a follow-up question for each. This would allow for more equity in regards to teacher-student interaction in the classroom, not only in regards to participation but in regards to question type as well.

The observed classroom dynamics for grades seven and nine revealed that gender might have influenced girls in terms of how they see themselves within the context of the subjects and classrooms at hand. By asking more questions in subjects like Mathematics and Science, it could be said that they consider themselves somewhat deficient in the skills needed to complete assigned tasks successfully. Contrary to boys, who seem to fit well with stereotypical notions that they are already good at STEM-related subjects, thus not requiring help initially, only as the exercises become more difficult or involve new concepts.

Nonetheless, because girls ask for more help, it can be inferred that in the long run, they have reached higher levels of understanding. By making sure they are properly completing tasks, girls are reflecting on what they are being taught, allowing them to fill in any knowledge or comprehension gaps almost immediately, providing them with a stronger grasp on content when it comes to assessments. Inevitably, this has enhanced their revision skills, which in the end might account for the higher grades they achieve in all subjects, not just STEM-related ones.

Even in grade eleven, where female participation in Science and English was lower, girls were still seen honing their revision and note-taking skills throughout their time in class. By the time female students get to the higher grades, they might have already encountered years of biased classroom dynamics, and so they begin to retrieve from the spotlight, as to not have to compete with male dominance. In the process of doing so, it seems they have managed to develop strong independent-learner skills and so continue to reach higher levels of academic achievement.

## Chapter VI Conclusions

The objective of this study was to discover participants' levels of self-efficacy to determine if such levels may have influenced female and male students, grades seven, nine, and eleven, differently in regards to their levels of academic achievement, taking into consideration the classroom dynamics in order to improve their learning experiences and help reduce the gender gap in academic achievement at the ABC. The data collected and the analysis performed allowed us to determine that general levels of self-efficacy amongst students of grades seven, nine, and eleven had no effect or direct impact on their academic achievement, allowing us to claim that the objective of this study was fulfilled.

Regarding the first research question which intended to discover any differences between male and female students' levels of self-efficacy at the ABC, it is possible to claim that a difference does exist across the board for all three grade levels.

In regards to the second question which inquired about the differences between male and female students' academic achievement based on the level of self-efficacy, results reveal that in general, there are no significant differences that may be affecting academic achievement based on gender. However, two particular factors could deserve further exploration, namely, learner self-regard and preparedness for learning. On the one hand, when looking at the difference in learner self-regard, male students show a slightly higher satisfaction level than female students. On the other hand, female students displayed a higher sense of preparedness for learning, which might explain why, even though there is a quite minimal difference, girls were still able to attain higher scores throughout.

Finally, the findings also allow answering the last research question, which took into



account teacher-student interactions within the classrooms that were observed, making it evident that that had an impact on students in the long run, and thus should be a factor to consider within this context.

The findings of this study show that students seem to be aware of their gender, and although it seems that boys are happily conforming to such roles, girls have, unconsciously or not, been working past the generalized expectations placed upon them, which for long have been encouraging them to fall short of male achievements. It is also evident that girls at the ABC have strengthened their academic skills, and boys have not, relying on confidence and dominance of the classroom to reach passing scores. Thus, strengthening academic skills for boys could have a positive effect on their learner self-regard and whether they consider themselves prepared for learning or not, impacting their levels of academic achievement and thus, reducing the current gender gap.

In a world that continues to place a strong emphasis on scores and how they relate to success, achieving equity in education is important, making sure that all stakeholders have the same minimum of academic skills in order to reach their academic potential.

### **6.1 Limitations and future research**

The findings of this study have to be seen in the light of potential limitations. The work presented does not consider cultural factors such as living conditions, gender roles within the immediate family, nor home or family views on education, which could also have an impact on how students relate to learning. Thus, future studies could consider the student's immediate familial environment and how the discourse or rhetoric confronted at home is replicated or not within the school and daily life. Similarly, this study does not factor in teacher gender and

cultural backgrounds, which, when confronted with a student's cultural context, could also become an influencing factor.

Likewise, personality traits and characteristics which could further explain why a student chooses to participate or not when faced with a question, have also not been taken into account. It would be interesting to examine deeper what aspects of personality account for classroom participation, and whether this stems from the household environment or strictly from the school context. Finally, this study did not consider teacher and learning practices experienced by students at a primary level. A future study examining how students behave at this level could provide further insight into whether the gender gap in academic achievement is an issue that results from a student's secondary school experiences or even before.

## **6.2 Recommendations**

Considering gender, teacher-student interactions, and the more specific factor levels of efficacy which seemed to have had an impact on the students' levels of academic achievement, the following recommendations have been made in an effort to reduce the current gender gap:

1. Strengthen values of collectivity within the student body, allowing students to embrace their gender differences. In doing so, the concept of power ceases to be about dominating or prevailing over others; instead it becomes a collective energy encouraging everyone to do well as a group, as a whole.
2. Conduct professional development sessions among teachers in order to create awareness of how students see themselves in relation to their gender.
3. Encourage teachers to identify and examine their own gender bias through the use of sources such as Project Implicit (2011)

4. Conduct professional development sessions among teachers on how to successfully shift the biased rhetoric and classroom dynamics into more inclusive ones.
5. Ensure personalized guidance in strengthening concepts of learner self-regard and preparedness for learning among weaker groups of students and grade levels, through the strengthening of skills needed to succeed at a secondary school level.

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## ANNEX

### Annex 1

1. I think carefully about my work
2. I worry about getting my work right
3. I can ask my tutor when I am stuck with my work
4. I enjoy doing hard college work
5. I can concentrate on my work in class
6. I know how to solve the problems in my college work
7. I like doing college work at home
8. This college is a friendly place
9. Tutors explain things well
10. My attendance at college is good
11. I think that problem solving is fun
12. I'd rather be somewhere else than in college
13. I think the rules in college are fair
14. I can read well
15. I think this is a good college
16. I like doing tests
17. I am lonely at college
18. My tutors expect me to work hard
19. I behave well in class
20. I like having difficult college work to do
21. I like discussing things
22. I like using my brain
23. I know how to be a good learner
24. Learning is difficult
25. I'm not good at solving problems
26. I find college work too difficult for me
27. I am bored at college
28. My tutor notices when I have worked hard
29. I am happy when I am in college
30. I am on time for lessons
31. I like being at college
32. When I get stuck with my work, I can work out what to do next
33. I like having problems to solve



34. I need more help with my work
35. My tutors tell me when I have done something well
36. I feel safe when I am in college
37. I get into trouble during breaks or lunchtimes
38. Learning new things is easy for me
39. I know the meaning of a lot of words
40. I like my tutors
41. I feel I belong to this college
42. I am clever
43. I make mistakes with my work
44. Working hard in college will help me in the future
45. The work I have to do in class is too easy
46. Thinking carefully about your work helps you do it better
47. I get anxious when I have to do new work
48. I try to do my best in lessons
49. I can do my homework easily
50. When I'm given new work to do I feel confident I can do it