

**Single-gender vs. Coeducational Classrooms in the
Primary School: A Comparative and Relational Case
Study of Student Engagement and Achievement**

الفصول الدراسية ذات الجنس الواحد مقابل الفصول الدراسية المختلطة في
المرحلة الابتدائية: دراسة مقارنة وعلائقية لمستوى تفاعل ومستوى انجاز
الطلاب

by

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**A dissertation submitted in fulfilment
of the requirements for the degree of
MASTER OF EDUCATION
MANAGEMENT LEADERSHIP AND POLICY**

at

The British University in Dubai

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July 2018**

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Abstract

The effects of classroom gender composition on students' academic outcomes have been at the center of a hotly contested discourse. The Al Ain study examines differences in student engagement and student achievement levels between the single-gender and coeducational classroom settings. An assessment of the relationship between student engagement and achievement in the two contexts represents the study's secondary purpose.

Inspired by a worldwide inconsistency in findings on the subject and a dearth of literature on the role of gender composition within classrooms in the Arab world, the quantitative pilot study pins the focus on the primary classroom in two American curriculum private schools in the UAE. Unique in the sense that this causal-comparative design incorporates elements of correlational research, the study relies on a tripartite blend of methods including documentary research, lesson observations, and survey research. MAP® results, student attainment and progress in lessons, and teachers' perceptions of their students are sought and analyzed to gauge student engagement and achievement.

The study's findings show negligible differences between the single-gender and coeducational settings for both student engagement and student achievement. An evident positive relationship between student engagement and achievement also comes to light throughout the study, although these correlations are unaffected by changes in classroom gender composition. The results of the Al Ain project support a significant body of literature which favors neither single-gender nor coeducational settings. Following an analysis of these findings, implications for wider scale research and potential policy considerations are discussed and recommendations for improved academic outcomes in both gender contexts proposed.

Key Words: single-gender, coeducational, student achievement, student engagement

ملخص البحث

لقد كانت تأثيرات التكوين الجنسي للفصول على النتائج الأكاديمية للطلاب في قلب الحوار المتنازع عليه بشدة. تبحث دراسة العين الاختلافات في مستوى تفاعل الطلاب ومستوى انجاز الطلاب بين الفصول المختلطة والفصول ذات الجنس الواحد. يمثل تقييم العلاقة بين تفاعل الطلاب وانجازاتهم في السياقين الغرض الثانوي للدراسة.

مستوحاة من عدم الاتساق في جميع أنحاء العالم في النتائج حول هذا الموضوع ونقص في الدراسات حول دور التكوين الجنسي داخل الفصول الدراسية في العالم العربي ، هذه الدراسة التجريبية-الكمية تركز على الفصول الدراسية الابتدائية في اثنين من المدارس الخاصة ذات المنهاج الدراسي الأمريكي في دولة الإمارات العربية المتحدة. فريدة من نوعها بتصميم

يمها السببي-المقارن الذي يشتمل على عناصر من البحث المترابط ، تعتمد الدراسة على مزيج ثلاثي من الأساليب بما في ذلك الأبحاث الوثائقية، حصص المشاهدة، والابحاث الاستبائية. يتم البحث في نتائج الـMAP®، تحصيل الطلاب وتقديمهم في الدروس، وتصورات المعلمين لطلابهم لتحليل وقياس مستوى تفاعل وانجاز الطلاب.

تُظهر نتائج الدراسة وجود فروق ضئيلة بين الفصول المختلطة والفصول ذات الجنس الواحد لكل من مستوى تفاعل الطلاب ومستوى انجازاتهم. وتُظهر أيضاً علاقة ايجابية واضحة بين مستوى تفاعل ومستوى انجاز الطلاب في جميع مراحل هذه الدراسة، على الرغم من أن هذه العلاقة المترابطة لا تتأثر بالتغيرات في التكوين الجنسي للفصول الدراسية. تدعم نتائج مشروع العين مجموعة كبيرة من الدراسات التي لا تفضّل الفصول المختلطة أو الفصول ذات الجنس الواحد. بعد تحليل هذه النتائج، نوقشت امكانية إجراء أبحاث أوسع نطاقاً والاعتبارات المحتملة للسياسات، وتم اقتراح توصيات لتحسين النتائج الأكاديمية في كل من التكوينين الجنسي في الفصول.

Dedication

To the most recent member of my family, my bundle of joy, my everything,
William.

Acknowledgements

This journey would not have been made possible without the unwavering support of my wife, Mirna. Her insight and understanding were key along the way.

A special thanks to my father, Nabil, whose advice and guidance was central in making this project a reality. I am also grateful to my mother, Naila and sisters Hanadi and Gianna for their belief in my abilities throughout this process.

Additionally, I would like to express my appreciation to Dr Christopher Hill whose informed feedback and perspective made a potentially arduous task practicable.

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List of Abbreviations	
Co-educational	COED
Measures of Academic Progress	MAP®
National Association for Single-sex Public Education	NASSPE
Progress in International Reading Literacy	PIRLS
Program for International Student Assessment	PISA
Single-gender	SG
Socioeconomic Status	SES
Student Achievement	SA
Student Engagement	SE
Teacher Engagement Report Form – New	TERF-N
Trends in International Mathematics and Science Study	TIMSS
United Arab Emirates	UAE

Chapter 1 – Introduction

1.1 Overview

A centuries-old debate over gender composition in education has left a plethora of questions in its wake. Amidst the uncertainty, the single-gender vs. coeducational classroom conundrum has transcended cultures and entangled itself with universal principles relating to gender equity and the concepts of nature vs. nurture. As the UAE claims its place in the vanguard of educational development (Fawwaz 2017), ranking as the number one country to study abroad (Al Serkal 2017), it is more than an apt environment around which to center the discussion. Its transformation of education has been an all-encompassing wave of change driven by diversity, openness, and a thirst for success on a global scale. This educational bloom and boom has however faced challenges along the way. With international assessments showing highly evident gender disparities in favor of girls in the UAE (Ridge et al. 2015), and most evidence on gender segregation a product of studies conducted in the Western hemisphere (Wiseman 2008), it is imperative that discourse on gender segregation and its effects on academic outcomes in the UAE classroom take place.

This study revolves around gender composition in primary classrooms and pins the focus on observed differences in student achievement and engagement levels across the different settings. A focused case study in Al Ain serves the project's purpose through a comparative and relational evaluation of each gender context and its effects on student outcomes. Seeking to build on an already present body of knowledge by shedding light on gaps in the literature, this project is set apart through its focus on students' academic outcomes and away from cultural considerations and societal implications. Furthermore, and although concrete answers derived from the field research offer insight on the effects of a classroom's gender composition as it relates to both student engagement and achievement, the study is underscored by its pursuit of a more holistic outlook through which it can serve as a catalyst for purposeful review, discussion, and potential change.

1.2 Background

1.2.1 Education Priorities

In a nation where education is a priority area and part of the leaders' vision for united prosperity (Ministry of Cabinet Affairs 2018), the UAE is pushing forward mightily to compete at a global level. Past are the days where access to education was a concern. With enrolment rates close to 100% for both boys and girls in Primary schools, and near identical gender ratio figures for students enrolled in the same phase (UIS 2018), access to education is no longer an obstacle. In lieu of these historical challenges, the onus is now on schools to provide environments suitable for students' skill and competence development.

1.2.2 Private Education

Close to 71% of all students, Emirati and expatriate, are enrolled in UAE private schools (Ridge et al. 2015). With the private school system catering to a multitude of nationalities in the UAE (UAE Government 2018a) the demand for these schools amongst UAE citizens has risen considerably over recent years. Since 2001, the percentage of Emirati students enrolled in private schools in Dubai has risen from 34% to 56% (KHDA 2012). The numbers in Abu Dhabi are on par with close to 56% of Emirati students enrolled in private schools across the emirate (Statistics Centre 2017). The surge of private schools is not only a response to the needs of the expatriate community (Ridge et al. 2015) but also a consequence of genuine parent beliefs that private schools offer a better education (Kenaid 2011); a revelation consistent with TIMSS, PIRLS, and PISA data illustrating higher performance of private school students than those in public schools (KHDA 2009 & KHDA 2011). This reality has translated into a competitive drive between private schools offering a vast wealth of selections in terms of curriculum, fee ranges, and both school and classroom gender composition.

1.2.3 Segregation and Coeducation in the UAE

Gender composition in UAE schools and classrooms is a dynamic and unique phenomenon. In a region where gender-segregated schools are the norm due to socio-religious intangibles arising from a considerable religious influence (Wiseman 2008), Islam remains vital to the educational structure of the UAE (Alhebsi et al. 2015). Evidence of this is seen in the public school system where males and females attend segregated schools starting in grade 1 (UAE Government 2018b). The private school system is however quite different and illustrates the UAE's openness to co-education, where the establishment of such schools is permitted, albeit through a process that is subject to checks and balances culminating in cabinet approval (Dhal 2009). Given this UAE reality of which coeducation is a part, a more profound understanding centered on gender-specific academic benefits, and away from demographic trends, is needed.

1.3 Statement of the Problem

There is an imperative need to comparatively assess the advantages and disadvantages between single-gender and co-educational classrooms. It is not only the scant number of studies on gender segregation in classrooms across the Arab world that necessitates the initiation of additional projects but also a long overdue universal contextualization of the situation where student outcomes are the focal point of the study.

1.4 Aim of the Study

Before highlighting the study's objectives, the underlying aim of the project must be stated and understood. As suggested by Thomas and Hodges (2010), the broadness of a study's aim naturally situate it before the more specific research objectives and questions. The aim of this causal-comparative case study in Al Ain is to determine the extent to which gender composition affects student achievement and engagement in the primary classroom.

1.5 Research Objectives

Setting clearly constructed and ordered objectives is key to the success of this project. According to (Thomas & Hodges 2010), research objectives are precise statements which specify the topics at the heart of the study. Building on the project's main purpose, the objectives listed below provide the paper with measureable direction and focus.

- (1.)To examine the differences between levels of student achievements in the two gender-based settings.
- (2.)To examine the differences between student engagement levels in the two gender-based settings.
- (3.)To assess the relationship between student engagement and achievement in each of the two gender-based contexts.
- (4.)To compare the relationship between student engagement and student achievement within the two different gender-based contexts.

1.6 Research Questions

Eloquently put forward by Haynes (2006), research questions are a consequence of a recognized knowledge deficiency in a specific field or subject area. It is this dearth of information that drives this study through its four research questions. Moreover, the questions serve as a core propeller of the study as it pertains to the selection of methodology, instruments, and data analysis strategies (Lipowski 2008). Quantitative in nature, the research questions examine connections among variables sought by the researcher (Creswell 2009). Given the three variables – one independent and two dependent – around which this study revolves, the formulated questions are both comparative and relational and aim at better understanding the relationships among the variables. According to Creswell (2009), these approaches allow the researcher to associate any number of independent variables with dependent variables and compare cohorts on the independent variable to measure impact on the dependent variable respectively. Two secondary questions culminate the inquiry and serve the purpose of

better understanding the relationship between student engagement and student achievement in each of the different gender settings.

The paper's four research questions are as follows:

- (1.)What is the difference in student achievement between students in the single-gender setting and those in the coeducational setting?
- (2.)What is the difference in student engagement levels between students in the single-gender setting and those in the coeducational setting?
- (3.)What is the relationship between student engagement and student achievement in each of the settings?
- (4.)What is the difference between the student engagement and achievement correlation in each of the settings?

1.7 Significance of the Study

The driving forces behind this project's undertaking lay not only in the desire to reduce gaps in the available literature but also a keenness to supplement, even if at only an infinitesimal scale, the UAE's enormous, nationwide investment in education. By presenting a unique idea or proposed resolution to an urgent problem, demonstrating its benefits within the context of which it is a part, and providing result-based suggestions for subsequent research (Baloch 2011), the essence of this study is given an avenue through which it can vividly come to light.

A contentious debate with significant policy implications has reverberated across academic circles on the subject of gender segregation in classrooms and schools. Much of the research has produced a range of mixed results. Spearheaded by Leonard Sax, single-gender classrooms are at the forefront of the educational debate (Cable & Spradlin 2008). Sax maintains that a coeducational classroom is incapable of fostering a gender neutral environment where the needs of gender-specific learning styles can be met (NASSPE 2006). On the opposite side of the spectrum, Halpern et al. (2011) suggest that gender segregation perpetuates stereotypes and legitimates sexism at the institutional level. Adding further complexity to the equation is the line of thought which suggests that there are neither advantages nor disadvantages with single-gender

education in classrooms (Smithers & Robinson 2006). With a body of literature as vast as it is polarized, there is a sincere and spirited craving for concrete findings able to further research as it pertains to the effects of classroom gender composition on student achievement.

As the lens is focused on the UAE, its investment in education cannot be overlooked. In fact, a stupefying 20% of the 2017 UAE national budget was allocated to education alone (Emirates News Agency 2016). The establishment of the Abu Dhabi Education Council in 2005, the Knowledge and Human Development Authority in Dubai in 2006, and the newly formed Abu Dhabi Department of Education and Knowledge in 2017 is a testament to the government's ongoing dedication towards its youth. These efforts, aimed at creating a sustainable first-rate education system, are cemented in the UAE's National Agenda Vision 2021 which views education as "a fundamental element for the development of a nation and the best investment in its youth"(Ministry of Cabinet Affairs 2018). Such a statement exemplifies the emphasis placed on education by the UAE government and consequently highlights the need for such a study.

The project's rationale is further reinforced when the vast and diverse expatriate population in the UAE is taken into account. This translates into a multitude of curricula offering both single-gender and coeducational schools to meet the needs of citizens and residents across the seven emirates. Accordingly, an understanding of the varied gender dynamics at play in the diversified and ever-changing context of the UAE becomes necessary. According to Moussly & Naidoo (2009), UAE education officials are of the belief that students should be offered as many gender-grouping options as possible based on their culture, levels of comfort, and tradition. These alternatives, though prevalent in private schools across the nation, have also begun to see the light in primary public schools (Ahmed 2012) where gender segregation was previously the standard (Dukmak 2009).

Adding more fuel to the driving forces behind this study is the fairly scarce research on gender-related differences in the UAE (Alkhateeb 2001) and the sparse data on gender composition in the UAE private sector at both school and classroom level. Moreover, addressing the effects of a classroom's gender composition on student engagement

and achievement outcomes is also worthy of inquiry. This urgency is further brought to light when gender gap differentials in UAE science, math, and reading scores are highly evident on internationally standardized assessments such as the TIMSS, PISA, and PIRLS (Ridge 2014). Lastly, and for good measure, the basis upon which this study was created is bolstered through its purposed focus on the primary classroom where the importance of early learning facilitates educational development in later years and provides the necessary building blocks for success in the higher grades (Dougherty 2014).

1.8 Structure of the Study

With the exception of a specially titled 'Literature Review' chapter, this study conforms with the conventional expectations laid out by social science research journals and includes the main headings, 'Abstract', 'Introduction', 'Methodology', 'Findings', 'Discussion' and 'Conclusions' (Denscombe 2010). In this paper, the main headings - excluding the Abstract - will be referred to as 'Chapters' and are chronologically ordered and summarized below.

Abstract

This is the essence of the paper (Hipp & Zoltan 2005) and serves as a synopsis of the entire study. A glance at the abstract offers the reader a comprehensive snapshot of what is in store throughout this paper.

Introduction

This chapter included a descriptive overview of the project, necessary background information, and problem statement which tackled the question of "so what?" (Hernon & Metoyer-Duran 1993), adding urgency to the purpose. It is in this chapter that the project's underlying purpose came to light and both its aims and objectives were stated in declarative and question form.

Literature Review

Offering a synopsis and synthesized examination of the available literature (Hart 1998), the paper's second chapter offers linkages between sources (Ridley 2008) and grounds the research in the context of previous literature (Maxwell 2005). Through the definition of key terms, a thorough relational analysis of the literature, and the positioning of the research within the wealth of available resources, this chapter solidifies the paper's foundations.

Methodology

In this chapter, the project's validity is judged through the information provided on data collection, generation, and the rationale behind the utilization of the selected procedures (Kallet 2004). The research philosophy, research approach, utilized instruments, ethical considerations, and limitations are among the key components of which this section of the paper consists.

Findings

Through the presentation of data using figures and tables coupled with the study's statistical analysis, conciseness is key in this chapter (Fisher et al. 2016). The findings of the research are stated and ordered in a sequentially sound manner without any interpretation (Annesley 2010). This portion of the paper sets the tone for the discourse which follows.

Discussion

This is the chapter which tackles the task of addressing the research questions. According to Bavdekar (2015), this section is focused and attempts to communicate the meaning behind the research's findings. By carefully interpreting the data and analyzing the relationships among the different variables, the discussion serves as a purpose-driven conjoiner of the literature upon which the study is founded and the data which has been generated and collected.

Conclusion

In addition to restating the paper's purpose, summarizing its findings, and pointing to its limitations (Hopkins & Dudley-Evans 1988), the final chapter also synthesizes the study's key findings in the build-up to its recommendations and implications. It is here that the essence of the paper is encapsulated and closure is found.

Chapter 2 - Literature Review

2.1 Introduction

The ongoing debate on classroom gender composition has reverberated loudly across the annals of educational research. Advocates of single-gender education support the notion that boys' and girls' achievement and engagement are increased upon separation by classrooms (Pahlke et al. 2014). On the other hand, proponents of co-educational classrooms cite its need on the basis of equality and avoidance of discrimination (Green 2006). Cable and Spradlin (2008) report that gender-related stereotypes are actually perpetuated by the unneeded separation within schools. Between these two polarized stances lies a significant body of knowledge that sees no clear advantage to either gender setting (Harker 2000; Warrington 2002). Amidst this array of literature, a dynamic shift is taking place. The UAE has recently opted for the incorporation of co-educational classrooms in their public Primary schools (Ahmed 2012) while the U.S. opened its doors to single-gender experiences within its public sector over a decade ago (U.S. Department of Education 2006).

In this chapter, key terms are defined and a historical context set. The review then examines the research's principal domains in view of the relevant literature and positions the study within that vast realm of knowledge.

2.2 Definition of Key Terms

A clear description of the paper's key terms is essential and targets readers outside the specialized field of study (Locke et al. 2013). These terms are defined below:

Student Achievement

Studies reviewed by Henderson and Mapp (2002) define student achievement as a representation of measures and outcomes which include but are not limited to standardized test scores, report card grades, grade point averages, and attendance rates. In the context of this research, it is only fitting that the definition of student

achievement be extracted from the guiding framework adopted by the UAE government and adhered to by the observed schools. According to the Ministry of Education (2015), student achievement is a performance standard and key outcome which serves as a measure of school effectiveness and is made up of three indicators: attainment, progress, and learning skills. A synthesis of these two explanations affords this research a working definition where student achievement is described as the attainment and progress of students in lessons and on standardized tests.

Student Engagement

The profundity of the term engagement is deserving of elaboration. According to Newmann et al. (1992), engagement is an incorporation of focused attentiveness, active involvement, and dedication. In the context of the classroom, student engagement is viewed as the intellectual investment and effort put forth by students towards their learning and understanding (Newmann et al. 1992). Expanding on this, Finn and Rock (1997) suggest that a psychological element related to the students' sense of belonging at school and a behavioral element tied to students' participation in school activities both make up the student engagement construct. This viewpoint is further reinforced by Sinclair et al. (2003) whose review of forty-five studies led to an all-encompassing definition of student engagement as a comprehensive construct which comprises affective, behavioral, and cognitive aspects. Based on these descriptions, and in the context of the classroom for the purposes of this study, student engagement can be defined as a synergy of students' purposeful involvement, self-motivation, and interest in the teaching and learning process.

Affective Engagement

Conceptualized as a dimension of student engagement (Veiga 2016), the affective component of engagement relates to the students' sense of belonging at school and the extent to which they value their academic outcomes (Willms 2003). The literature on affective engagement offers even more specific definitions. According to Hart et al. (2011), affective engagement describes a student's feelings towards the school, classmates, mentors, and his or her learning experiences. It is this personal sense of

interest and care demonstrated by students that represent the affective engagement domain in the Al Ain study.

Behavioral Engagement

Behavioral engagement is one of the three primary domains through which the student engagement construct is studied (Cooper 2014). According to Fredricks et al. (2004), behavioral engagement revolves around students' attendance, conduct and participation during school-related activities. A key trait of this particular domain is concerned with the student-teacher dynamic. Birch and Ladd (1997) suggest that behavioral engagement is directly linked to positive relationships between students and teachers. In fact, and as postulated by Patrick et al. (2007), students display higher levels of behavioral engagement if they possess a genuine belief that their teachers care about them. These aforementioned characteristics of behavioral engagement represent the study's viewpoint on the domain itself and its position within the student engagement construct.

Cognitive Engagement

In better understanding student engagement theory, researchers have used the cognitive engagement domain as a means to that end (Yazzie-Mintz & McCormick 2012). Defined by Shernoff (2013) as the students' inner investment in the learning process, cognitive engagement integrates essential psychological traits. According to Cooper (2014), traits associated with cognitive engagement work towards the advancement of students' effort in their learning. The connection between psychological qualities and the cognitive domain is not only limited to effort and persistence (Hart et al. 2011). Nguyen et al. (2016) acknowledge that psychological motivations also factor in, and this belief is reinforced by Hart et al.'s (2011) categorization of self-motivation as a key indicator of cognitive engagement. This depth of literature surrounding cognitive engagement is foundational in the Al Ain study, helping to shape its instruments and guide its discussion.

2.3 Historical Perspective

A vast, multi-dimensional, and ever-evolving history surrounds single and co-educational education. Until the late 19th century, single-gender education was the norm in the United States (Anfara & Mertens 2008); a reality not witnessed in Europe until nearly one century later (Rogers n.d.). Unlike Europe however, where the shift to co-education was driven by pedagogical and ideological motives, in the U.S., change was an outcome of economic factors (Tyack and Hansot 1990). By the turn of the 21st century, this trend towards co-education was evident worldwide with close to 98% of schools in most countries following a co-educational system (Wiseman 2008). The majority of Islamic nations were exceptions to this global movement and along with other notable countries such as the U.K., Singapore, South Korea, and Australia – among others – continued to offer more single-gender educational options with numbers exceeding 10% (Wiseman 2008). Interestingly, and given this historic shift witnessed in most countries, a more recent inclination back towards single-gender schooling has seen a resurgence across the educational landscape – private and public - and specifically in modern societies (Riordan 2002).

2.4 Gender Composition in UAE Schools

The availability of single-gender and coeducational classrooms and schools in the UAE reflects a reality similar to that of many countries. A diversity of options in private schools does exist. Even the public sector is now opening its doors. Ironically, UAE research on classroom gender composition and the array of choices provided are on opposite poles of a spectrum in need of further examination.

While coeducational options in the UAE have become more plentiful in recent years, these alternatives, similar to the curricular selections on offer, have been driven mainly by demographics. After all, the diversity of the UAE educational landscape is a reality which cannot be ignored and of which both resident and citizen are a part. In Abu Dhabi alone, 14 different curricula cater to an ever-growing multicultural community (ADEC 2016). The wide range of educational options is not limited to curricular choices but also extends to gender-varied settings. This breadth should not however be taken

at face value and a more profound look at the numbers is needed. For example, in Dubai, a relatively insignificant 9.3% of private schools are gender-segregated; however, this percentage does not show the number of coeducational schools which segregate classrooms (Dhal 2009). In fact, a significant 41% of private school classrooms in Dubai are single-gender (KHDA 2012); a reflection of a polarized reality. Interestingly, this polarization is inexistent in the Primary phase where a markedly lower 15% of classrooms are gender-segregated (KHDA 2012). With the absence of more statistical information on the percentage of single-gender and coeducational classrooms in Abu Dhabi and the UAE on the whole, evident performance-related gender disparities on international assessments (KHDA 2011 & Ministry of Education 2013), and a lack of research on SG vs. COED classrooms in the UAE context, gender composition in UAE classrooms is an area that requires attention.

2.5 The Primary School

In the relatively recent past, much of the research on single-gender and coeducation has focused on students in higher grade levels. According to Bracey (2006), most studies examined students in high school phases with only a minority aimed at students in the primary. With the spotlight now on the gender debate in schools, more reviews are incorporating studies on students in the primary classroom. Mael et al.'s (2005) systematic review for the U.S. Department of Education focused on both elementary and high school students.

To shed light on the importance of the primary phase, its impact on students during these early years needs to be better understood. Key here is the student's cognitive skill development. Research by Entwisle and Alexander (1998) has shown that the primary phase is a vital stage for the development of students' cognitive skills. The connection between these skills and student achievement is also essential. According to Hauser et al. (1983), these skills are connected to student achievement and have also played a foundational role in students' academic progress (Entwisle & Alexander 1998). A gender-based perspective offers more insight into the criticality of the primary classroom. Studies by Fryer and Levitt (2010) showed that girls and boys who entered Kindergarten on equal footing in reading and math were no longer on par with one

another by the end of the fifth grade. This gap reflects a need for increased attention directed towards the primary classroom; attention brought to the fore through the Al Ain project.

2.6 Literacy and Numeracy

The selection of mathematics and English as the focal point of the study was heavily based on reviewed research and literature. These core courses did after all embody essential literacy and numeracy skills, vital learning tools for basic education (World Declaration on Education for All 1990). In fact, longitudinal research has shown a need for emphasis on reading literacy in primary grades (Cunningham & Stanovich 1997). The importance of numeracy was also reported by Geary (2011) who noted that abilities in simple arithmetic in the early primary were predictors of students' mathematics performance in middle school years.

A deeper appreciation for literacy in the educational context comes in the form of its globally recognized status as a right for all. According to the U.N. General Assembly Resolution 56/116 (2002), literacy is an essential learning tool needed for the acquisition of life skills and a foundational step towards basic education which in and of itself is a basic human right (U.N. General Assembly 1948). Mindful of this, and given the all-encompassing field of literacy which consists of reading, writing, and numeracy skills (Global Monitoring Report 2006), it is only fitting to centralize the study's focus on English and mathematics.

2.7 Gender-related Learning Differences

The notion that boys and girls are wired differently is one that has garnered the supported of brain-based research (Anfara & Mertens 2008). Studies have in fact revealed that brain processes differ between the two genders. Clements et al. (2006) have shown that boys perform better than girls at gross motor and mechanical tasks while girls are at an advantage when processing language-related assignments. The sometimes misunderstood conception that girls perform better in English or the humanities while boys excel in mathematics and science is in fact supported by the

literature. According to Gurian and Stevens (2004), language-oriented brain processing advantages for girls are reflected in the classroom during reading and writing activities at which girls outperform their male peers. Conversely, and mindful of the connection between spatial ability and mathematics (Halpern 2000), studies on second and third graders showed boys accomplishing more on spatial ability tasks (Levine et al. 2005). These findings illustrate learning differences are not merely a result of nurture, in the form of curricular choice, but exist innately through gender-based biological processes.

Having shone the light on gender differences in isolation, an understanding of their effects within different gender settings is key to this study. According to Anfara and Mertens (2008), the two genders' unique needs require gender-differentiated learning environments and experiences. Salomone (2006) supported this line of thought in his belief that girls, as a single-gender group, had greater attention spans, better control of impulses, and more complex fine-motor and verbal skills. On the other hand, boys as a separate group held advantages in their visual and spatial skills – aspects which favored them in mathematics and science (Salomone 2006). Given this body of knowledge, and as a by-product of the Al Ain study's findings, the effects – if any - of the aforementioned gender-specific, biological differences can be better understood within each of the single-gender and coeducational learning environments.

2.8 The Effects of Student Engagement on Student Achievement

The positive correlation between student engagement and student achievement defines a relationship to which many scholars can attest. Contrary to older theory which suggests student disengagement is a consequence of low achievement, recent literature points to the existence of a reverse relationship (Willms 2003). According to Dotterer and Lowe (2011), and in the classroom context specifically, student engagement factors in both directly and indirectly in its positive impact on student achievement. The significant extent of this influence on student achievement has been realized and supported through findings in educational research (Fredricks et al. 2004; Chen 2008). In fact, student engagement has been found to be one of the strongest predictors of student achievement (Klem & Connell 2004). Research has shown that engaged students' investment in learning and their pride in performance, knowledge

comprehension, and ability to incorporate skills into their lives are all heavily tied to academic success (Newmann 1992). Given the importance of active participation within the student engagement construct (Newmann et al. 1992) and the linear relationship between student participation and achievement (Finn 1993), the connection between the study's two main dependent variables is further solidified.

2.9 The Case for Single-gender classrooms

Since the 1990s, a renewed interest in single-gender schooling has emerged on to the scene (Anfara & Mertens 2008). With advocates making the case for the positive effects of single-gender schooling on student achievement and engagement, the abundant discourse and ensuing momentum has left its mark. To this end, international policy changes and officially-backed reviews have been put into effect. In the U.S., an amendment of the Education Act permitted public schools to establish single-gender classes as a means to meet the needs of their students (U.S. Department of Education 2006). Across the Atlantic in the U.K., a government-funded review has suggested that boys should be segregated and taught in more competitive environments (Department of Education and Skills 2007). The widespread impact affects other countries too. The benefit of SG classrooms has been supported by researchers in New Zealand (Scott 1991), South Africa (Mallam 1993), and Australia (Smith 1994). This evident wave of influence led by the research cannot be ignored. Leading the drive on the front lines is Leonard Sax, a vocal proponent of the single-gender schooling movement. He believes that the segregation allows for both genders to better focus on academics (Cable & Spradlin 2008). A study conducted by the NASSPE on elementary students supports this notion; based on the findings, boys and girls in single-gender classrooms achieved higher proficiency scores on the Florida Comprehensive Assessment Test (Cable & Spradlin 2008). An earlier study on 5th grade students led by Singh, Vaught and Mitchell (1998) had revealed similar outcomes where academic achievement was deemed higher in SG classes.

With most research on SG classes focused on the advantages for females (Anfara & Mertens 2008), the results have shown the same. According to the AAUW (1998), the majority of researchers believe that single-gender classes impact girls positively.

Whereas their male peers seek and receive most of the teachers' attention in COED classes (Lee et al. 1994), girls in SG classes are more empowered (Pahlke et al. 2014) in an environment more conducive to their academic achievement (Shapka & Keating, 2003). Improved participation is key to the favorability of SG classes. According to Ferrara and Ferrara (2004), students' self-consciousness was not as heightened as it would be in a COED classroom and thus led to increased participation. Findings by Gurian and Henley (2001) found that disciplinary problems were less evident in single-sex classes as reported by teachers. A more comprehensive determination made by Riordan (2002) suggests that both student achievement and engagement were positively impacted by SG settings. Additional advantages specifically tied to gender differences are also ever-present in the literature. Bracey (2006) favored SG classes in the belief that they provided an environment through which an increased focus on pedagogically-related, brain-based, gender variances could thrive.

SG classes are also seen by some as advantageous for particular genders at a subject-specific level. Research conducted by Parker and Rennie (1997) showed that girls had more optimistic and confident attitudes towards science, math, and technology within the SG environment. Similar findings were reported by Sadker et al. (2009), who suggested that girls' interest in STEM subjects was negatively affected by boys' behaviors in the classroom.

The case for SG education is indeed robust. In addition to the ardent support of SG classrooms, more modest findings also exist. Through their studies in the U.K. and a review of studies in the U.S. and Australia, Younger and Warrington (2006) postulate that SG classrooms can have a positive influence on student engagement and achievement but only if accompanied by appropriate training of teachers on gender-specific pedagogy. With a defense as widespread, longstanding, and explicit, the Al Ain study only scratches the surface of the existing literature; it does however provide a new context to a global phenomenon.

2.10 The Case against Single-gender classrooms

The expansive research on the benefits of SG classes is met with an equally significant body of knowledge in favor of COED classes or of the belief that neither setting is advantageous. Opposition is not only extensive but also varied. Some opponents of SG education believe that the underlying reasons behind its support are affected by passion. According to Jill (1993), inconclusive results coupled with emotionally driven sentiments are the foundational bases for SG education. Other critics, as reported by Cable & Spradlin (2008), contend that the separation of genders reflects inferiority. Beyond the emotional and social implications, academic outcomes are also part and parcel of the debate. The extensive review conducted by Smithers and Robinson (2006) covered SG and COED settings in the U.S., U.K., New Zealand, Ireland, Canada, and Australia and arrived at the conclusion that neither SG nor COED environments held advantages over the other.

The notion that girls benefit greatly in SG environments was also countered by critics who cite extensive research as solid defense. In Australia, a study conducted by Rowe (1988), and focused specifically on student achievement in math, showed negligible differences between girls in SG and COED classrooms. Subsequent research has supported these results. Studies by Workman (1990), Young and Fraser (1992), and Leder and Forgasz (1994) have shown consistent findings. A more recent study with introduced controls revealed that there were insignificant differences in student achievement for English, math, and science (Harker 2000).

Skeptics of SG education have always been wary of the positive impact reported on the separation of girls and boys in schools. The defense used by supporters of coeducation has maintained that SG research fails to control key variables. Results which have favored SG education can be attributed to SES, individual student ability, the quality of teaching, and the type of school (Jackson & Smith 2000). According to Lingard et al. (2001), the differences between SG and COED settings are insignificant when key variables are controlled. With this in mind, the Al Ain study, treads carefully and attempts to control as many variables as possible as it seeks concrete answers.

Chapter 3 - Methodology

3.1 Introduction

This chapter describes how the research in the AI Ain study is carried out. The beginning sees a discussion of the research methodology's theoretical underpinnings in terms of its philosophy, approach, design, purpose, and strategy. The chapter also presents the rationale behind the selection, use, and effectiveness of specific research methods and instruments throughout the study. Limitations, delimitations, validity, reliability, and ethical considerations are also integral components detailed towards the end and round out the chapter in archetypal fashion.

3.2 Research Philosophy

Referred to as a worldview, the research philosophy assists in the justification of why a particular approach was selected for a study (Creswell 2014). Labeled a paradigm by Lincoln et al. (2011), it is a set of principles or convictions which drive action in inquiry-based research Guba (1990). According to Creswell (2014), the four philosophies in research are the postpositivist, constructivist, transformative, and pragmatic.

The AI Ain case study is an unequivocal representation of the postpositivist world view. In postpositivism, there is the inevitable notion that causes lead to outcomes and acquired knowledge is a consequence of both measurement and observation (Creswell 2014). This deterministic relationship, a key attribute of postpositivism, is observed in the AI Ain study between classroom gender composition and both student engagement and achievement. Moreover, the study's desire to quantify measures of observation is also evident in the operationalization of the engagement and achievement variables through the different observation tools and instruments. An additional feature within the postpositivist view is the reductionist line of thought; one which necessitates the breaking up and separation of ideas into variables apt for testing (Creswell 2014). In the AI Ain project, the reduction of the learning process and student outcomes into specific variables, namely engagement and achievement, position the research in the sphere of postpositivism.

3.3 Research Approach

Perhaps the most common way to describe a research project's wide-ranging methodological scope is through its approach. As defined by Creswell (2014), the approach is a comprehensive plan and set of procedures ranging from general suppositions to specific methods of data collection and analysis. Divided into three broad categories, namely quantitative, qualitative, and mixed methods (Williams 2007), the classification is not one that is rigid but analogous to points on a continuum (Newman & Benz 1998).

At the heart of the Al Ain study is a quantitative approach. With its origins dating back to 1250 AD (Williams 2007), quantitative research revolves around the collection of data and the quantification of its information to support or contend varying assertions in the field (Creswell 2003). Another core characteristic of the quantitative approach is its thorough examination of the study's variables and their association with one another (Creswell 2014).

The quantitative nature of the Al Ain study arises in part due to the in-depth analysis of its variables and the relationships amongst them. In addressing the first two primary research questions, a comparative relationship examines the effects of the independent variable – classroom gender composition – on two dependent variables, namely student engagement and student achievement in each of the three gender-based settings. The uniqueness of the project is then demonstrated through its second relationship, a relational connection, where a reassignment of variables takes place. In this instance, the study positions 'student engagement' as an independent variable and investigates its effects on student achievement within the different gender settings.

The study's quantification of data further solidifies its place as one that is quantitative in nature. Quantifiable data collected through a lesson observation tool (see Appendix C), a questionnaire (see Appendix D) targeting teachers, and standardized assessment results (Appendix E) enable subsequent analysis in the form of descriptive and inferential statistics, both characteristic of a quantitative study (ACAPS 2012). Data interpretation in the Al Ain project also reflects its quantitative properties as the

conclusions it draws from the results – obtained through the statistical tests - of the study directly address the research questions and the overall significance of the study (Creswell 2014).

The substantial use of literature at the start of the Al Ain study is also noteworthy and justifies its classification as one that is quantitative. According to Creswell (2014), the deductive utilization of extensive literature at the beginning of a study with the aim of guiding its research questions, positions the research as one that is quantitative. In the Al Ain case, the questions posed are provided initial direction through the literature, and the comparative analysis between the study's results and the existing body of knowledge which ensues, solidifies the research's quantitative standing.

Additional traits of quantitative studies include the use of close-ended questions and pre-set, standardized instruments (ACAPS 2012). The first of these two features is evident in the Al Ain study through its use of four closed research questions. The study's instruments and data sources, which rely on official government performance expectations, accrediting agency observation criteria, and peer-reviewed survey forms, are also representative of fixed standards that act as a control over the researcher's potential bias and thus reflect the study's quantitative characteristics.

3.4 Research Design

Having clearly identified the approach, understanding the research design is necessary. Within all three research approaches are designs specific to each type of approach. The research design offers the study's processes direction and is a strategy of inquiry (Denzin & Lincoln 2011) within the qualitative, quantitative, and mixed methods approaches (Creswell 2014).

Better understanding the all-encompassing aspects of the research design means false beliefs need to be put to rest and the nature of the design must first be described. One common misconception associated with studies in which two or more subjects or groups are compared is that they are experimental in nature. Even though both the 'experimental' and the 'non-experimental causal-comparative' design are similar in that they compare two or more subjects or groups and seek to determine the cause and

effect relationship between independent and dependent variables (Salkind 2010), there are distinct differences between the two. In fact, the nature of this study is strictly non-experimental as there was no manipulation of the independent variable (Salkind 2010) which in the case of this project is the gender. Reinforcing the classification of the project's design as causal-comparative lays in the fact that its independent variable has already occurred (Salkind 2010 & Creswell 2014). In this study, the gender of the three different student groups – girls, boys, mixed gender - is incapable of manipulation and has already been decided. This also negated the need to randomly select subjects for this project – a feature of the experimental design (Salkind 2010) - and thus underpins its categorization as a causal-comparative design.

To further solidify the case for this research as one that is causal-comparative is to understand how its variables are connected. In a causal-comparative research design, the goal of the research is to determine whether the dependent variable is affected by the independent variable through the comparison of two or more groups of individuals (Salkind 2010). In the Al Ain study, the student engagement and achievement levels represent the dependent variables while the students' gender acts as the pre-defined independent variable.

Even though the case for this quantitative study's approach and design has been made, the project is unique in the sense that the primary design, a causal-comparative research, also incorporates aspects of correlational research to achieve secondary objectives (see Figure 3.1.1). According to Salkind (2010), correlational research designs involve only one group of individuals and examine the effects of an independent variable on a dependent variable within the same group. The correlational aspect of the Al Ain study becomes evident when, in pursuit of achieving the research's secondary aims, student achievement is set as the only dependent variable and a relationship is sought between student engagement and achievement levels for each specific gender group.

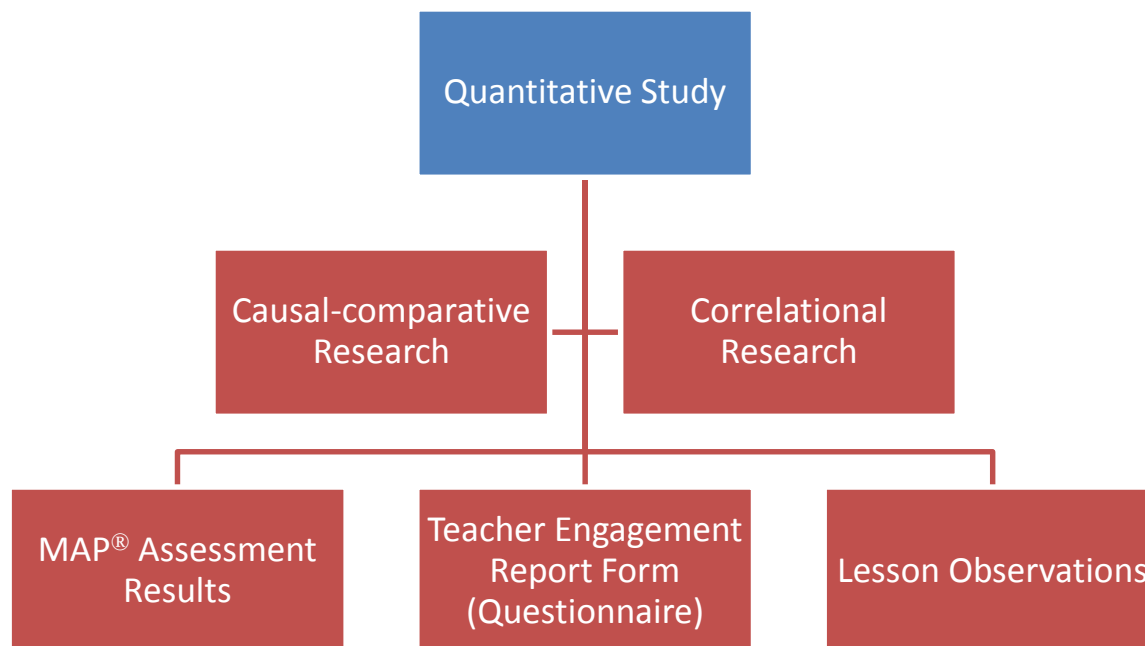


Figure 3.1.1

3.5 Research Purpose

The classification of the study according to purpose allows for a clearer understanding of its rationale and overarching message. According to Babbie (2015), social-science research is comprised of three purposes: explanatory, exploratory, and descriptive. Interestingly, Yin (1984) makes note of the same categories and refers to them as case studies. Given the quantitative nature of this particular study (ACAPS 2012) coupled with its aim to explain the phenomena in the data (Zainal 2007) through the provision of causal relationships (Babbie 2015), it is best classified as explanatory. This characterization is further reinforced with the knowledge that qualitative case studies are suited for exploratory and descriptive research (Mouton 2001). Clearly defined categorizations do not however negate possible blends between the three types of studies. In fact, Babbie (2015) acknowledges that elements of all three purpose types could be incorporated in one study, an occurrence that is somewhat evident in this research. For example, the project does have some semblance of an exploratory study in that not much has been written about the topic in the region (Creswell 2014) and its research questions are posed with the word ‘what’ (Creswell 2009) as opposed to the conventional use of ‘why’ often associated with explanatory studies (Yin 1984). Despite

the commonalities, this particular research is more explanatory in nature as it extends beyond highlighting the differences between students' academic outcomes in each of the gender-based settings and attempts to explicate - via thorough assessment and examination - the levels of both student achievement and engagement in each of the gender-based settings. In this sense, it is more than a mere description of the phenomena or state of affairs (Zainal 2007), and instead synthesizes between the literature and results to formulate fundamental explanations. Moreover, and mindful of the study's explicitly stated variables – student engagement, student achievement, gender – it is far from an exploratory study where significant variables in need of examination are unknown to the researcher (Creswell 2003).

3.6 Research Strategy

In better understanding the type of empirical inquiry used in the Al Ain project, a closer look at the study's strategy is needed. Saunders et al. (2009) defined research strategies as broad plans describing how a researcher will endeavor to answer the study's research questions. The research strategy adopted in this particular project, as the title suggests, is an example of a case study. As defined by Robson (2002), case study research is a strategy utilized for empirical studies of current phenomenon in the bounds of its actual context. The emphasis here is on the relative non-existence of boundaries between the phenomenon itself and the context in which it is a part; a key attribute of case studies (Saunders et al. 2009). Throughout this project, observations take place within unaltered environments. Classroom gender composition is observed in three different settings across two schools in contexts which are not controlled in any way.

Another feature of the case study research strategy is its dependence on multiple sources of evidence (Robson 2002). The notion that various techniques can be used within a case study is reinforced by Saunders et al. (2009) and is reflected in the Al Ain project through both in-class observations and questionnaires targeting concerned teachers. In fact, survey research, a strategy in its own right, is a part of case study research in this project and this non-exclusivity is exemplified through the collection and analysis of standardized quantitative data using the said questionnaires.

3.7 Research Methods

Before the identification and discussion of the study's various methods, it is essential to highlight the differences between the terms 'methods' and 'methodology'. Due to their interchangeable use in research studies, confusion might abound if defining descriptions are not sought. According to Saunders et al. (2009), methodology is centered on the theoretical and concerned with how research is carried out. In contrast, methods describe the specific practices and procedures used in the study to collect and analyze data (Saunders et al. 2009). Three main data collection procedures were used in the Al Ain study.

3.7.1 Data Collection

Lesson Observations:

An integral part of this study takes place in the classroom. Most of the data collected and analyzed by the researcher, is after all, acquired during classroom observations. It is through the lesson observations that both student achievement and student engagement are measured. To ensure a sound and reliable process with wide scope and sufficient depth, the researcher took a variety of measures.

Firstly, variables with potentially undesirable effects on the study's results were kept constant. All lesson observations took place during the same term of the academic year and were conducted by one observer. Moreover, observed teachers in both schools had been informed of the scheduled classroom visits two days in advance and had equal time to prepare for the announced observations. Time spent in each of the classrooms was also equalized at a pre-determined range of fifteen to twenty minutes. Also key was the decision to only target two subjects, ensuring the study's results were not stretched thin across a vast array of subject-specific environments.

The lessons observed are denoted by checkmarks below (see Table 3A); each checkmark represents one lesson observation. A total of 18 different lessons were observed across the two gender settings.

Lesson Observation Summary				
Grade	Subject	Single-gender (Girls)	Single-gender (Boys)	Coeducational (Girls & Boys)
2	English	✓✓	✓✓	✓✓
	Math	✓✓	✓✓	✓✓
3	English	✓	✓	✓
	Math	✓	✓	✓

Table 3A

Survey Research:

The use of survey research in the Al Ain pilot study proves to be a significant part of the data collection and analysis process. According to Creswell (2014), survey research provides a quantitative project with descriptions relating to a population's tendencies and outlooks through the study of a sample. For the Al Ain case, a questionnaire aimed at reinforcing the study's student engagement data targeted teachers in the primary. This was deemed crucial by the researcher given the teachers' pivotal role in the classroom and their position within the school system as key stakeholders.

Nature of the Survey:

Categorized as development designs (Williams 2007), cross-sectional and longitudinal studies represent the two main types of survey designs used in survey research (Creswell 2014). As part of this project, a questionnaire (see Appendix D) based on Hart et al.'s (2011) 'Teacher Engagement Report Form – New' (TERF-N) was made available to all primary teachers in the schools under-study through a secure, online link over the course of one week. Conducting this survey at one point in time qualifies it as a cross-sectional study by definition (Creswell 2014).

Documentary Research:

The review of documents during the research process proved to be an invaluable source of information. According to Bailey (1994), documentary evidence involves the examination of documents which contain information on the subject or topic under study. During the site selection process of the Al Ain study, it was important to run comparative analyses of all Al Ain schools' inspection reports. These reports contained key information on each school's profile and allowed the researcher to select ideal sites for the project based on equalized variables such as student-teacher ratios and student diversity percentages. Although this documentary review takes place during the early stages of the project, it proves to be significant in shaping the research and allowing for more robust findings.

Documentary evidence also supported the research during the data collection and analysis process. To further corroborate the study's findings on student achievement, attainment and progress results from each of the schools were carefully analyzed. These results came in the form of official, external, standardized English reading and math score reports obtained by the researcher. As both schools administered MAP® (Measures of Academic Progress) assessments in the Fall and Spring seasons, the researcher meticulously reviewed these documented score reports to validate the study's other findings and help achieve the research's aims.

3.7.2 Data Analysis

The procedures used for the study's data analysis were dependent on the generation and utilization of numerical data through graphs, a key attribute of quantitative data analysis (Saunders et al. 2009). The nature of the small-scale pilot study did not require the use of computer software to calculate correlations and classifications; instead, a manual analysis was sufficient to wholly answer the study's research questions.

Combining primary and secondary data analysis techniques, the study's examination of quantifiable data is accomplished using a mix of data matrices, bar graphs, and line graphs. The operationalization of the study's main variables – SA and SE - and their

breakdown into measurable indicators, offered more depth and enabled relational analysis of data obtained from different instruments.

3.8 Selection Processes

3.8.1 Population Sample

Prior to the administration of the survey, significant steps were taken to guarantee the dependability of the process. The identification of the target population was first on the agenda and was narrowed down to primary school teachers of all subjects in American curriculum private schools located in the city of Al Ain; this represented the total population size of the pilot study.

It was equally important to understand the selection process, and in the case of this pilot study, work within its challenging bounds. Given the constraints in accessibility, the survey only targeted teachers in the two schools under study and as such, the sampling procedure was nonrandom. Also referred to as quota sampling, this method is nonrandom in nature and representative of a selected population (McMillan 1996). The case could also be made that the sample selected by the researcher is a convenience sample where the subjects were selected based on availability (McMillan 1996). Although partly true, the available group of teachers in both schools was truly representative of the target population, a characteristic associated with quota sampling as opposed to convenience sampling.

Sample size determination was also a priority for the researcher. Avoiding the more common route of selecting a fraction of the population (Creswell 2014), the researcher opted for the use of a more complex survey table recommended by Fowler (2009) and consisting of three core elements, namely: confidence level, margin of error, and response distribution. To determine an appropriate minimum sample size, the confidence level was set at 90%, a 5% margin of error was deemed acceptable, and the response distribution was adjusted to 5% as the survey's questions were not binary but followed a six-point Likert scale. With a population size of $N=375$, and given the above determinants, the Raosoft® sample size calculator required a minimum $n=46$

participants; a number that was achieved for the Al Ain study. The below summary illustrates all sample-related numbers (see Table 3B).

Population Sample – Summary				
	Single-gender school (Girls)	Single-gender school (Boys)	Co-educational school	Total
Grade 1	2	4	3	9
Grade 2	1	2	2	5
Grade 3	5	4	3	12
A combination of grade levels	8	9	3	20
Total sample size (n)	16	19	11	46
Targeted population size (N)	375			

Table 3B

3.8.2 Site Selection

The on-site research conducted for the Al Ain study takes place in two American curriculum private schools in April 2018. The project's focus on the Primary level classroom, specifically Grades 1-3, was the main driver behind the schools' selection. This however was not the lone factor behind the decision as selection was also a consequence of convenience. For example, site selection of the school with single-gender classes was a direct result of accessibility as the researcher held a position at this school. The selection of the school offering coeducational classes proved to be a greater challenge. Having reached out to a total of ten schools for the on-site project, only one school responded positively to the research requests. Even though the researcher was unable to acquire permission to conduct the study in schools with better matching profiles, the responding school had been on the list of targeted schools and met all minimum requirements for the project with many of the key variables equalized prior to final selection (see Table 3C). This meant that the researcher only selected schools which offered the American curriculum, used the same external standardized assessment, followed the same educational framework, accommodated a similarly

diverse student base, were rated similarly on the ADEK inspection report, and were located in close proximity to one another.

School Profile Comparison		
Variables	School A (Single-gender)	School B (Coeducational)
Curriculum	American	American
Location	Falaj Hazaa, Al Ain	Falaj Hazaa, Al Ain
Educational Framework	UAE Inspection Framework	UAE Inspection Framework
External Standardized Assessment	MAP (NWEA)	MAP (NWEA)
Fee range	Low to average	Medium to high
Teacher-Student classroom ratio	1:14	1:22
Student diversity (from highest to lowest)	1- UAE 2- Jordanian 3- Egyptian 4- Syrian	1- UAE 2- U.S. 3- Jordanian 4- Syrian
Teacher gender	Female	Female
ADEK Inspection Score (Progress & Learning Skills in the Primary)	Good	Good
Accreditation	NCA & AdvancED	WASC

Table 3C

3.8.3 The Researcher

The researcher's eleven years of experience in both public and private schools in Al Ain was a major catalyst in the realization of this project. Working in a leadership capacity at one of the schools under study, the researcher trod carefully to ensure the elimination of any potential subjective influence. This came relatively easy as quantitative research is non-reliant on the human as an instrument of data collection, a trait generally attributed to qualitative studies (Denzin & Lincoln 2003). With both academic and administrative experience, and in a position where the use of different instruments during classroom observations is part of the job, the researcher took naturally to this aspect of the study.

3.9 Instruments

3.9.1 Lesson Observation Tool

In the field of educational research, classroom observations have, for numerous decades, been used as measurement tools (Gage 1989). Given the fact that the classroom is the chief source of variation in students' academic achievement (Pianta et al. 2008), it was only fitting that the Al Ain study utilize a classroom observation tool as its primary data collection instrument.

First and foremost, the selection of the appropriate lesson observation tool required knowledge of the performance standards to which both schools are aligned. As of the 2015/2016 academic year, all Abu Dhabi schools have been bound by a set of six performance standards under the "UAE School Inspection Framework". The first of these standards – Students' Achievement – is the foundation upon which the lesson observation tool for this study was created. The second performance standard – "Students' personal and social development, and innovation skills" – is an additional building block used in the construction of the observation tool.

Divided into student achievement and student engagement spheres, the tool's first section aims to gauge student achievement levels through two elements taken directly from the Ministry of Education's (2015) UAE School Inspection Framework. As per the framework, the first of these elements targets students' levels of knowledge and understanding in lessons as demonstrated by their learning and work. The second element assesses students' progress within a lesson based on student knowledge gains in relation to stated learning objectives.

The second section of the observation tool pins the focus on student engagement and is also based on the indicators within the UAE School Inspection Framework. Nine elements carefully selected from the framework across the first and second performance standards serve as the tool's student engagement measure. The division of these elements into three domains – affective, behavioral, and cognitive – allows for direct correlation between the lesson observation tool (see Appendix C) - as it pertains to student engagement - and the Teacher Engagement Report (see Appendix D).

All eleven elements on the classroom observation tool serve as its evaluative criteria and are rated according to the framework's six-level quality scale (see Table 3D). Reinforced with clear descriptors which provide the observer with defined, qualitative references, the scale serves as a working rubric. Additionally, and due to the quantitative nature of this study, the rating scale's levels have been assigned numerical values. These values are all weighted equally as every individual criterion within each section of the tool carries near identical relevance and importance. With an estimated twenty minute observation period per lesson, the tool allows for gender-focused, number-based scoring and descriptive comments for each of its eleven elements. The below diagram (see Figure 3.1.2) illustrates the classroom observation tool's different dimensions:

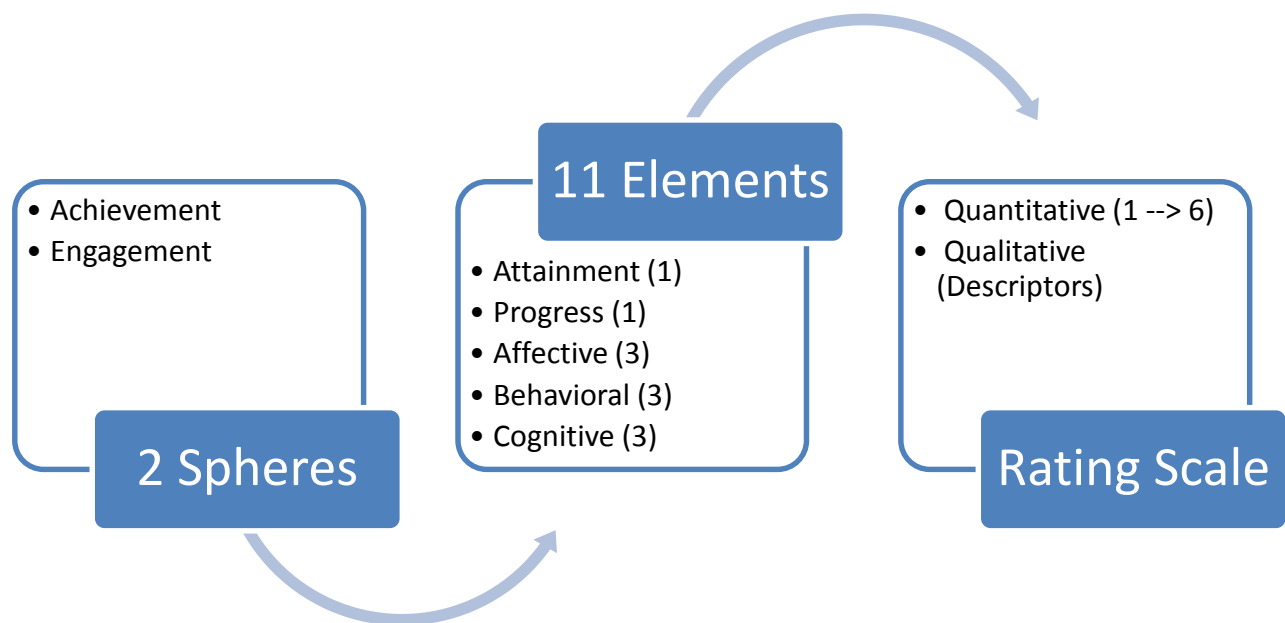


Figure 3.1.2

Quality Scale		
Level	Descriptor	Score
Outstanding	Quality of performance substantially exceeds the expectation of the UAE.	1
Very Good	Quality of performance exceeds the expectation of the UAE.	2
Good	Quality of performance meets the expectation of the UAE.	3
Acceptable	Quality of performance meets the minimum level of quality required in the UAE.	4
Weak	Quality of expectation is below the expectation of the UAE.	5
Very Weak	Quality of performance is significantly below the expectation of the UAE.	6

Table 3D

(Ministry of Education 2015)

3.9.2 Teacher Engagement Report - New

Originally developed by Lam and Jimerson (2008), the Teacher Engagement Report Form-Original (TERF-O) contained six items measuring different indicators of engagement. Hart et al.'s (2011) Teacher Engagement Form-New (TERF-N) expanded on the TERF-O and included ten items which cover the affective, behavioral, and cognitive domains of engagement. For the purposes of this project, and based on classroom procedures followed by both schools under study, only nine of the ten items are used. With three items targeting each engagement domain, a similar six-point rating scale (see Table 3E) - in this case quantitatively measuring consistency – corresponds to the nine student engagement elements found on the classroom observation tool. Unlike Hart et al.'s (2011) report which was completed by teachers for each of their students, the adjusted TERF-N used in the Al Ain study relies on a rating scale capable of negating the need for individual student assessments and instead captures each teacher's views of all his/her students by gender.

Consistency in Quantitative Terms		
Term	Definition	Score
Most	Over 75%	1
Large Majority	61% to 74%	2
Majority	50% to 60%	3
Large Minority	31% to 49%	4
Minority	16% to 30%	5
Few	Up to 15%	6

Table 3E

(Ministry of Education 2015)

3.10 Validity and Reliability

Threats to reliability and validity – both internal and external - were overcome in the Al Ain study through a series of preemptive measures. Through the use of multiple data collection methods, a process known as triangulation (Denzin 2006), reliability and internal validity are enhanced markedly (Merriam 1988). The use of a classroom observation tool based on a comprehensive government-sponsored framework, an established, peer-reviewed teacher questionnaire, and official external standardized assessment results provide the researcher with a range of methods to solidify the findings.

External validity threats in the Al Ain project were also addressed through the paper's clearly laid out statistical data which itself was reinforced with both descriptive and inferential analysis. This well-structured, detailed reporting and discourse provides a solid framework for potential generalizability (Merriam 1988). Moreover, and mindful of the Abu Dhabi educational system in which all schools abide by one set of standards under a unified national framework, the findings of the pilot study could be easily applicable in other American curriculum private schools in the Abu Dhabi emirate and the UAE.

3.11 Limitations and Delimitations

Ironical as it may seem, stating the research's shortcomings solidifies its credibility. According to Denscombe (2010), limitations to any utilized method need to be acknowledged and evaluated for research to be sound. These potential weaknesses which are out of the researcher's control (Simon 2011), are present in the Al Ain study and come in a variety of forms.

The most common type of limitation is found in the study's confounding variables. These are variables that do not lie within the researcher's scope of interest but can affect the dependent variable (McDonald 2014). Well aware of the need to equalize as many variables as possible in a case study involving two schools, there were minor setbacks in this regard. An example of one such discrepancy with potentially undesirable influences on the outcome is evident in the fee ranges. The disparity in fee ranges between the two schools is a valid indicator of family socio-economic status (SES) which for its part has an established relationship with students' achievement (Considine & Zappala 2002). Other variables beyond the researcher's control included the accreditation standards and teacher-student ratio of the two schools. In the case of the former, the discrepancy was negligible as both schools taught the same content standards, followed the same curriculum, and were run both academically and administratively under one educational framework. The difference in the schools' overall teacher-student ratio was also a key statistical finding at the start of the project; however, its significance was to a large extent negated upon learning of the teacher-student ratios in the observed classrooms where numbers and ratios were very similar. Additional confounding variables relating to student and teacher diversity were also taken into account. Although minimal, the differences in diversity levels of both students and teachers are noticeable and thus recognition of such a culturally-driven potential influence is required.

Other limitations of the project presented themselves during the data collection process. Perhaps the most striking limitation of the study was the researcher's inability to observe grade 1 classes in the Primary school. Even though an attempt to compensate by observing additional grade 2 classes was made, this did not address the need for

comprehensive coverage of all Primary level grades. Furthermore, and as a consequence of the ethical measures taken to inform participating teachers of the forthcoming visits, all observed teachers were notified of the date and time of the classroom observation. Even though this practice was applied in both schools, the usually uninterrupted teaching and learning process was more than likely affected by the upcoming prospect of classroom visits. Additional contributors to the variances found in the observation scores relate to the time of day in which the classroom visits took place. Due to scheduling constraints, it was not possible to observe all lessons at the same time of day, and this undoubtedly, to some extent, led to unnecessary variances.

Another limitation of the study related to the students' achievement scores obtained by the researcher. Given the fact that the data collection process took place before the schools' Spring 2018 testing season, the researcher secured and settled for scores of two academic years, namely Spring 2017 and Fall 2017. This meant that progress was measured across two separate academic years, albeit for the same cohorts. As a consequence of this reality, imperfect student retention, after a given academic year for any particular cohort, is worthy of being highlighted. The aforementioned setback also affected the study's measure of attainment in that it was not cohort-specific but also spanned two academic years for two different cohorts. Although worthy of indication, this last limitation was relatively negligible as the study's point of focus is on the Primary phase in the general sense and not particular cohorts.

A closer look at the administration of the teacher survey also reveals an imperfect process. In an effort to accommodate for teachers with busy schedules, while also aiming for a high response rate, participants were given an entire week to complete the survey. The decision to favor convenience at the expense of control results in the receipt of questionnaire responses submitted in unobserved environments where external factors could have had an undesired influence. The wide-ranging scope of the survey also proved to be a limitation when compared to the narrow range of subjects targeted in the classroom observations. While only English and math teachers of Grades 2-3 were observed during classroom visits, the survey, and in order to ensure

the minimum number of participants for a sufficient sample size was met, targeted Grades 1-3 teachers of all subjects. The survey's all-inclusive scope, although representative, was also a limitation in that the number of teachers surveyed in each of the gender settings was uneven.

Equally important in this section of the chapter is an acknowledgement of the delimitations within the study. According to Creswell (2014), delimitations are the steps taken by the researcher to define the study's parameters. In addition to the specific research questions and variables of interest targeted by the study, boundaries set for the Al Ain project, in terms of inclusion and exclusion criteria, relate to academic phase or cycle, location, and educational framework. Focusing the study on students of Grades 1-3 attending American curriculum private schools in Al Ain further exemplifies the deliberate restrictions put in place to serve the study's aims.

3.12 Ethical Considerations

Mindful of the fact that all research spawns ethical issues (Newby 2010), the Al Ain study places great weight on ethical considerations. According to Saunders et al. (2009), the universal ethical consideration is to ensure all those involved in the research are not subjected to any type of harm or disadvantage. This mindset is at the core of the research and drives it past potentially obstructive ethical challenges.

Throughout the study, concrete steps were taken to address all ethical concerns. Preemptive action comes in the form of site selection and approvals prior to the study. First and foremost, it was crucial to guarantee that the researcher had nothing to gain from any potential project outcome. Although the researcher worked at one of the schools under study, his views on gender composition in the primary classroom are neutral and as such, it is the inquisitive mind and not vested interest that guides the study. Obtaining the schools' approvals was also a necessary step, and this was accomplished through official letters of request submitted to each school's designated authority on behalf of the educational body supporting the research. These letters elaborated on the study's purpose and benefits while also summarizing its scope and onsite logistical requirements.

After initial approval by the school authorities, it was also important to obtain voluntary informed consent in writing, ensuring all authorities and participants understood and agreed to their role in the research (British Educational Research Association 2011). The consent forms used in the Al Ain study also detailed its purpose to all participants; this was key as full disclosure of aims is a requirement by which proposal developers must abide (Sarantakos 2005). Going even further, consent forms highlighted the study's benefits to education and the community, guaranteed school and participant confidentiality, and specified data ownership after completion of the project. It was also clarified to the designated authorities through the written agreement that their decision to withdraw from the study at any point in time was within their rights.

Beyond the written letters and consent, and given the observational nature of the study, the researcher took measures to avoid disrupting the physical settings of both schools. Cognizant of the surroundings, the time spent by the researcher during in-class observations did not exceed the minimum twenty minutes needed for a realistic assessment. The survey research conducted throughout the project was also managed carefully using nonintrusive means which came in the form of an anonymous online questionnaire. This was made available to targeted participants over the course of three weeks, offering them ample time to respond and not causing on-the-job interference.

Chapter 4 – Findings

4.1 Introduction

The sole focus of this chapter is to provide clear and concise explanations of the study's findings. Also referred to as descriptive analysis (Creswell 2014 & Newby 2010) or descriptive statistics (Trochim 2016), the description of data, away from inferential statistics where inferences are made and conclusions reached (Trochim 2016), allows the researcher to demonstrate an understanding of the study and its context (Newby 2010).

The pilot study in Al Ain yielded results on both student achievement and engagement. These findings were obtained from lesson observations, surveys, and assessment reports. Through the use of tables and charts, this chapter will objectively present and describe the project's data, paving the path for interpretation and reflection in the chapters that follow.

4.2 Lesson Observation Results

Encompassing student achievement and engagement constructs, lesson observations afforded the study its richest source of data. Students' attainment and progress in lessons constituted the project's student achievement variable and each of these two elements was quantified and measured using the first part of the study's observation tool. The student engagement variable required wider perspective and relied on the quantification of nine items divided into the affective, behavioral, and cognitive domains.

This section of the chapter illustrates all results obtained through the 18 lesson observations. First to be reported are the attainment and progress findings. These will be followed by a domain-specific presentation of the engagement-relevant data after which more specific, item-based results will then be laid out. Incorporated throughout, comparative observations will highlight discrepancies between the different domains and items.

Before findings of this study are reported, and in accordance with the official government framework upon which the scoring scales were constructed and used, it should be noted that numerical scores of “lower” value actually represent “higher” or “greater” scores on the scale.

4.2.1 Student Achievement – Attainment & Progress

Lesson observations showed relatively similar findings with respect to attainment across the two gender settings and between the four gender groups; these scores ranged between a 3.00 and a 3.50. Based on the results, girls in both settings demonstrated equal levels of attainment. Boys in the co-educational context exhibited higher attainment levels at 3.33 on the scale compared to boys in single-gender classrooms who were judged to have had the lowest attainment at 3.50 on the scale.

Progress in lessons was highest with girls in single-gender classrooms. A difference of 0.5 between girls in each of the two contexts reflects a significant disparity. Boys on the other hand showed equal progress in the two settings with a score of 3.5 on scale.

There is evident consistency between attainment scores and those of progress with a relatively miniscule 0.67 discrepancy between minimum and maximum scores recorded. Overall, for all gender groups and in each of the two settings, scores reflective of attainment were slightly higher than those of progress (see Figure 4.1.1).

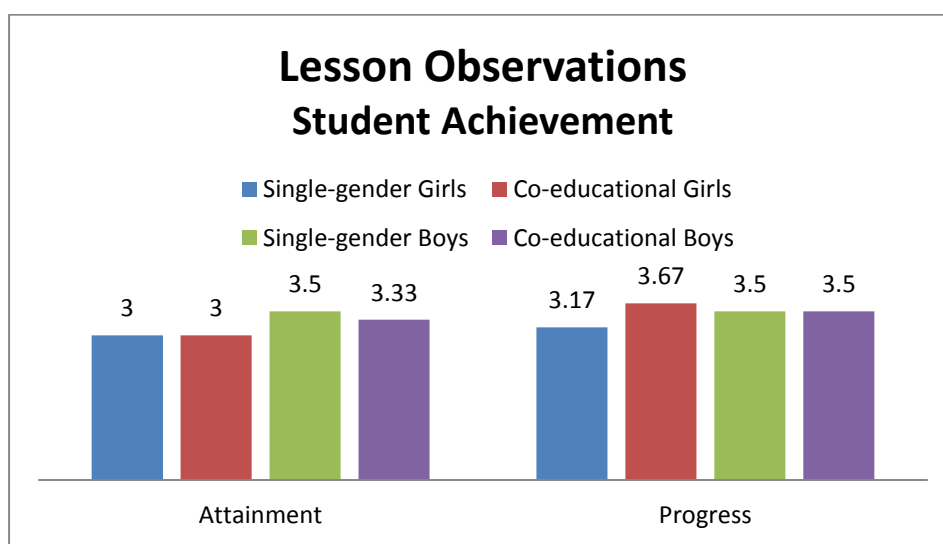


Figure 4.1.1

4.2.2 Student Engagement – Affective Domain

In-class observations showed that boys and girls in co-educational classrooms exhibited greater levels of affective engagement with the former scoring slightly higher than the latter. In contrast, girls in single-gender classes were seen to be more affectively engaged than their male peers with a favorable 0.17 difference. An evident consistency in scores exists across the two gender settings and four gender groups with a 0.39 differential.

4.2.3 Student Engagement – Behavioral Domain

With equal scores of 2.11, students in co-educational classrooms were judged to have higher levels of behavioral engagement than those in the single-gender setting. Near identical scores of 2.61 and 2.67 were recorded for girls and boys respectively in single-gender classes. A gap of 0.56 separated the lowest and highest scores in this domain and reflected relative consistency.

4.2.4 Student Engagement – Cognitive Domain

No differences were observed between girls in each of the two gender-based settings with equal scores of 3.06 recorded. This was not the case with the boys where a 0.45 gap in favor of the co-educational classroom was noted. The 0.45 differential also marked the greatest gap within this domain and represented an overall consistency in scores.

4.2.5 Comparative Findings across Domains

Overall, the highest scores in both gender contexts were those of the behavioral engagement domain (see Figure 4.1.2). Lowest scores were reported for items within the cognitive domain. Although differences between the scores of the cognitive and affective domains do exist, these are minimal.

Focusing on the different gender groups and contexts, it can be seen that boys in co-educational classrooms exhibited the highest levels of engagement across the three domains followed closely by their female peers. Single-gender girls and boys

demonstrated slightly lower levels of affective, behavioral, and cognitive engagement in their respective settings.

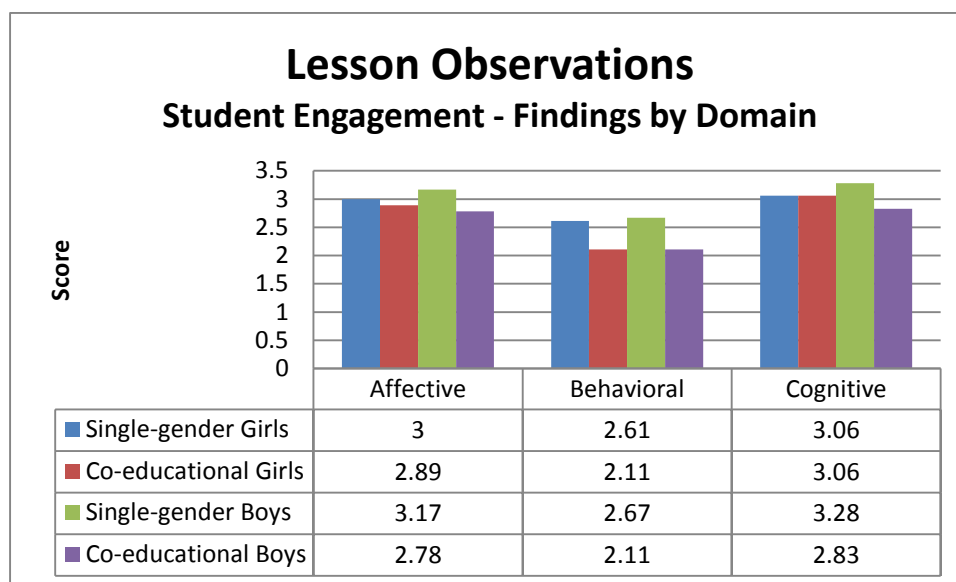


Figure 4.1.2

4.2.6 Affective Engagement by Item

Students' positive attitudes, their support and consideration for one another, and their reflection and involvement in learning all make up the affective engagement domain.

Positive Attitudes – Girls and boys in co-educational classrooms projected more positive attitudes than their peers in single-gender classrooms. With equal scores of 2.67, these attitudes were not favorable to any gender within the co-educational environment. In single-gender classrooms, a slight difference of 0.17 in favor of the girls was reported.

Support and Consideration – Findings here show great consistency across gender groups and between the two gender-based contexts. Apart from a 0.17 disparity in favor of girls in single-gender classrooms, students in the other three gender groups showed equal support and consideration to one another with a 3.00 score on the observation scale.

Reflection on Learning – Variances - albeit slight - are evident for this particular item. Students in co-educational settings reflected more on their learning than their peers in

single-gender classes. A difference of 0.17 separated the girls while the gap on the boys was significantly higher at 0.66.

4.2.7 Behavioral Engagement by Item

This domain is made up of three items, namely; students' attendance, their active participation in learning, and their respectful attitude towards staff.

Attendance – Significant discrepancies between the two gender contexts is highly evident for this item. With a 1.00 differential between the girls and a 0.83 differential between the boys, recorded attendance rates were noticeably higher in co-educational classrooms.

Active Participation – According to the observation scores, students in co-educational classrooms demonstrated greater levels of active participation than their peers in the single-gender setting. With equal scores of 2.67, the co-educational environment proved more favorable for boys and girls as compared to the single-gender context where lower scores of 3.17 and 3.00 respectively were reported.

Respect – Boys and girls in co-educational classrooms demonstrated equal levels of respect towards their teachers with a score of 2.67. This was higher than reported scores in single-gender classrooms where student-teacher interactions were slightly less respectful as evidenced by 2.83 and 3.00 scores for girls and boys respectively.

4.2.8 Cognitive Engagement by Item

Students' work ethic and resilience, their responsibility for learning, and their eagerness and motivation make up the final domain – cognitive engagement.

Work Ethic and Resilience – Based on the lesson observations, girls in each of the two gender settings demonstrated equal work ethic and resilience during lessons. Disparities between the boys were much more evident with a 0.5 differential in favor of boys in co-educational classes.

Responsibility for Learning – Across the two gender settings, scores for this item are consistent with one another with a mere 0.17 disparity separating any of the gender

groups. Girls in single-gender classes were observed to be more responsible for their learning than girls in co-educational classrooms. For the boys, the same 0.17 advantage favored boys in the co-educational classroom.

Eagerness and Motivation – According to observation scores, the co-educational setting provided an environment where students were more eager and motivated during in-class activities. A 0.17 differential for the girls and a 0.67 difference in favor of the boys highlighted the advantage of the co-educational classroom for this particular item.

4.2.9 Comparative Findings across Items

Across the nine items, the highest scores based on in-class observations are those of students' attendance (see Figure 4.1.3). The lowest reported scores relate to students' work ethic and resilience.

Interestingly, boys in co-educational classrooms were second to none in each of the 9 items. In contrast, boys in single-gender classes scored lowest in 7 of the 9 items.

A comparative look between girls in each of the two settings reveals advantages for the co-educational environment in 6 of the 9 items. Single-gender girls only had favorable scores in their support and consideration of peers and their responsibility for learning. Advantages were more apparent for co-educational boys over their peers in single-gender classes; higher scores were evident in 8 of the 9 items, the lone exception being support and consideration of peers which was judged to be equal across settings.

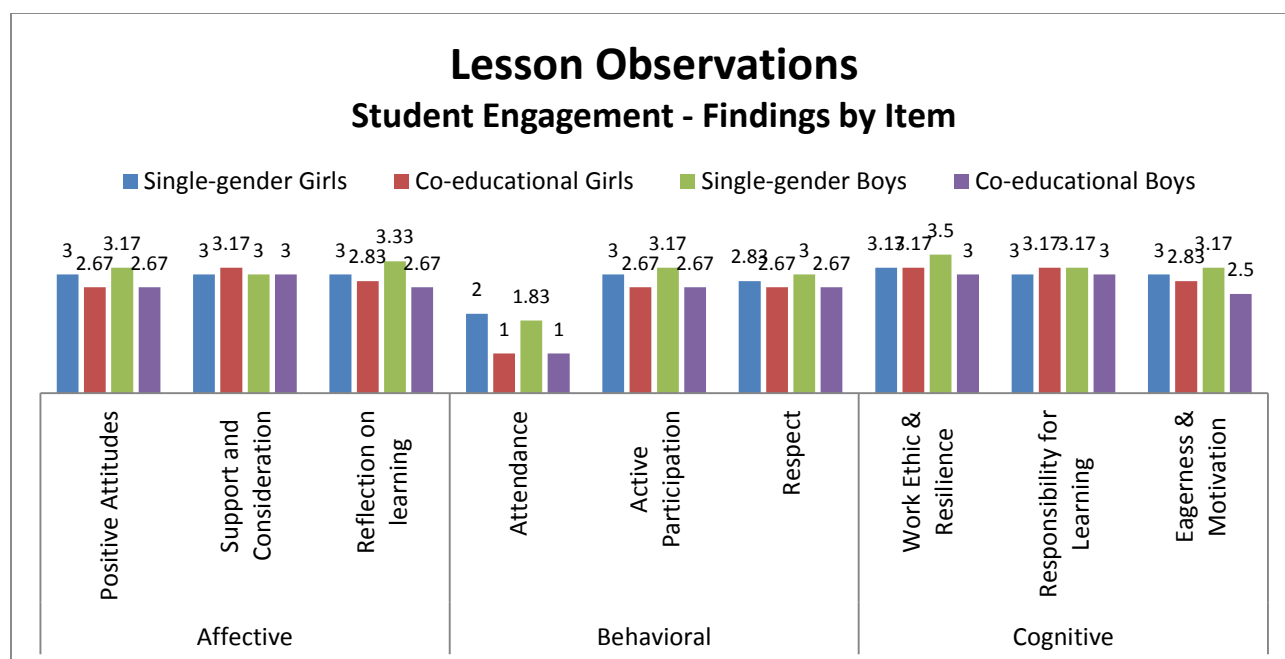


Figure 4.1.3

4.3 Teacher Engagement Report Form Results

A key measure of student engagement in the Al Ain pilot study relied on the responses received by the Primary teachers in the two schools under study. Responding to 9 items associated with the affective, behavioral, and cognitive domains, teachers reported on their students in each of the different gender settings based on individual experiences in lessons.

In this section of the chapter, findings of the survey will first be presented at the domain-specific level. This will be followed by an item by item description of the data. Each of these analyses will include comparative observations explaining student engagement variances in each of the different gender contexts. Using a six-point scoring scale tied to the quantitative measure of consistency in student numbers, Hart et al.'s (2011) Teacher Engagement Report Form (TERF) provides the needed numerical data for each of student engagement items.

4.3.1 Student Engagement – Affective Domain

According to the surveyed teachers, girls in the single-gender classroom exhibited greater levels of affective engagement – general liking and positivity for learning – than any other gender group with a score of 1.48. A slightly lower score of 1.58 in this domain illustrates relatively similar findings for girls in the co-educational context. These like figures are not evident with the boys. With over a 0.6 disparity, boys in the co-educational classroom were seen to be less affectively engaged than those in single-gender classrooms. In fact, the reported score for the co-educational boys can be judged to be an outlier as its relative distance from the other three scores is clearly noticeable. Also evident in the results is the advantage held by girls in each of the two gender contexts as compared with the boys respectively.

4.3.2 Student Engagement – Behavioral Domain

Reported findings for behavioral engagement show that girls in single-gender classes are more inclined to demonstrate attributes linked to this domain. A noticeable 0.29 advantage sets them apart from girls in the co-educational setting. Disparities between the boys are slightly higher at 0.42 with the single-gender environment proving to be more favorable to aspects of behavioral engagement. Additionally, and when comparatively examining the two different genders, clear advantages are evident in favor of the girls.

4.3.3 Student Engagement – Cognitive Domain

Results for the third domain - cognitive engagement – illustrate highly evident discrepancies between the two different gender contexts for both boys and girls. For the girls, scores of 1.63 and 2.06 reflect significant differences in favor of those in single-gender classes. Even greater disparities exist between the boys' gender settings with a 0.92 gap. Consequently, the categorization of the score obtained for co-educational boys could be viewed as an outlier. Centering the focus on the gender vs. gender dimension reveals significantly higher scores for girls than their respective male peers in each of the two main gender-based contexts.

4.3.4 Comparative Findings across Domains

Looking at the bigger picture across contexts and domains, the findings show the highest reported scores relate to items within the behavioral domain (see Figure 4.1.4). An exception to this case is seen with co-educational girls where affective engagement levels proved to be slightly greater. The lowest scores were reported for the cognitive domain for each of the different gender groups with no exception and were noticeably distant from scores reported for the behavioral and affective domains.

Scores also reflect a consistent pattern across the four different gender groups. For each of the domains, single-gender girls are rated highest among their peers, followed by girls in the co-educational classroom, boys in the single-gender environment, and finally boys in the co-educational setting. This order is evident for the three engagement domains.

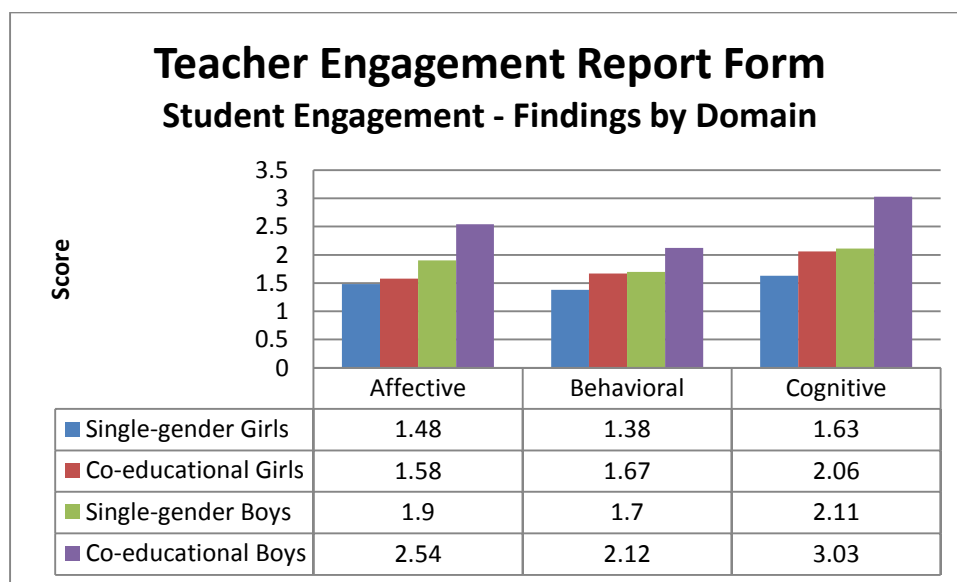


Figure 4.1.4

4.3.5 Affective Engagement by Item

The three items within the affective engagement domain relate to students' interest in school, their relations with peers, and students' feelings towards their performance.

Interest in School – For this particular item, teachers' reported responses for the girls were near identical between the single and co-educational settings, slightly favoring the latter. With a difference of over 1.0 on the rating scale between boys in each of the two settings, the survey results paint a contrasting picture indicative of higher levels of interest for boys in single-gender classrooms.

Peer Relations – Teachers reported that students' relationships amongst their peers were most positive for girls. According to the survey, girls in the co-educational setting tend to get along better with their classmates than girls in the single-gender classroom, albeit slightly with a 0.08 margin. Differences on the boys are significantly greater with a 0.55 margin indicating more constructive in-class relations are observed amongst boys in the single-gender setting.

Care about Grades – According to the surveyed teachers, girls care more about their grades in lessons than boys. This was seen to be more evident in single-gender classrooms where a very high score of 1.19 was reported. Teachers also felt that boys in single-gender classes were more concerned about their academic performance than those in the co-educational environment with a 0.37 difference evident in the results.

4.3.6 Behavioral Engagement by Item

Students' attendance, their participation in classroom activities, and their respectful attitude towards staff are the three items aimed at measuring the behavioral engagement construct.

Student Attendance – All students had near outstanding attendance scores according to their teachers. This was slightly more evident in the single-gender school where girls' and boys' attendance was scored at 1.25 and 1.32 respectively. A different picture arose in the co-educational school where equal attendance scores of 1.55 were reported by teachers for both boys and girls.

Class Participation- Scores for this item reflected higher, nearly equal, levels of participation for the two genders in the single-gender school. Girls and boys of co-educational classes demonstrated poorer participation levels with scores lower by 0.34 and 0.66 respectively. Overall, girls participated more in lesson discussions and activities than their male peers in both contexts.

Respect to Staff- Surveyed teachers felt that girls were more respectful to them than boys in both gender environments. The survey also showed that girls in single-gender classes exhibited greater levels of respect than those in co-educational classrooms holding a 0.23 advantage. For the boys, a 0.36 difference was reported where, not unlike the girls, the single-gender environment proved to be advantageous.

4.3.7 Cognitive Engagement by Item

An additional three items make up the final student engagement domain. Cognitive engagement is broken down into three criteria, namely; students' persistence on challenging tasks, students' demonstration of appropriate effort, and students' self-motivation.

Persistence on Challenge- Survey respondents believed that girls were more inclined to persist on challenging tasks than their male classmates. According to teachers, a greater percentage of girls in single-gender classes demonstrated resilience than girls in co-educational classrooms; a 0.67 difference on the scoring scale was reflective of that belief. Similar discrepancies were reported for the boys with a 0.59 variance illustrating a noticeable advantage in favor of boys in single-gender classrooms.

Appropriate Effort- Based on the study's survey responses, girls exhibited greater effort for assigned tasks than their male peers. This was more evident in single-gender classrooms for each of the girls and boys. A 0.47 difference separated the girls in each of the two contexts while a significantly larger 1.05 disparity was reported for the boys.

Self-motivation- Survey findings showed that more girls were self-motivated to learn during lessons than boys. This intrinsic motivation was more evident in single-gender settings for both girls and boys. A relatively small 0.10 difference separates the girls

across the two gender-based contexts while a much larger 1.13 disparity is seen with the boys.

4.3.8 Comparative Findings across Items

A more holistic picture of the student engagement items comes to light when the lens is zoomed out (see Figure 4.1.5). Based on the survey's findings, the highest scores reported by teachers for all groups and in both settings were associated with good student attendance. On the other hand, the two lowest reported scores were for items found in the cognitive domain. Students' persistence on challenging tasks and their self-motivation were judged to be areas of greatest weakness.

Looking across the 9 items, it is noteworthy to mention that boys in co-educational classes fared worse than all of their peers and in 8 of the 9 categories. In contrast, girls in the single-gender setting scored better than all groups in 8 of the 9 items, the lone exception being their relations in lessons with their peers where girls in co-educational environments fared better.

A comparative look across the two gender settings reveals a closeness (<0.25) in girls' scores in only 4 items, namely; students' interest in school, peer relations, respect towards staff, and self-motivation. These narrow differences are not evident in boys' scores where only good attendance is comparable between the two gender contexts. In fact, and based on the teachers' responses, boys in single-gender classes scored higher than boys in co-educational classrooms across each of the 9 different student engagement items.

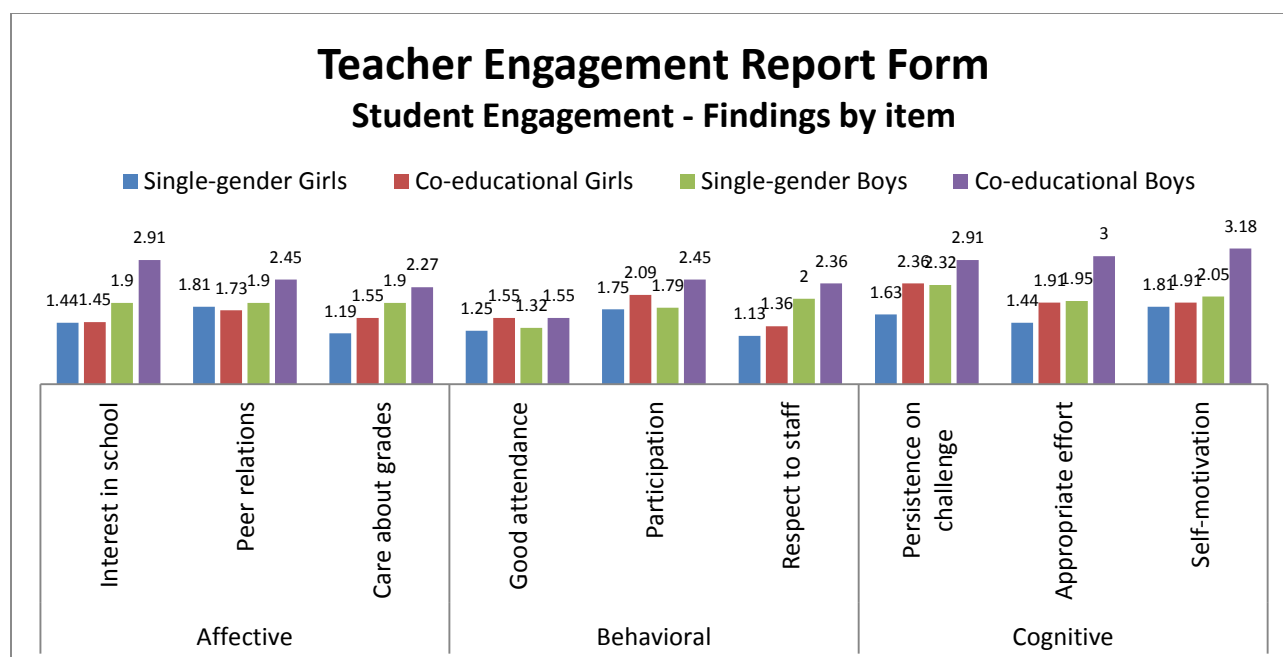


Figure 4.1.5

4.4 MAP® Assessment Results:

The ability to measure student achievement in the schools under study was central in realizing the project's aims. By zooming the lens on clearly laid out external assessment scores in each of the two gender contexts, similarities and discrepancies can be identified and the role of gender on student achievement can be better understood. To this end, the world renowned, standardized MAP® assessment, a product of the Northwest Evaluation Association, provided the researcher with student scores in English reading and mathematics over two testing seasons (see Appendix E). Through these assessment reports, the researcher was able to determine attainment and progress - core indicators of student achievement - for students of both genders in each of the two subjects and for each of the two gender contexts.

Due to the various variables at play – subjects, testing seasons, gender – it was important to first gather all the data and lay it out in an all-inclusive manner (see Table 4A). MAP® scores are denoted by a RIT (Rasch Unit) scale. This RIT score measures student achievement at a given point during the academic year and is “equal-interval” in nature. Most importantly, the RIT score is neither grade-dependent nor age-dependent

and carries the same meaning for all levels and cohorts, making it ideal for progress measurement.

	MAP® Scores (Raw data set)											
	Grade 1 Spring '17		Grade 1 Fall '17		Grade 2 Spring '17		Grade 2 Fall '17		Grade 3 Spring '17		Grade 3 Fall '17	
	Eng. Reading	Math	Eng. Reading	Math	Eng. Reading	Math	Eng. Reading	Math	Eng. Reading	Math	Eng. Reading	Math
Single-gender (Girls)	154	160	145	150	155	170	161	166	170	175	169	175
Co-educational (Girls)	152	155	151	153	177	182	160	167	190	192	177	181
Single-gender (Boys)	141	148	141	147	155	164	155	163	158	170	168	178
Co-educational (Boys)	149	153	146	144	177	184	160	163	184	191	172	178

Table 4A

4.4.1 MAP® Attainment

Student attainment is the first indicator of achievement in the UAE inspection framework (Ministry of Education 2015). Attainment represents the level of achievement at a particular point in time. In the Al Ain study, the mean of the two seasons' results represents the student attainment variable. With the Fall and Spring season results reflecting beginning-of-year and end-of-year scores respectively, a calculation of the mean offers a sound measure of student attainment in a typical academic year. This section of the chapter will first present results from a broad, gender-based perspective before describing more detailed, grade specific data.

MAP® - Girls' Attainment:

Overall levels of attainment for girls in mathematics and English reading are markedly higher in the co-educational Primary classroom (see Figure 4.1.6). With a difference of 6 points on the RIT scale in mathematics and a significant 9 point disparity in English reading, girls in the co-educational classroom outperformed their peers in the single-gender classroom in both subjects.

Digging deeper into the data leads to similar findings at the grade-specific level (see Figure 4.1.7). In English reading, girls of all grades in the co-educational setting outscore their peers in the single-gender classroom. The advantages held by girls in the co-educational classroom actually increase between grades 1 and 3. In mathematics, the same disparities are evident except in grade 1 where girls in the single-gender classroom score slightly higher with an infinitesimal 1 point advantage on the RIT scale. Gaps in mathematics, between co-educational and single-gender contexts, follow a similar growth trend seen in English reading between grades 1 and 3.

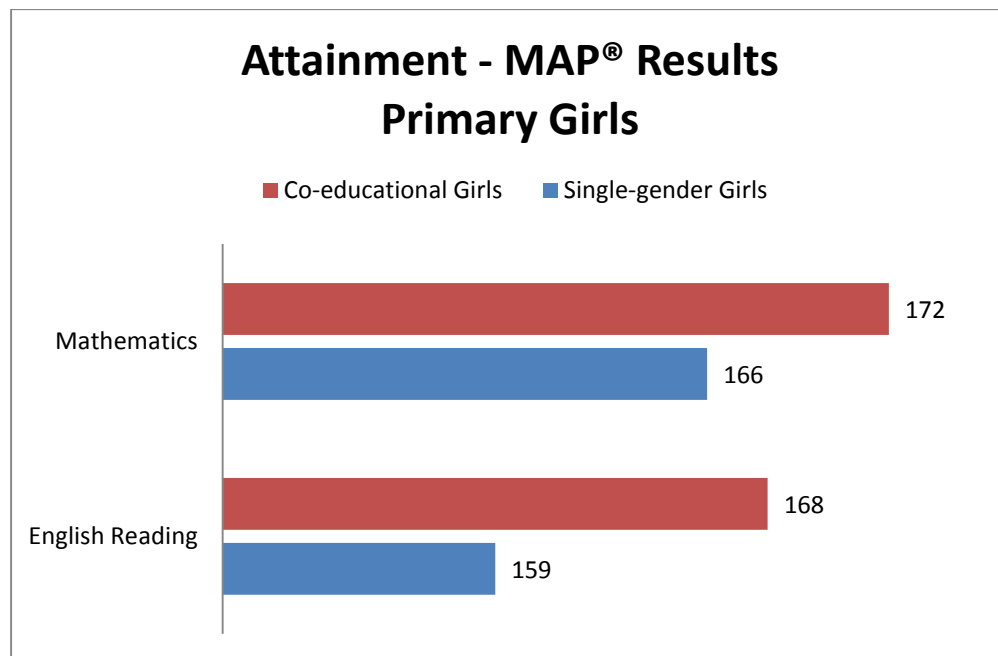


Figure 4.1.6

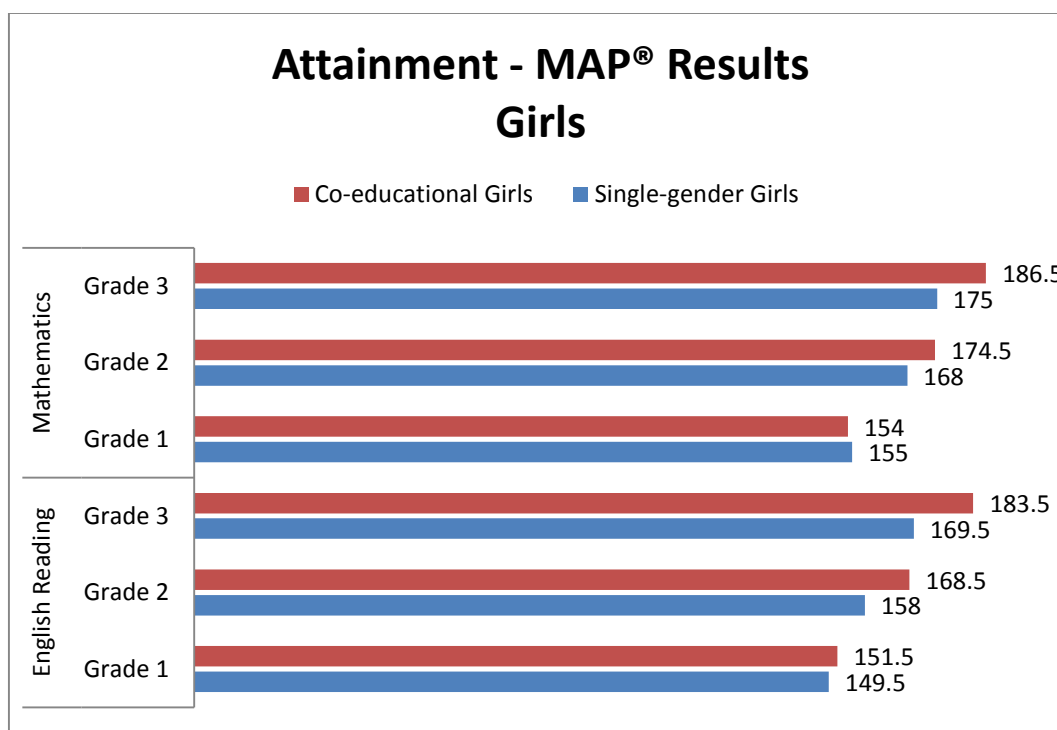


Figure 4.1.7

MAP® - Boys' Attainment:

Boys in the co-educational classroom fared as well as their female classmates when measured against their male peers in the single-gender classroom (see Figure 4.1.8). Even though their levels of attainment were noticeably lower than those of their female classmates, differences of 6 points in mathematics and 9 points in English reading between them and boys in the single-gender setting mirrored the discrepancies seen with the girls.

After breaking down the findings by grade, a picture similar to that of the girls' presents itself (see Figure 4.1.9). Boys in the co-educational setting outperform those in single-gender classrooms in all grades 1-3 and in both subjects. Similar to the girls, gaps between the boys' gender settings for both subjects expand from grades 1 to 3 in favor of boys in the co-educational classroom. Boys' attainment levels in each grade and in each gender setting are also lower than those of the girls' with the sole exception being grade 2 in the co-educational classroom where levels are equal.

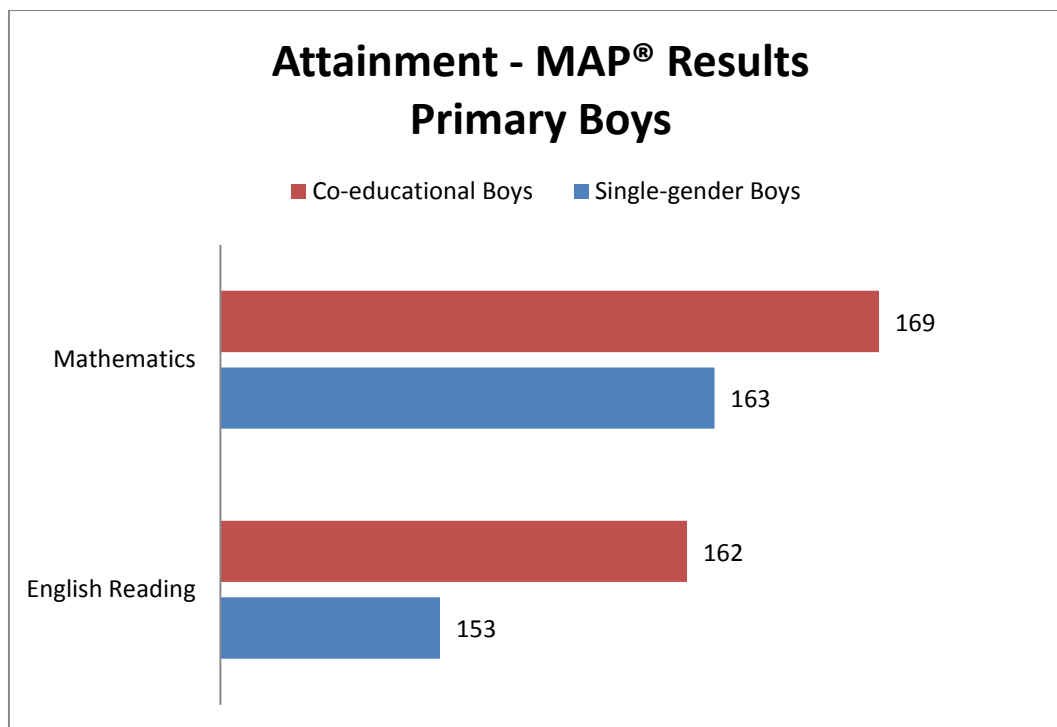


Figure 4.1.8

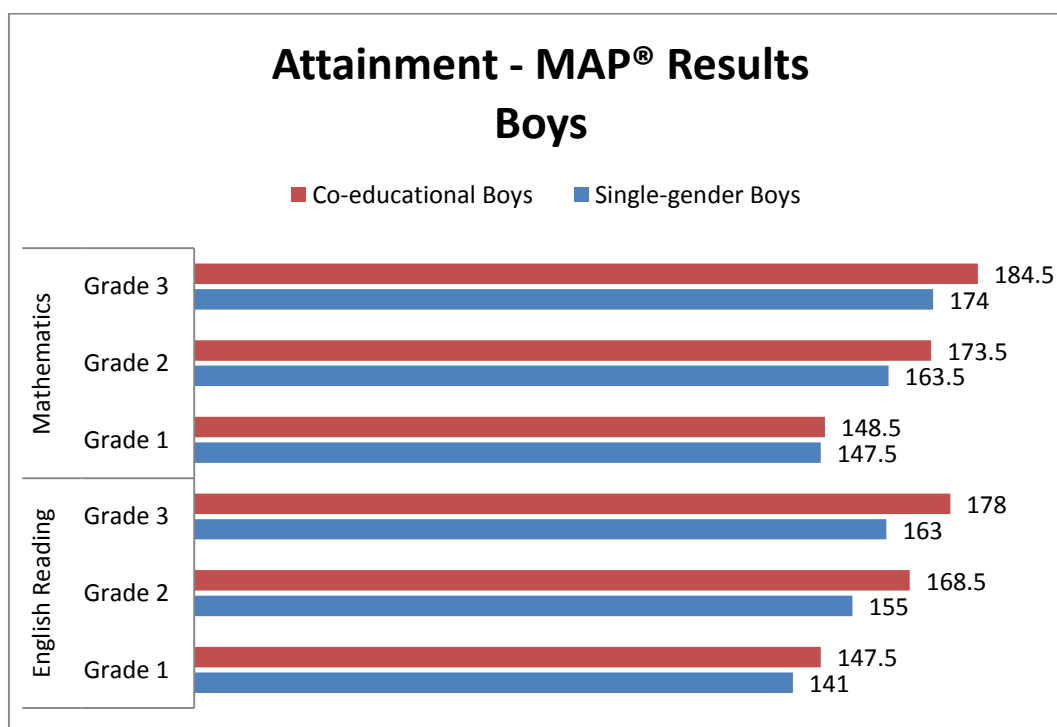


Figure 4.1.9

4.4.2 MAP® Progress

The second key indicator of student achievement in the UAE inspection framework is progress (Ministry of Education 2015). Consistent with the framework's position, progress is defined as any gain in knowledge over a specified period of time. In the Al Ain study, progress was measured for the same cohort across two academic years. The difference in student MAP® scores between the Spring 2017 and Fall 2017 testing seasons represented student progress. Based on this, the researcher was able to determine progress for each of the 2016/2017 grades 1 and 2 cohorts. As was done in the previous section, results will first be presented at phase level before delving into grade specific scores.

MAP® - Girls' Progress:

In the Primary, girls show highly evident progress in both single-gender and co-educational settings. Girls demonstrate this noticeable progress in mathematics and English reading. In the former of the two subjects, the rate of progress is identical at 5.5 points on the RIT scale (see Figure 4.2.1). In English reading, girls in the single-gender classroom make more than double the progress – a significant 6.5 disparity on the RIT scale - in relation to their peers in the co-educational environment (see Figure 4.2.2).

At grade level, and in mathematics specifically (see Figure 4.2.3), the data shows interesting variations for co-educational girls. Of the four cohorts across the two gender-based settings, the grade 1 cohort in the co-educational classroom shows most progress with a significant 12 point rise between testing seasons. On the other end of the spectrum, the grade 2 cohort regresses slightly, dropping 1 point. More consistency is seen with single-gender girls with 6-point and 5-point improvements evident for each of the grade 1 and 2 cohorts respectively.

Findings in English reading are somewhat similar (see Figure 4.2.4) to those observed in mathematics. The grade 2 co-educational cohort again shows no progress while the grade 1 group makes noticeable gains with an 8 point climb on the RIT scale. On the other hand, the two single-gender cohorts make evident progress with a 7-point rise for the grade 1 group and a strong 14-point increase for the girls of grade 2.

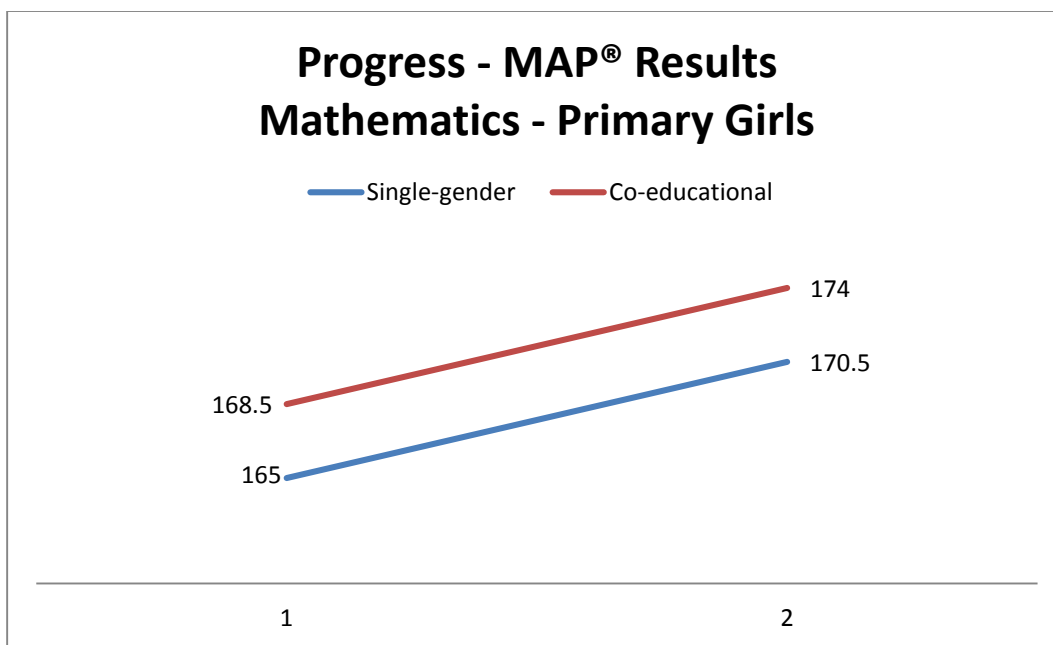


Figure 4.2.1

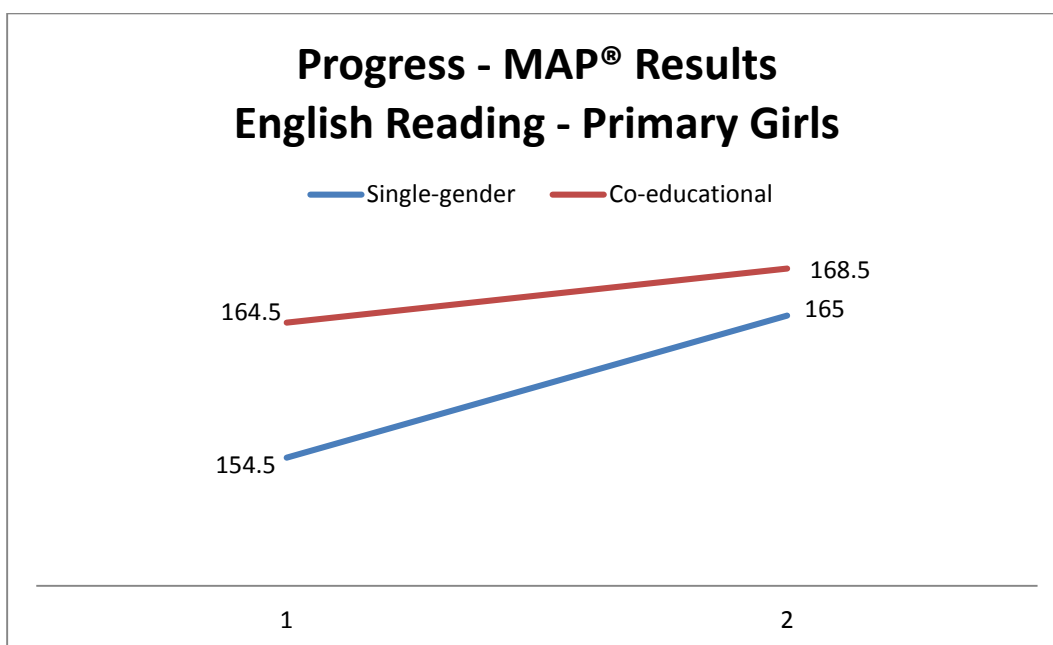


Figure 4.2.2

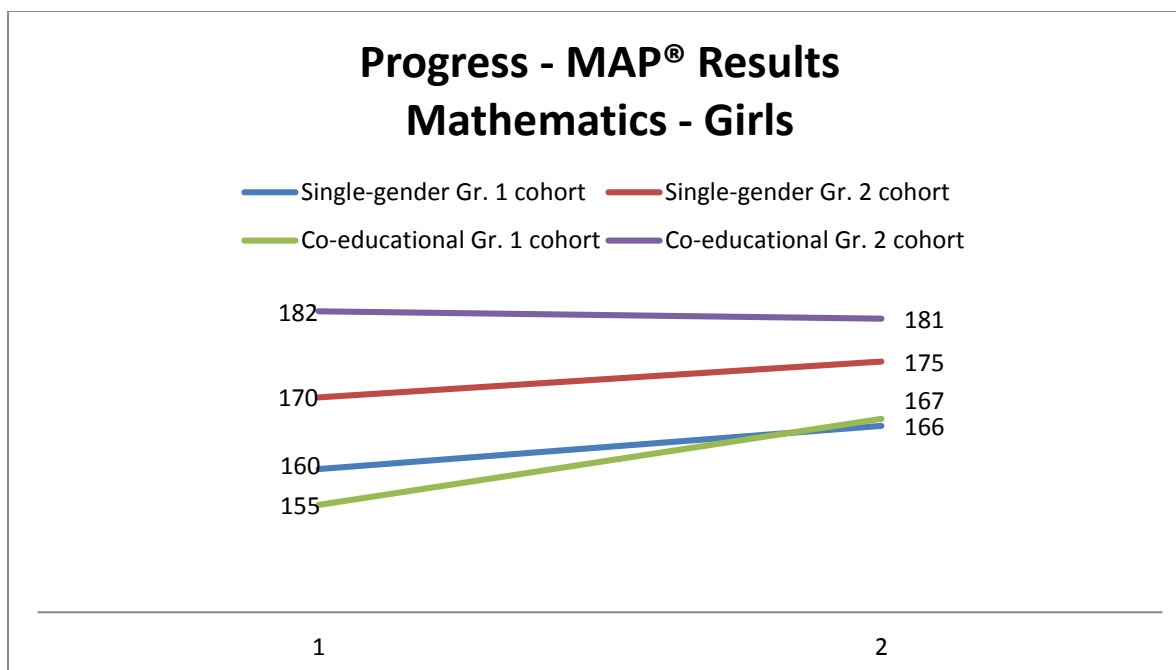


Figure 4.2.3

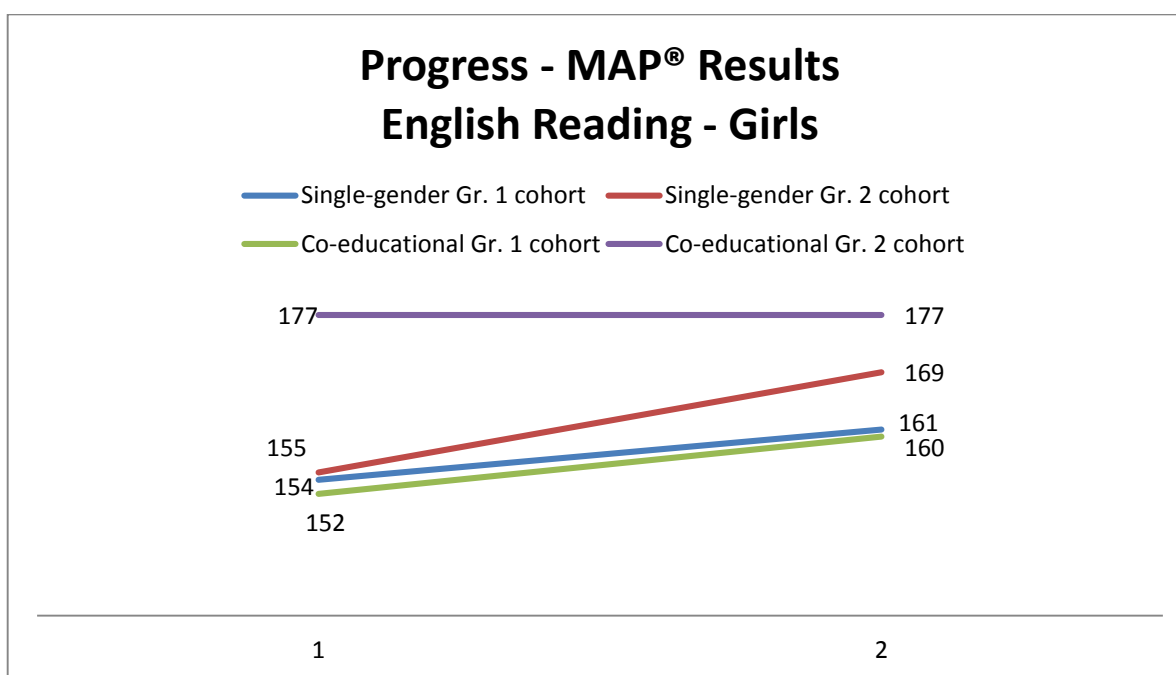


Figure 4.2.4

MAP® - Boys' Progress:

Although boys in the Primary make progress in both gender settings, this growth is much more evident in the single-gender classroom for both subjects. In mathematics for example, co-educational boys make a mere 2-point gain on the RIT scale while their peers in the single-gender class exhibit a significantly greater 14.5-point RIT score improvement (see Figure 4.2.5). Differences are almost as extreme in English reading (see Figure 4.2.6) where a 3-point progression is made in the co-educational classroom as compared to a marked 13.5-point ascent on the RIT scale.

Honing in on grade-specific data for mathematics (see Figure 4.2.7) reveals interesting findings generally consistent with the broader picture. Boys in single-gender classes show greater progress than boys in co-educational classrooms for each of the two Primary grades. In fact, grade 2 co-educational boys retrogress considerably, falling 6 points down the RIT scale as compared to a 14-point climb by their peers in single-gender classrooms. For grade 1, differences are less polarized. The 10-point gain made by boys in co-educational classes is slightly outdone by a 13-point improvement by single-gender boys.

English reading results (see Figure 4.2.8) paint a similar picture as the one seen for mathematics. With 14 and 13-point rises on the RIT scale for the grades 1 and 2 cohorts respectively, boys in single-gender classes showed greater progress than their peers where the co-educational cohorts improved by 11 points and again regressed 5 points down the RIT scale.

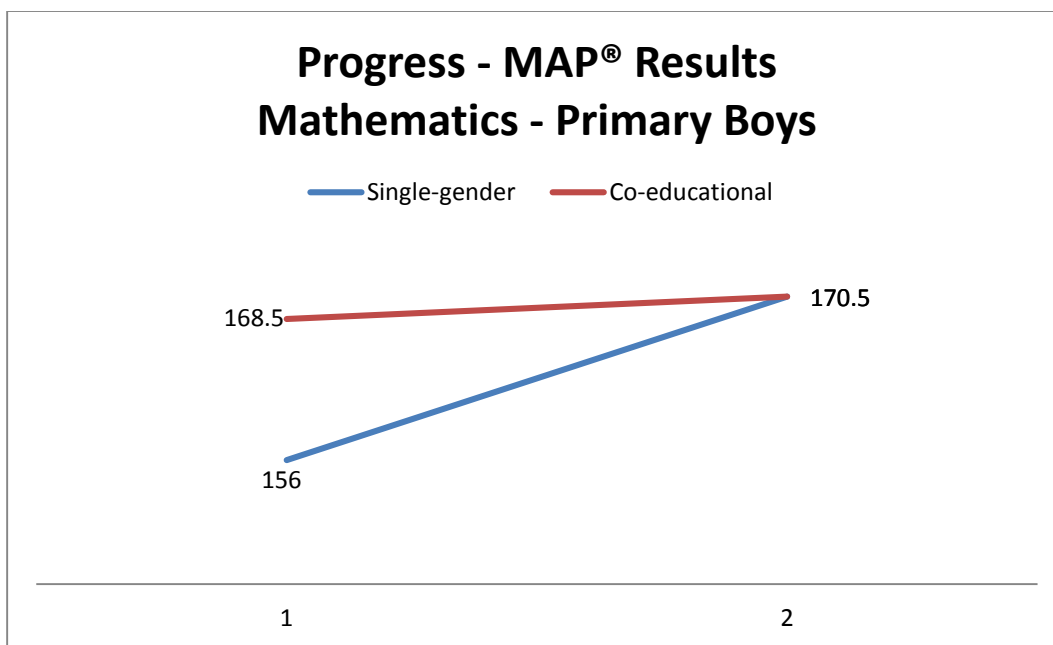


Figure 4.2.5

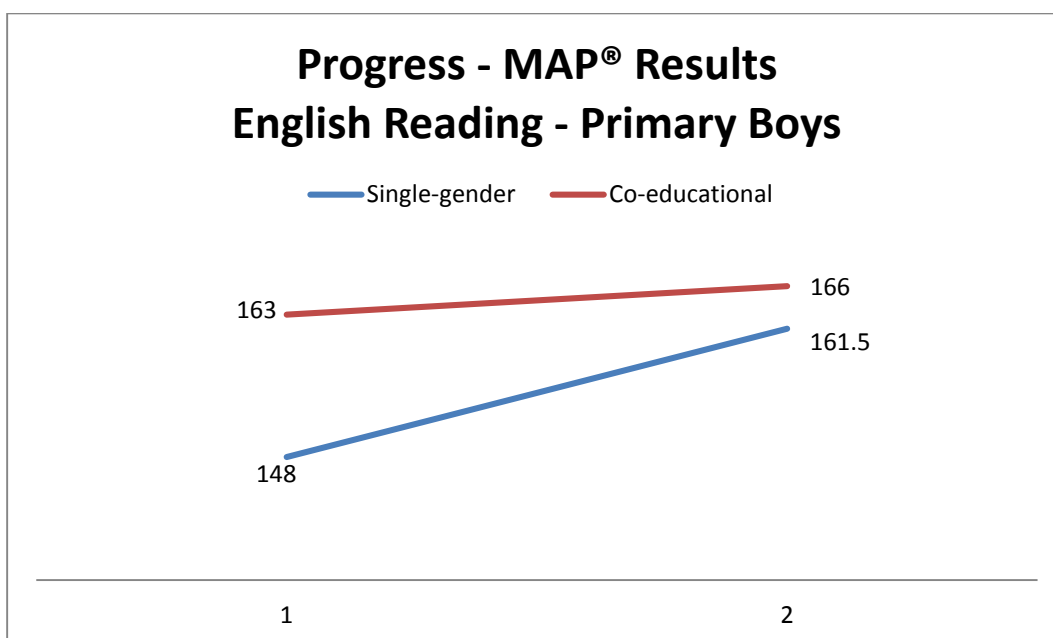


Figure 4.2.6

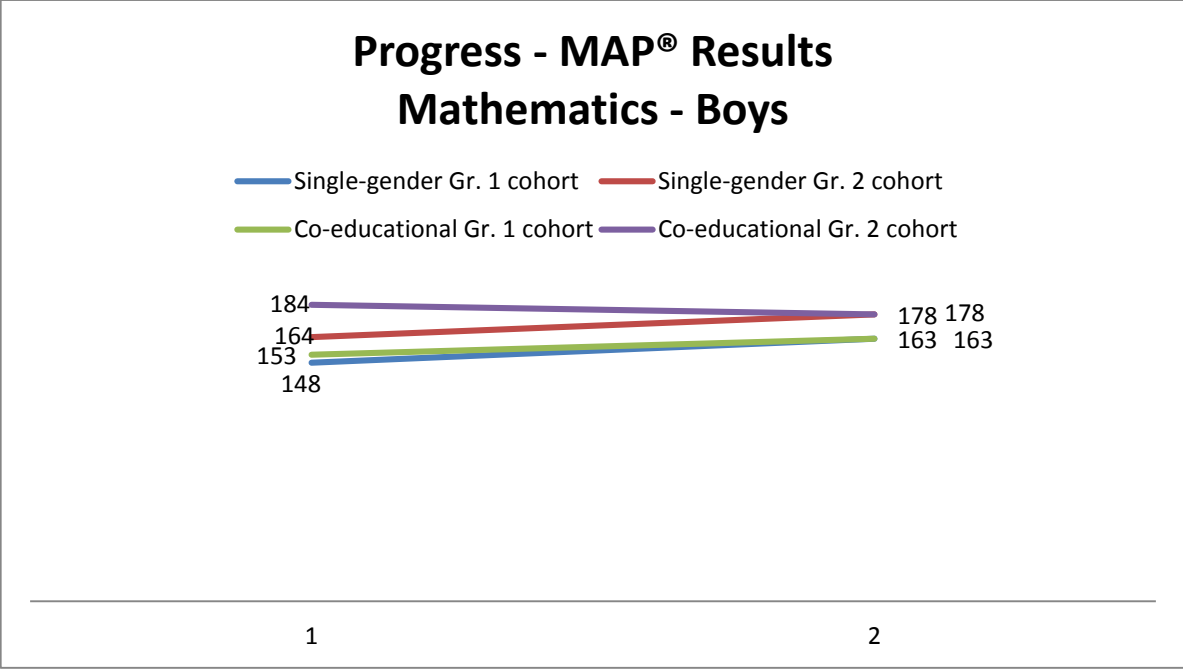


Figure 4.2.7

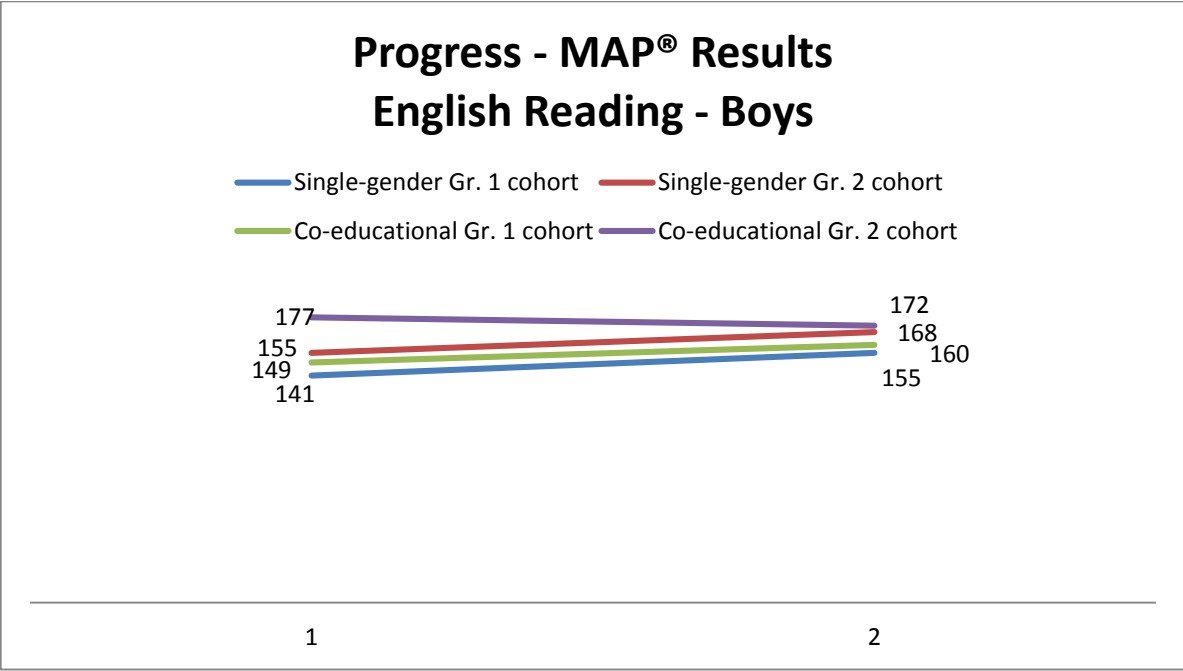


Figure 4.2.8

Chapter 5 - Discussion

5.1 Introduction

The study's vast wealth of results is only deserving of careful examination. According to Denscombe (2010), the discussion offers detailed scrutiny of the study's findings as it pursues profound meaning. It is in this chapter where the paper's research problem is addressed through interpretation and description of the on-site results. Connected to the first two chapters of the paper via its discourse surrounding the research questions and literature (Annesley 2010), the discussion is climactic in every sense of the word.

In this paper, the discussion will function as a platform for in-depth analysis of the study's findings. These will be thoroughly examined, synthesized, and interpreted in relation to each of the project's research questions. Following this structured analysis, the research's findings will be explained in relation to the current literature.

5.2 Research Question #1

- What is the difference in student achievement between students in the single-gender setting and those in the coeducational setting?

Advantages in student achievement do not favor a particular gender setting (see Table 5A). While attainment levels of boys and girls in the co-educational classroom were higher on the MAP® assessment, greater progress on the MAP® was noted for students in the single-gender context. Lesson observation scores illustrate a somewhat similar picture. Girls' attainment was judged to be equal in both settings while boys in the co-educational classroom demonstrated slightly higher levels of understanding. In-class observations also indicated greater progress in lessons for girls in single-gender classrooms and equal lesson progress for boys of both settings.

With attainment scores higher for the co-educational classroom and progress deemed greater in the single-gender classroom, a definitive difference in student achievement across settings cannot be determined. Mindful of this, the pilot study shows that student achievement in co-educational classrooms - and in terms of attainment specifically - is

slightly higher than it is in the single-gender context. In contrast, student achievement in the single-gender classroom, as it relates to progress, is marginally higher than it is in the co-educational classroom.

Student Achievement Measures	Single-gender girls	Co-educational girls	Single-gender boys	Co-educational boys
MAP® Attainment (English & Math)	162.5	170	158	165.5
MAP® Progress (English & Math)	+ 8	+ 4.75	+ 14	+ 2.50
LO Attainment	3.00	3.00	3.50	3.33
LO Progress	3.17	3.67	3.50	3.50

Table 5A

5.3 Research Question #2

- What is the difference in student engagement levels between students in the single-gender setting and those in the coeducational setting?

According to lesson observation scores, students in co-educational classrooms exhibited noticeably higher levels of student engagement. A 0.20 margin separated the girls while a more evident 0.47 disparity was noted for the boys. These advantages were negated and reversed when teachers' reported findings on student engagement were collected and analyzed. TERF-N scores significantly favored students in single-gender environments with a 0.27 differential between girls and a 0.66 difference for boys.

The conflicting findings from the two instruments – when averaged - yielded near identical scores (see Table 5B). It is these very slim margins that separate student engagement levels in each of the two settings. A mere 0.04 differential between girls and a 0.10 gap between the boys – both in favor of the single-gender environment – set the two gender-based contexts apart. Overall, an infinitesimal 0.07 advantage was recorded for students in single-gender classrooms.

Student Engagement Domains	Single-gender girls		Single-gender boys		Co-educational girls		Co-educational boys	
	LO	TERF	LO	TERF	LO	TERF	LO	TERF
Affective	3.00	1.48	3.17	1.90	2.89	1.58	2.78	2.54
Behavioral	2.61	1.38	2.67	1.70	2.11	1.67	2.11	2.12
Cognitive	3.06	1.63	3.28	2.11	3.06	2.06	2.83	3.03
Instrument Averages	2.89	1.50	3.04	1.90	2.69	1.77	2.57	2.56
Averages by group	2.19		2.47		2.23		2.57	
Averages by setting	2.33				2.40			

Table 5B

5.4 Research Question #3

- What is the relationship between student engagement and student achievement in each of the settings?

A more specific, gender group-based approach was needed to ascertain the relationship between student engagement and student achievement. Understanding the pattern in variable differences for the two gender groups within each of the two settings offers needed scope and sheds light on the relationship between the variables at play. According to the findings of the study, a positive relationship between engagement and achievement exists. Despite the approximate 1 point differential on the unified scoring scale between engagement and achievement, a linear association was noted for each of the two gender groups within the two settings. In each of the two gender contexts, higher engagement levels for girls led to greater achievement in comparison to lower engagement levels for the boys which resulted in poorer achievement (see Table 5C).

Dependent Variables	Single-gender girls	Single-gender boys	Co-educational girls	Co-educational boys
Student Engagement (Lesson Observations)	2.89	3.04	2.69	2.57
Student Engagement (TERF-N)	1.50	1.90	1.77	2.56
Student Engagement (Totals)	2.19	2.47	2.23	2.57
	2.33		2.40	
Student Achievement (Lesson Observations)	3.09	3.50	3.34	3.42
	3.30		3.38	

Table 5C

5.5 Research Question #4

- What is the difference between the student engagement and achievement correlation in each of the settings?

The study's findings show near identical correlations in each of the two gender-based contexts. A disparity of 0.97 in the single-gender environment and a 0.98 discrepancy in the co-educational environment reflect a noteworthy sameness across the two settings (see Figure 5.1.1). With this holistic perspective providing a clear and concise answer to the research's question, a deeper look at gender group-level reveals similarly consistent numbers. Differences between the two variables for each of the four gender groups ranged between a 0.85 and a 1.11 on the scoring scale, a relatively low 0.26 average differential. Consequently, the correlational trend across the four gender groups shows solid consistency in the already evident relationship between student engagement and achievement (see Figure 5.1.2). These findings demonstrate that classroom gender composition was not a factor in the relationship between SE and SA.

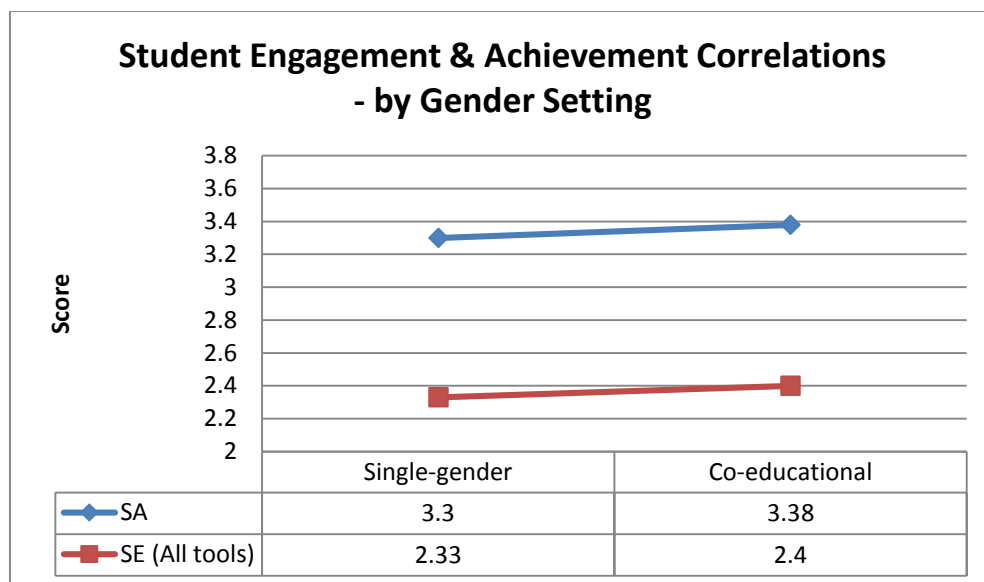


Figure 5.1.1

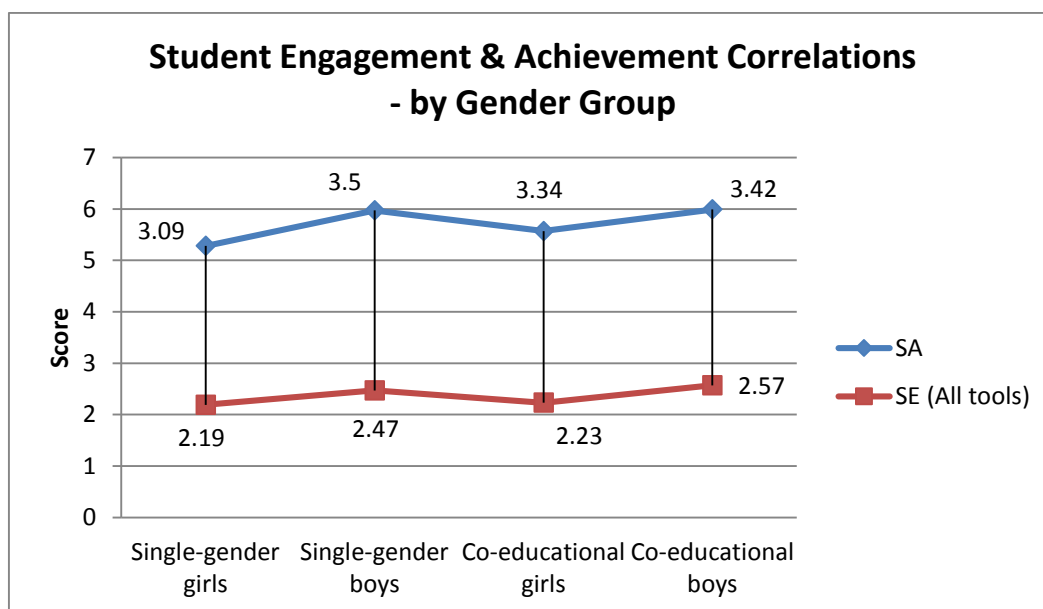


Figure 5.1.2

Further Discussion – Al Ain in the Wider Context

Even though the prevailing debate on single-gender and coeducation continues to resonate across academic circles, the pilot project finds itself positioned in well-established middle ground. According to a meta-analysis by Pahlke et al. (2014), there are no advantages to either SG or COED classroom contexts. A review by Smyth (2010) reached similar conclusions with very little agreement on advantages for either gender in any of the two contexts. The Al Ain study's results are very much consistent with this already present research and solidify its position.

More consistency between the pilot project and the existing literature is also evident in the relationship between SE and SA. The positive relationship between SE and SA as noted in previous research results (Greenwood 1991; Finn 1993) is consolidated in the Al Ain project.

Additional commonalities come to light when focusing on the effects of gender on the relationship between SE and SA. Although the boy vs. girl comparison was a by-product of a study centered on gender composition in the classroom, the significant insight gained reinforces the current body of knowledge. Based on the results of the Al Ain study, the relationship between SE and SA for each of the girls and boys – irrespective of classroom context - is separated by a miniscule average differential (+/- 0.06) on a 0-6 scale. This is consistent with findings by Ruban and McCoach (2005), who found no discrepancies between the two genders when relating engagement and achievement. Lam et al. (2012) reached the same conclusions, favoring neither gender despite the evident relation between engagement and achievement.

Chapter 6 – Conclusion

6.1 Summary of the Study

The purpose of the Al Ain pilot study was to discern the degree to which – if any - gender composition impacted student engagement and achievement in the primary classroom. Born of a need to add to the limited research on the subject in the Arab world and contextualize a long disputed global phenomenon, the incentives behind the study were genuine cornerstones upon which it was based. A secondary aim addressing the relationship between student engagement and achievement provided the quantitative research project with a correlational dimension serving to complement its causal-comparative design.

By operationalizing the study's main variables in accordance with officially recognized frameworks and peer-reviewed literature, an assortment of instruments and methods were used to record in-class observations, report teachers' perceptions, and analyze raw assessment data. Throughout this process, challenges relating to lesson inaccessibility, collected data, and survey administration were acknowledged and overcome by the researcher.

6.2 Key Findings

Despite the relatively small scale of the Al Ain project, the research process culminated in an abundance of findings. These are bullet-pointed below:

- There are trivial differences in student achievement between the single-gender and coeducational settings.
- Students in coeducational classes demonstrated higher levels of attainment while greater progress was evident in single-gender classrooms. The conflicting findings of attainment and progress nullified one another and led to comparable student achievement levels in each of the two gender contexts.
- Negligible discrepancies were evident in student engagement levels between the single-gender and coeducational classrooms. Even though lesson observation

scores pointed to higher engagement levels in coeducational classes, reported teacher perceptions favored students in single-gender classes.

- A positive correlation between student engagement and student achievement was noted in each of the two gender settings.
- Correlations between student engagement and student achievement were nearly indistinguishable in the two gender contexts and across the four gender groups.
- Classroom gender composition had no effect on the relationship between student engagement and student achievement.

6.3 Implications

The UAE's commitment to and investment in the education sector has resulted in unequaled growth amongst its Arab neighbors (Warner & Burton 2017). Amidst this rising tide towards quality education in the UAE, the Al Ain study offers a unique perspective on educational reform. Given that studies on gender-segregated schools in the Arab world on the whole are limited (AlMatrouk 2016), the Al Ain project explores uncharted territory, albeit on a small scale. Despite this limited scope, the study's findings on classroom gender composition offer a glimpse into avenues worthy of discussion as educational development continues to spearhead the UAE's investment priorities.

Although the Al Ain study does not provide definitive answers to the worldwide debate on single and coeducational education, it does shine the spotlight on gender composition in UAE classrooms and thus paves a path for policy considerations. The far-reaching potential impact of the study, a consequence of the scant national and regional literature on the subject, offsets its modest scale and positions it as a stepping stone for more comprehensive research projects, or at the very least, an instigator of constructive debate.

6.4 Recommendations

Based on the project's empirical findings and relevant literature, the points listed below represent specific recommendations intended to improve student engagement and achievement within the two main gender contexts and for all gender groups:

- Advancing gender-based differentiation methods - both instructional and assessment - based on gender-specific cognitive abilities and strengths in all classroom contexts.
- Enhancing teachers' gender responsive pedagogical skills through mandatory in-service training.
- Exploring and trialing focused approaches - targeting boys in both gender contexts within the primary classroom - aimed at boosting engagement and achievement outcomes.
- Implementing and routinizing various in-class strategies aimed at raising student engagement levels through effective leadership, relevant professional development programs, and monitoring processes.
- Continuing to offer single-gender and co-educational classroom environment options to concerned stakeholders across all UAE communities.

6.5 Further Study

Describing the Al Ain project within the larger context, it would be safe to say that the study scratched the surface of a much greater field. On the whole, more robust research is needed (Cable & Spradlin 2008) and specifically studies which are controlled for selection effects (Pahlke et al. 2014). At the regional level in Gulf countries and the Arab world, comparative studies are lacking and further research is a necessity.

Given this perspective, the Al Ain study has opened the door, ever so slightly, for future research. In a country where gender disparities favor girls (OECD 2015), and authorities are vying for a first rate education system (Ministry of Cabinet Affairs 2018),

the effects of classroom gender composition on student outcomes are deserving of more comprehensive investigation. To this end, controlled, comparative studies of single-gender and coeducational classrooms throughout the UAE are needed. It would also be advised that subsequent studies take the form of full-scale systematic reviews reliant on meta-analyses. With the stakes in the UAE education sector as high as they have ever been, and wide-ranging cultural, SES, and curricular diversity ever-present across the school landscape, it is imperative that heavily funded, single vs. coeducational studies continue to dig deeper and seek answers aimed at achieving the first rate education to which all aspire.

6.6 Closing Note

Before this study came to fruition, a long-standing curiosity grew restlessly. The stark difference in realities within a single community brought about more questions than answers. As a response to the persistent inquisition, the Al Ain project set forth focused objectives which sought to put all relevant lines of inquiry to rest.

By the end of the project, the determinations made were similar to much of the literature on the subject and showed that there are no differences between single-gender and coeducational classes. Beyond these core findings, the study also reinforced past research on the positive relationship between student engagement and achievement. In the grand scheme of things, this success is a miniscule step in the right direction. For now, the Al Ain study has managed to keep the rousing interest dormant. It is only a matter of time before the emergence of more extensive studies amidst the ever-evolving educational landscape in the UAE.

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Appendix A


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2/20/2018

Department of Education and Knowledge
Abu Dhabi, UAE

This is to certify that Mr. Bassam Saryeddine with Student ID number 2016101038 is a registered part-time student in the Master of Education offered by The British University in Dubai since September 2016.

Mr. Saryeddine is currently collecting data for his research (Single Gender Classrooms vs. Coeducational Classrooms in the Foundation Phase: A Comparative and Relational Case Study of Student Engagement and Achievement).

He is required to gather data through conducting surveys that will help him in writing the final research. Your permission to conduct his research in your organisation is hereby requested. Further support provided to him in this regard will be highly appreciated.

Any information given will be used solely for academic purposes.

This letter is issued on Mr. Saryeddine's request.

Yours sincerely,


Dr. Amer Aljaya
Head of Academic and Student Administration

PO Box 345015 - Block 11, Dubai International Academic City, Dubai, U.A.E - T +971 4 279 1400 - F +971 4 279 1490
 fb.com/BUIDTeam  BUID_Team  youtube.com/BUIDAdmin  @BUID_Team  BUID

January 22, 2018

Dear School Principal,

First and foremost, I would like to thank you for taking the time to read this letter.

A student in the Masters of Education program at the British University in Dubai, I am currently working on my dissertation entitled **Single Gender Classrooms vs. Coeducational Classrooms in the Foundation Phase: A Comparative Case Study of Student Achievement**. Seeing that this project seeks to address critical questions which remain unanswered, it is my firm belief that your school's profile and its proven and esteemed reputation within the community and the Emirate of Abu Dhabi make it an ideal environment for the purposes of this study.

I am formally requesting your permission and support over the course of one to two days as I conduct field research for my dissertation in your respectable school. This research will include no more than twelve lesson observations, two simple online surveys targeting teachers of Grades 1-3, and access to student MAP results (Gr.1-3) for analysis. The confidentiality of the study and the anonymity of the school and all of its staff members will of course be guaranteed and maintained. Further details about the study, its benefits, potential concerns, etc. can be found in the attached consent form which is to be signed by both parties should my request be approved. I have also attached a copy of my UAE ID and University ID to this letter as verification and for your additional reference.

I look forward to your positive response and am excited at the prospect of your school being a part of this profound and pertinent study which seeks to make a constructive impact on education in the UAE.

Thank you again for your time.

Sincerely,

Bassam Saryeddine
Street #10, Al Khabisi
Al Ain, Abu Dhabi, UAE
+971-50-3953436
saryeddinebassam@hotmail.com

Under the guidance of:

Dr Christopher Hill

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PO Box 345015 - 1st & 2nd Floor, Block 11
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Dubai, United Arab Emirates



[Handwritten signature]

Appendix B



Consent to Participate in a Research Study

Title of the Study: Single Gender Classrooms vs. Coeducational Classrooms in the Foundation Phase: A Comparative and Relational Case Study of Student Engagement and Achievement

Researcher's Name: Bassam Saryedine

Introduction

- You are being asked to contribute to a one-of-a-kind study aimed at better understanding the role of gender grouping in foundation-level classes and its effect on student engagement and achievement.
- You are kindly asked to read this form and ask any questions that you may have before agreeing to willfully participate in this study.

Purpose

- The purpose of the study is to better understand the effects of gender grouping on student engagement and achievement in the foundation phase.

Needs & Requests

As a participant in this study, you will be asked to grant the visiting researcher the following:

- Permission to observe 1 or 2 of your lessons (15-20 min per lesson).
- Completion of a 19-item online survey related to the research. This survey should take no longer than 15 minutes to complete and can be taken at your discretion through to April 26, 2018.

Benefits

- This study sheds light on the effects gender grouping has on student learning. Moreover, the school's participation in this in-depth study represents a tangible and impactful contribution to educational research in the community and potentially on educational policy in the UAE as a whole.

Confidentiality

- This study is anonymous. There will be no collection or use of any information about the identity of the staff members or the school.
- The records of this study will be kept strictly confidential. No part of the study will be published or used in any manner unless your permission is officially granted upon the researcher's request. Research records will remain in the hands of the researcher and the university in which he is a part. The university's use of the report will be limited to marking the report based on quality of the content and its meeting academic standards. The university may also choose to make the dissertation available as a resource to the public; in such a case, any version made public would not reveal information about the identity of the school or its participants.

Refusal or Withdrawal

- The decision to participate in this study lies with you. Should you, as a participant, come across irregularities during the research period, you may withdraw the previously granted permission without affecting your relationship with the researcher. In such a case, any material or data collected until that point would not be used upon your request.

Questions and Concerns

- You have the right to ask questions about this research study before, during or after the study. The researcher will ensure that those questions are answered to the best of his abilities. You can reach the researcher at the following email: bassamsaryeddine@gmail.com
- Should you have any concerns about the study, please feel free to contact the researcher directly at the above-mentioned email. Should you require more official channels for your complaints, the researcher will provide you with an official complaint form to complete.

Consent

- Your signature below indicates your voluntary decision to take part as a research participant, host, or subject for this study and that you have read and understood all above-stated information.

Participant's Name: _____

Participant's Signature: _____

Appendix C

Classroom Gender Grouping:	Grade/Section:	Date:	Time in/out:					
New Inspection Framework Observation Tool (Achievement) – ADEK								
Area	Gender	Scoring Scale						Comments
		1	2	3	4	5	6	
Attainment								
Students demonstrate knowledge, skills, and understanding (NIF – 1.1.3)	Girls							
	Boys							
Progress								
Students make progress in relation to learning objectives (NIF -1.2.2)	Girls							
	Boys							
Observer's Name & Signature:		The above tool and all criteria within are part of the UAE's official 2015/2016 New Inspection Framework.						

Classroom Gender Grouping:	Grade/Section:	Date:	Time in/out:					
New Inspection Framework Observation Tool (Engagement) – ADEK								
Area	Gender	Scoring Scale						Comments
		1	2	3	4	5	6	
Affective								
Students have very positive and responsible attitudes (2.1.1)	Girls							
	Boys							
Students always help each other and are considerate of one another (2.1.3)	Girls							
	Boys							

Students focus well, are involved in, and reflect on their learning (1.3.1)	Girls							
	Boys							
Behavioral								
Students attendance is at least 98% (2.1.5)	Girls							
	Boys							
Students are active participants involved in their learning and development (1.3.1)	Girls							
	Boys							
Students are respectful to staff (2.1.3)	Girls							
	Boys							
Cognitive								
Students show an excellent work ethic, are enterprising and resilient (2.3.2)	Girls							
	Boys							
Students take responsibility for their own learning in sustained ways (1.3.1)	Girls							
	Boys							
Students are eager and motivated learners (1.3.1)	Girls							
	Boys							
Observer's Name & Signature:							The above tool and all criteria within are part of the UAE's official 2015/2016 New Inspection Framework.	

Appendix D

1. I am a teacher of: - أنا ادرس الصف 

- ☐ Grade 1 - الأول
- ☐ Grade 2 - الثاني
- ☐ Grade 3 - الثالث
- ☐ A combination of the above - مزيج من الصفوف المذكورة

2. Boys in my class seem interested in school - البنين في صفي مهتمين بالمدرسة 

- ☐ Most (Greater than 75% من أكثر من 75%)
- ☐ Large majority (61% - 74% من غالبية كبيرة)
- ☐ Majority (50% - 60% من غالبية)
- ☐ Large minority (31% - 49% من أقلية ملحوظة)
- ☐ Minority (16% - 30% من أقلية)
- ☐ Few (Up to 15% حتى 15%)

3. Boys in my class get along with all of their peers-

البنين في صفي يتفقون مع أقرانهم 

- ☐ Most (Greater than 75% من أكثر من 75%)
- ☐ Large majority (61% - 74% من غالبية كبيرة)
- ☐ Majority (50% - 60% من غالبية)
- ☐ Large minority (31% - 49% من أقلية ملحوظة)
- ☐ Minority (16% - 30% من أقلية)
- ☐ Few (Up to 15% حتى 15%)

4. Boys in my class seem to care about their grades-

البنين في صفي يهتمون بعلاماتهم 

- ☐ Most (Greater than 75% من أكثر من 75%)
- ☐ Large majority (61% - 74% من غالبية كبيرة)
- ☐ Majority (50% - 60% من غالبية)
- ☐ Large minority (31% - 49% من أقلية ملحوظة)
- ☐ Minority (16% - 30% من أقلية)
- ☐ Few (Up to 15% حتى 15%)

5. Boys in my class have good attendance- معدل حضور البنين في صفي جيد 

- ☐ Most (Greater than 75% من أكثر من 75%)
- ☐ Large majority (61% - 74% من غالبية كبيرة)
- ☐ Majority (50% - 60% من غالبية)
- ☐ Large minority (31% - 49% من أقلية ملحوظة)
- ☐ Minority (16% - 30% من أقلية)
- ☐ Few (Up to 15% حتى 15%)

6. Boys in my class participate in discussions/activities -

البنين في صفي يشاركون في المناقشات والأنشطة الصفية

- | | |
|---|---|
| ☐ Most (Greater than 75% معظم (أكثر من 75%) | ☐ Large minority (31% - 49% أقلية ملحوظة (من 31% - 49%) |
| ☐ Large majority (61% - 74% غالبية كبيرة (من 61% - 74%) | ☐ Minority (16% - 30% أقلية (من 16% - 30%) |
| ☐ Majority (50% - 60% غالبية (من 50% - 60%) | ☐ Few (Up to 15% عدد قليل (حتى 15%) |

7. Boys in my class are respectful to staff -

البنين في صفي يحترمون المعلمين

- | | |
|---|---|
| ☐ Most (Greater than 75% معظم (أكثر من 75%) | ☐ Large minority (31% - 49% أقلية ملحوظة (من 31% - 49%) |
| ☐ Large majority (61% - 74% غالبية كبيرة (من 61% - 74%) | ☐ Minority (16% - 30% أقلية (من 16% - 30%) |
| ☐ Majority (50% - 60% غالبية (من 50% - 60%) | ☐ Few (Up to 15% عدد قليل (حتى 15%) |

8. Boys in my class persist on more challenging tasks -

البنين في صفي يثابرون على المهام الأكثر تحدياً

- | | |
|---|---|
| ☐ Most (Greater than 75% معظم (أكثر من 75%) | ☐ Large minority (31% - 49% أقلية ملحوظة (من 31% - 49%) |
| ☐ Large majority (61% - 74% غالبية كبيرة (من 61% - 74%) | ☐ Minority (16% - 30% أقلية (من 16% - 30%) |
| ☐ Majority (50% - 60% غالبية (من 50% - 60%) | ☐ Few (Up to 15% عدد قليل (حتى 15%) |

9. Boys in my class demonstrate appropriate effort for the task -

البنين في صفي يظهرون الجهد المناسب للمهمة

- | | |
|---|---|
| ☐ Most (Greater than 75% معظم (أكثر من 75%) | ☐ Large minority (31% - 49% أقلية ملحوظة (من 31% - 49%) |
| ☐ Large majority (61% - 74% غالبية كبيرة (من 61% - 74%) | ☐ Minority (16% - 30% أقلية (من 16% - 30%) |
| ☐ Majority (50% - 60% غالبية (من 50% - 60%) | ☐ Few (Up to 15% عدد قليل (حتى 15%) |

10. Boys in my class are self-motivated -

البنين في صفي لديهم التحفيز الذاتي

- | | |
|---|--|
| ☐ Most (Greater than 75% معظم (أكثر من 75%) | ☒ Large minority (31% - 49% أقلية ملحوظة (من 31% - 49%) |
| ☐ Large majority (61% - 74% غالبية كبيرة (من 61% - 74%) | ☐ Minority (16% - 30% أقلية (من 16% - 30%) |
| ☐ Majority (50% - 60% غالبية (من 50% - 60%) | ☐ Few (Up to 15% عدد قليل (حتى 15%) |

Appendix E



Grade Report

Term: Spring 2017-2018
District:
School:

Norms Reference Data: 2015
Weeks of Instruction: 32 (Spring 2018)
Grouping: None
Small Group Display: No

Reading

Growth: Reading K-2 CCSS Int'l 2010 / Common Core English Language Arts: 2010

Goal Performance

A. Foundational Skills
B. Language and Writing
C. Literature and Informational
D. Vocabulary Use and Functions

Name (Student ID)	Test Date	RIT (+/- Std Err)	Percentile (+/- Std Err)	Lexile® Range	Test Duration	A	B	C	D
	05/21/18	155-158-161	6-9-13	BR	24 m	157-171	160-174	150-164	141-155
	05/21/18	158-161-164	9-13-18	BR	32 m	163-177	150-164	161-175	144-158
	05/21/18	151-154-157	3-5-8	BR	21 m	147-159	145-159	153-165	144-157
	05/21/18	169-172-175	28-35-43	BR	30 m	159-173	175-189	166-180	159-171
	05/21/18	166-169-172	21-28-36	BR	32 m	164-178	170-182	159-173	156-170
	05/21/18	162-165-168	14-19-26	BR	28 m	164-178	165-179	155-169	147-161
	05/21/18	163-166-169	15-21-29	BR	38 m	163-177	162-176	156-170	154-168
	05/21/18	148-151-154	2-3-5	BR	15 m	149-162	145-157	138-150	149-163
	05/21/18	151-154-157	3-5-8	BR	20 m	151-165	149-163	138-152	154-167
	05/21/18	163-166-169	16-21-28	BR	35 m	160-172	158-170	159-172	164-178
	05/21/18	159-162-165	10-14-20	BR	28 m	137-151	150-164	156-170	168-182
	05/21/18	157-160-163	8-11-16	BR	34 m	157-171	154-168	157-170	149-162
	05/21/18	165-168-171	19-26-33	BR	21 m	155-169	161-175	163-175	167-181
	05/24/18	116-119-122	1-1-1	BR	17 m	116-130	112-126	117-130	108-120
	05/21/18	119-122-125	1-1-1	BR	16 m	125-139	120-134	114-128	105-119
	05/21/18	152-155-158	4-6-9	BR	17 m	158-172	145-159	137-152	150-164
	05/21/18	164-167-170	17-23-31	BR	25 m	156-169	165-179	161-173	159-171
	05/21/18	145-148-152	1-2-4	BR	19 m	152-166	127-141	151-165	136-150
	05/21/18	151-154-157	3-5-8	BR	23 m	149-163	144-158	153-167	143-156
	05/21/18	155-158-161	6-9-13	BR	22 m	157-171	144-158	157-171	146-160
	05/21/18	159-162-165	10-14-20	BR	29 m	158-172	157-170	153-167	156-168
	05/24/18	149-152-155	2-4-6	BR	17 m	149-163	151-163	138-150	145-157
	05/21/18	158-161-164	9-13-18	BR	30 m	164-178	150-164	148-162	152-166
	05/22/18	145-148-151	1-2-3	BR	22 m	151-165	146-160	129-143	137-151
	05/21/18	141-144-147	1-1-2	BR	23 m	141-155	120-136	137-150	150-166
	05/21/18	149-152-155	2-4-6	BR	19 m	139-151	143-157	147-160	152-166
	05/24/18	166-169-172	21-28-36	BR	25 m	170-184	160-174	165-179	152-166
	05/21/18	153-156-159	4-7-11	BR	34 m	141-155	163-177	158-174	139-153
	05/21/18	154-157-160	5-8-12	BR	32 m	154-168	161-175	147-161	140-154

Explanatory Notes

Tests shown in gray are excluded from summary statistics. Either the test occurred outside the testing window for a term, had an invalid score, or was a repeat test for a student within a term. Due to statistical unreliability, summary data for groups of less than 10 are not shown.
* This data is not available for reporting. Please refer to help and documentation for more information.
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Grade Report

Term: Spring 2017-2018
District:
School:

Norms Reference Data: 2015
Weeks of Instruction: 32 (Spring 2018)
Grouping: None
Small Group Display: No

Reading

Growth: Reading K-2 CCSS Intl 2010 / Common Core English Language Arts: 2010

Goal Performance
A. Foundational Skills
B. Language and Writing
C. Literature and Informational
D. Vocabulary Use and Functions

Name (Student ID)	Test Date	RIT (+/- Std Err)	Percentile (+/- Std Err)	Lexile® Range	Test Duration	A	B	C	D
	05/21/18	155-188-181	8-9-13	BR	24 m	157-171	160-174	150-164	141-155
	05/21/18	158-181-184	9-13-18	BR	32 m	163-177	150-164	161-175	144-158
	05/21/18	151-154-157	3-5-8	BR	21 m	147-159	145-159	153-165	144-157
	05/21/18	169-172-175	28-35-43	BR	30 m	159-173	175-189	166-180	159-171
	05/21/18	166-169-172	21-28-36	BR	32 m	164-178	170-182	159-173	156-170
	05/21/18	182-165-168	14-19-26	BR	28 m	164-178	165-179	155-169	147-161
	05/21/18	163-166-169	15-21-29	BR	38 m	163-177	162-176	156-170	154-168
	05/21/18	148-151-154	2-3-5	BR	15 m	149-162	145-157	138-150	149-163
	05/21/18	151-154-157	3-5-8	BR	20 m	151-165	149-163	138-152	164-167
	05/21/18	163-166-169	16-21-28	BR	35 m	160-172	158-170	159-172	164-178
	05/21/18	159-162-165	10-14-20	BR	28 m	137-151	150-164	156-170	168-182
	05/21/18	157-160-163	8-11-16	BR	34 m	167-171	154-166	157-170	149-162
	05/21/18	165-168-171	19-26-33	BR	21 m	155-169	161-175	163-175	167-181
	05/24/18	116-119-122	1-1-1	BR	17 m	116-130	112-126	117-130	108-120
	05/21/18	119-122-125	1-1-1	BR	16 m	126-139	120-134	114-128	105-119
	05/21/18	152-155-158	4-6-9	BR	17 m	168-172	145-159	137-152	150-164
	05/21/18	164-167-170	17-23-31	BR	25 m	156-169	165-179	161-173	159-171
	05/21/18	145-148-152	1-2-4	BR	19 m	162-166	127-141	151-165	136-150
	05/21/18	151-154-157	3-5-8	BR	23 m	149-163	144-158	153-167	143-156
	05/21/18	155-158-161	6-8-13	BR	22 m	167-171	144-158	157-171	146-160
	05/21/18	159-162-165	10-14-20	BR	29 m	158-172	157-170	153-167	156-168
	05/24/18	149-152-155	2-4-6	BR	17 m	149-163	151-163	138-150	145-157
	05/21/18	158-161-164	9-13-18	BR	30 m	164-178	150-164	148-162	152-166
	05/22/18	145-148-151	1-2-3	BR	22 m	151-165	146-160	129-143	137-151
	05/21/18	141-144-147	1-1-2	BR	23 m	141-166	120-136	137-150	160-166
	05/21/18	149-152-155	2-4-6	BR	19 m	139-151	143-157	147-160	152-166
	05/24/18	166-169-172	21-28-36	BR	25 m	170-184	160-174	165-179	152-166
	05/21/18	153-156-159	4-7-11	BR	34 m	141-155	163-177	158-174	139-153
	05/21/18	154-157-160	5-8-12	BR	32 m	164-168	161-175	147-161	140-154

Explanatory Notes

Tests shown in gray are excluded from summary statistics. Either the test occurred outside the testing window for a term, had an invalid score, or was a repeat test for a student within a term.

Due to statistical unreliability, summary data for groups of less than 10 are not shown.

* This data is not available for reporting. Please refer to help and documentation for more information.

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Appendix F

Classroom Gender Grouping: Coed	Grade/Section: 2(ELA)	Date: 10/4/18	Time in/out: 8:15am-9:00am					
New Inspection Framework Observation Tool (Achievement) – ADEK								
Area	Gender	Scoring Scale						Comments
		1	2	3	4	5	6	
Attainment								
Students demonstrate knowledge, skills, and understanding (NIF – 1.1.3)	Girls			X				Vast majority of students able to complete assigned tasks, albeit with some mistakes.
	Boys			X				
Progress								
Students make progress in relation to learning objectives (NIF -1.2.2)	Girls			X				Definite progress made through the verb sorting exercise.
	Boys			X				
Teaching and Assessment								
Observer's Name & Signature:				The above tool and all criteria within are part of the UAE's official 2015/2016 New Inspection Framework.				

Classroom Gender Grouping:	Grade/Section: 2 (ELA)	Date: 10/4/18	Time in/out: 8:15am-9:00am					
New Inspection Framework Observation Tool (Engagement) – ADEK								
Area	Gender	Scoring Scale						Comments
		1	2	3	4	5	6	
Affective								
Students have very positive and responsible attitudes (2.1.1)	Girls		X					All students enjoy the exercise and demonstrate confidence and leadership skills.
	Boys		X					
Students always help each other and are considerate of one another (2.1.3)	Girls		X					Cooperative learning is very effective with boys and girls working well together with purpose.
	Boys		X					
Students focus well, are involved in, and reflect on their learning (1.3.1)	Girls		X					Focus is optimal for both genders.
	Boys		X					

Behavioral							
Students attendance is at least 98% (2.1.5)	Girls	X					Few noted absent students – both boys and girls.
	Boys	X					
Students are active participants involved in their learning and development (1.3.1)	Girls		X				Both girls and boys peer assessing and evaluating one another.
	Boys		X				
Students are respectful to staff (2.1.3)	Girls		X				Respect to the teacher is shown equally by boys and girls.
	Boys		X				
Cognitive							
Students show an excellent work ethic, are enterprising and resilient (2.3.2)	Girls		X				Students show a willingness to complete their tasks successfully.
	Boys		X				
Students take responsibility for their own learning in sustained ways (1.3.1)	Girls			X			One girl questions the “ing” ending for the word “close”. There is evident responsibility by students for their learning.
	Boys			X			
Students are eager and motivated learners (1.3.1)	Girls		X				Eagerness and motivation is exhibited through the students’ drive during the verb sorting exercise.
	Boys		X				
Observer’s Name & Signature:						The above tool and all criteria within are part of the UAE’s official 2015/2016 New Inspection Framework.	
Bassam Saryeddine 							

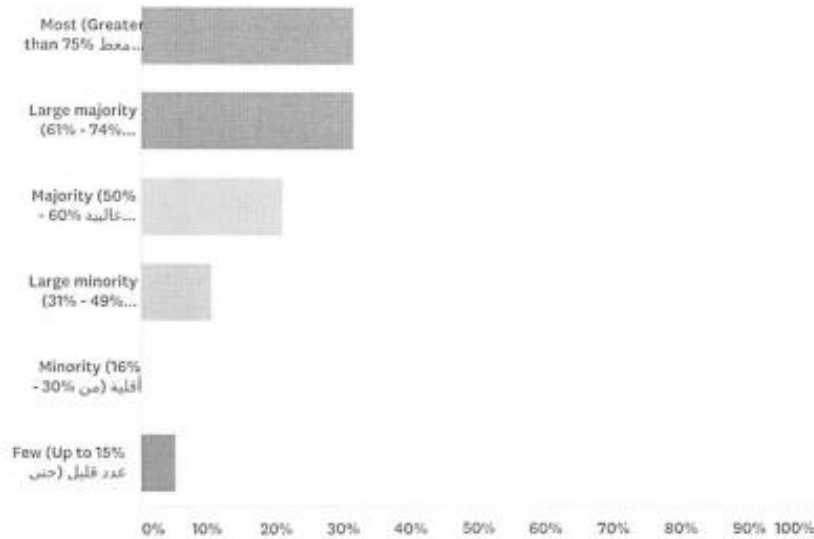
Appendix G

Copy of Teacher Engagement Report Form (Single-gender Boys) - (Final)

SurveyMonkey

Q8 Boys in my class persist on more challenging tasks - البنين في صفي يثابرون - على المهام الأكثر تحدياً

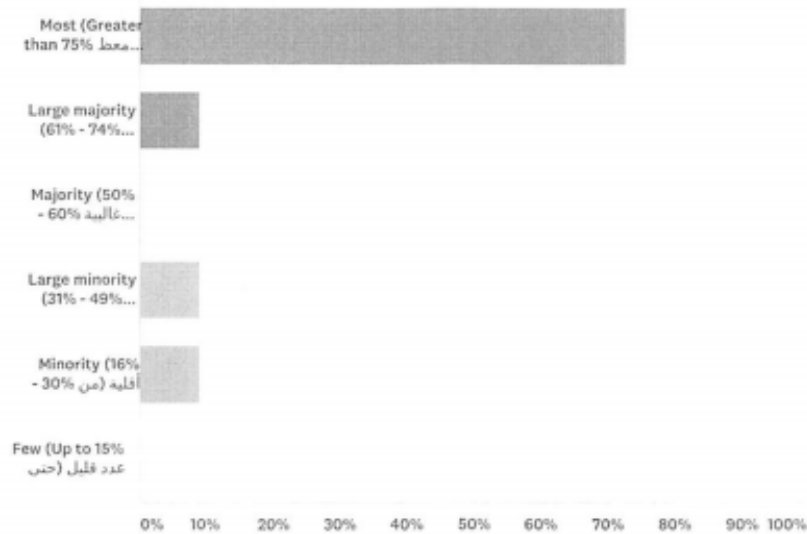
Answered: 19 Skipped: 0



ANSWER CHOICES	RESPONSES	
Most (Greater than 75% من أكثر من)	31.58%	6
Large majority (61% - 74% من غالبية كبيرة)	31.58%	6
Majority (50% - 60% من غالبية)	21.05%	4
Large minority (31% - 49% من أقلية ملحوظة)	10.53%	2
Minority (16% - 30% من أقلية)	0.00%	0
Few (Up to 15% من عدد قليل)	5.26%	1
TOTAL		19

Q4 Girls in my class get along with all of their peers- البنات في صفي يتفقن مع أقرانهن

Answered: 11 Skipped: 0



ANSWER CHOICES	RESPONSES	
Most (Greater than 75%) معظم (أكثر من 75%)	72.73%	8
Large majority (61% - 74%) غالبية كبيرة (من 61% - 74%)	9.09%	1
Majority (50% - 60%) غالبية (من 50% - 60%)	0.00%	0
Large minority (31% - 49%) أقلية متحوطة (من 31% - 49%)	9.09%	1
Minority (16% - 30%) أقلية (من 16% - 30%)	9.09%	1
Few (Up to 15%) عدد قليل (حتى 15%)	0.00%	0
TOTAL		11