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Aurora Terry
May 2013

**A STUDY OF INTERNATIONAL BACCALAUREATE MIDDLE YEAR
PROGRAMME PARTICIPANTS' COLLEGE READINESS INDICATOR EXAM
SCORES AND THE IMPLICATIONS FOR SCHOOL LEADERS**

**A Doctoral Thesis Presented to the
Faculty of the College of Education
University of Houston**

**In Partial Fulfillment
of the Requirements for the Degree**

**Doctor of Education
in Professional Leadership**

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Dedication

For My Parents (all four of you),

Thank you for believing in me, pushing me, and always challenging me to take risks. I have never been afraid to leap knowing that you were there to catch me if I fell.

Thank you for your encouraging words, calls, notes, mail, cards, snacks, and hugs.

I could never have done this without your support.

Your work ethic, sacrifice and dedication have inspired me.

Thank you for being such wonderful examples.

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“It’s not what we have in our life, but who we have in our life that counts.”

– J.M. Laurence

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Abstract

The purpose of this longitudinal, non-experimental, causal comparative research study was to investigate whether a statistically significant difference existed between the college readiness indicator exam scores of students who participated in an International Baccalaureate Middle Years Programme (IBMYP) and those who did not. This quantitative study compared the archival data results of the AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, SAT Reading, SAT Writing, SAT Math, IB Mathematics HL, IB Mathematics SL, and IB English A1 exams of students in two large, urban comprehensive high schools. This study examined participation in an IBMYP middle school and high school exam scores three and four years later. The independent variable in this study was student participation in IBMYP in grades 6-8.

There were mixed results in the findings of this study. Students who participated in the IBMYP middle school program achieved better than their non-IBMYP counterparts on the SAT Math, SAT Reading, SAT Writing, IB English A1, AP English Language, AP English Literature, and IB Math HL. Significant differences in scores between IBMYP participants and non-participants were found in all but three of the exams: IB Math SL, AP Calculus AB, and AP Calculus BC.

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CHAPTER 1

Introduction

Traditionally, the metric used to gauge educational success has been high school graduation rates. With colleges finding more high school graduates deficient in core subject area knowledge and more careers requiring not just high school but college diplomas, national concerns regarding education have shifted from increasing high school graduation rates to increasing college readiness and enrollment (U. S. Department of Education, 2009). Eighty percent of 21st Century jobs require some postsecondary education (Texas Education Agency, 2009). High school graduation is no longer enough to prepare future generations for the workforce. The Obama administration, the Governor's Association, the Bill and Melinda Gates Foundation, and the National Center on Education and Economy have focused their attention on ensuring students are prepared for college-level courses upon graduation from high school (Balfanz, 2010).

The shift is also apparent at the state level. Twenty-four states have joined the Partnership for Assessment of Readiness for College and Careers (PARCC) as of January 2012, in order to create a common set of measures to prepare students for college and career readiness (Center on Education Policy, 2012). In 2008, the 79th Texas Legislature adopted the Texas College and Career Readiness Standards (CCRS) in response to the fact that Texas was trailing other states in sending students to postsecondary education (Texas Education Agency, 2009). The standards define what students need to know to be able to succeed in entry-level classes in postsecondary institutions in Texas. The TEA developed this framework of standards for English/Language Arts, science, social studies, and math. The CCRS was created to highlight the knowledge and skills students

need to succeed in entry- level college courses or careers (Texas Education Agency, 2009).

David Conley (2007) defines college readiness as the level of preparation a student needs to succeed without remediation in entry- level credit-bearing college courses. Lack of college readiness can be defined by the number of remedial courses students take in college. Student enrollment in remedial courses is increasing (Baber, 2010). Educators and lawmakers, in an effort to negate this phenomenon, are searching for and developing educational frameworks to create college and career readiness programs to properly prepare students for college. States are working to align high school programs and graduation expectations with the requirements of colleges and careers.

Measuring college readiness creates its own challenges. High school grade point averages, class rank, and standardized test scores have been instruments traditionally used to measure college readiness (Baber, 2010). Additionally, Advanced Placement (AP) and performance in high school college preparatory courses have been a national standard for college readiness (Board, 2011). AP courses are delivered on individual campuses by high school teachers based on the course descriptions given to them by the College Board (Texas Education Agency, 2011). The College Board currently offers more than 30 AP courses across subject disciplines. The AP course curricula are developed by a committee made up of university faculty and AP teachers. The committee considers the depth and breadth of content, skills, and tasks for each course to ensure they correspond with the equivalent college course (College Board, 2013).

AP courses are available in 59% of U.S. public secondary schools (Center on Education Policy, 2012). In an attempt to help students become “college ready,” school

districts have encouraged students to take AP courses and exams, and some school districts pay for all students enrolled in AP courses to take AP exams. According to the Center on Education Policy (2012), in 2010, 1,973,545 U.S. students took AP exams. Out of a possible 5, only 58% of the examinees scored a 3 or higher on AP exams. AP exam scores are an indicator of college readiness (Center on Education Policy, 2012). The pass rate is worse in the school district in which this study focused. Only 38% of the 8,875 examinees in the district scored a 3 or higher on AP exams.

One of the most difficult aspects of the college readiness initiative is ensuring equity in education for all (Kyburg, 2007). This is particularly true when considering the demographic composition of different school districts. The large, urban school district in this study has a student body that is 92% minority. By comparison, in 2008, there were 44% minority students enrolled in national K-12 public schools (Center on Education Policy, 2012). This large, urban southeastern school district is likely a bellwether for the nation's educational future.

The number of minority students in the United States is increasing and is projected by the National Center for Education Statistics (NCES) to be 58% of all students in 2020. Figure 1-1 is a chart showing the performance by race of students who took the AP exams in Texas during the 2009-2010 school year. The number of minority examinees who scored high enough to earn college credit is undeniably low (Kyburg, 2007). As the graph below states, only 24.8% of African American examinees scored between 3 and 5 on AP exams, and only 36.7% of Hispanic examinees scored between 3 and 5 on AP exams. Sixty-two point six percent of White examinees scored between 3 and 5 on the AP exams.

Figure 1-1

*Performance by Race on the AP Exams in Texas***Advanced Placement (AP) Examination Participation and Performance, Grades 11 and 12, by Race/Ethnicity, Economic Status, and Gender, Texas Public Schools, 2009-10**

Group	Students	Examinees Participation		Examinees scoring 3-5 on examinations		Examinations	Examinations with scores of 3-5	
		Number	rate (%)	Number	Percent		Number	Percent
African American	68,829	9,816	14.3	2,436	24.8	17,993	4,053	22.5
American Indian	2,798	536	19.2	262	48.9	1,119	445	39.8
Asian	20,274	10,652	52.5	7,254	68.1	30,663	19,184	62.6
Hispanic	231,622	45,000	19.4	16,514	36.7	85,288	24,576	28.8
African American	2,229	390	17.5	108	27.7	696	163	23.4
American Indian	74,017	12,787	17.3	4,746	37.1	24,759	6,658	26.9
Asian	758	234	30.9	116	49.6	493	214	43.4
Pacific Islander	765	130	17.0	55	42.3	270	125	46.3
White	145,930	28,077	19.2	10,123	36.1	52,888	15,378	29.1
Multiracial	7,923	1,948	24.6	843	43.3	3,951	1,369	34.6
Unknown	n/a ³	1,434	n/a	523	36.5	2,231	669	30.0
Pacific Islander	720	162	22.5	74	45.7	317	137	43.2
White	200,892	51,438	25.6	32,221	62.6	111,450	63,905	57.3
Multiracial	7,432	1,987	26.7	1,212	61.0	4,521	2,570	56.8
Unknown	n/a	152	n/a	52	34.2	263	80	30.4
Economically disadvantaged	234,017	38,148	16.3	12,275	32.2	71,941	17,878	24.9
Not economically disadvantaged	298,550	78,385	26.3	46,423	59.2	174,112	94,921	54.5
Female	272,280	67,437	24.8	32,816	48.7	136,701	59,278	43.4
Male	260,287	52,306	20.1	27,209	52.0	114,913	55,672	48.4
State	532,567	119,743	22.5	60,025	50.1	251,614	114,950	45.7

Source: College Board and Texas Education Agency (TEA).

Increased minority population and increased expectations of college readiness make it important for our schools to incorporate a college preparatory curriculum that ensures a high success rate for all (Saxby Smith, 2009). This is particularly true in the large, urban school district in this study. With a pass rate of only 38% on AP exams, there is a need to look at alternative college readiness programs that may result in higher success rates for students.

An alternative college readiness program to the AP is the International Baccalaureate Diploma Programme (IBDP). AP courses are available in 59% of U.S. public high schools. The IBDP is only available in 2% of U.S. public high schools. The IBDP is being adopted at an increasing rate across the nation and world (Center on Education Policy, 2012). In 2007, there were 1,588 schools in the world offering the IBDP, and in 2011, there were 2,283 (International Baccalaureate Organization, 2011). The popularity and expansion of this international program around the world is mirrored in the United States. In 2013, there are 1,413 IB schools in the United States, and in 2007, there were only 867 (IBO Statistical Bulletin, 2013). The current mission statement of the IB is to develop inquiring, knowledgeable, and caring young adults who help to create a better and more peaceful world through intercultural understanding and respect in the context of a rigorous and demanding curriculum (IBO, 2009).

The International Baccalaureate Organization offers four programs. The IBDP for grades 11-12, the Primary Years Programme (PYP) for elementary students, the Middle Years Programme (MYP) for grades 6-10, and the IB Career-related Certificate (IBCC) for high school students interested in focusing on a career-related pathway. The goals of the PYP and MYP programs are to better prepare students for the Diploma Programme through a continuum of educational philosophy and practice (IBO, 2011).

In 2009, David Conley sought to align the IBDP content standards to the Knowledge and Skills for University Success (KSUS) college-ready standards (Conley, 2009). The KSUS were developed by the members of the Association of American Universities (AAU) to indicate what students must know and be able to do in order to succeed in AAU institutions. Conley found the IBDP standards were highly aligned with

the KSUS standards. He also found many of the IBDP standards were at a level more advanced than entry-level college courses (Conley, 2009).

The IBDP is a two year framework of study beginning in the 11th grade and is recognized by universities around the world. Juniors and seniors in the IBDP take theory of knowledge (TOK); extended essay; creativity, action, and service (CAS); language A; language B; humanities; experimental sciences; mathematics; and art. Theory of knowledge is a course unique to the IBDP and challenges students to study the foundations of knowledge, find interrelation between academic disciplines, and analyze subjective and ideological biases to develop arguments and appreciate cultural perspectives (International Baccalaureate Organization, 2006).

The extended essay requires students to investigate a topic and demonstrate independent research and writing skills; a skill expected of students who enter universities. The creativity, action, and service requirement of the IBDP encourages students to become responsible citizens in their community. Students must share their energy or special talents with others through a community service activity to develop themselves, to instill a concern for others, and to learn to work cooperatively (International Baccalaureate Organization, 2006). Students must pass exams in the six subject areas and complete three additional activities: TOK, extended essay, and CAS, to earn the IB diploma. The exams are scored on a scale of 1-7, and a score of 4 is considered passing. The diploma requires students to earn at least 24 of the 45 points possible (42 points possible for exams and 6 points possible for the TOK, extended essay, and CAS) (International Baccalaureate Organization, 2006).

A score of 4 or higher on an IB exam is one indicator of college readiness and can qualify students for college credit hours (Glaude-Bolte, 2010). Nine states currently accept the IBDP for up to 36 college credit hours (TEA, 2011). In 2010, 532,567 students took IB exams in Texas. Results showed 87.9% earned a score of 4 or higher, indicating college readiness and qualifying them for college credit hours in participating universities (TEA, 2011). The IBDP is a framework of study and a complete curriculum. IBDP students must complete the entire course of study. The AP courses stand as individual opportunities for students to earn college credit hours. The IBDP is a more comprehensive, holistic approach to high school education focusing on learning how to learn (Kyburg, 2007).

High pass-rates on IB end of course exams is one reason schools across the United States are investing the time and resources into implementing the program (McLendon, 2008). According to the results listed in the Texas Education Agency's Advanced Placement and International Baccalaureate Examination Results in Texas (2011), the IBDP pass-rates are much higher for minority students than the AP exam pass-rates. The number of students who have access to the IB exams is much smaller. Students must attend an IB-authorized school to take the IBDP exams.

IB authorized schools must apply with the IB to provide the Diploma Programme to students. Implementing the IBDP takes time; for some schools, the authorization process can take up to five years. As a first step, schools must first go through the consideration phase. The consideration phase includes a feasibility study, which requires schools to analyze the IB philosophy, structure, and requirements and compare those with the needs and desires of the school community. Schools must submit a plan of action for

implementation before applying to become an IB authorized world school (International Baccalaureate, 2010).

A school may begin the authorization process by completing the application for candidacy after the feasibility study has been completed. The school then submits the application and supporting paperwork requesting formal candidacy status from the IB. Once accepted, the candidacy phase follows. The candidacy phase includes a consultation process, a visit to the school, followed by a formal request for authorization application. Before the IB makes the final authorization determination, there is a site visit with representatives from the IB (International Baccalaureate, 2010). Throughout the authorization process, schools must pay the associated fees, send their teachers and administrators to specialized professional development, create an action plan for implementation, and demonstrate a commitment to the program standards and practices.

There are many costs associated with the IB authorization process. There are three different IB regional offices in the Americas, Asia-Pacific, and Africa/Europe/Middle East. The fees vary slightly in each of the IB regions. The initial application fee in the Americas region is \$4,000. This fee is charged to the school upon submission of the initial application for candidacy. The annual candidate fee is \$9,500 and is charged to the school for every year of candidacy until school authorization. The services provided by the IB for the initial application fee includes a review and feedback of the application, a subscription to the IB's online curriculum center, and counseling services regarding program requirements. The services provided by the IB for the yearly candidate fee include a review and feedback for the authorization application, two different on-site

visits by IB representatives, and a consultant to provide guidance (International Baccalaureate Organization, 2013).

IB schools, after authorization, pay an annual fee for each program they offer. IBDP annual fees are \$10,400, IBMYP annual fees are \$8,700, and IBPYP annual fees are \$7,600. Every five years after official authorization, all authorized IBMYP schools must go through a mandatory program evaluation. The program evaluation visit fee is \$3,500. IB schools may pay to have their assessments moderated or monitored by the IB. Monitoring of assessment provides advice and guidance for schools regarding their assessments. Moderation is a validation of subject specific assessment results. There are two different moderation fees: a school subject fee for each subject and a student fee for each student being moderated. The IBDP school subject fee is \$104 and the student fee is \$151. The IBMYP school subject fee is \$684 and the student fee is \$67. The monitoring of assessment fee is \$201 for each subject area. Teacher professional development, staffing of an IB coordinator, and library resources are all additional costs associated with being an IB authorized school (International Baccalaureate Organization, 2013).

The IB authorization process is more extensive and expensive than adding an AP course at a high school. Once a school decides to include an AP course to the schedule, they need to select a teacher and register students. The teacher orders the course materials, completes an AP course audit, and attends the AP professional development. They are then able to launch the course (College Board, 2013). Starting an AP course can cost a school less than \$2,000. This fee includes the teacher training, textbooks, course reading materials, and equipment (College Board, 2013).

It is important for middle schools to help support the initiative of college readiness by ensuring students are high school ready by the eighth grade (Wimberly, 2005). Most middle schools throughout the United States offer honors or Pre-AP courses in the attempt to prepare students for the rigors of high school. Schools in the United States are implementing the IBMYP in the hopes of doing the same. In 2005, there were 333 authorized MYP schools in the world, in 2011 there were 729, and in 2013 there are 1,002 (International Baccalaureate Organization, 2013). The majority of this growth is taking place in the United States. The hope is that by implementing and offering the IBMYP in middle schools, not only will the framework benefit student achievement, but it will also prepare students for the rigorous academic courses they will face in high school (IBO, 2011).

Many middle schools are implementing the MYP to replicate the success of the IBDP at the middle school level (Sizmur, 2012). IBMYP schools have implemented the program to increase student achievement (Willcoxon, 2005). Additional reasons for IBMYP implementation, according to research commissioned by the IB, include the fact that favorable instructional practices and student behaviors have been observed more frequently in IB classrooms than in non-IB classrooms (Sillisano, 2010). MYP students outperformed peers on the *International Schools Assessment* (ISA) in reading, math, and writing, and MYP students were more likely to agree that “overall, I feel good about being in school” (International Baccalaureate, 2011). In addition, the IB cites a higher percentage of students in MYP schools achieved a Proficient or Advanced Performance level on mathematics and science assessments than their non-IB counterparts in comparison schools (International Baccalaureate, 2011).

Research on the impact of student achievement in the MYP is not as extensive as the research on IBDP. Despite the limited amount of research, schools, at an increasing pace, are spending time and resources to become authorized IBMYP schools (Bunnell, 270). Is this investment making an impact on student achievement? Will the implementation of IBMYP into U.S. middle schools help the national goal of creating college and career ready students in high school? The purpose of this study was to add to the limited data on the academic outcomes of students who participated in the IBMYP during their middle school years.

Statement of the Problem

There are many reasons why schools are choosing to implement the IBMYP. Some schools choose IB because of the international mindedness aspect, some schools choose IB because of the service aspect, others because of the inquiry approach to teaching, and some schools implement the program to improve student achievement. Prior research has found mixed results when linking the IBMYP to student achievement. In 2010, the IB Organization commissioned Texas A&M University to conduct a study on Texas International Baccalaureate Schools to determine if reading and math scores on the Texas Assessment of Knowledge and Skills (TAKS) differed from non-IB schools. No significant differences were found between IBMYP schools and their comparison non- IB schools. IB schools did not perform any better than their non-IB peers in mathematics or reading achievement as measured by the TAKS (Sillisano, 2010).

In 2008, the Texas International Baccalaureate Schools Organization (TIBS) commissioned a study to determine if statistically significant differences existed in students on middle school campuses with IB programs and comparable middle school

campuses with non-IB programs. The statistical analysis focused on comparing the performance of students on the 2008 TAKS math, reading, science and social studies tests for 8th grade students. One of the MYP schools the study focused on was outperformed by its non-IB counterparts in reading, math, writing, and on all tests (McLendon, 2008).

Despite the mixed data relating to the academic effects of the IBMYP, the district in this study is currently working to implement the IBMYP into five middle schools. This process is expensive and time intensive. Can the investment be justified with student results on college readiness indicator exams once these students who have participated in MYP programs reach high school? Does the IBMYP have an impact on the national college readiness initiative? In an era of school-choice and competition, district leaders and stakeholders should be interested in concepts that keep their programs relevant, individualized, and catered to the needs of students and parents of all types. District leaders need to make important decisions about middle schools. They must meet the needs of students, taking into account the students' vast range of academic readiness, and prepare them for a common goal of preparing for high school as well as some form of higher education. Is the IBMYP a viable middle school program option for school leaders?

Purpose of the Study

The purpose of this longitudinal non-experimental causal comparative research study was to investigate whether a statistically significant difference existed between the college readiness indicator exam scores of high school students who participated in an IBMYP during their middle school years and those who did not. Tests have been used as

a direct approach for measuring college readiness (Conley, 2007). The ACT, SAT, IB, and AP exams have established benchmarks, or cut scores, representing the probability of success in corresponding entry-level college courses. Requirements in the No Child Left Behind Act have mandated states adopt assessment tests that measure student knowledge (Conley, 2007). These tests can be used as a potential indicator of college readiness.

This archival causal comparative longitudinal study examined the following college readiness indicator exam scores: SAT, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1. The purpose of this study was to add to the limited data on the academic outcomes of students who participated in the IBMYP during their middle school years three or four years later as high school students. The independent variable in this study was student participation in IBMYP. The dependent variables were SAT math, reading, and writing scores; IB math and English scores; and AP math and English scores. The research hypothesis was there was no statistically significant difference in exam scores.

The purpose of this study was to examine the effects of attending an IBMYP school by looking at how high school students perform on college readiness indicator exams after having attended IBMYP middle schools compared to their counterparts who did not attend an IBMYP middle school. The significance of the findings can help educational leaders determine if the implementation of the IBMYP in middle schools is addressing the national college readiness initiative. Research clearly links the IBDP to student achievement, but there is little documentation showing that a causal relationship exists between the IBMYP and student achievement in high school (Bunnell, 270). This study sought to add to the body of research.

A positive correlation would suggest implementation of the IBMYP in middle schools is helping prepare students for the rigors of high school and college readiness indicator exams. A negative correlation or no correlation would suggest the IBMYP does not impact student achievement at the high school level. The results of this study can provide information to principals, teachers, parents, community members, and policy makers on the long term benefits of implementing the IBMYP in middle schools. The research will assist educational decision makers by providing data and research on the impact of the IBMYP. It is important to note the IBMYP is designed to be a five year program (grades 6-10). This study focused on a middle school that only offers grades 6-8 of the MYP. Currently, the IB does authorize standalone three year program MYP schools, like the one in this study.

Research Question

The theoretical basis for this study was to determine if IBMYP participants' scores on college readiness indicator exams differ statistically from those students who did not participate in an IBMYP middle school. The research question guiding the study was:

Is there a statistically significant difference in college readiness indicator exam scores (SAT, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1) of students who participated in an IBMYP middle school compared to those who did not participate in an IBMYP middle school?

Definition of Terms

1. **Advanced Placement (AP)** - A high school course with a subsequent end of course exam that can qualify students for college credit in participating universities.
2. **College Board**- A private company that prepares standardized tests used by colleges for admission and placement.
3. **College Readiness**- Being able to qualify for and succeed in entry-level college courses or career training programs without the need for remedial coursework (Conley, 2012).
4. **International Baccalaureate Diploma Programme (IBDP)** - A two year international curriculum and set of end of course exams for students 16-19 years old.
5. **International Baccalaureate Middle Years Programme (IBMYP)** - A five year international curricular program for students 11-16 years old. Also offered as a three year program in middle schools with 6th – 8th grade.
6. **International Baccalaureate Organization (IB)** - A non-profit organization currently providing four international educational programs.
7. **No Child Left Behind (NCLB)** - The Elementary and Secondary Education Act (ESEA), commonly referred to as No Child Left Behind, originally passed by Congress in 1965. It was reauthorized by the Bush administration in 2001 and again in 2011 by the Obama administration. The purpose of the bill is to promote equal access to education and high standards and accountability.

8. Race to the Top- A contest created by the U.S. Department of Education as part of the American Recovery and Reinvestment Act (2009) to encourage educational reforms.
9. Scholastic Assessment Test (SAT) - A standardized test created by the College Board used for college admissions decisions and placement in the United States.
10. Texas Assessment of Knowledge and Skills (TAKS) -Texas state standardized tests given to assess students' attainment of core content. These achievement tests are designed to measure the extent to which a student can apply the defined knowledge and skills at each tested grade level (TEA, 2012).

Limitations

There were several constraints present in the study. The study focused on the student population enrolled in two of three campuses in the identified large, urban school district in Texas. The study looked at the college readiness indicator exams of students in two magnet high schools. The sample of MYP middle school students came from a gifted and talented magnet school. Two thirds of the students who attended the IBMYP middle school are identified by the state of Texas as gifted and talented. This may have influenced the dependent variable (student achievement on exams).

Preparatory sessions could also affect a student's performance on college readiness indicator exams. Differences in student readiness, teacher training, and instructional delivery may contribute to student performance. Student mobility, parental support, and the reorganization of district resources may also contribute to the limitations of this study. The district where all three campuses are located is a decentralized school district meaning the campus principals and campus-level decision making committees

can decide where campus funds are spent. Additionally, this study has limitations because determining causal patterns with any degree of certainty is difficult.

The IBMYP was implemented at the middle school in the study in 2003. It can be assumed there would be different levels of program implementation in the early years of the program as compared to the later years of the program. Many other variables can make an observed difference in the academic success of students including their cognitive ability, students' academic experiences, and nonacademic experiences.

Organization of the Study

Chapter One of the study provides an introduction to the national college readiness initiative, describes the problem statement, the purpose of the study, the research question addressed in the study, and the study limitations. Chapter Two includes the history of Advanced Placement, International Baccalaureate Programs, and the college readiness initiative. Chapter Two examines the prior research on which this study relies. Chapter Three describes the research methodology and design as well as the research question, subjects, procedures, and instruments used. Chapter Four of the study explains the results of the research and a description of the results in terms of the population sample. Chapter Five describes the implications of the study for school leaders and will answer the research question. Connections between the research base and the assumptions of the study are presented. Chapter Five also describes the limitations of the study and includes suggestions for future research.

CHAPTER 2

Literature Review

A review of the literature was in order before the study commenced. The literature review first illustrates how the current notion of college readiness has been manifested in schools. In 2011, President Obama gave his State of the Union Address to the country in which he demonstrated the administration's emphasis on post-secondary education by introducing the Race to the Top Initiative. In his address, President Obama stated "by the end of the decade, America will once again have the highest proportion of college graduates in the world" (Center on Education Policy, 2011). The Race to the Top initiative has encouraged states to adopt learning standards to help prepare high school graduates for college and careers (CEP, 2011).

The 1983 report entitled *A Nation at Risk* stated our schools were failing to prepare our students for the global economy. Since then, a great deal of educational reform legislation has been passed as lawmakers try to improve the quality of education (Verneuille, 2011). The No Child Left Behind Act (NCLB) of 2001, a reauthorization of the Elementary and Secondary Education Act (ESEA), held schools accountable for preparing students to meet high school readiness standards as measured through high-stakes testing (Bottoms, 2008). The testing movement has increased academic expectations and standards. High school graduates are now expected to graduate with the skills and knowledge for success in college or a career (CEP, 2011). The most recent reauthorization of the ESEA in 2011 requires states to adopt college and career readiness standards and to report college acceptance rates and college credit accumulation rates of students (U.S. Department of Education, 2011).

The Obama administration and the U.S. Department of Education have emphasized five goals for educational reforms for our schools through the Race to the Top initiative. The goals are to: (1) “implement rigorous standards and high quality assessments”; (2) “attract and keep teachers and leaders in classrooms”; (3) “support data systems that improve instruction”; (4) “use innovative approaches to turn around low performing schools”; and (5) “demonstrate and sustain education reform” (U. S. Department of Education, 2009).

In order to meet the first goal and to make standards more consistent from state to state, the National Governors Association and the Council of Chief State School Officers have sponsored a movement to create a list of standards called the Common Core State Standards (CCSS) (CEP, 2011). Because proficiency standards vary greatly by state, reform at the national level was needed (Bottoms, 2008). The CCSS were created to align standards to better prepare students for college and careers across 31 participating states (CEP, 2011).

The state of Texas has not accepted the CCSS. Instead, the Texas Legislature created a set of College and Career Readiness Standards (CCRS). Vertical teams of secondary and postsecondary faculty met and defined content, skills, and knowledge students must know and have to succeed at institutions of higher learning in Texas (Texas Education Agency, 2009). The CCRS delineate specific content and performance expectations for students in English/Language Arts, mathematics, science, social studies, and cross-disciplinary studies (TEA, 2009).

Education is a state responsibility. The federal Constitution does not mention education; this right is given to the American people through state constitutions. For example, Article 7 of the Texas Constitution states:

A general diffusion of knowledge being essential to the preservation of the liberties and rights of the people, it shall be the duty of the Legislature of the State to establish and make suitable provision for the support and maintenance of an efficient system of public free schools. (Alexander, 2009)

Traditionally, state and local bodies have funded and made decisions regarding educational policy and curriculum; however, some federal laws have been passed that apply to public education. School districts must adhere to these laws in order to receive federal funding.

The nation has moved towards increased funding and the establishment of educational standards at the national level through initiatives such as the Race to the Top legislation (Verneuille, 2011). As a result of these federal education laws, schools have incorporated a variety of school reform methods to improve the academic achievement of students. National policy makers and local administrators are looking for reform programs at both the primary and secondary levels to deliver positive achievement outcomes (Mayer, 2010). The IBMYP is an example of a reform model increasingly being used in middle schools across the United States. There are currently 480 MYP schools in the United States (International Baccalaureate Organization, 2013).

Middle School Curriculum Development

School reform has been a major topic in education for nearly 50 years. Educational leaders have struggled to find a successful model of education, especially for

the tumultuous middle school years. Abraham Maslow was a humanistic psychologist who greatly influenced education after the 1960s. Before his, and other humanistic psychologists' influences, schools focused solely on the cognitive abilities of students (Maslow, 1968). Adolescents deal with the transition from elementary to middle school, hormonal changes, and the need to be accepted by peers. The nature of adolescence contributes to the difficulties of middle school.

Maslow's theory on humanistic psychology has had great influence on education and humanistic curriculum. In the 1960s and 1970s, schools focused on cognitive learning and subject matter only. American schools were charged in Charles Silberman's best-selling book *Crisis in the Classroom: The Remaking of American Education* (1970) with being repressive. He, Maslow, and others advocated humanizing American schools. As a result, schools are charged with meeting the emotional and physical needs of children in addition to their cognitive needs.

Humanistic curriculum focuses on the affective domain rather than only on cognitive outcomes. Bloom defines the cognitive domain as "the simple behavior of remembering or recalling knowledge and the other more complex behaviors of the abilities and skills" (Bloom, 1956, p. 28). The affective domain includes the emotional, moral, social, and ethical aspects of education (Bloom, 1956). In the late 1970s, schools began melding the cognitive and affective domains. Student participation, joint responsibility, and meaningful learning were implemented. Schools began considering the whole person and integrated the thinking, feelings, and actions of the students as an integral part of the curriculum.

Another large shift in educational thinking came in 1966 when James Coleman, of the University of Chicago, conducted the largest educational reform study to date. He gathered data from more than 600,000 students, 60,000 teachers, and 6,000 schools. Often referred to as the Coleman Report, the Equality of Educational Opportunity Study (EEOS) was conducted in response to the Civil Rights Act of 1964. The purpose of the study was to gather information regarding the availability of educational opportunities to children of all different race, religion, socio-economic status, and ethnicity. Coleman found U.S. schools were highly segregated and educational opportunities were inequitable. He also concluded teachers could only impact about 10% of the effects of poverty on students' educational success (Coleman, et al., 1966).

In response to the 1966 Coleman Report indicating not all students could achieve at equal levels based on their socioeconomic background, educators such as Ronald Edmonds, a professor at the Graduate School of Education at Harvard, conducted studies attempting to identify ways for all students to be successful. Ronald Edmonds, in his book *Educational Leadership* (October 1979), argues:

We can, whenever and wherever we choose, successfully teach all children whose schooling is of interest to us. We already know more than we need to do that.

Whether or not we do it must finally depend on how we feel about the fact that we haven't so far. (Edmonds, 1979).

He believed all children could learn, no matter their circumstance, if the school they attended was effective.

Edmonds introduced the Five Correlates of Effective Schools which stated schools, in order to successfully educate all children, included: (1) "Principal leadership

notable for substantial attention to the quality of instruction”; (2) “A pervasive and broadly understood instructional focus”; (3) “An orderly, safe climate conducive to teaching and learning”; (4) “Teacher behaviors that convey the expectation that all students are expected to obtain at least minimum mastery”; and (5) “The use of measures of pupil achievement as the basis for program evaluation” (Edmonds, 1983; Lezotte, 1991).

In the quest to identify successful educational strategies for all students, the United States Congress called for a report on the state of the country’s gifted and talented students, which was later called the Marland Report (Marland, 1972). The U.S. Secretary of Education at the time, Sidney P. Marland, completed the report. This report detailed the state of gifted and talented education and outlined recommendations for change. He found that although the United States had a large number of gifted and talented students, a very small amount were receiving appropriate educational services due to funding and trained teacher shortages. In an attempt to improve the quality of education for advanced students, the Marland Report (1972) outlined key components for successful advanced educational programs: (1) “a differentiated curriculum which denotes higher cognitive concepts and processes”; (2) “instructional strategies which accommodate the learning styles of the gifted and talented curriculum content”; and (3) “special grouping arrangements which include a variety of administrative procedures appropriate to particular children” (p.21).

National dialogue regarding how to successfully reach all students continued, and the Secretary of Education requested another key report in 1983 regarding the quality of education in America. The report, entitled *A Nation at Risk: The Imperative for*

Educational Reform, was created by the Secretary of Education's National Commission on Excellence in Education. The United States Department of Education gave its findings in the form of an open letter to the American public. The report described American education as one containing a "rising tide of mediocrity that threatens our very future as a Nation and a people" (National Commission on Excellence in Education, 1983, p. 9). This report noted over half of the nation's students were not achieving at a level that matched the students' ability. The report called on the federal government to work with state and local governments in order to meet the needs of students.

The Carnegie Council on Adolescent Development (1989) created a report on reforming middle school practices. The report was titled *Turning Points: Preparing Youth for the 21st Century* and was one of the first and most comprehensive studies focused on the middle grades specifically. The report examined middle school theory, practice, and the changing economic and social contexts surrounding young adolescent education. The report stated that young adolescents were more at risk for self-destructive behaviors, such as dropping out, drug and alcohol abuse and violence, than their age group ever was before. The report concluded schools were producing too few young adolescents with higher skill levels and problem solving abilities (Carnegie Council on Adolescent Development, 1989).

The Carnegie Corporation report called for a reassessment of the middle school curriculum. The authors believed there were eight main principles middle schools ought to operate under. These were: (1) "Large middle grade schools should be divided into smaller communities for learning"; (2) "Middle grade schools should transmit a core of common knowledge to all students"; (3) "Middle grade schools should be organized to

ensure the success of all students”; (4) “Teachers and principals have the major responsibility and power to transform middle grade schools”; (5) “Teachers in the middle grades should be specifically prepared to teach young adolescents”; (6) “Schools should promote good health”; (7) “Families should be allied with school staff through mutual respect, trust, and communication”; and (8) “Schools and communities should be partners in educating young adolescents” (Carnegie Council on Adolescent Development, 1989). The authors believed middle schools operating under these principles would benefit all students, especially those at-risk.

Turning Points: Preparing Youth for the 21st Century (1989) concluded with the idea the curriculum and adolescent development was mismatched. The term “turning points” was developed to explain the dichotomy of adolescence during the 10-15 year old range. The authors believed this was the crucial time of life when youth either became productive citizens or fell through the cracks. The authors of the work gave insight into the importance of middle school education by stating:

A profound change is needed in how Americans view the education of young adolescents, from one that tolerates institutes that regularly fail to prepare millions of young people for productive and fulfilling adult lives, to one that demands success for all adolescents. (Carnegie Council on Adolescent Development, 1989, p. 85)

The George Bush administration highlighted the need for educational reform once again and focused on the use of assessment and the ranking of public schools with the No Child Left Behind Act (NCLB). “With the enactment of the No Child Left Behind federal legislation in 2002, the United States became the first nation to establish a

national goal of all students attaining proficiency in reading, math, and science” (Barr, 2007, p. 5). With the implementation of NCLB, emphasis was placed on student achievement which was measured by standardized tests. NCLB demanded schools meet higher accountability standards (U. S. Department of Education, 2009). In 2009, the American Recovery and Investment Act offered financial aid to public schools and emphasized the need for: 1) “Improving teacher and principal effectiveness”; 2) “Family involvement and investment; 3) College- and career-readiness standards”; and 4) “Intensive support and intervention for struggling students” (U. S. Department of Education, 2010). In 2010, the U. S. Department of Education published *A Blueprint for Reform: The Reauthorization of the Elementary and Secondary Education Act*. The document defines the nation’s priorities for educational reform and student achievement and built on the goals of 2009. The U.S. Department of Education outlined the following five areas needed to transform our nation’s schools into effective institutions for all students:

1. College and Career-Ready Students- all students will graduate from high school ready for college and a career. States must develop or update a set of common standards to be taught in schools. States must use assessments aligned to college- and career-readiness standard. Students will receive a well-rounded education with a focus on literacy, mathematics, the arts, financial literacy, technology, civics, and foreign languages.
2. Great Teachers and Leaders in Every School– districts will focus on recognizing, encouraging and rewarding excellent teachers. New programs will be created to support the recruitment and placement of teachers. Funds

will be provided to states to support improving the effectiveness of teachers and leaders. The effectiveness of state and local alternative certification programs will be monitored.

3. **Equity and Opportunity for All Students** –all students will be provided with a challenging curriculum and the support to be successful. Resources will be given to schools so success can be equal and attainable for students in high- and low-poverty areas.
4. **Fostering a Race to the Top** - Race to the Top incentives will be continued at the state level. Expansion of high performing charters and “autonomous” public schools will be supported so students and families may have choice. Access to enhanced courses will provide a more challenging high school curriculum to all students.
5. **Promote Innovation and Continuous Improvement** - Supporting, recognizing, and rewarding local innovations to support student success. School schedules will be redesigned in order to promote schools as the centers of the communities. (U. S. Department of Education, 2010)

With the abovementioned goals at the forefront of educational reform, it is clear the success of every student in the nation is a priority. Schools throughout the United States searched for programs which would help them meet these national standards, and some middle schools across the country began implementing the IBMYP as a way to improve the education of their adolescent students.

College Readiness

The Educational Policy Improvement Center (EPIC) defines college readiness as the level of preparation a student needs in order to enroll and succeed at a post-secondary institution offering a baccalaureate degree. EPIC defines success as being able to complete an entry-level course at a level of understanding allowing the student to take the next course in a sequence or the next level in the subject (Conley, 2007; Verneuille, 2011). National educational concerns have shifted from increasing high school graduation rates to increasing college enrollment (Race to the Top, 2009). Ali and Jenkins (2002) describe the mission of secondary schools as one which ensures students are prepared for post-secondary education and the workforce (McDowell, 2009). Determining the knowledge and skills each student must know for success in college is a complex task.

David Conley (2012) has created a conceptual model describing knowledge and skill profiles necessary for student success in postsecondary studies. High schools need to align curricular programs to these four areas in order to properly prepare students for college. Conley defines the following four key areas students must master for college and career readiness:

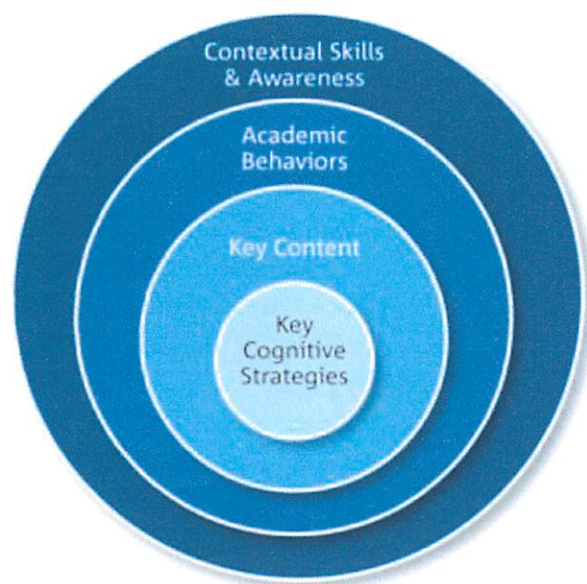
1. Key Cognitive Strategies- types of thinking necessary for college level work.

These strategies include problem formulation, research, interpretation, communication, precision and accuracy. Students should be able to formulate hypotheses, develop problem solving skills, identify sources, collect information, analyze findings, and construct products.

2. **Key Content Knowledge-** the foundational ideas from core subjects all students must know and understand. This knowledge includes key terms, factual information, linking ideas, and organizing concepts.
3. **Key Learning Skills and Techniques-** student ownership in learning and specific learning techniques. These skills include goal setting, persistence, self-awareness, motivation, help seeking, and progress monitoring. Students should be able to demonstrate learning techniques such as time management, test taking skills, note taking skills, memorization, strategic reading, collaboration, and proficiency in technology.
4. **Key Transition Knowledge and Skills-** necessary to transition to life after high school. This knowledge includes postsecondary awareness, postsecondary costs, career awareness, and workforce norms and expectations. Students should be able to self-advocate. (Conley, 2012)

Conley believes college readiness cannot simply be measured by standardized test scores. In addition to core content knowledge, students must know how to navigate postsecondary institutions and have specific cognitive capabilities and behavioral attributes (Conley, 2007). Figure 2-1 depicts Conley's model of the four interactional components he believes students must possess to be successful in postsecondary credit earning coursework.

Figure 2-1

Facets of College Readiness

Source: Conley, D.T. (2007) *Toward a More Comprehensive Conception of College Readiness*

The Southern Regional Education Board (SREB) has listed one of their main goals for all high school graduates to have solid academic preparation and be ready for postsecondary education or a career. One way the SREB is measuring student progress towards this goal is by assessing how many students participate and pass AP and IB courses because AP and IB programs have standards to prepare students for college-level classes (Andrews, 2003). One of the reasons the IB and AP programs have become indicators of college readiness is because researchers have proven the college success rates of students who participated in AP or IB in high school (College Board, 2007). Participation in AP and IB programs has been positively correlated with higher GPAs and completion rates in college (McDowell, 2009). Researchers at the University of Texas found students who placed out of college courses as a result of AP exam scores earned

higher college grade point averages than students who were not exposed to AP classes in high school (College Board, 2007; Saxby Smith 2009).

AP courses were first introduced to allow students who had taken college-level course work in high school to place out of college requirements (McDowell, 2009). IB courses were initially designed to offer international students a curriculum that colleges throughout the world could use to judge the quality of their applicants (McDowell, 2009). Studies claim category scores of 3, 4, or 5 on AP exams predict achievement in college (Glaude-Bolte, 2010). Researchers almost all agree the IBDP improves the quality of secondary education (Verneuille, 2011). In a study done in Chicago by Saavedra (2011), she finds IBDP enrollment increased student achievement scores on the ACT by .5 standard deviations and increased college enrollment by as much as 22 percentage points. Researchers have found students who graduated with an IB diploma have a higher cumulative grade point average in college than those without a diploma (Saavedra, 2011).

Despite the differences in standards amongst the states, preparing students to be college and career ready when they graduate high school is the ultimate goal of secondary schools. Several enriched programs provide advanced curricula to high school students today to contribute to college readiness and college graduation. For example, some high schools collaborate with colleges and offer dual credit courses. The IBDP and the AP programs provide university preparation (Educational Testing Service, 2008). AP and IB courses are not just college preparatory courses, they can be considered college courses because students can earn college credit in participating schools with high enough scores. The exams are written and graded by outside experts to match college standards (Mathews, 2007). Because the goal of secondary schools is to prepare students to be

college ready, high school students are encouraged to enroll in advanced curriculum courses (Glaude-Bolte, 2010). Students who participate in college-level classes in high school are provided with the challenge to work harder and gain more knowledge; they then have an idea of what to expect in college and can enter with confidence and preparation (Saxby Smith, 2009).

The International Baccalaureate Organization was founded in 1968 to provide a standardized, high level, college preparatory curriculum for expat students attending high schools abroad. The organization was created in order to ensure children of diplomats had a rigorous education recognized by most countries (IBO, 2009). In 1955, the AP Program was acquired by The College Board with the mission to encourage U.S. high school students to engage in college-level work (College Board, 2003). AP is not always considered a program; some researchers consider it only a series of courses and tests allowing students to earn college credits. In contrast, the IB has developed a reputation as an interdisciplinary, rigorous curriculum and assessment system which prepares students for college (O'Connor, 2011; Verneuille, 2011).

Early manifestations of the AP and IB programs in the United States were aimed at gifted and talented children. The American public education system has evolved to meet the demand of high expectations and achievement standards over the years. The current expectation is that all students to leave high school, college and career ready. Educational programs and practices which were once directed at high-performing students have been expanded to ensure all students have access to quality education. Joyce Van Tassel-Baska analyzed the history of gifted and talented education in *The History of Urban Education* (2010).

The beginnings of gifted or specialized education can be traced back to 1918 when a school in Los Angeles sought to identify the brightest students and separate them to take part in an advanced curriculum. Chicago was one of the largest cities to pioneer and create a school system-wide model which stressed coherent and cohesive design and implementation. Secondary gifted and talented students pioneered the use of AP and IB programs as forms of advanced curriculum aimed at challenging gifted and talented students in public schools. The Speyer school opened in 1926 and was the first elementary to offer gifted and talented education for primary students. The Speyer school offered several features beyond the traditional gifted and talented education such as: (1) “differentiated curriculum developed into units of study”; (2) “the use of special enrichment options like foreign language and philosophy”; and (3) “the use of diagnostic assessment for curriculum decisions” (Hollingworth, 1926).

The Marland Report (1972) defined gifted and talented children as children who have demonstrated or have potential ability in the following areas: (1) “general intellectual ability”; (2) “specific academic aptitude”; (3) “creative or productive thinking”; (4) “leadership ability”; (5) “visual and performing arts”; and (6) “psychomotor ability” (Marland, 1972, p. ix). The Texas Education Agency defines a gifted and talented student as a child or youth who performs at or shows the potential for performing at a remarkably high level of accomplishment when compared to others of the same age, experience, or environment. A gifted child or youth who: (1) “exhibits high performance capability in an intellectual, creative, or artistic area”; (2) “possesses an unusual capacity for leadership”; or (3) “excels in a specific academic field” (Texas Education Agency, 2012). With higher expectations placed on all students, the AP and IB

are no longer considered programs only for gifted and talented students. Students of all ability levels are given access to these programs in public schools across the country.

In a nation pushing high school students to be college ready, it is important for middle schools to help support the initiative by ensuring students are high school ready by the eighth grade (ACT, 2005). Improving middle school education will help our country in its goal to improve student achievement and prepare students to be college and career ready (Bottoms, 2008). Most future dropouts begin to disengage from school during the middle grades if they are not involved in meaningful learning activities enabling them to succeed in a rigorous college and career readiness high school curriculum (Balfanz, 2010). Middle schools are responsible for preparing students for participation in an advanced high school curriculum which will enable them to further their education and career (Bottoms, 2008).

The U.S. Department of Education recommends students begin planning for college as early as the sixth grade (Wimberly, 2005). Middle school becomes an important time in postsecondary planning because student placement during the middle years is directly related to tracking decisions made in high school (ETS, 2008). Studies support the relationship between high-quality or advanced high school curriculum and college entrance, success, and completion (McDowell, 2009). Middle school standardized test scores and grades in English and mathematics have been shown to determine if students qualify for advanced courses in high school (ETS, 2008). Advanced courses or honors courses at the middle school level are supposed to prepare students for advanced high school courses, which in turn prepare them for college and the workplace (Glaude-Bolte, 2010).

Students in middle school who take advanced courses such as Algebra 1 can enroll in advanced level classes once they reach high school. Students who take upper level courses in high school are more likely to apply to a four year college or university (Wimberly, 2005). By the eighth grade, many students already know the sequence of courses they will take in high school, and students who took a foreign language or Algebra in middle school plan to continue onto the next level in high school (Wimberly, 2005). Unfortunately, many middle school students are not taking the course prerequisites for advanced high school classes. Only about one third of eighth graders are prepared to take high school courses recommended for college readiness (ACT, 2003).

Middle schools need to work harder to cultivate students who are academically ready to participate in college readiness courses such as honors, IB, or AP classes once they reach high school (Mayer, 2010). If students are exposed to foundational ideas early in their educational career, later learning will be easier for them (Bruner, 1977). In order for the proper vertical alignment of knowledge and high school readiness courses to occur, complex learning must take place at the middle school level (Glaude-Bolte, 2010). Interest in extending college readiness to middle school has taken several different forms in the United States such as standardized exams and curriculum frameworks (Glaude-Bolte, 2010). College Board has created college readiness middle school programs such as ReadinessStep, a test for eighth graders, and Springboard, a curriculum (Glaude-Bolte, 2010). The IBMYP is another option middle schools across the country are using to help student exposure to rigorous curriculum before they enter high school.

International Baccalaureate Middle Years Programme

The IBMYP has its earliest origins as a pre-IBDP in international schools in Africa. These schools sought to better prepare students for the rigors of the IBDP. In 1991, the International Schools Association (ISA) stated, “Schools preparing for the IB are becoming more and more aware of the need for a ‘pre-IB’ course” (International Schools Association (ISA), 1991, pp. 4-5). In 1994, the IB adopted the ideas from the ISA curriculum in the form of the MYP and authorized their first 15 MYP schools to focus on an educational program aimed towards students aged 11-16 specifically. The aim was to develop a curriculum to encourage international awareness in adolescence with an emphasis on the skills, knowledge, and attitudes needed to participate in a global society. The IB wanted the ideas of inquiry-based learning, reflective, critical and creative thinking, and internationalism to be the foundation of the MYP curriculum they would develop in the early stages of the MYP development (International Baccalaureate Organization, 2010).

The first draft of the MYP curriculum created a framework allowing schools flexibility to meet local educational requirements as well as the IB objectives (International Baccalaureate, 2009). While the framework has evolved over time, the IB has not changed the concept of the original framework, and it still allows for schools to meet local requirements while still promoting and developing international education. To ensure the IB requirements are being met, the IB prescribes specific aims and objectives for all subject groups. Every authorized MYP school must incorporate the subject specific aims and objectives for the subject areas. These subject areas are organized into eight groups: (1) language A (the student’s first language); (2) language B (the student’s

second language); (3) humanities; (4) sciences; (5) mathematics; (6) arts; (7) physical education; (8) technology. Figure 2-2 is a visual representation of this program model.

Figure 2-2

IB Middle Years Programme Model

Source: International Baccalaureate Organization

The MYP is generally described as a framework for curriculum. There are many other components which make the MYP unique as an educational program for middle schools. For example, one of the foundations of the MYP is the learner profile. IB learners are encouraged to be inquirers, thinkers, communicators, risk-takers, knowledgeable, principled, open-minded, caring, balanced, and reflective (International Baccalaureate, 2009). The MYP was designed to promote independent learners who recognize connections between school subjects and the outside world. The MYP focuses on academics and attempts to provide students with values and opportunities enabling them to develop sound judgment (International Baccalaureate, 2009). The three fundamental concepts of the MYP are holistic learning (the idea all knowledge is interrelated), intercultural awareness, and communication. These concepts support the IB mission statement that other people, with their differences, can also be right (International Baccalaureate, 2009). The MYP addresses the students' physical, affective, social, and intellectual development in addition to the curriculum framework.

The effectiveness of the IB method of teaching is assessed through moderation or monitoring of assessed student work teachers send away to teachers trained by the IB. External moderation of assessment is completed by trained, experienced MYP teachers. Assessment levels and judgments are based on the application of assessment criteria defined in each subject guide. These criteria match the aims and objectives of the particular subject area (International Baccalaureate, 2009). The IB monitors judge the rigor and quality of both the assignments the teachers assign and the quality of the student work produced (IBO, 2011).

MYP teachers assess student learning through standards-based assessment. Students are assessed on the IB subject area criteria, and, in order for students to meet these standards, the teachers must be implementing the Programme. Standards-based assessment, if done correctly, can enhance student achievement (Marzano, 2010). Monitoring of assessment provides feedback, support, and guidance in the implementation and development of the MYP with regards to internal assessment procedures and practices in the form of a report (International Baccalaureate, 2009).

Monitoring and moderation are both ways the IB holds schools accountable for proper implementation of the program. Other accountability measures are the authorization process and evaluation visits. The IB authorization process takes years. During the authorization process, all of the teachers participate in specialized IB training, learn to implement the program curriculum, incorporate standards-based assessment, and have an IB consultant as a resource (Guide to School Authorization, IBO 2010). Once a school is considered an authorized IB world school, it is the school's responsibility to maintain the implementation of the program and curriculum. Representatives from the International Baccalaureate Organization return to schools every five years for an evaluation visit.

The IB provides schools with program standards and practices, which are requirements for program implementation. The IB representatives are looking to see schools are making a commitment to meet all of the program standards and practices when they come for authorization and evaluation visits. The standards and practices are broken into three parts: (1) "philosophy- the school's educational beliefs and values reflect IB philosophy"; (2) "organization- the school's leadership and administrative

structures ensure the implementation and the school's resources and support structure ensure the implementation of the program"; and (3) "curriculum- collaborative planning and reflection supports implementation, the school's written curriculum reflects IB philosophy, teaching and learning reflects IB philosophy, and assessment at the school reflects IB philosophy" (International Baccalaureate, 2010).

Middle Years Programme Assessment

The IBMYP assessment model is described as criterion-related because it is based on pre-determined criteria students have access to before they are assessed. Teachers are required to create assessments according to specified criteria which directly correlate to the objectives of each subject group (International Baccalaureate, 2009). Grading which references student achievement to specific topics within each subject area is called standards-based grading (Marzano, 2010). Although the IB refers to their assessment as criterion-related, it can also be considered standards-based by using the previous definition because student success is based on reaching the objectives described for each of the different subject areas, and they are measured in terms of achievement levels for each assessment criterion (IBO, 2008).

The IB (2008) states the purpose of assessment is to support student learning by providing feedback on the learning process, to inform the teaching process, to promote student attitudes towards learning, and to promote the development of higher-order cognitive skills by providing objectives. The IB requires their schools and teachers to engage in both formative assessments and summative assessments. The IB (2008) believes formative assessments help teachers to identify student learning needs so they can better the learning process. The IB encourages formative assessment because it is the

most beneficial for student achievement. Formative assessment provides focused feedback to both the student and to the teacher. The purpose of summative assessments is to determine the achievement level of students. These IB requirements and beliefs are supported by the research and ideas of Dr. Robert Marzano.

Marzano (2010) states teachers need accurate data in order to judge an individual student's progress so they can modify and determine the next instructional methods that will best meet student needs. This mirrors the ideas of IB in regards to formative assessment and the importance of assessment as a tool teachers should use to guide their instruction. Marzano (2010) states although there has been no major study demonstrating standards-based grading directly correlates to increased student achievement, a strong case can be made that student achievement will be positively affected using standards-based grading in conjunction with formative assessment. Marzano, like the IB, believes formative assessment is the most beneficial to students and can have the biggest impact on student achievement.

Marzano (2010) believes student classroom grades should be based on a formative approach to assessment so the grades reflect student status at the end of a grading period, and they do not penalize the students for initially misunderstanding certain topics. This goes against the traditional grading system in which all student grades are averaged to come up with the cumulative grade. The IB and Marzano believe the traditional grading system punishes students for what they do not know instead of rewarding them for what they do know or what they have learned. Formative assessment and standards-based grading allows students to progress at their own pace regarding

subject matter content and allows teachers the feedback they need to modify and differentiate instruction for their students.

In a standards-based system, students do not move on to a new level of content until they have mastered the content at their current level. This concept differs greatly from the traditional system; one in which students are scored on their knowledge of the content, and students are allowed to move on to the next concept and grade level without anyone ensuring student mastery (Marzano, 2010). Mastery of the content relates to student achievement.

Challenges of the MYP

There are many challenges of being an IB school (Bunnell, 2011). Teachers, students, administrators, parents, and community members must become familiar with the program framework, which includes the IB philosophy, the mission statement, the IB Learner Profiles, the Areas of Interaction, standards-based grading, and the IB Fundamental Concepts. In addition, teachers must incorporate many aspects of the IB Program into their educational practice, such as the MYP unit planner, standards-based grading with the MYP subject area criterion, rubric creation, and student-centered lesson plans.

Additional challenges include program costs and IB policy requirements. The program costs include the application and annual fees, professional development expenses, and supplemental curriculum materials. The IB policy requirements include assessment and reporting, world language classes, special education, and technology courses. The curriculum and framework challenges include integration of IB, state, and district standards, understanding the IB design, staff development and being able to

provide exemplars for new teachers. IB middle schools also face the challenge of teaching the community why the IBMYP program is a viable alternative to the Pre-AP coursework most people in the United States are familiar with.

The IBMYP is appealing for campuses because the curriculum and philosophy is centered on inquiry-based learning and teaching (IBO, 2011). In order to implement inquiry-based teaching in the classroom, teachers must use aspects of constructivist teaching, student-centered teaching, project-based teaching, problem-based teaching, and cooperative learning in a balanced manner to let students answer and ask questions about why and how (IBO, 2011). Inquiry, as Dewey conceived it, allows both the student and the teacher take part in the inquiry process. The inquiry process is a step by step chronology to problem solving. Increased student achievement is one of the most current and relevant goal of educators today (Marzano, 2003). According to the Center on Education Policy (2012), schools across the United States are working to implement programs which will increase student achievement.

Middle schools are going through the rigorous process of becoming IBMYP schools because they believe it will increase student achievement. Middle schools must provide programs to prepare students for the rigorous academic courses they will face in high school (IBO, 2011). The IBMYP is considered a program for all students, not just for advanced students, and students who consider themselves IB students in the middle grades may be more likely to continue on into the Diploma Programme and thus be college ready at the end of high school (McDowell, 2009).

Researchers such as Marzano (2003) have found students in effective schools show higher achievement. Educators, researchers, and school administrators are currently

trying to identify the formula of what makes a successful school (Witziers, Bosker, & Kruger 2003). School principals are being held accountable for student success or failure (Witziers et al., 2003). In a study done by Willcoxon in 2011, more students in IBMYP took Algebra in 8th grade than non-IBMYP students, suggesting the IBMYP is preparing students for more advanced college preparatory courses once they reach high school.

There are studies which suggest a relationship between participation in the MYP and student achievement (Bunnell, 2010). In a California study, students who received two years of the IB curriculum in middle school showed statistically significant differences in math and science scores on the California Standards Tests than students who received the traditional California educational curriculum (Wade, 2011). MYP students compared with students in similar non-MYP schools were found to have a slightly greater effect in mathematics than in reading (Kiplinger, 2005). There was a .01 greater difference among students who received the IBMYP curriculum on their California Standards Test scores in English-Language arts and mathematics than students in traditional education (Willcoxon, 2005).

A higher percentage of MYP schools achieved a proficient or advanced performance levels on standardized assessments compared with their counterparts in five comparison schools in a study conducted by Wade in 2011 (Wade, 2011). The Australian Council for Educational Research (ACER) found MYP students performed better than their non-MYP peers on the International Student Assessment, which is given to 48,000 students in math literacy, reading, narrative writing and expository writing (IBO, 2010). In 2007-2010, the IB found pass-rates of previous IBMYP participants on the Diploma Programme exams was higher than pass rates for all candidates (IBO, 2010).

Studies also demonstrate little correlation between participation in the MYP and student achievement (Bunnell, 2010). The MYP is under-researched, especially compared to the DP as it relates to student achievement (Robertson, 2011). Most research on the MYP has focused on its ability to sync with state and local curricula or its support as a pre-DP curriculum (Bunnell, 2011).

In 2010, the IB commissioned Texas A&M University to conduct a study on Texas IB Schools and how their reading and math scores on the State standardized test, the TAKS, differed from non-IB schools. No significant differences were found between IBMYP schools and their comparison non-IB schools. IB schools did not perform any better than their non-IB peers in mathematics or reading achievement as measured by the TAKS (Sillisano, 2010).

In 2008, the Texas International Baccalaureate Schools Organization commissioned a study to determine if statistically significant differences existed in students on middle school campuses with IB programs and comparable middle school campuses with non-IB programs. The statistical analysis focused on comparing the performance of students on the 2008 TAKS tests of 8th grade students. One of the MYP schools the study focused on was outperformed by their non-IB counterparts in reading, math, writing, and on all tests (McLendon, 2008).

Glaude-Bolte examined the effects of enrollment in honors middle school classes and AP social studies and AP science exams and did not find any relationship between the two, indicating middle school honors classes did not provide students with the skills they needed to be successful on AP exams (Glaude-Bolte, 2010). In a study conducted by Wade (2011), which compared MYP and non-MYP test scores, the percentage of

students who met proficiency standards on reading tests showed no statistical difference (Wade, 2011). The MYP has generally received positive commentary as an academic program, but recently more critical feedback has come out regarding the assessment procedures, the lack of supporting research, the rapid growth, and the complexity of the structure (Bunnell, 2011; Hayden & Thompson, 2011).

Program Choice

Middle school students arrive with varying ranges of academic readiness. School leaders and teachers must make decisions regarding differentiated instruction, ability grouping, and flexibility in curriculum. When considering which program to implement on a campus, a school leader must take into consideration many aspects of the program, including the wants and needs of the local community (Sperandio, 2011). Finding ways to close the achievement gap is one of the most crucial issues facing school leaders today, and administrators are constantly searching for ways they can improve student academic performance (Mayer, 2010; Saxby Smith, 2009).

Datnow's (1999) study on educational program choice indicated an educator's emotional reaction influenced program choice more than an analysis of the benefits (Sperandio, 2010). The IBMYP is growing at a rapid pace in the United States (Bunnell, 2011). O'Connor (2011) believes the excitement the IBMYP has evoked amongst policymakers, educators, parents, and students is one explanation of the expansion of the program in the United States. Another reason for the exponentially large growth of the MYP in the United States as compared with other regions in the world is most countries centralize control of their school systems. The United States allows local authorities, such as states or local school boards, to choose the curriculum (Verneuille, 2011). As long as

educational policy continues to be determined by local school communities, the opportunity to implement the IBMYP program on individual campuses exists (Sperandio, 2010; Verneuille, 2011).

Principals are charged with the task of selecting and implementing curricular programs with strong enough core components to increase student achievement for all (Mayer, 2010). Principals must be able to assess and implement effective programs (Wimberly, 2005). The IBMYP includes aspects of what the National Middle School Association reported successful middle schools as having: a relevant and challenging curriculum, the use of multiple learning and teaching approaches, the implementation of effective assessment programs, and an organizational structure promoting meaningful relationships to foster guidance and support (Bottoms, 2008). According to the Partnership for 21st Century Skills, the middle school curriculum should include aspects of collaborative skill building, critical thinking, and teaching work ethic (Glaude-Bolte, 2010). Principals must look for curricular programs to meet the needs of their school community (Sperandio, 2010).

Principals and school administrators are choosing to implement the MYP for reasons other than data regarding student achievement (Boatzis 1998; Patton, 2002). Schools must complete an application form when applying to become an MYP school and one of the questions on the application asks schools to select reasons why they are applying (IBO, 2011). The top five reasons chosen were: (1) “innovative program features such as interdisciplinary holistic approach”; (2) “a seamless curriculum between the Primary Years Program and the Diploma Program”; (3) “the program was a good fit to their existing philosophy and mission”; (4) “the program would increase global

awareness and internationalism in the community”; and (5) “the program was challenging for students and had high academic standards” (Sperandio, 143).

In a survey of MYP principals given by Wade (2011), four of five principals indicated teacher training and the support of the MYP coordinator were some of the most important benefits of the MYP program. All five of the principals interviewed described the importance of interdisciplinary learning and the opportunity for students to make connections between what they were learning in the classroom with real world scenarios as significant reasons for implementing the MYP in their schools (Wade, 2011). The MYP was initially designed to prepare students to participate in the IBDP but has since been used in a number of other contexts such as a framework for a school designed curriculum or a transition program between the Primary Years and Diploma Program (Hayden & Thompson, 2011).

Not all of the students who attend IBMYP schools continue to an IBDP school, so the design of the IBMYP, which was initially a precursor to the DP, has shifted to meet the need of the individual school implementing the program (Hayden & Thompson, 2011). In comparison with other, more rigid middle school programs, the MYP is a framework schools can modify to meet their individual needs by choosing the objectives, content material, and types of assessment (Sperandio, 2010). The IBDP is considered an advanced course of study, but the MYP program is designed for participation by all students in the school- not only the high achievers- because the curriculum promotes student-centered inquiry and learning how to learn (McDowell, 2009; Sperandio, 2010).

School Leadership and Student Achievement

Throughout history, great emphasis has been placed on the influence of leaders. From George Washington to Ulysses S. Grant, we have always given the credit of successful endeavors to people in leadership roles. We assume in order for an organization to be successful the organization needs a strong leader, but finding a statistical correlation between educational leadership and student achievement has been difficult and has shown mixed results. Witziers, Bosker, and Kruger (2003) found very little correlation between school leadership and student achievement. In contrast, Marzano, Waters, and McNulty (2005) found a strong correlation. While most people would agree educational leaders make a direct impact on school organizations and student achievement, there is little research to substantiate this claim. The IBMYP expects schools to have strong administrative teams that encourage teachers to use best practice and to help improve student achievement (IBO, 2011).

School leadership is mentioned in both the philosophy and organization sections of the IB program standards and practices document. According to this document, IB schools must have: (1) “an administrative and pedagogical leadership body that demonstrates an understanding of the IB philosophy”; (2) “a governing body informed about the ongoing implementation and development of the program”; (3) “a leadership structure that supports implementation of the program”; and (4) “a head of school/school principal that demonstrates pedagogical leadership aligned with the philosophy of the program” (International Baccalaureate, 2010).

Increased student achievement is the most current and relevant goal of educators today (Marzano, 2003). Researchers such as Marzano (2003) have found students in

effective schools show higher achievement. We are currently trying to identify the formula of what makes a successful school (Lezotte, 1991). A successful school can educate and increase the achievement of all different types of students. One would assume a trait of an effective school would be the role an effective leader plays in school. In addition, school principals are being held accountable for student success or failure (Witziers et al., 2003). In an attempt to recognize an effective leader, Marzano, Waters, and McNulty (2005) have identified 21 responsibilities of a school leader. Witziers, Bosker, and Kruger (2003) used the seven principal behaviors identified by Hallinger (1996) and Cotton (2003) to identify 25 leadership practices. Pinpointing the behaviors and responsibilities of an effective school leader is done so effective leadership can be identified and correlated to higher student achievement (Marzano et al., 2005).

Witziers et al. (2003) found the existing knowledge base of educational research failed to offer proof that educational leadership matters as it relates to student achievement. They wanted to contribute to the scholarly debate by conducting a quantitative meta-analysis to estimate the effect of educational leadership on student achievement. Their results suggested school leadership had a positive effect on student achievement, but the effect was very small, only .02 for the total sample and .11 for primary education studies conducted in the United States. A .02 correlation indicates almost no relationship between leadership and achievement. When the 25 international studies were excluded from the analysis, the correlation between leadership and achievement doubled indicating the correlation in the United States is higher.

Witziers et al. (2003) found school leadership effects were absent in secondary education as it related to student achievement. When looking at individual behaviors of

school leaders, they found defining and communicating mission, with a .19 effect size, seemed to have the most relevance on student outcomes, but when they removed the outliers, the effect size was only a .08. They found a negative effect size with the conducting activities aimed at improving and developing the school behavior. They explained this negative relationship by stating other factors would have contributed. For example, principals in schools with low achievement would take action to improve their schools. Their analysis did not show direct evidence of educational leadership on student achievement.

Witziers et al. (2003) recognized effect of leadership could be indirect, but their focus was to examine the extent educational leadership directly affected student achievement. They looked at 37 studies conducted between 1986 and 1996 in 25 different countries. Twenty-five of these studies were taken from the International Association for the Evaluation of Educational Achievement (IEA) on reading literacy in 25 countries. Witziers et al. (2003) used studies measuring educational leadership behaviors that met the framework of the seven leadership behaviors (defining and communicating mission, supervising and evaluating curriculum, monitoring student progress, coordinating and managing curriculum, visibility, promoting school improvement and professional development, and achievement orientation) identified by Hallinger (1996).

Using these behaviors allowed Witziers et al. (2003) to see specifically which leadership behaviors had a significant and positive relationship on student outcomes. They also limited their studies to those including valid measures of student achievement. They conducted three different meta-analyses on their 37 research studies and used

Fisher's Z transformation of the correlation coefficient to indicate the effect of educational leadership (Witziers et al., 2003).

It is important to understand the extent educational leadership directly effects student achievement. Studies that measure the indirect effect show a greater impact of school leadership on student performance than studies using direct models (Witziers et al., 2003). It is difficult to clearly define how school leaders or principals effect student achievement without the research to substantiate it. In a time when principals are being held accountable for student achievement, it is more important than ever to find links between principal behaviors and student outcomes. The Witziers et al. (2003) study show connections between certain leadership behaviors and student achievement, but the effect size is too small to be widely accepted.

Marzano et al. (2005) wanted to prove a stronger correlation between school leaders and student achievement than Witziers et al. (2003), and other previous studies, had found. They did so in their book *School Leadership that Works: From Research to Results* (2005). Marzano et al. (2005) conducted a meta-analysis using 69 studies and found a .25 correlation between leadership behaviors of principals and academic achievement of students. The studies they used ranked principals on their behavior. This ranking came from surveys from teachers who provided ratings on their principal's leadership. Marzano and his colleagues listed the principals in order of their effectiveness as leaders in schools. They considered the first half of the principals to be the top 50% and the second half to be the bottom 50 %. From their studies they found schools with principals rated in the top half of all principals based on their leadership effectiveness had a 62.5% average pass rate on standardized tests and a 37.5 % average failure rate. They

also found schools with principals rated in the bottom half of all principals had a 37.5 % average pass rate on standardized tests and a 62.5% average failure rate (Marzano et al., 2005).

Using these studies, Marzano et al. (2005) were able to explain the .25 correlation indicated an increase in principal leadership behavior from the 50th percentile to the 84th percentile correlated to an overall achievement of the school from the 50th percentile to the 60th percentile. They also found an increase in leadership behavior from the 50th percentile to the 99th percentile correlated to an increase in overall student achievement from the 50th percentile to the 72nd percentile (Marzano et al., 2005).

Whereas the meta-analysis conducted by Witziers et al. (2001) used international studies, Marzano et al. (2005) only used studies from the United States or cultures similar to the United States. The 69 studies they included in their meta-analysis were done between 1978-2001, scored leadership behavior using similar constructs, examined the relationship between leadership and student achievement, measured achievement by a standardized achievement test, and had effect sizes could be computed.

While examining the 69 studies in their meta-analysis, Marzano et al. (2005) identified 21 behaviors of principals they called responsibilities. They correlated these 21 responsibilities with student achievement. The responsibility of Situational Awareness, which they define as a leaders' awareness of the details and undercurrents regarding the functioning of the school and their use of this information to address current and potential problems, had the largest correlation, .33 (Marzano et al. 2005).

As an educational leader the implications of the Marzano et al. (2005) meta-analysis are very important. They were able to make strong correlation between principal

behaviors and student achievement, which researchers have been trying to do for years. In addition, they were able to single out which principal behaviors had the most impact on student achievement. As a school leader this research is very important because it allows us to focus and work on behaviors can impact the school and students which is the main goal of education.

Marzano et al. (2005) used their meta-analysis to help guide principals in their actions. They were able to use their research to suggest an action plan to be used by successful educational leaders. Using the findings and conclusions of their research, both through the overall .25 correlation and the identified 21 behaviors, they suggest five ways the research can be put into an action plan on school campuses to increase the achievement of students. Marzano et al. (2005) believe developing a strong leadership team, distributing responsibilities throughout the leadership team, selecting the right work, prioritizing the right work, and matching the management styles to the types of change needed in the school will allow leaders to have the most impact on student achievement.

In the past, researchers have had difficulty finding links between school leadership and student achievement. This trend has not diminished the necessity of strong leaders in schools, but in an era where principals are being rewarded monetarily in the form of bonuses based on student achievement, it has become increasingly necessary to be able to find a correlation between school leadership behaviors and student achievement. If principals are going to be held accountable for test scores, it is important we discover the effective behaviors that make the strongest impact on student learning.

The most important thing coming from research connecting school leadership behaviors and student achievement is how to put this into practice in schools. Principals and school leaders need to be able to prioritize behaviors and actions that will encourage growth in all students. Witziers et al. (2003) were able to explain the difficulties researchers were having finding a correlation and Marzano et al. (2005) were able to narrow the search criteria in order to pinpoint behaviors in leaders that make the most difference in schools.

CHAPTER 3

Methodology

The purpose of this longitudinal archival non-experimental causal comparative research study was to investigate whether a statistically significant difference existed between the college readiness indicator exam scores of students who participated in an IBMYP and those who did not. The independent variable in this study was student participation in the IBMYP during their middle school years. Although the IBMYP is designed to be a five year program for grades 6-10, this study focused on a middle school that only offers the first three years of the program (grades 6-8). The IB currently authorizes standalone three year IBMYP schools.

The dependent variables were the SAT scores, the IB math and English scores, and the AP math and English scores of students in high school. The research hypothesis was there was no statistically significant difference in scores between students who had participated in the IBMYP during middle school and those who had not. Table 3.1 lists the indicator exams used in the study.

Table 3-1

College Readiness Indicator Exams Used in Study

College Readiness Indicator Exams Used in Study:	
	AP Calculus AB
	AP Calculus BC
	AP English Language
	AP English Literature
	IB Mathematics HL
	IB Mathematics SL
	IB English A1
	SAT Math
	SAT Reading
	SAT Writing
	Total SAT

AP and IB both offer math and English exams. The IB exams consist of two to three written examination papers including different examination options such as oral and written, long and short responses, data-based questions, essays, or multiple choice questions (International Baccalaureate Organization, 2006). The AP exams include multiple choice questions and essays (College Board, 2013). The AP Calculus AB exam covers functions, graphs and limits, derivatives, integrals and Fundamental Theorem of Calculus. The AP Calculus BC exam covers all of the topics from AP Calculus AB plus

differential and integral calculus (College Board, 2013). Students who score a 3 or higher (out of a possible 5) on the AP Calculus AB exam are given college credit for one semester course, and students who score a 3 or higher on the AP Calculus BC are given credit for two semesters of calculus at most U.S. universities (College Board, 2013).

The AP English Language exam tests students' ability to analyze and evaluate complex text and their ability to produce arguments. Scores of a 3 or higher on the AP English Language exam can earn students college credit for a first year college course in rhetoric and composition (College Board, 2013). The AP English Literature exam requires students to read and analyze literature from a variety of texts. Students who pass the exam with a score of 3 or higher show knowledge equivalent to having completed a one year college course in literary analysis (College Board, 2013).

The IBDP exams are scored on a scale of 1-7. A score of 4 or higher is considered passing, the equivalent of college ready, and can qualify students for college credits at some colleges and universities. The IB English A1 exam requires students to demonstrate language skills through written examination papers and oral activities evaluating the students' ability to analyze familiar and unfamiliar texts and to respond to literature (International Baccalaureate Organization, 2006). The IB Mathematics HL (higher level) exam includes three written examination papers and a portfolio that includes tasks from students demonstrating mathematical investigation and mathematical modeling. The exam evaluates student knowledge in the following areas: algebra, functions and equations, circular functions and trigonometry, matrices, vectors, statistics and probability, and calculus. Students must also include one of the following four options: (1) "statistics and probability"; (2) "sets, relationships and groups"; (3) "series and

differential equations”; or (4) “discrete mathematics” (International Baccalaureate Organization, 2006). The IB Mathematics SL (standard level) exam includes two written examination papers and a portfolio with two assignments that include mathematical investigation and mathematical modeling. The topics included in the assessment on the exam are Algebra, functions and equations, circular functions in Trigonometry, matrices, vectors, statistics and probability, and Calculus (International Baccalaureate Organization, 2006).

Description of the Research Design

Both descriptive and inferential statistical analyses were conducted. The student sample consisted of two groups. One group was students who had participated in the IBMYP in middle school, and the other group was students who had not participated in the IBMYP during middle school. The two groups were followed over time and multiple high school exams were tested to measure the effectiveness of the IBMYP. The descriptive statistics included the means and standard deviations for the two groups. These are graphed in Tables 4.1- 4.6 to aid interpretation of the inferential statistics.

The inferential statistics conducted for this study were independent sample two tailed t -tests. Two tailed t -test analysis is appropriate for examining the difference between scores for two groups. A two tailed t -test was run in order to test for statistical significance in either direction. The hypothesis was there was no statistically significant difference between the two groups' exam scores. A two tailed t -test for the two independent sample groups was used to assess whether the means of the two independent groups (IBMYP participants and non IBMYP participants') test scores were statistically different from each other in either direction. Two tailed t -tests were performed for each

of the exam score sets, as listed in Table 3-1, to allow comparisons between the two groups (IBMYP participants and non IBMYP participants). SPSS 20 software was used for the data analyses.

The method to examine the central research question was two tailed *t*- tests for independent groups. The mean scores of two samples, students who attended an IBMYP school and those who did not, were compared to determine whether they were significantly different from each other. The *t*-test is appropriate when a comparison is being made between two averages of two groups (Gall & Gall, 2003). The *t*-tests in this study were performed to determine if there was a statistically significant difference between students' academic achievement as measured by the SAT, IB, and AP exams as a function of participation in an IBMYP middle school as compared to students who did not participate in an IBMYP middle school. The level of significance was set at .05. The quantitative research design selected for this study was causal comparative; meaning students were not randomly assigned to groups. The groups were formed based on whether the student attended the IBMYP middle school or not. The students from the two different high schools were placed into these groups.

Research Question

The theoretical basis for this study was to determine if IBMYP participants' scores on college readiness indicator exams significantly differ statistically from those students who did not participate in an IBMYP middle school. The research question guiding the study was:

Is there a statistically significant difference in college readiness indicator exam scores (SAT, AP Calculus AB, AP Calculus BC, AP English Language, AP

English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1) of students who participated in an IBMYP middle school compared to those who did not participate in an IBMYP middle school?

Setting

The focus district is one of the top ten largest school districts in the United States. There are over 25,000 employees serving 201,594 students. The student population of the district is ethnically, culturally, and socioeconomically diverse. Table 3-2 shows the demographic make-up of the district and the participating middle school and high schools. The research study used archival data from one district middle school offering the IBMYP and archival data from two district high schools offering the IBDP, AP, and SAT exams.

Table 3-2

Demographic Breakdown of Schools in the Study

	Total Number of Students (%) n=number	Title I	Economically Disadvantaged (based on Free and Reduced Lunch Criteria) (%)	Gifted and Talented (%)	Special Education (%)	Ethnicity				
						Asian (%)	African American (%)	Caucasian (%)	Hispanic (%)	Other Ethnicities (%)
District	100 n= 201,594	Yes	80.7 n= 162,699	15.2 n=30,587	7.7 n=15,506	3.3 n=6,611	25.2 n=50,778	7.9 n=15,879	62.6 n=126,149	1 n=2,177
Middle School in Study	100 n= 1,341	Yes	32.1 n=430	70.3 n=943	3.8 n=51	12.8 n=171	11.9 n=159	36.8 n=493	36.2 n=485	2.3 n=33
B High School	100 n= 3,470	Yes	44.4 n=1,541	26.3 n=912	6.2 n=215	14.1 n=489	18.9 n=655	25.7 n=891	39.1 n=1,358	2.2 n=77
L High School	100 n= 3,357	Yes	47 n=1,578	28.2 n=947	5.5 n=183	3.6 n=120	28.8 n=967	28.3 n=949	36.5 n=1,226	2.8 n=95

All three of the participating schools are magnet schools, meaning, in addition to accepting students who live in their attendance zones, these schools accept students who

apply and qualify for their magnet programs. A magnet school attracts students from all across a school district, including students who may normally attend their neighborhood school (Junetune, 1999). The district is considered a district of choice, meaning students are able to apply for spaces available in one of the 120 magnet school options in the district. Magnet programs offer curriculum designed around a specialized theme. Teachers in magnet programs take specialized professional development in the magnet theme and the schools recruit and draw their student body from all areas of the city. Magnet schools are currently viewed as a way to improve the academic achievement of students by providing parents a choice in schools for their children (Junetune, 1999). Parents can enroll their students in their neighborhood school, or they can select and apply for a magnet school.

All three of these schools are high-performing, desirable schools in the district. Table 3.3 shows the number of magnet applicants per school and the number of students accepted. The middle school is a gifted and talented magnet school and began offering the IBMYP in 2003. B high school is a foreign language magnet school and L high school is a business administration magnet school. High school B became an IBDP world school in 1979, and high school L began offering the IBDP in 1982.

Table 3-3

Magnet Applications

MAGNET PROGRAM APPLICATION TOTALS AND ACCEPTANCES 2011-2014			
	Middle School in Study	B High School	L High School
2013 – 2014 School Year			
Total Number of Student Applicants	1,110	1,671	1,870
Total Number of Students Accepted	350	300	400
2012 – 2013 School Year			
Total Number of Student Applicants	1,153	1,538	1,189
Total Number of Students Accepted	375	300	400
2011 – 2012 School Year			
Total Number of Student Applicants	1,068	1,276	1,850
Total Number of Students Accepted	350	300	400

These schools are desirable because they are very high performing schools in the district. Table 3-4 and 3-5 below break down the state assessment data from the schools involved in the study. A new state assessment system was implemented in the 2011-2012 school year and is currently in a phase-in period. Results of the new state assessment, the STAAR, are not yet available. Tables 3-4 and 3-5 use previous state assessment test, Texas Assessment of Knowledge and Skills (TAKS), data from 2010 and 2011 to compare school achievement against district averages for the 2009-2010 and 2010-2011 school years.

Table 3-4

Middle School State Data Comparison

MIDDLE SCHOOL STATE ASSESSMENT OVERALL PERCENTAGE MEETING PASSING STANDARD 2010 - 2011										
Year	READING/ELA (8 th Grade)		MATH (8 th Grade)		WRITING (7 th Grade)		SCIENCE (8 th Grade)		SOCIAL STUDIES (8 th Grade)	
	District Middle Schools	Middle School In Study	District Middle Schools	Middle School In Study	District Middle Schools	Middle School In Study	District Middle Schools	Middle School In Study	District Middle Schools	Middle School In Study
2011	87%	97%	79%	90%	92%	97%	78%	89%	94%	97%
2010	87%	99%	75%	96%	92%	96%	74%	88%	93%	97%

Table 3-5

High School State Data Comparison

HIGH SCHOOL STATE ASSESSMENT OVERALL PERCENTAGE MEETING PASSING STANDARD 2010 - 2011												
Year	READING/ELA (All Grades)			MATH (All Grades)			SCIENCE (All Grades)			SOCIAL STUDIES (All Grades)		
	District High Schools	B High School	L High School	District High Schools	B High School	L High School	District High Schools	B High School	L High School	District High Schools	B High School	L High School
2011	87.3%	93%	95%	74.6%	79%	85%	78.5%	86%	88%	93.5%	97%	98%
2010	88%	95%	96%	73%	81%	84%	77%	87%	88%	93%	95%	98%

The state of Texas uses the Academic Excellence Indicator System (AEIS) to summarize information regarding the performance of students in each school and district. In 2012, the state of Texas began using a new state assessment system. Prior to 2012, the Texas state assessment was the TAKS test. The TAKS test is now being phased out and State of Texas Assessment of Academic Readiness (STAAR) exams are being phased in (Texas Education Agency, 2012). Table 3-6 compares the two high schools in the study to the district average against state performance indicators used in AEIS reports. The two high schools perform better than the district average in four year completion rates,

number of students taking the SAT/ACT, and student performance on the SAT/ACT exams.

Table 3-6

State Performance Indicators

HIGH SCHOOL STATE OVERALL PERFORMANCE INDICATORS									
	4-YEAR COMPLETION RATE (GRADUATION)			SAT/ACT RESULTS (TESTED)			SAT/ACT RESULTS (AT/ABOVE CRITERION)		
	District High Schools	B High School	L High School	District High Schools	B High School	L High School	District High Schools	B High School	L High School
Class of 2010	74.3%	88.5%	90.5%	69.7%	86.9%	92%	21%	59.9%	38%
Class of 2009	70%	85.9%	88.4%	66.8%	89.8%	83.9%	22.2%	60.8%	35.9%

Subjects

The study sample was composed of archival student exam data of those who met the following set of criteria: (a) enrolled in a district middle school in 2003-2004, 2004-2005, 2005-2006, 2006-2007, or 2007-2008 (including, but not limited to, the middle school offering the IBMYP in the district); (b) students enrolled in one of the two district high schools in the study through 2007-2008, 2008-2009, 2009-2010, 2010-2011, or 2011-2012 depending on their cohort; and (c) students who took IB Mathematics HL, IB Mathematics SL, IB English A1 or AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, and SAT exams in one of the two high schools. No additional student testing was required, only archival student exam data was used.

The study incorporated college readiness indicator exam results for five years of student cohorts; students who took the AP and SAT or IB and SAT exams in 2008-2012.

All students who attended B or L high school and took either AP, IB or SAT exams were included in the sample population. The archival student exam data was separated into two different categories; those who attended the IBMYP middle school and those who did not attend the participating IBMYP middle school.

Procedures

Approval by the University of Houston Committee for the Protection of Human Subjects was requested. Archival student exam result data was requested from the district through a research request. The district was asked to provide exam scores as well as an identifying indication for students who attended the IBMYP middle school. Data was collected from the research and accountability department of the district. The data included the following: (a) the sample of students in each cohort as described above, (b) student performance on the 2008, 2009, 2010, 2011, and 2012 IB Mathematics HL, IB Mathematics SL, IB English A1, or AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, and SAT exams, and (c) distinction between students who attended the IBMYP middle school and those who did not. Privacy and confidentiality was ensured by instructing the district research and accountability department to provide the data de-identified, i.e. with student name, ID, or other identifying information removed.

Once the data was collected and approval was granted by the University, the next step was the calculation of the data. Analyses were run in SPSS 20. The data was explored to examine whether the assumptions of normality and equality of variances were met. The assumption of normality was met. The assumption of equality of variances was examined using Levene's test (i.e., whether the variances of dependent variables were

significantly different between the two groups). If this test was significant ($p \leq .05$), meaning the variances were not equal across the two groups, the appropriate analysis was conducted to account for these differences. Both descriptive and inferential statistical analyses were conducted. The descriptive statistics included the means and standard deviations for groups. The inferential statistics conducted for this study were independent sample two tailed *t*-tests. Two-tailed independent group *t*-tests were conducted with IBMYP participation and non-IBMYP participation as the independent variable, each exam type as the dependent variable, and an α (significance) level of .05. Separate tests were required for each of the eight different exam types because different students took combinations of different exams (e.g., Student 1 took IB Math and AP English, Student 2 took AP Math and IB English). The different *t*-tests were on different subsamples. *T*-tests are used to compare the means between the two groups. If significant differences are found, it suggests there is an effect for the group. The SAT scores range from 600 to 2400, the IB exams are scored between 1- 7, and the AP exams are scored on a range of 1- 5.

Instruments

Version 20 of the Statistical Package for the Social Sciences (SPSS) was used for this study. The research study focused on IB Mathematics HL, IB Mathematics SL, IB English A1, or AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, and SAT exam results because the AP, IB, and SAT exams are accepted as measures of college readiness. The SAT score range is 600 as the lowest and 2400 as the highest. The AP exam score range is 1 as the lowest and 5 as the highest. Scores of 3 or

higher are considered passing. The IB exam score range is 1 as the lowest and 7 as the highest. Scores of 4 or higher are considered passing.

Limitations

There are several constraints present in the study. The study only focused on the student population enrolled in two of three campuses in the identified large, urban school district in Texas. The study looked at the college readiness indicator exams of students in two magnet high schools. The sample of middle school MYP students came from a gifted and talented magnet school. Two thirds of the students who attended the IBMYP middle school are identified by the state of Texas as gifted and talented- this may have influenced the dependent variable (student achievement on exams). Preparatory sessions and tutorials could affect a student's performance on college readiness indicator exams. Differences in student readiness, teacher training, and instructional delivery may contribute to student performance. In addition, student mobility, parental support, and the reorganization of district resources may also contribute to the limitations of this study. Finally, this study has limitations because determining causal patterns with any degree of certainty is difficult.

The IBMYP was implemented at the middle school in 2003. One can assume there would be different levels of program implementation in the early years of the program as compared to the later years of the program. The district where all three campuses are located is a decentralized school district, meaning campus principals and campus level decision making committees can decide how campus funds are spent. Many other variables can make an observed difference in the academic success of students including their cognitive ability, academic experiences, and nonacademic experiences.

CHAPTER 4

Results

The purpose of this study was to add to the limited data on the academic outcomes of students who participated in the IBMYP during their middle school years. This study explored college readiness indicator exams in the form of SAT, IB math and English, and AP math and English scores of students in high school who were IBMYP participants and non-IBMYP participants in middle school. The research question addressed in this study was:

Is there a statistically significant difference in college readiness indicator exam scores (SAT, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1) of students who participated in an IBMYP middle school compared to those who did not participate in an IBMYP middle school?

Description of Results in Terms of the Population Sample

The data sample consisted of five years of exam scores from 11th and 12th grade students at two different high schools in an urban Texas school district. The data set was obtained from the school district's archives of assessment results. Table 4-1 below includes the statistical information regarding the sample size. The research hypothesis was that no statistically significant difference would exist in the scores of IBMYP participants and non-IBMYP participants' college readiness indicator exams.

The quantitative research design selected for this study was causal comparative; students were not randomly assigned to groups. The groups were formed based on whether the student attended the IBMYP middle school or not. Students from the two

different high schools were placed into these groups. The study incorporated college readiness indicator exam results for five years of student cohorts: students who took the AP and SAT, or IB and SAT exams in 2008-2012. All students who attended B or L high school and took both AP and SAT or IB and SAT exams were included in the sample population.

Table 4-1

Sample Size

High School	Number	IBMYP Participants	Non-IBMYP Participants
B	1715	301	1414
L	1417	468	949
Total	3132	769	2363

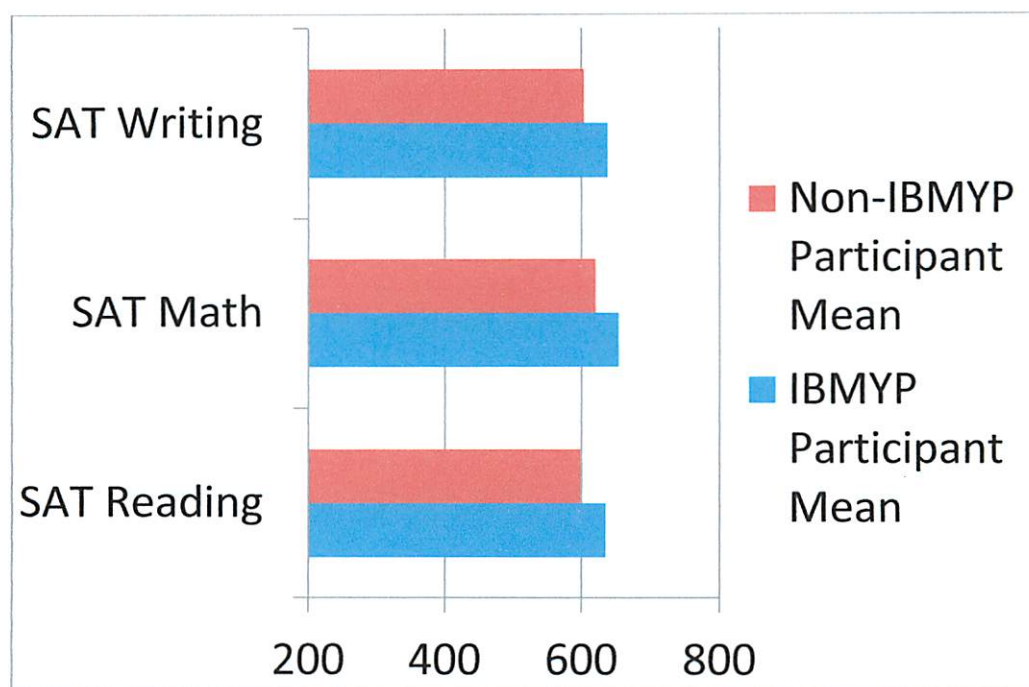
Analyses were run in SPSS 20. The data was explored to examine whether the assumptions of normality and equality of variances were met. The assumption of normality was met. The assumption of equality of variances was examined using Levene's test (i.e., whether the variances of dependent variables were significantly different between the two groups). If this test was significant ($p \leq .05$), meaning the variances were not equal across the two groups, the appropriate analysis was conducted to account for these differences. Two-tailed independent group *t*-tests were conducted with IBMYP participation and non-IB participation as the independent variable, each exam type as the dependent variable, and an α (significance) level of .05. Separate tests were required for each of the eight different exam types because different students took

combinations of different exams (e.g., Student 1 took IB Math and AP English, Student 2 took AP Math and IB English). *T*-tests are used to compare the means between the two groups. If significant differences are found, it suggests there is an effect for the group.

Results of Each Set of Statistics

The SAT exam includes three sections (reading, writing, and math) and students have three hours and forty five minutes to complete the test. There is a 25 minute essay, six 25 minute sections, and two 20 minute sections covering math, reading and writing and a ten minute multiple choice writing section. Each section (reading, writing, and math) is scored on a scale of 200-800 points with a total of 2400 possible (College Board, 2013). The SAT reading includes passage-based reading and sentence completion questions. The SAT math is made up of multiple choice and student-produced response questions. The SAT writing includes improving sentences, improving paragraphs, and identifying sentence error questions as well as the essay section (College Board, 2013). The study's sample showed 2,886 students took the SAT. The mean score for the total SAT for IBMYP participants was 1926.69 (SD= 230.21) and the non-IBMYP participant mean was 1822.77 (SD= 262.24). Figure 4-1 includes mean scores for each of the separate SAT reading, SAT math, and SAT writing scores for IBMYP participants and non-IBMYP participants. Significant differences in scores between IBMYP participants and non-participants were found in each of the SAT exams.

Figure 4-1

SAT Mean Scores

The AP English Language exam tests students' ability to analyze and evaluate complex text and the ability to produce arguments. The test is broken into two sections. The first section is 54 multiple choice questions and the students have one hour to complete the section. The second section asks students to write three essays. The students have 15 minutes to read the information and then two hours to write the essays (College Board, 2013). According to the study, 1,613 students took the AP Language exam. As shown in the table below (Table 4-4), 1,180 students passed the AP Language exam with a score of 3 or higher. The mean score on the exam was a 3.29. Three hundred and four of these examinees were IBMYP participants and their mean score was 3.62 (SD= 1.18). The mean score of the 1,309 non-IBMYP participants was 3.21 (SD= 1.19). Significant

differences in scores between IBMYP participants and non-participants were found in the two tailed t -test ($p=.000$).

Table 4-2

AP English Language

AP Score	IBMYP Sample $f(\%)$	Non-IBMYP sample $f(\%)$	Total $f(\%)$
1	15(4.9)	115(8.8)	130(8.1)
2	43(14.1)	260(19.9)	303(18.8)
3	72(23.7)	380(29)	452(28)
4	86(28.3)	341(26.1)	427(26.5)
5	88(28.9)	213(16.3)	301(18.7)
Total	304(100)	1309(100)	1613(100)

The AP English Literature exam requires students to read and analyze literature from a variety of texts. As shown in the table below (Table 4-5), of the 1,027 students in the sample who took the AP English Literature exam, 860 passed with a score of a 3 or higher. Two hundred and two of the students had participated in the IBMYP during middle school, and their mean AP English Literature score was a 3.77 ($SD=.914$). The 825 non-IBMYP participants' mean score was a 3.39 ($SD=1.00$). Significant differences in scores between IBMYP participants and non-participants were found in the two tailed t -test ($p=.000$).

Table 4-3

AP English Literature

AP Score	IBMYP Sample <i>f</i> (%)	Non-IBMYP sample <i>f</i> (%)	Total <i>f</i> (%)
1	2(1)	22(2.7)	24 (2.3)
2	10(5)	133(16.1)	143(13.9)
3	71(35.1)	291(35.3)	362(35.2)
4	69(34.2)	261(31.6)	330(32.1)
5	50(24.8)	118(14.3)	168(16.4)
Total	202(100)	825(100)	1027(100)

The IB English A1 exam requires students to demonstrate language skills through written examination papers and written tasks evaluating the students' ability to analyze familiar and unfamiliar texts and to respond to literature (International Baccalaureate Organization, 2006). Written examination papers and written tasks make up the IB English A1 exams. There are two different IB English A1 exams, the SL (standard level) and the HL (higher level). For the purposes of this study, the scores to the SL and HL exams were grouped together. Examination paper 1 is linked to textual analysis and examination paper 2 is linked to literary works. SL students are required to complete one written task between 800-1,000 words and the HL students submit two written tasks of 800-1,000 words each (International Baccalaureate, 2011).

On the IB English A1 SL exam, students have a total of three hours to finish the examination papers. Examination paper 1 provides students with two unknown passages from texts and the students select one and write an analysis. Examination paper 2 is based on literary texts studied in the IB Language A course during the year. Students respond to

a question to show their understanding of the text and analyze the meaning. In addition, the SL students must submit a written task, and the task may not be an essay. Some examples of acceptable written tasks are: newspaper articles, a letter from a fictional character, or an opinion column (International Baccalaureate, 2011). The IB English A1 HL exam has the same format as the SL exam, but different requirements. HL examination paper 1 requires students to comparatively analyze two unfamiliar texts. Students have two hours to complete paper 1. Examination paper 2 is an essay. HL students must choose from six questions based on literary texts studied in their course during the school year. Students must answer the questions demonstrating their ability to analyze literature (International Baccalaureate, 2011). In addition to the two HL examination papers, students must submit two written tasks each 800-1,000 words. One of the tasks must be based on a literary text and the other must be in the form of a critical response.

The IB exams are scaled from 1-7 and a score of 4 or higher is considered passing. Three hundred and ninety-six of the 1,125 students in the sample participated in the IBMYP in middle school and the mean score on the IB English A1 exam was 4.89 (SD=.728). Seven hundred and twenty-nine students were non-IBMYP participants and the mean score was 4.76 (SD=.741). As shown in table below (Table 4-7), 97.9% of the students in the sample population passed the IB English A1 exam. Significant differences in scores between IBMYP participants and non-participants were found in the two tailed *t*-test ($p=.005$).

Table 4-4

IB English A1 SL and HL

IB Score	IBMYP Sample <i>f</i> (%)	Non-IBMYP sample <i>f</i> (%)	Total <i>f</i> (%)
1	0 (0)	0 (0)	0 (0)
2	0 (0)	0 (0)	0(0)
3	8(2)	16(2.2)	24(2.1)
4	99(25)	247(33.9)	346(30.8)
5	221(55.8)	370(50.8)	591(52.5)
6	63(15.9)	85(11.7)	148(13.2)
7	5(1.3)	11(1.5)	16(1.4)
Total	396(100)	729(100)	1125(100)

The IB Mathematics HL (higher level) exam includes three written examination papers that demonstrate mathematical investigation and mathematical modeling. Students have five hours to complete the exam. The exam evaluates student knowledge in the following areas: Algebra, functions and equations, circular functions and Trigonometry, matrices, vectors, statistics and probability, and Calculus (International Baccalaureate Organization, 2006). Examination paper 1 and 2 are both broken into two sections. Section A includes short response questions and section B includes extended response questions. Students have two hours to complete paper 1 and two hours to complete paper 2. Students are not allowed to use a calculator for paper 1 and they need a graphing calculator to complete paper 2. Examination paper 3 takes one hour and consists of extended response questions involving sustained reasoning and the emphasis is on problem-solving (International Baccalaureate Organization, 2012).

As shown in Table 4-7, 562 of the sample population took the IB Math HL exam and 416 of them passed the exam with a score of 4 or higher. According to the study, 223 of the students participated in the IBMYP middle school and their mean score was 4.73 (SD=1.30). The mean score of the non-IBMYP participants was 4.29 (SD=1.43). Significant differences in scores between IBMYP participants and non-participants were found in the two tailed t -test ($p=.000$).

Table 4-5

IB Math HL

IB Score	IBMYP Sample <i>f</i> (%)	Non-IBMYP Sample <i>f</i> (%)	Total <i>f</i> (%)
1	1 (.4)	6(1.8)	7(1.2)
2	8(3.6)	31(9.1)	39(6.9)
3	31(13.9)	69(20.4)	100(17.8)
4	53(23.8)	79(23.3)	132(23.5)
5	68(30.5)	78(23)	146(26)
6	41(18.4)	58(17.1)	99(17.6)
7	21(9.4)	18(5.3)	39(6.9)
Total	223(100)	339(100)	562(100)

The IB Mathematics SL (standard level) exam includes two written examination papers with mathematical investigation and mathematical modeling. Students have three hours to complete the exam. The topics included in the assessment on the exam are Algebra, functions and equations, circular functions in Trigonometry, matrices, vectors, statistics and probability, and Calculus (International Baccalaureate Organization, 2006). SL students have 90 minutes to complete paper 1. Paper 1 and 2 are both broken into two

sections, section A of each paper is composed of short response questions and section B includes extended response questions. Students may not use calculators for paper 1 and are required to use graphic display calculators for paper 2 (International Baccalaureate Organization, 2006).

Of the 225 students in the sample population, 69 were IBMYP participants and 156 were not. The mean score of the IBMYP participants was 4.75 (SD=1.01) and the mean of the non-IBMYP participants was 4.44 (SD=1.15). According to the study, 180 of the students in the sample passed the IB Math SL exam with a score of 4 or higher. Scores between IBMYP participants and non-participants were approaching significance in the two tailed t -test ($p=.053$).

Table 4-6

IB Math SL

IB Score	IBMYP Sample $f(\%)$	Non-IBMYP sample $f(\%)$	Total $f(\%)$
1	0(0)	1(.0)	1(.4)
2	1 (1.4)	5(3.2)	6(2.7)
3	7(10.1)	31(19.9)	38(16.9)
4	18(26.1)	34(21.8)	52(23.1)
5	25(36.2)	60(38.5)	85(37.8)
6	18(26.1)	22(14.1)	40(17.8)
7	0(0)	3(1.9)	3(1.3)
Total	69(100)	156(100)	225(100)

The AP Calculus AB exam is broken into two different parts and students have three hours and fifteen minutes to complete the exam. The AP Calculus AB exam

includes multiple choice questions and free response questions and covers functions, graphs and limits, derivatives, integrals and Fundamental Theorem of Calculus (College Board, 2013). Of the 620 students in the sample who took the AP Calculus AB exam, 400 passed with a score of 3 or higher (see Table 4-2). One hundred and twenty-nine of these students went to the IBMYP middle school, and their mean score on the AP Calculus AB exam was 2.96 (SD=1.58) compared to their 491 non-IB counterparts whose mean score was a 3.09 (SD=1.52). No significant differences in scores between IBMYP participants and non-participants were found in the results of the two tailed t -test ($p = .413$).

Table 4-7

AP Calculus AB

AP Score	IBMYP Sample <i>f</i> (%)	Non-IBMYP sample <i>f</i> (%)	Total <i>f</i> (%)
1	41 (31.8)	131(26.7)	172 (27.7)
2	9(7)	39(7.9)	48 (7.7)
3	23(17.8)	93(18.9)	116 (18.7)
4	26(20.2)	113(23)	139 (22.4)
5	30(23.3)	115(23.4)	145 (23.4)
Total	129(100)	491(100)	620 (100)

The AP Calculus BC exam covers all of the topics from AP Calculus AB plus differential and integral calculus (College Board, 2013). The exam includes both multiple choice and free response questions and is broken into two different sections which both include a part A and part B. The exam is timed and students have three hours and fifteen minutes to finish 51 questions. Students use a graphing calculator for 19 of the problems

and may not use a calculator for the remaining 32 problems (College Board, 2013). As seen in the table below (Table 4-4), 530 students in the sample took the AP Calculus BC exam and 469 passed with a score of 3 or higher. One hundred and twenty-nine of these students attended the IBMYP middle school. The IBMYP participant mean score was 4.17 (SD=1.2) and the non-IBMYP participant mean was 4.05 (SD=1.26). No statistically significant differences in scores between IBMYP participants and non-participants were found in the results of the two tailed *t*-test ($p=.361$).

Table 4-8

AP Calculus BC

AP Score	IBMYP Sample <i>f</i> (%)	Non-IBMYP sample <i>f</i> (%)	Total <i>f</i> (%)
1	8(6.2)	33(8.2)	41(7.7)
2	6(4.7)	14(3.5)	20(3.8)
3	18(14)	69(17.2)	87(16.4)
4	21(16.3)	67(16.7)	88(16.6)
5	76(58.9)	218(54.4)	294(55.5)
Total	129(100)	401(100)	530(100)

Conclusions

The results regarding the first research question can be found in Table 4-9.

Significant differences in scores between IBMYP participants and non-participants were found in all but three of the exams: IB Math SL, AP Calculus AB and AP Calculus BC. Students who participated in the IBMYP middle school program achieved better than

their non-IB counterparts on the SAT Math, SAT Reading, SAT Writing, IB English A1, AP English Language, AP English Literature, and IB Math HL. Non-IBMYP participants outscored their IBMYP counterparts on the AP Calculus AB and AP Calculus BC exams. The results of the study are broken down by test in the following section.

Table 4-9

Statistical Significance

Test		N	Mean	SD	T(df)	p
SAT Reading	IBMYP	720	634.97	88.28	9.41 (1340.49)	.000
	non IBMYP	2166	598.31	97.02		
SAT Math	IBMYP	720	653.75	82.30	8.87 (1454.88)	.000
	non IBMYP	2166	620.71	98.36		
SAT Writing	IBMYP	720	637.97	88.64	8.72 (1355.36)	.000
	non IBMYP	2166	603.74	98.55		
SAT Total	IBMYP	720	1926.69	230.21	10.13 (1387.38)	.000
	Non IBMYP	2166	1822.77	262.24		
IB Math HL	IBMYP	223	4.73	1.30	3.77 (505.94)	.000
	Non IBMYP	339	4.29	1.43		
IB Math SL	IBMYP	69	4.75	1.006	1.95 (233)	.053
	Non IBMYP	156	4.44	1.149		
IB English A1	IBMYP	396	4.89	.728	2.84 (822.62)	.005
	Non IBMYP	729	4.76	.741		
AP English Language	IBMYP	304	3.62	1.18	5.42 (1611)	.000
	Non IBMYP	1309	3.21	1.19		
AP English Literature	IBMYP	202	3.77	.914	4.90 (1025)	.000
	Non IBMYP	825	3.39	1.00		

AP Calculus AB	IBMYP	129	2.96	1.578	-.820 (618)	.413
	Non IBMYP	491	3.09	1.52		
AP Calculus BC	IBMYP	129	4.17	1.2	.914 (528)	.361
	Non IBMYP	401	4.05	1.26		

There were mixed results to this study. Students who participated in the IBMYP middle school achieved better than their non-IB counterparts on the SAT Math, SAT Reading, SAT Writing, IB English A1, AP English Language, AP English Literature, and IB Math HL. Significant differences in scores between IBMYP participants and non-participants were found in all but three of the exams: IB Math SL, AP Calculus AB and AP Calculus BC. Non-IBMYP participants outscored their IBMYP counterparts on the AP Calculus AB and AP Calculus BC exams. The research hypothesis demonstrated no statistically significant difference in exam scores of students who participated in the IBMYP and of students who did not participate in IBMYP. The hypothesis was correct for the IB Math SL, AP Calculus AB and BC exams.

CHAPTER 5

Conclusions

School leaders are charged with the task of selecting curricular programs that impact student achievement and meet the needs of their school community. Because educational leaders play such a significant role in program choice, it is important for them to be able to assess and implement effective programs. Middle school is a tumultuous time in the life of young adolescents and having a relevant and challenging curriculum as well as a school culture that promotes meaningful relationships that foster guidance and support can help students excel in this trying time. This chapter includes a summary of the results of this study as outlined in Chapter Four. In addition, this chapter includes interpretative comments and discussion regarding the implications of the conclusions of this study to school administrators and to future research. The research question guiding the study was:

Is there a statistically significant difference in college readiness indicator exam scores (SAT, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1) of students who participated in an IBMYP middle school compared to those who did not participate in an IBMYP middle school?

Overview of Study

This research was designed as a longitudinal causal comparative study to determine whether a statistical difference existed between the academic achievement of students who participated in an IBMYP middle school and those who did not. Specifically, this study explored possible differences of students' academic achievement on college readiness indicator exams as measured by the SAT math, SAT writing, SAT

reading, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1 exams as a function of participation in an IBMYP and non-IBMYP for the three years of middle school (6th-8th grade).

The student sample for this study was drawn from a large, urban school district in Texas. Students identified as the IBMYP group were selected from students who attended the district IBMYP middle school and then attended one of two district high schools offering AP and IBDP for students in the 11th and 12th grade. Students in the non-IBMYP group were selected from students who attended a non-IBMYP district middle school and then attended one of the two district high schools offering the AP and IBDP for students in the 11th and 12th grade. The two sample groups were comprised of students who attended one of the two district high schools in the study and took the college readiness indicator exams in the five year period from 2008-2012. There were 3,132 students who met the requirements of the study. Seven hundred and sixty-nine students attended the IBMYP middle school and went on to one of the two district high schools, and 2,363 students attended non-IBMYP middle schools and went on to one of the two district high schools and took one or more of the college readiness indicator exams.

SAT math, SAT writing, SAT reading, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1 scores were utilized to measure the students' academic achievement and college readiness level. The SAT exams are each scored on a scale of 200-800 for a total score possible of 2400 by combining the scores of the math, writing, and reading sections. The AP exams are scored on a scale of 1-5 with a score of 3 or higher

considered passing with a level of college readiness. The IB exams are scored on a scale of 1-7 with scores of 4 or higher considered passing with a level of college readiness. The scores from these three different college readiness indicator exams were used to interpret student academic achievement levels.

Inferential statistical tests used in this non-experimental, quantitative study were the *t*-tests for independent groups. *T*-tests assess whether the means of two groups are statistically significantly different from each other. The *t*-test is appropriate when a comparison is being made between the two means or averages of two groups. *T*-tests were performed to determine whether there was a statistical significant difference between students' academic achievement as measured by the SAT math, SAT writing, SAT reading, AP Calculus AB, AP Calculus BC, AP English Language, AP English Literature, IB Mathematics HL, IB Mathematics SL, and IB English A1 exams in high school as a function of participation in an IBMYP middle school program in sixth through eighth grades, as compared to students who did not participate in an IBMYP middle school in the identified large, urban school district. The level of significance was set at $P < .05$. Descriptive data and *t*-tests were employed to explain the results.

There are several constraints present in the study because determining causal patterns with any degree of certainty is difficult. There were several deliberate boundaries pre-established in this study. For example, the study only focused on the student population enrolled in two of three campuses in the identified large, urban school district in Texas. The study looked at the college readiness indicator exams of students in only two magnet high schools. The sample of middle school MYP students came from a gifted and talented magnet school. Two thirds of the students who attended the IBMYP

middle school are identified by the state of Texas as gifted and talented, which may have influenced the dependent variable (student achievement on exams). Although, Frost (2011) states no data supports the claim gifted students gain any more or less academically from IB or AP courses than their non-gifted peers (Frost, 2011). The student demographics of the three schools in the study are not representative to the district's overall demographics. Variables other than the IBMYP curriculum in middle school may have accounted for the significantly higher exam scores on the on the SAT Math, SAT Reading, SAT Writing, IB English A1, AP English Language, AP English Literature, and IB Math HL exams. Some theoretical event could have influenced the dependent variable, college readiness indicator exam scores.

Additionally, differences in student readiness, teacher training, and instructional delivery may have contributed to student performance and were not taken into account in this study. Preparatory sessions could have affected students' performance on some of these college readiness indicator exams. Student mobility, parental support, and the reorganization of district resources may also contribute to the limitations of this study. Many other variables can make an observed difference in the academic success of students including cognitive ability, academic experiences, and non-academic experiences.

Due to the self-selection factor and due to the entrance and selection criteria to participate in magnet schools and in the IBDP in high school, there may have been an ambiguous temporal precedence. It is difficult to specify which variable preceded the other. Were the higher means on the college readiness indicator exams the results of participation in the IBMYP in middle school, or were they the result of the selection

process into the IBDP in high school as compared to the open enrollment of the AP courses? Was the dependent variable of achievement on college readiness indicator exam scores the result of the independent variable (participation in an IBMYP middle school)?

Discussion of Results

The major findings of this study revealed a statistically significant difference ($p < .05$) in the mean achievement of the students who attended the IBMYP middle school when compared to those students who did not attend an IBMYP middle school on all college readiness indicator exams at the high school level except the IB Math SL, AP Calculus AB and AP Calculus BC exams. Students who participated in the IBMYP middle school outperformed those students who did not participate in the IBMYP middle school except on the IB Math SL, AP Calculus AB and AP Calculus BC exams.

The performance outcomes of the students who participated in the IBMYP middle school are as follows:

1. A statistically significant difference existed between the IBMYP and non-IBMYP students on the SAT reading exam ($p = .000$). The mean achievement of IBMYP students was higher (634.97) than the mean of their non-IBMYP counterparts (598.31). This finding mirrors studies outlined in the literature review of this study. For example, according to Willcoxon (2005) in a study done in California, students who received the IBMYP curriculum achieved higher on the California Standards test in English/language arts than students in traditional education.
2. A statistically significant difference existed between the IBMYP and non-IBMYP students on the SAT math exam ($p = .000$). The mean achievement of the IBMYP students was higher (653.75) than that of students who did not participate in the

IBMYP in middle school (620.71). This finding is similar to the study done by Wade (2011) that found a higher percentage of MYP students achieved proficient or advanced on standardized assessments than their counterparts in non-MYP schools.

3. A statistically significant difference existed between the IBMYP and non-IBMYP students on the SAT writing exam ($p = .000$). The mean achievement of the IBMYP students was higher (637.97) than their non-IBMYP counterparts (603.74). Similarly, The Australian Council for Educational Research (ACER) found MYP students performed better than their non-MYP peers on the International Student Assessment, which is given to 48,000 students, in math literacy, reading, narrative writing, and expository writing (IBO, 2010).
4. A statistically significant difference existed between the IBMYP and non-IBMYP students on the IB Math HL exam ($p = .000$). The mean achievement of the IBMYP students was higher (4.73) than their non-IBMYP counterparts (4.29). In a similar study, Kiplinger (2005) found MYP students compared with students in similar non-MYP schools showed a slightly greater effect in mathematics than in reading (Kiplinger, 2005).
5. A statistically significant difference existed between the IBMYP and non-IBMYP students on the IB English A1 exam ($p = .005$). The mean achievement of the IBMYP students was higher (4.89) than their non-IBMYP counterparts (4.76). Similarly, The International Baccalaureate Organization found between 2007 and 2010, the pass-rates of ex-MYP students on the Diploma Programme exams were higher than the pass rate total for all candidates (IBO, 2010).

6. A statistically significant difference existed between the IBMYP and non-IBMYP students on the AP English Language exam ($p = .000$). The mean achievement of the IBMYP students was higher (3.62) than their non-IBMYP counterparts (3.21). In a similar study done by Saavedra (2011), IB enrollment increased students' academic achievement on the ACT examination by one half of a standard deviation point.
7. A statistically significant difference existed between the IBMYP and non-IBMYP students on the AP English Literature exam ($p = .000$). The mean achievement of the IBMYP students was higher (3.77) than their non-IBMYP counterparts (3.39). In a similar study done in Virginia in 2006, Jackson found the mean scores of the MYP group were higher than the mean scores of the non-MYP group in all areas of the Virginia State Standards of Learning (SOL) exams (Jackson, 2006).
8. The scores on the IB Math SL exam were approaching significance between the IBMYP and non-IBMYP students ($p = .053$). The mean achievement of the IBMYP students was higher (4.75) than their non-IBMYP counterparts (4.44). Similarly, in a study done by McLendon (2008), mixed results were found when determining significant differences between IBMYP campuses and non-IBMYP campuses. One of the MYP campuses was outperformed by their non-IB counterparts in reading, writing, math, and on all tests.
9. There was no significant difference on the AP Calculus AB scores between IBMYP and non-IBMYP students. The mean achievement of the non-IBMYP students was higher (3.09) than their IBMYP counterparts (2.96). These findings are similar to a study done by Sillisano (2010) that found no significant

differences between IBMYP schools and non-IBMYP schools in math or reading achievement on TAKS tests

10. There was no significant difference on the AP Calculus BC scores between IBMYP and non-IBMYP students. The mean achievement of the non-IBMYP students was higher (4.17) than their IBMYP counterparts (4.05). Similarly, Glaude-Bolte did a study in 2010 examining the effects of enrollment in honors middle school classes and AP social studies and AP science exams and did not find any relationship between the two, indicating middle school honors classes did not provide students with the skills they needed to be successful on AP exams (Glaude-Bolte, 2010).

Implications for School Leaders

In a time when high schools are no longer focusing on simply graduating our students rather on preparing students to be college and career ready, it is increasingly more important for our public schools to challenge our students with rigorous standards and curriculum. Educators, researchers, and school administrators are currently trying to identify the formula for a successful school that meets the needs of all students. Middle school success has proven to be a difficult challenge for many school leaders because the young adolescent years are an especially tumultuous time in the lives of our youth. Thus, middle school reform has been a major topic in education over the last 30 years. Middle school educators and leaders play an instrumental role in shaping the future.

District leaders need to make important decisions about middle schools. Middle schools are caught in the middle of the scope and sequence between elementary schools and high schools. They must meet the needs of students in a way that takes into account

the students' vast range of academic readiness and prepares them for a common goal of achieving success in high school as well as some form of higher education. The information in this study can be utilized to inform practice for educational leaders at the middle school level. A further implication is program choice for school leaders. In an era of school-choice and competition, district leaders and stakeholders should be interested in concepts that keep their programs relevant, individualized, and catered to the needs of students and parents of all types of learners.

School leaders today are tasked with finding an effective way to meet the emotional and academic needs of our students. Middle school leaders need to be prepared to do whatever it takes to lead a successful school and sometimes that involves risk taking and innovative thinking. This study provides data for school and district leaders in regards to program choice. The findings in this study showed IBMYP middle school graduates achieved significantly higher test results when they reached high school on SAT exams, IB exams, and some AP exams. This may be attributed to the characteristics of the IBMYP that are similar to that of Ronald Edmonds' Five Correlates of Effective Schools. He stated successful schools have: (1) "Strong leadership focused on instruction"; (2) "School-wide instructional focus"; (3) "An orderly safe environment"; (4) "Specific student expectations"; and (5) "Student achievement as the basis for program evaluation" (Edmonds, 1983). The IBMYP philosophy, framework, curriculum, standards and practices, and accountability measures align with Edmonds' Five Correlates.

An additional implication for school leaders is meeting the needs of all students. The nature of adolescence contributes to the difficulties of middle school. Teachers and

school leaders must use the affective domain to nurture middle school students' psychological growth as well as their cognitive abilities, since adolescents learn affectively and cognitively, and schools are accountable for academic achievement and emotional well-being. Schools are being held accountable for both the academic achievement of our students and the emotional well-being.

Understanding middle school age students is necessary for successful school leaders in order to meet both students' affective and cognitive needs. Similar to the views of Abraham Maslow, it is generally believed students will achieve better academically if their affective needs are being met. Evidence of Abraham Maslow's humanistic influences is easy to find in current schools. Some examples of these include free and reduced lunch programs, anti-bullying programs, codes of conduct, emergency plans and drills, maintained facilities and regulated building temperatures. One reason IBMYP participants' college readiness indicator exam scores showed significant difference from non-IBMYP participants could be the humanistic and affective aspects built into the IBMYP.

Characteristics of the program, such as the IB Learner Profile which encourages and teaches students to be caring, balanced, risk-takers, inquirers, thinkers, knowledgeable, communicators, principled, open-minded, and reflective, cater to the affective needs of adolescents. In addition, the Areas of Interaction, which encourages students to make real world connections with their learning and the fundamental concepts, holistic education, communication, and inter-cultural awareness, also cater to the affective needs of adolescents. Intercultural awareness is increasingly more relevant with the changing demographics of our schools and our national population. Strong

academic achievement in students can be linked to aspects of the MYP such as in high expectations, meaningful connections in lessons, promoting creativity and self-expression, college and career initiatives, and teaching lifelong learning skills.

The IBMYP framework has many similarities to David Conley's (2007) College Readiness Framework. Conley's framework consists of cognitive strategies, key content knowledge, academic behaviors, and contextual skills and awareness. Conley believes in order for students to achieve in postsecondary institutions, they must possess skills and knowledge from all four of the key areas. The IBMYP framework includes aspects of all four areas. The eight MYP subject areas and the aims and objectives provide students with the cognitive strategies and content knowledge in Conley's framework. The IB learner profile traits emphasize the academic behaviors stressed in Conley's college readiness framework. The MYP areas of interaction and the approaches to learning skills provide students with the contextual skills and awareness in Conley's model. These connections may attribute to the achievement levels of IBMYP participants on high school college readiness indicator exams.

New accountability measures require our school leaders to consider innovative programs in education. The findings of this study indicate components of the IB curriculum lay a foundation for academic success to help students be college ready by the end of high school. Data from this study indicated the implementation of the IBMYP in middle schools improved student achievement in high school. This may be attributed to the rigorous curriculum, assessment strategies, inquiry based learning models, and specialized teacher training. The IBMYP may be offered as a middle school curriculum

model and framework to improve student achievement in high school through a holistic approach to the education of the young adolescent.

Criticisms surrounding the implementation of the IBMYP focus on the cost of the program and on the timeline of implementation. The program is expensive, including pre-authorization fees of at least \$15,000 and then post-authorization fees of nearly \$10,000 a year. Specialized teacher training is a requirement of the program and workshop fees are \$699 per teacher. From the time that a school makes a decision to commit to IB, through the authorization process, then to full implementation of the program can take up to five years. In an era of high stakes testing, school stakeholders must consider the implications of programs that increase student achievement. Higher scores on college readiness indicator exams imply that the advantages afforded by the IBMYP to students are worth the time and expense the program requires.

When speculating as to the reason high school test scores of students who attended the IBMYP middle school were statistically significant, one must consider the IBMYP framework, philosophy, and educational approach. The IB's list of standards and practices as well as the accountability in implementation through the authorization and evaluation visits may contribute to the quality of the educational program. Program structure and pedagogy affect student achievement. Holistic education teaches the whole student, including social, emotional and physical development, with the incorporation of interdisciplinary learning through connections as well as the areas of interaction and real world application of learning. The detailed framework and curriculum of the IBMYP provide students with the cognitive capabilities and academic behaviors necessary for secondary success.

These aspects of the MYP program match the recommendations made in the Carnegie Corporation report *Turning Points: Preparing American Youth for the 21st Century*, which called for eight main principles to guide middle schools. The principles were: (1) “Small learning communities”; (2) “A core of common knowledge”; (3) “Success of all students”; (4) “Teacher and principal responsibility”; (5) “Teacher preparation specific to teaching young adolescents”; (6) “Schools promoting good health”; (7) “Family involvement”; and (8) “School and community partnerships” (Carnegie Council on Adolescent Development, 1989). The MYP addresses the students’ physical, affective, social and intellectual development in addition to the curriculum framework. The implication for school leaders is that a strong school program must include not only meaningful and challenging curriculum, but also be inclusive and holistic like IBMYP.

In addition, the IBMYP includes aspects of what the National Middle School Association reported successful middle schools as having: a relevant and challenging curriculum, use of multiple learning and teaching approaches, implementation of effective assessment programs, and an organizational structure promoting meaningful relationships that foster guidance and support. According to the Partnership for 21st Century Skills, the middle school curriculum should include aspects of collaborative skill building, critical thinking, and teaching work ethic (Glaude-Bolte, 2010). The implications are school leaders must look for curriculum programs that meet the needs of their school community.

Witziers, Bosker, and Kruger (2003) defined seven successful school leadership characteristics as being: (1) defining and communicating mission; (2) supervising and

evaluating curriculum; (3) monitoring student progress; (4) coordinating and managing curriculum; (5) visibility; (6) promoting school improvement and professional development; and (7) achievement orientation. These leadership characteristics are mirrored in the expectations of the IBMYP through their standards and practices. IB schools must have: (1) “an administrative and pedagogical leadership body that demonstrates an understanding of the IB philosophy”; (2) “a governing body informed about the ongoing implementation and development of the program”; (3) “a leadership structure that supports implementation of the program”; and (4) “a head of school/school principal that demonstrates pedagogical leadership aligned with the philosophy of the program” (International Baccalaureate, 2010). Using data to guide decision making and continuous improvement is an essential component in a high-performing school; however, we must be purposeful in the way we disaggregate and use it to make decisions. School and district administrators must not narrow their focus solely to data regarding student achievement during program selection for middle school adolescents.

Implications for Further Research

This study did not consider any qualitative factors such as school climate or culture, school leadership, teacher- student relationships, or years of program implementation. Further studies could be conducted to analyze how those variables affect student achievement after the MYP. More information is needed to conclude whether the IBMYP in middle school helps prepare students to be college and career ready by the end of high school. Further research in this area is needed to specify which aspects of the program supported student achievement and may have attributed to student achievement on college readiness indicator exams. A cost analysis of the sustainability of IBMYP

schools is another area of interest that could be examined for educational decision makers.

In addition, this study did not take into account student demographic data when exploring the effectiveness of the MYP program student populations. Further research could be done by disaggregating data by gender, ethnicity, and socioeconomic status. Another study might be replicated but using a larger sample size from multiple MYP schools.

Research could be conducted using MYP schools that are not also gifted and talented schools to measure consistency of the effectiveness of the program for all students. Further studies could look at student achievement between student groups that participated in only three year MYP programs versus the full five year MYP program. The MYP is a 5 year program for grades 6-10. The middle school in the study offers only the first 3 years of the program. Further research could compare college readiness indicator exam scores of students who completed a 5 year MYP program. Some of the students in the study continued from the three year MYP program to finish the last two years of the MYP program and other students did not.

Long term studies to compare the success of IBMYP students after graduation from high school to see if there is any impact on college or career success would also be appropriate. Studies could compare college readiness indicator exams scores of students who participated in an IBMYP program in middle school and students who took pre-AP courses at the middle school level.

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APPENDIX A

Approval from the University of Houston Human Subject Research Committee

UNIVERSITY of HOUSTON

DIVISION OF RESEARCH

December 21, 2012

Aurora Terry
c/o Dr. Michael Emerson
Curriculum and Instruction

Dear Aurora Terry,

Based upon your request for exempt status, an administrative review of your research proposal entitled "A study of International Baccalaureate Middle Year Programme participant's college readiness exam scores and the implications for school leaders." was conducted on October 3, 2012.

At that time, your request for exemption under Category 4 was approved pending modification of your proposed procedures/documents.

The changes you have made adequately respond to the identified contingencies. As long as you continue using procedures described in this project, you do not have to reapply for review. * Any modification of this approved protocol will require review and further approval. Please contact me to ascertain the appropriate mechanism.

If you have any questions, please contact Alicia Vargas at (713) 743-9215.

Sincerely yours,



Kirstin Rochford, MPH, CIP, CPIA
Director, Research Compliance

*Approvals for exempt protocols will be valid for 5 years beyond the approval date. Approval for this project will expire **October 1, 2017**. If the project is completed prior to this date, a final report should be filed to close the protocol. If the project will continue after this date, you will need to reapply for approval if you wish to avoid an interruption of your data collection.

Protocol Number: 13051-EX