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DISSERTATION

**INTERNATIONAL BACCALAUREATE MIDDLE YEARS PROGRAM:
AN EMPIRICAL STUDY**

Submitted by

Deidre Houston Magee

School of Education

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2005

UMI Number: 3173075

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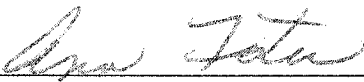
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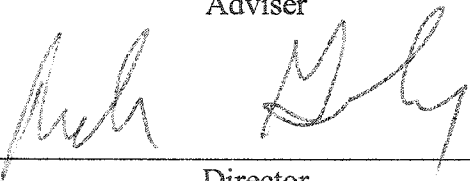




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ABSTRACT OF DISSERTATION
INTERNATIONAL BACCALAUREATE MIDDLE YEARS PROGRAM:
AN EMPIRICAL STUDY

The International Baccalaureate Middle Years Program (IBMYP) provides a rigorous academic course of study for students. The IBMYP concentrates on the interrelatedness of language, math, science, geography, history and the arts. The IBMYP provides students with the prerequisite skills to enter the IB Diploma Program (IBO, 2003).

This study of the International Baccalaureate Middle Years Program (IBMYP) at a high school located in the mountain west region of the United States was a quantitative, quasi-experimental, ex-post facto, posttest only research design. The study explored the relationship between an academic program of study (IBMYP) and student achievement. ACT Reading and Math scores were the dependent variable and the covariate was achievement levels test (ALT) scores. The purpose of this study was to determine if there was a difference in the ACT Math and ACT Reading scores of students who participated in IBMYP and matched peers who studied the traditional curriculum.

The data set was requested and obtained from the school District Office of Student Achievement, Data and Assessment. The ANCOVA results showed that there was statistical significance for the main effect of IB participation and Non-IB participation for ACT Reading and ACT Math scores when controlling for prior achievement. There was no statistical significance in the interactions of IB/Non-IB with

gender and ethnicity. The results of this study revealed patterns of higher ACT Reading and Math scores for IBMYP students when controlling for prior achievement levels.

This study was framed within the context of the goals of schooling in the United States as articulated by the research of John I. Goodlad. The goals of schooling are to provide for the academic, vocational, social/civic and personal development of individual students while developing democratic character in the next generation. The findings of this study show that the components of the IB curriculum are reflective of recommended goals for schooling in the United States.

The statistical data generated in this study will add to the limited information available on the IBMYP and student achievement.

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ACKNOWLEDGMENTS

I would like to thank R. Brian Cobb, Ph. D. who encouraged and provided me with opportunities to pursue educational research. Thank you for your tireless guidance throughout the dissertation process. Thank you to Drs. Donna Cooner, Louann Reid and Ann Foster for their patience in serving on my committee. Special thanks to Drs. Cobb and Foster for providing words of encouragement in times of disappointment.

Thanks to the faculty in the School of Education: Drs. Carole Makela and Jean Lehmann who were consistently supportive; Drs. Rick Ginsberg, David Whaley and Barbara Warner who provided opportunities for me to develop as an instructor at the collegiate level. Thanks to friends and staff at the Research & Development Center; friends and colleagues in CSU Apartment Life, and Elaine Ann from Aggie Village for sharing inspirational readings. Special Thanks to Dr. Nancy Leech for encouragement and statistical guidance.

Thanks to fellow doctorate students Dorothy Garrison Wade and Jean Radin. Special thanks to my dissertation writing teammates Jed Bowman, Malcolm Scott, John and Sandy Tracy. By faith we will each reach our goal.

Acknowledgments are also extended to my spiritual family members at Bethel A.M.E. Church, New Orleans; Abyssinian Christian Church, Ft. Collins and Shorter Community A.M.E. Church, Denver; my friends in New Orleans Public Schools Doris Hicks, Tassin Idewu, Paula Mirabin, Charlene Pleas, Lavonsell Rogers, Ivy Williams and

Linda Young; my friends Cheryl Cammon, Yvonne Lancelin and Miriam Riquelim who accepted phone calls and listened all hours of the night.

Thanks and love to my parents, sisters and brothers and special relatives Gerald, Irma and Dr. Angela Houston. To my big sister and friend Sheryl Houston Louis, thank you for the endless care packages and constant words of encouragement.

Thank you to my best friend Louis E. Livers, Jr. This journey was possible only through God who made us friends for reasons unknown, kept us friends through seasons of sorrow and celebration and has blessed us with a lifetime of peace and joy.

Love to my son Jerry Marcus, his wife Myya and my precious granddaughter, Jaden. Finally, to my daughter D'Andrea you have truly been a blessing! Thank you for relocating, trying new adventures, living on pennies while constantly keeping a smile on your face and a song in your heart.

MEMORIAL DEDICATION

This dissertation is dedicated to the memory of my brother and sister, Cedric and Trudi Houston. You left me far too soon but your memories are forever in my heart.

This dissertation is also dedicated to the memory of Rev. Volover Williams, Pastor of Bethel A.M.E. Church 1984-1990. I thank God for the spiritual guidance and encouragement of Rev. Williams, who appointed me Director of Christian Education, challenged me to become a leader and prophesied that I would earn a doctorate.

CONTENTS

| | |
|--|------|
| ABSTRACT OF DISSERTATION..... | iii |
| ACKNOWLEDGMENTS..... | v |
| MEMORIAL DEDICATION..... | vii |
| CONTENTS..... | viii |
| LIST OF TABLES..... | xi |
| LIST OF FIGURES..... | xii |
| CHAPTER 1: INTRODUCTION..... | 1 |
| Problem Statement..... | 2 |
| Conceptual Framework..... | 3 |
| Purpose..... | 5 |
| Research Questions..... | 6 |
| Abbreviations for Key Terminology..... | 6 |
| Other Abbreviations..... | 7 |
| Definitions of Key Terminology..... | 7 |
| Delimitations of the Study | 9 |
| Methods..... | 9 |
| Organization..... | 9 |
| CHAPTER 2: LITERATURE REVIEW..... | 11 |
| Historical Overview: High Schools in America | 11 |
| Current Issues in American Schools..... | 14 |

| | |
|--|----|
| Standards Based Instruction..... | 14 |
| School Renewal versus School Reform..... | 16 |
| High-Stakes Testing..... | 19 |
| Achievement Test: Gender and Ethnicity..... | 20 |
| Historical Overview: International Baccalaureate Organization..... | 23 |
| IB North America..... | 24 |
| Curriculum Content: International Baccalaureate..... | 26 |
| International Baccalaureate Diploma Program..... | 26 |
| International Baccalaureate Middle Years Program..... | 29 |
| International Baccalaureate Primary Years Program..... | 31 |
| IBDP: Positive Impact on Student Achievement..... | 32 |
| International Baccalaureate: Criticisms..... | 36 |
| Summary..... | 40 |
| CHAPTER 3: METHODS..... | 42 |
| Introduction..... | 42 |
| Research Design and Rationale..... | 43 |
| Variables..... | 45 |
| Theoretical Population..... | 46 |
| Sample..... | 46 |
| Research Questions..... | 47 |
| Data Collection..... | 47 |
| Data Analysis..... | 48 |
| CHAPTER 4: RESULTS..... | 49 |

| | |
|---|----|
| Data Analysis..... | 49 |
| Demographic Data..... | 50 |
| General Assumptions..... | 52 |
| Random Assignment..... | 52 |
| Normality..... | 52 |
| Homogeneity of Variances..... | 54 |
| ANCOVA Assumptions..... | 54 |
| Linearity..... | 54 |
| Covariate Reliability..... | 56 |
| Homogeneity of Regression Slopes..... | 56 |
| Summary of ANCOVA..... | 57 |
| Mean Line Plots..... | 62 |
| CHAPTER 5: DISCUSSION | 67 |
| Conclusions..... | 68 |
| Achievement Test: Gender and Ethnicity..... | 69 |
| Limitations..... | 70 |
| Recommendations..... | 72 |
| Future Research..... | 78 |
| References..... | 80 |
| APPENDIX A..... | 87 |
| School District Consent Form..... | 88 |
| APPENDIX B..... | 89 |
| Human Subjects Research Application..... | 90 |

LIST OF TABLES

| | |
|--|----|
| 1. Eleventh Grade Enrollment by Ethnicity and Gender, 2002-2003..... | 47 |
| 2. Demographic Characteristics of Students..... | 50 |
| 3. Demographic Characteristics of Students – Recoded..... | 51 |
| 4. Descriptive Statistics for Covariate and Dependent Variable..... | 52 |
| 5. Intercorrelations for Covariate and Outcome Variables..... | 56 |
| 6. Raw and Covariate Adjusted ACT Reading Mean Scores..... | 58 |
| 7. Raw and Covariate Adjusted ACT Math Mean Scores..... | 59 |
| 8. ANCOVA of ACT scores Reading as a function of IB/Non-IB | 61 |
| 9. ANCOVA of ACT scores Math as a function of IB/Non-IB | 62 |

LIST OF FIGURES

| | |
|--|----|
| 1. Q-Q Plot for normality of Act Reading Scores..... | 53 |
| 2. Q-Q Plot for normality of Act Math Scores..... | 53 |
| 3. Scatterplot of ALT Math and ACT Math..... | 55 |
| 4. Scatterplot of ALT Reading and ACT Reading..... | 55 |
| 5. Line Plot of ACT Reading Mean Scores and Gender..... | 63 |
| 6. Line Plot of ACT Reading Mean Scores and Ethnicity Revised..... | 63 |
| 7. Line Plot of ACT Math Mean Scores and Gender..... | 64 |
| 8. Line Plot of ACT Math Mean Scores and Ethnicity Revised..... | 64 |

CHAPTER 1

INTRODUCTION

The purpose of schooling in the United States has been debated since colonial times. The discussion of an academic curriculum versus vocational education has lasted into the 21st century. Under current school accountability systems, standards-based instruction and high-stakes testing guide instructional decisions. School districts offer a variety of instructional options. Families and students have the option of selecting academic or vocational tracks in high school. The International Baccalaureate Diploma (IBD) provides an option for college-bound students.

The International Baccalaureate Organization (IBO) was formed in Geneva, Switzerland in 1968 (Peterson, 2003). The International Baccalaureate Diploma Program (IBDP) was developed as a rigorous course of study specifically designed to prepare students moving from one country to another for admissions to universities in a country different from where they had received their high school education. Students in the Diploma Program (DP) culminate their secondary education by completing a series of comprehensive examinations and writing an extended essay. Eventually the IBO extended its academic programs to offer a comprehensive curriculum for kindergarten to

twelfth grade students through the Primary Years, Middle Years and Diploma Programs (International Baccalaureate Organization, 2003).

From its inception, the IBDP was developed to indicate that a student had achieved academic competency through a meticulous program of study. Over 1,079 universities in 109 international locations in North America, Western Europe and in Australia recognize the IBD (IBO, 2003). Nearly four decades after its inception the number of universities that accepts the IBD increases yearly. A 1994 survey by the National Research Council's Committee on Programs for Advanced Study of Math and Science in U.S. high schools revealed that International Baccalaureate and Advanced Placement courses on a student's transcript indicate a willingness to maximize academic opportunities (National Research Council NRC, 2002). In North America the IBD is recognized as evidence of a superior education and a predictor of post-secondary academic success (IBO, 2003).

Problem Statement

The challenging IBDP offers a unique blend of courses and independent study. The academic rigor of the IBDP has been widely researched and accepted as a predictor of academic performance in college (NRC, 2002). The National College Board's Advanced Placement courses are comparable to the IBDP courses in terms of academic rigor. However, the IBDP is not testable by empirical methods because the Theory of Knowledge course and Extended Essay requirement provide a unique addition that is not available in other high school curricula. Therefore, it would be difficult to compare the IBDP as an outcome to other high school courses of study. Similarly, a good research problem should be testable by empirical methods (Gliner & Morgan, 2000). Since

studying the IBDP was not feasible, an investigation of its prerequisite program was plausible.

The IBO adopted the International Baccalaureate Middle Years Program (IBMYP) in 1994 to provide prerequisites for the IBDP. The IBMYP offers a curriculum for students grades six - ten. The IBMYP concentrates on the interrelatedness of language, math, science, geography, history and the arts (IBO, 2003). The IBMYP affords students with the prerequisite skills to enter the IBDP. Scrutinizing student achievement scores of IBMYP participants and non-IBMYP participants provided empirical data about the impact of IBMYP participation on student achievement.

Conceptual Framework

This study was framed within the context of the goals of schooling in the United States as articulated by the research of John I. Goodlad. In *A Place Called School* (Goodlad, 1984), the author presented findings from the research project *A Study of Schooling*. Four broad goals were identified for schools in the United States based upon themes from the data collected. The goals were academic, vocational, social/civic and personal. Each state's Department of Education offered a variety of different academic programs nationally. Goodlad recommended that states implement a balanced curriculum and presented ten goals as a guideline. The first three goals address academics, intelligence and vocational skills. The initial goals were essential for all students to master basic skills, develop intellectually and make career decisions. The other goals address socialization, citizenship, enculturation, morality, personal development, creativity and self-actualization. Goodlad (1994) further asserted that the school system in the United States is inherently flawed because of historical inequities for

African Americans and students from lower socio-economic families. Recently in *Letters to the Next President*, Goodlad (2004) challenged the future leader to restore the core aim of schooling in the United States, namely the development of democratic character in the next generation. In addressing this aim schools would have to engage in community dialogue about how best to provide educational systems that nurture and develop the social, personal, vocational and academic needs of all students.

Under the current system of accountability the goals for providing schooling in the United States seem unclear. School districts are confounded by the ideals of the academic, vocational and personal development of all students in light of mandates to adhere to standards-based instruction and demonstrate academic proficiency as measured by high-stakes tests. An added responsibility under the No Child Left Behind Act (2001) allows parents to transfer their students from schools that do not show academic progress. The school district studied offered an assortment of curriculum models as options for parents.

The school district in this study officially applied to the IBO for authorization of the IBDP on June 1, 1994. The timing of the application coincided with Colorado legislative actions of creating a school accountability system. House Bill #93-1313 required school districts to redesign curriculum, instruction, assessment and professional development around academic standards. The legislative action resulted in the restructuring of Colorado's Kindergarten - 12th grade education system. The goal was to establish quality content standards for all students and a public education system that promotes high academic achievement (Colorado Department of Education, 2003).

The school district later earned authorization for the IBMYP and the International

Baccalaureate Primary Years Program (IBPYP). The IBMYP was originally offered as an honors track within two junior high schools. The IBMYP has been expanded to a school wide program in one junior high and continues as an honors track in two other schools. Students in the IBMYP complete the program at one of the high schools at the end of 10th grade. This study will analyze the content of the IBMYP in light of the goals of schooling in the United States as expressed by Goodlad's research on school renewal.

Purpose

A variety of curricula have been implemented to achieve the goals for providing for the academic, vocational and personal development of all students. Internationally the IBO is recognized for its broad-based academic programs. The school district in this study offers the IBPYP, IBMYP and the IBDP. A decade after its first IBO-authorized program began, the school district now offers parents and students a variety of academic choices through a standards-based curriculum. Instructional programs offered are Core Knowledge, Bilingual Immersion, Spanish Literacy, Math and Science Content, Creative Learning, Advanced Placement, International Baccalaureate, Post-Secondary College Credit, Career and Technology Education, and Alternative Secondary Programs (School District, 2004).

The purpose of this study is to provide empirical data on the impact of the IBMYP on academic achievement as measured by ACT scores. The present study adds to the research on the academic rigor of the programs offered by the IBO and to the discussion on whether optional programs meet the expectations of parents and students.

Research Questions

The research questions in this study are complex difference questions. The questions are (a) Is there a difference between IBMYP students and non-IBMYP students in regard to ACT scores in Reading and Math when controlling for achievement on 8th grades Achievement Levels Test (ALT)? (b) Is there an interaction between participation in IBMYP and non-IBMYP participation and gender in regard to ACT scores in Reading and Math when controlling for achievement on 8th grade ALT? (c) Is there an interaction between participation in IBMYP and non-IBMYP participation and ethnicity in regard to ACT scores in Reading and Math when controlling for achievement on 8th grade ALT?

The IBMYP provides students with prerequisite skills to enter the IBDP and subsequent schooling beyond the secondary level. The ex post facto, posttest-only research design was used to analyze the difference and interaction research questions raised in this study.

Abbreviations for Key Terminology

The International Baccalaureate Organization (IBO) has a distinct vocabulary associated with its programs. Many of the terms begin with International Baccalaureate. Because of the length of the phrases that describe the program components, abbreviations are used extensively in International Baccalaureate literature. A list of common abbreviations used in this paper follows.

| | |
|-----|--------------------------------|
| CAS | Creativity, Action and Service |
| DP | Diploma Program |
| EE | Extended Essay |
| HL | Higher Level |

| | |
|--------|---|
| SL | Subsidiary Level |
| TOK | Theory of Knowledge |
| IB | International Baccalaureate |
| IBD | International Baccalaureate Diploma |
| IBDP | International Baccalaureate Diploma Program |
| IBMYP | International Baccalaureate Middle Years Program |
| IBNA | International Baccalaureate North America |
| IBPYP | International Baccalaureate Primary Years Program |
| IBO | International Baccalaureate Organization |
| Pre IB | Preliminary International Baccalaureate |

Other Abbreviations

| | |
|------|-------------------------------------|
| ALT | Achievement Levels Test |
| ACT | American Collegiate Test |
| CSAP | Colorado Student Assessment Program |

Definitions of Key Terminology

Achievement Levels Test - The School District administers reading, writing, and mathematics tests at various times throughout the students' academic program to measure student progress toward standards.

American Collegiate Test - A battery of standardized achievement tests used to predict academic success in college.

Creativity, Action and Service - The Creativity, Action and Service (CAS) course is required for completion of the IB Diploma. The purpose of the course is to help students develop holistically. The Creativity section involves creativity in a variety of arts

activities and in the selection of a service project. Action refers to the students' active involvement in school and community programs (sports, athletics) and local, regional and international expeditions. Service includes school and community service projects.

CSAP Scores – The Colorado Student Assessment Program includes annual statewide examinations in reading, writing and mathematics. The tenth grade reading and mathematics CSAP scores of participants are analyzed in this study.

Diploma Program – The Diploma Program refers to the course of study offered in the final two years of high school. The curriculum of the DP consists of six content areas: Language A1, Second Language, Individuals and Societies, Experimental Sciences, Mathematics and Computer Sciences and the Arts. The Extended Essay, the CAS course and the Theory of Knowledge course are also requirements of the DP.

Extended Essay - Students are required to write an essay on a topic of their choice with a maximum of 4,000 words. The content of the EE can relate directly to a course from the six content areas or a special interest of the student. The EE is not a creative writing exercise and must follow the criteria established by the IBO.

Gifted and Talented - The Colorado Department of Education defines a gifted and talented student as a person between the ages of five and twenty-one whose academic abilities, talents and potential are advanced and require special provisions to meet their academic needs.

Theory of Knowledge - TOK is an interdisciplinary reflective course that focuses on critical thinking and various ways of knowing. Students in the TOK course are encouraged to develop the ability to think philosophically.

Delimitations of the Study

There are eleven schools in the state of Colorado authorized to offer the IBMYP. This study is limited to the IBMYP participants at one high school located in Colorado.

Methods

This quantitative study consisted of an ex post facto, posttest-only research design with a covariate. Attribute independent variables of gender and ethnicity were compared on the dependent variable, ACT Reading and Math scores. The outcomes were measured using 11th grade ACT scores of students who had completed the IBMYP. Achievement Levels Test results (ALT) were used as a covariate to control for prior achievement in Reading and Math.

The IB Diploma is accepted by universities in North America as a predictor of post-secondary scholastic abilities. The IBMYP provide students with prerequisite skills to enter the IBDP. Scrutinizing the student achievement scores provided much needed empirical data about the impact of the IBMYP curriculum on student achievement. The purpose of this study was to provide empirical data to inform the academic community of the impact of the IBMYP on student achievement.

Organization

This dissertation is presented in five chapters. Chapter 1 defines the research problem; describes the conceptual framework; lists abbreviations, definitions and delimitations; and identifies the research questions. Chapter 2 provides an overview of the history and purpose of schooling in the United States standards-based instruction, high-stakes testing and the impact of gender and ethnicity on achievement tests. The chapter also gives a historical overview of the programs offered by the IBO with positive

impacts and criticisms. Chapter 3 describes the research design, sampling frame, data collection, variable selection, methods and data analysis. Chapter 4 reveals the research findings with descriptive data and discussion of the analysis of covariance. The dissertation finishes with Chapter 5, which presents conclusions and discussion of limitations and recommendations for further study.

CHAPTER 2

LITERATURE REVIEW

This study explored the International Baccalaureate Middle Years Program as a curriculum option. The literature review consisted of a historical overview of high schools in America, current issues in schools, historical overview of the IBO and components of the IB programs. The chapter closes with a discussion of positive impacts and criticisms of IB programs.

Historical Overview: High Schools in America

High schools in America were developed as a matter of local choice. The Vermont Constitution established English secondary “Grammar Schools” in each county in 1777 (Reese, 1995). These advanced centers of learning were eventually referred to as academies. The academies focused on the classics and were established nationally but excluded children from families that were poor. Although most academies were coeducational, males and females were taught separate subjects in separate departments (Reese, 1995).

In the South, wealthy landowners were scorned for providing education for their children but not providing general public education. Nationally schools excluded slaves

because it was illegal to educate slaves. The Massachusetts Education Act of 1790 mandated a six-month elementary school and a grammar school in any community of 200 families (Spring, 1994). In the 1800s the Boston Committee provided public education for free African Americans. But discrimination in the predominately white schools forced the African American community to acquiesce to segregated schools (Spring, 2001).

In *Democracy's High School* (Wraga, 1994), key events in the foundation of the comprehensive school were chronicled. The idea of providing education for the general public led educational reformers through the Bureau of Education to publish what has been referred to as the Committee of Ten Report released in 1893. Later, 1918, the Cardinal Principles of Secondary Education established two main purposes of the comprehensive high school. The aims were to meet the needs of all youth and to unify students of all backgrounds, abilities and aspirations. The reform movement continued on a path toward establishing high schools to meet society's needs for trained employees. The Smith Hughes Act of 1917 expanded the focus of high schools with vocational education training. The Act allocated federal funds in proportion to state populations. Each state was required to establish a State Board of Vocational Education that developed a plan for Vocational Education. Parts of the funds were earmarked for workers over fourteen to prepare them for agricultural or vocational work (Wraga, 1994).

However, the proponents of comprehensive high schools opposed the Smith-Hughes Act (Krug, 1972). The comprehensive high school incorporated all curricula in one pedagogical model. This period was also impacted by the lack of compulsory schooling laws. Prior to 1920 most states mandated attendance in school through the

eighth grade or age fourteen. Work permits were issued to children as young as fourteen years of age in a few states. The National Education Association (NEA) passed a resolution in 1919 requiring compulsory education for youth fourteen years of age. Utah was the first state to pass a law mandating part-time compulsory education until the age of eighteen.

As educators shifted the focus from academics to vocational education, American high schools faced the issue of increased enrollments. The influx of immigrants created other challenges for public schools. James Bryant Conant, a proponent of the comprehensive high school, advocated ability groups as a means to address the needs of all students (Wraga, 1994). In accordance with The Cardinal Principles of Secondary Education, Conant believed that the comprehensive school of the early 19th century would unify students from all ethnic, cultural and economical backgrounds. Students from rural communities, immigrants, and “Colored” students in urban slums as well as suburban students would all have the opportunity to study a basic or core curriculum. The battle over a core academic only curriculum versus vocational and technical special courses continued for decades.

During that time John Dewey also joined the discussion about the comprehensive high school curriculum. He advocated the education of all youth, college bound or trained with vocational skills. Under Dewey’s system society would be enhanced through the social mingling of all youth. Ultimately society would improve as students would find commonalities and understand their cultural differences through schooling (Wraga, 1994). However, throughout the 19th century, schools in the South remained segregated with African Americans attending inferior facilities with inadequate funding (Spring,

1994).

After the economic depression of the 1930s, the vision for high school shifted to a more general education. The vocational and technical courses were financially unfeasible as a result of the national job shortage. The college preparatory track became nearly obsolete since most students could not afford to go to college.

Thus, a general program of academic instruction evolved (Marsh & Coddling, 1999). The downside to general education was a lack of clear outcomes for students. American high schools currently function with an assortment of general education, vocational/technical and college preparatory programs. The school reform movement of the 1980s and 1990s focused American education on standards-based instruction and assessment-based school accountability.

Current Issues in American Schools

The current issues in American schools center on student achievement. Student achievement is the focal point for measuring individual student progress, teacher competence, curriculum effectiveness and overall school performance levels. This study discusses standards-based instruction and high stakes-testing, and compares school reform to school renewal to frame the discussion on the IBMYP as a curriculum option.

Standards-Based Instruction

Historically, political issues have influenced the instructional focus in American schools. In response to Russia's launch of Sputnik and the Cold War in the 1950s academics focused on science, math and technology (Tyack & Cuban, 1995). Then in 1983 the National Commission on Excellence in Education issued the infamous report titled *A Nation at Risk*. The report identified excellence in education with the

establishment of high expectations and goals for every learner. This reputed crisis in America's schools resulted in a wave of school reform initiatives that identified competencies based on test results (Berliner and Biddle, 2001). Thus instruction became standards based.

The standards-based content instructional movement emerged as a result of the National Council of Teachers of Mathematics' (NCTM) efforts to reform teaching and learning in mathematics. The NCTM Board of Directors appointed a Commission to develop standards for mathematics. The purpose of the standards was to establish a broad framework of curriculum and evaluation standards to improve teaching and learning of mathematics (NCTM, 1989). Gratz (2000) stated that standards were used for economic competition and to improve education for poor and minority students.

The American Association for the Advancement of Science (AAAS) also published *Project 2061: Science for All Americans* in 1989 (Solomon, 2003). The project was updated with *Benchmarks for Science Literacy* in 1994. The National Research Council (NRC) published the *National Science Standards* in 1996 (NRC, 2002). The science standards were not as widely accepted as the math standards. Educators representing kindergarten through 12th grade were not included in the development of these standards (Solomon, 2003). The expectation was that standards-based instruction would lead to more consistency in instructional content. Most states include an instructional standard that would develop a more democratic citizenry (Tolo, 1999). Like the general education, standards-based instruction lacked clear outcomes for students.

School Renewal versus School Reform

Since colonial times, the call to reform schools in the United States resurfaced each decade. The current system of accountability with standards-based instruction and high-stakes testing is yet another attempt to reform public education. The reason for school reform varied from economics to politics. Inevitably most societal problems resurface as issues to be addressed through school reform (Tyack & Cuban, 1995). Ultimately the intent of school reform was to preserve the common good (Fowler, 2004).

However, the idea that public schools provide for the good of all was challenged by Goodlad (1994) in *Common Schools for the Common Weal: Reconciling Self-Interest with the Common Good*. The author asserted that historically the common school was instituted to serve the common good of society but self-interest provided the primary motivation. Some reform efforts addressed the curriculum debate of academic versus vocational education, instructional content, finance, length of school year, testing and content standards (Fowler, 2004). Goodlad (1984) asserts that school and societal issues should be simultaneously addressed. Similarly, societal and school failures should be simultaneously addressed. Fundamental inequities led to continued rates of high school drop-outs, unequal educational opportunities for minority and poor students, and inadequate preparation of teachers (Goodlad, 1994). The fundamental inequities refer to the experiences of African Americans and students from low socio-economic families in public education. The history of slavery that legally prohibited education, separate but equal schools, integration and the current blight of urban communities and schools negatively impacted the education of African Americans. Students from families with low incomes faced inadequate buildings, text and teachers in public schools.

Goodlad's research led to the development of the Center for Educational Renewal (CER) in 1985. The CER focused on the simultaneous renewal of P-12 schools and teacher education programs (CER, 2004). The work of the center fits within the broader scope of schooling in a democratic society. Fundamentally, reform and renewal differ because the process of renewal is continuous. Reform efforts continue to swing with the pendulum of public opinion. Currently, public interest is focused on school accountability as measured by high-stakes test that burden students with retention.

School reform programs offer standards-based instruction and optional choice academic programs. Standards-based accountability systems focused on what content students should know and the level of academic proficiency. Schools follow state content standards to develop instruction. In standards-based accountability systems benchmarks are used to monitor levels of student progress. Academic proficiency is measured through the administration of annual tests. Some tests have high stakes attached; students are not allowed to pass to the next grade or graduate from high school if they do not demonstrate proficiency at state-mandated achievement levels (Heubert & Hauser, 1999).

School choice options allow parents to move students from schools that were not attaining satisfactory levels of achievement. Transferring students from one school to another placed the responsibilities of gaining entrance on students and providing transportation on parents (Tyack & Cuban, 1995). Most school districts have limited space for optional programs and use entrance criteria to limit enrollment for programs. When students applied for optional programs in the school district in this study, they were ranked by academic ability and then offered admission on first-come, first-served basis. The admission policies for optional programs highlight how inequities in public

schools still exist. African Americans and students from families with fewer financial resources often are unable to access the admission process. Even if the process is navigated and the student is admitted to a program outside of the neighborhood school, parents must provide transportation. This process often results in students and families with the greatest need choosing not to participate in optional academic programs (Berliner & Biddle, 2001).

Choice programs provide unique learning opportunities but the satisfaction level is contingent on teacher quality. NCLB (2000) mandated a highly qualified teacher in each class. Researchers state that teacher quality is the most important factor in student achievement (Darling-Hammond, 2000; Darling-Hammond & Young, 2002; Perry, Steele & Hillard, 2003).

The CER concentrates on teacher education programs and building relationships between school districts and teacher programs (CER, 2004). Teachers trained in professional development schools gain the theoretical knowledge and practical experiences required to provide quality instruction. Goodlad (1994) described the foundational beliefs of a center of pedagogy. Essential elements include an ongoing discussion about the aims of education thematically threaded through a specified curriculum. The recommended undergraduate curriculum included six knowledge domains. The major concepts in the domains included the nature of the human species; social, political and economic systems or the global village; the world as a physical system; the world as a biological system; evaluative and belief systems; and communicative and expressive systems. In *School Renewal* (Goodlad, 1994) nineteen postulates were identified to facilitate the review of the renewal process. Postulate 13

emphasized the moral obligation of teachers to ensure equitable access to the best possible education for all students.

School renewal focuses on what is best for all students. Past inequities for African Americans and students from low socioeconomic families are addressed through partnerships with school districts in urban communities. Continuous renewal provides opportunities for qualified teachers to provide quality instruction in schools with the greatest needs. The basic goals for schooling are to provide for the academic, vocational, social/civic and personal development of students. School renewal seeks to achieve these goals through the realization that issues must be simultaneously addressed in schools and communities.

High-Stakes Testing

The Elementary and Secondary Education Act (ESEA) authorized in 1965, required statewide assessments of students to measure their academic growth. As a major part of the War on Poverty the original ESEA focused on educational equity for children of low-income families (Puma & Drury, 2000). In 1994, the Act was amended as IASA, Improving America's Schools Act (Tindal & Haladyna, 2002). Further legislation in 1994 included President Clinton's Goals 2000: Educate America Act. Goals 2000 was a grant program that offered eight objectives for the improvement of public schools but it impacted only states that applied for funds under its guidelines. Goal three of the Educate America Act asserted that every student in fourth, eighth and twelfth grades would demonstrate minimum competency over challenging subject matter. Assessing minimum competency would require nationally administered, standardized tests. However, mandatory national test were not included in Goals 2000 because of political opposition

(Fowler, 2004). Campbell (2003) asserted that standards and evaluation were the major issue that emerged from the Goals 2000: Educate America Act.

The 2001 No Child Left Behind (NCLB) Act reauthorized ESEA and solidified the federal government's commitment to standards-based instruction and evaluation (Tucker & Coddling, 2002). The NCLB Act required states to develop and administer annual proficiency test in reading and math for all students in grades three – eight. States were also required to develop proficiency labels to rank schools, provide annual report cards to describe the schools' progress and define adequate yearly progress goals. Each state must define "adequate yearly progress" goals for school districts ranked as needing to improve (US Department of Education, 2004). Under provisions of NCLB parents were allowed to transfer their students from schools rated unsatisfactory.

Achievement Test: Gender and Ethnicity

Although the NCLB Act mandated annual examinations, testing has always been an issue in public education in America. Every era of school reform included assessment of students for various purposes. Linn (2000) identified the purposes for testing students over the last five decades as tracking in the 1950s, program accountability in the 1960s, minimum competency in the 1970s, school and district accountability in the 1980s and standards-based accountability in the 1990s. Testing in the 21st century became high-stakes as students were penalized for inadequate progress. Students were not promoted and in some cases not able to graduate until testing requirements were met (Tindal & Haladyna, 2002).

The state of Colorado includes the ACT in its state assessment program for high school students. The ACT has been used as a predictor of academic success in college for

decades. It has been psychometrically reviewed for reliability and validity. In the past decade a noticeable gap in standardized test scores (including ACT) between genders and ethnic groups has been documented and researched (Good, Aronson & Inzlicht, 2003; Jencks & Phillips, 1998; Steele & Aronson, 1995). The research showed that males score higher than females in math and science. Whites score higher than minorities, especially African Americans in all content areas. In one study (Mau & Lynn, 2001) the ACT and SAT scores for males and females were compared. Males scored significantly higher than females but the females earned higher grade point averages in college.

In challenging the pattern of females scoring lower than males in math and science Murphy (1994) suggested scrutinizing the test-taking population. The author asserted that 52 percent of SAT takers were females from African American, Native American or Latina backgrounds, and college applicants with lower income backgrounds. On the other hand when test scores from normed populations were analyzed the gender differences were not as pronounced.

Similarly the pattern of African Americans who scored lower than white students was challenged on the fundamental level of the definition and measurement of intelligence (Hillard, 1994). The author questioned the historical and political implications of measuring intelligence. The process used for measuring intelligence included biases against students from racial, ethnic and lower economic groups. These inherent flaws perpetuated a systemic sorting of students and resulted in the over-representation of African Americans and students from low-income families in Special Education and under representation of the same groups in gifted and talented programs.

Another theory on the differences in test scores of African Americans and white

students is stereotype threat. The idea of stereotype threat emerged after a research study of graduate-level students resulted in white students scoring significantly higher than African American classmates of equal academic levels (Steele & Aronson, 1995). In the study the students were cautioned on the importance of the test results prior to the exam. The researchers gave the same students another test without mentioning the importance of the test results and the student scores were fairly equal. Therefore, the researchers surmised that the importance of the test results caused increased anxiety for African American students that resulted in lower test scores. When tests were taken without the results having high-stakes, African American students scored equally with peers of the same aptitude level.

In some school districts admission into the IBDP requires prerequisite courses. In addition to achievement tests, placement tests are points of contention for African American students. Equal access to the IB programs and the use of achievement test scores as admission requirements led to legal action in Florida. The Pre-IB program has been used in one school district to facilitate the integration of African American students into Suncoast Community High School as a result of issues over the placement test (Ferrara, 1996). The Pre-IB program consisted of foundational courses that schools with the IBDP deemed necessary prerequisites. The Palm Beach County School District was mandated by the Office of Civil Rights to maintain an African American student population of not less than 6% or more than 40% in any school. The Pre-IB program was used to prepare African American students with the prerequisite skills for admittance to the IBDP.

The IBO has authorized schools internationally with students from many cultures

and socio-economic levels (IBO, 2003). So how did such a culturally diverse program end up in the American school system?

Historical Overview: International Baccalaureate Organization

The mission of the IBO is “to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect” (IBO, 2003).

Acting in the interest of inquiring minds a group of educators sought to develop a school-leaving examination to provide evidence that the children of international diplomats were qualified to gain entrance to universities internationally. It was common practice for children of diplomats to attend school in another country as their parents completed their duties. Before World War II college attendance depended upon the individual family’s ability to pay tuition. After the Second World War, entrance to universities became more competitive because of the availability of financial assistance from governments. Both a school-leaving examination and an entrance examination were now required for admittance to college. Subsequently, there was a need to provide a common core of courses that would be internationally accepted. This led to the creation of an international baccalaureate curriculum (Peterson, 2003).

While universities have embraced students who earn IB Diplomas, there is a lack of statistical data that compares the academic achievement of IB students to non-IB students. The level of academic competency by IBD students is determined by the completion of a series of comprehensive examinations and the writing of an extensive essay.

The rigor of the IBDP is undergirded by a curriculum inclusive of five areas of

interaction. The five areas of interaction are Approaches to Learning, Community Service, Homo faber, Environment and Health, and Social Education. Philosophically the IB Diploma Program asserted that these areas of interaction when interwoven with academic subjects of reading, writing, mathematics, science and history provide a comprehensive course of study. The students and teachers develop essential questions in each content area for each concept studied.

Consequently, the historical foundation of the IB Diploma Program was based on the understanding that entrance to and success at the post-secondary level required challenging academic studies in high school. The comprehensive program was essential for students to compete for entrance to universities. On the other hand, the historical foundation for the comprehensive high school in America focused on the need to maintain an effective democratic citizenry (Wraga, 1994).

International Baccalaureate North America

Finding the right fit for the IBDP was crucial for the IBO to implement its programs in North America. The IBO originally targeted private schools like Andover and Exeter for expansion into North America but neither school applied for IB authorization. Officials at Andover investigated the IBDP but opted to continue its curriculum and also offered the College Board Advanced Placement credits to assist students with university admission (Peterson, 2003). As a result of public interest in community colleges during the 1970s, the IBO administrators pursued IBDP accreditation at that level. The intent was that students were to begin the IBDP at a local high school and complete the program at the community college level. Although four community colleges were authorized for the IBDP in 1977 their existence was brief.

Failure to secure articulation agreements between colleges and school districts created problems for the prospect of the high school/community college IBDP (Peterson, 2003).

Francis Lewis High School in Queens, NY became the first high school in the United States to introduce the IBDP. The principal was interested in offering a program for the most advanced students seeking entrance to the best colleges (Peterson, 2003). The IBO does not consider the IBDP as a gifted program. However, schools that implemented the IBDP created an environment that was supportive of the academic and intellectual development of students identified as gifted (Tookey, 1999). From its introduction to schools in the United States, the IBDP became linked with gifted and talented programs. The schools authorized to offer the IBDP use a variety of admissions criteria. Some schools use the IBDP as a means of supporting students identified as gifted and talented. Other schools accept any student willing to meet the rigorous academic program requirements (FAQ, 2003).

A major misconception in North America is that the IBDP is an elitist program meeting the needs of privileged students. This may be the result of early attempts to interest private schools like Andover and Exeter in the IBDP and its original introduction into suburban magnet school programs. In his dissertation, Wagner (1978) provided a detailed report of the history and origins of the IBO. His study included minutes from the Third Plenary Session at the Second IB Evaluation Conference in April, 1974. One committee's discussion focused on elitism in the IBO. The commission sought to reduce socio-economic elitism but maintain intellectual elitism. Currently schools offering the IBDP include students from all ranges of the socio-economic spectrum (FAQ, 2003). The IBO has intentionally sought inclusion of students from all socio-economic levels in its

programs worldwide (Kroll, 1984).

While the IBO continued to diversify participants in the IBDP the elitist perception persists. In one study (Parker, 1996) IBDP students stated that non-IB peers viewed them as elitist. Their study habits, concern about grades and interest in college made them different but not elitist. In a more recent study (Parker, 2000), high school students in South Carolina responded to perceptual surveys about participation in the IBDP. The results showed that students believed that the IBDP was elitist and caused separations between DP participants and non-participants.

Another misconception in North America is that the IBDP is a gifted and talented program. The rigorous academic standards set forth by the IBO are indicative of a superior scholastic program. Tookey (1999) stated that the IBDP provided a climate that encouraged advanced cognitive growth. There were no statistical studies found in a search of publications that compare the achievement of IBDP students identified as gifted and talented to other students in the IBDP. However, in one perceptual study (Parker, 2000) revealed that the students believed participation in the IBDP did not require gifted and talented abilities. The students believed that any student who is motivated and willing to work hard could earn an IBD. This was also the position taken by the IBO (FAQ, 2003).

Curriculum Content: International Baccalaureate

International Baccalaureate Diploma Program

Since 1968 the number of schools authorized to offer the IBDP has grown immensely. There were 1,365 schools authorized for the IB programs in 112 countries internationally. In North America the IBDP was offered in over 406 schools in the United

States, more than 89 schools in Canada and five schools in the Caribbean (FAQ, 2003).

The curriculum of the IBDP consists of six content areas: Language A1, Second Language, Individuals and Societies, Experimental Sciences, Mathematics and Computer Sciences and the Arts. In Language A1 the student must master oral and written language skills in their primary language in addition to an appreciation of literature and the international perspective of that language. In the IB North American schools English and World Literature are the courses used in the Language A1 content area. The Second Language requires that students are assessed in another language. The goal is for students to communicate in oral and written forms at a level of fluency comparable to their linguistic skills in the secondary language. A broad range of content falls under the category of Individuals and Societies. Economics, geography, history, Islamic history, information technology in a global society (at Subsidiary Level only), philosophy, psychology, and social and cultural anthropology are included in the category. The experimental sciences include biology, chemistry and physics offered at the Subsidiary Level (SL) and Higher Level (HL). Environmental systems design technology is offered at the Subsidiary Level (SL). Mathematics courses at the Subsidiary Level (SL) and Higher Level (HL). SL mathematics is designed for students to meet the basic requirements in mathematics but who will not require advanced mathematics at the college level. HL mathematics courses are designed for students who have advanced competency in math and plan to pursue college programs focused on math and science (Schools Guide to the IBDP, 2003).

The IBDP also includes several unique curriculum features. The Theory of Knowledge (TOK), and Creativity, Action and Service (CAS) courses and the Extended

Essay (EE) are only attainable through the IBDP. Instructors in the IBDP are required to participate in IBO specialized training before they can teach in these areas. TOK is an interdisciplinary reflective course that focuses on critical thinking and various ways of knowing. Students in the TOK course are encouraged to develop the ability to think philosophically. The CAS (Creativity, Action and Service) course is required to help students to develop holistically. The Creativity section involves creativity in a variety of arts activities and in the selection of a service project. Action refers to active involvement in school and community programs (sports, athletics) and local, regional and international expeditions. Service includes school and community service projects. The CAS course involves self-evaluation through reflective projects. Students seeking an IBD are required to conduct original research and write an essay on a topic of the student's choice with the EE. The essay has a maximum of 4,000 words and must provide the an opportunity to gain experience researching and developing a topic at an advanced level. The content of the EE can relate directly to a course from the six content areas or a special interest of the student. The EE is not a creative writing exercise and must follow the criteria established by the IBO. Each student is assigned a faculty member to supervise the project and authenticate its originality during the writing of the essay (School's Guide to IBDP, 2003).

Internal and external assessments are administered according to international standards established by the IBO and add to the uniqueness of the program. Internal assessments are given by the classroom teacher and monitored by external examiners. Internal assessments constitute 20% of the final grade in the subject. All instructors must follow the uniform grading system. The external assessments include course

assignments, papers and final examinations. Assessments are criteria based formatted as written or oral short responses, essays, multiple choice and data base questions. There are specific performance assessment requirements for students in visual arts and music. The final examinations for IBD candidates are given in November for schools in the Southern Hemisphere and in May for schools in the Northern Hemisphere.

The IBO has four regional offices to serve its authorized schools worldwide: IB North America located in New York, NY; IB Latin America located in Buenos Aires, Argentina; IB Africa, Europe and Middle East located in Geneva, Switzerland; and IB Asia-Pacific located in Singapore (IBO, 2003). There are over 1,365 schools authorized by the IBO (Peterson, 2003).

International Baccalaureate Middle Years Program

The IBO adopted the *International Baccalaureate Middle Years Program* (IBMYP) in 1994. The IBMYP is offered internationally in over 222 authorized schools (Peterson, 2003). North America has over 75 schools in Canada, more than 44 schools in the United States and one in the Caribbean (FAQ, 2003). The local school district has three elementary and two junior high schools authorized to offer the IBMYP. Students from these schools have the option of applying to complete the IBPYM at a local high school (SD, 2004). The IBMYP serves as the Pre-IB Diploma Program at the local high school.

The writing and critical thinking skills acquired in the IBMYP are accepted as prerequisites for the IB Diploma Program in some school districts. However, in other school districts students who have not earned the IBMYP Certificate are allowed to apply to the IBDP.

The IBMYP offers a curriculum for students in grades six - ten. The IBMYP concentrates on the interrelatedness of language, math, science, geography, history and the arts (IBO, 2003). All students are encouraged in the five areas of interaction that are integrated within all content subject matter. The areas of interaction are approaches to learning, community and service, homo faber, environment, and health and social education. The areas of interactions are not subjects but themes interwoven throughout the instructional content. The approaches to learning focus on how students use critical thinking to facilitate independent learning. The primary focus is learning how to learn. Community and service directs students to answer, how can I make a difference? through required service dedicated to helping others in the school and community. Students focus on human nature and the creativity of humans in the area of homo faber. Environment seeks to inform students of the interdependent relationship between humans and the physical environment. Health and social education promotes a physically and mentally healthy lifestyle for all through the understanding of self-responsibility in the development of positive habits and choices. All instruction is guided by teachers asking students to respond to the Essential Question from the prompt: What will I learn from this? (IBO, 2003).

The IBMYP culminates with the student conducting a Personal Project. The Personal Project is a comprehensive, independent project developed on an issue of personal interest. The main criteria are that the Personal Project must include at least two of the five areas of interaction. In addition to the Personal Project, students are required to work toward attaining fluency in a second language by enrolling in foreign language courses throughout the program. Teachers assess students in the IBMYP using the

criteria set forth by the IBO. Formative assessment includes periodic evaluation to influence instructional goals (IBO, 2003).

Self-reflection is required for students to consider their academic progress in the areas of interaction. Finally, a portfolio including evidence of academic accomplishment is developed by each student in the IBMYP. Course assignments chronicling the experiences of the student are compiled to provide samples of learning experiences. IBMYP school officials, IBO representatives and students can select documents for inclusion in the portfolio. Students completing the IBMYP receive a certificate and are eligible to continue in the IBDP.

The IBMYP has been associated with the sustainability of the IBDP (Berkey, 1994; Tsukuda, 1998). One researcher conducted a comparative study on the achievement scores of sixth-grade IBMYP students (Remington, 2000) who were compared to matched peers in an exemplary middle school program. Fourth-grade Cognitive Skills Index (CSI) scores were used to match the students. The participants attended the same school and had the California Achievement Test, 5th Edition (CAT5) administered to them after seven months in sixth grade. The CAT5 results showed that students participating in the IBMYP had statistically significantly higher math scores than their peers in the other program. The mean scores of IBMYP students were higher than their peers in language, social studies and study skills but not statistically different. The admittance criteria for the IBDB vary across North American schools (FAQ, 2003).

International Baccalaureate Primary Years Program

The IBO adopted the International Baccalaureate Primary Years Program (IBPYP) in 1997. There are over 93 schools authorized to offer the IBPYP

internationally. North America has seven schools in Canada, twenty-three schools in the United States and two schools in the Caribbean (FAQ, 2003). The school district in this study has authorized schools (SD, 2004).

The IBPYP concentrates on the importance of the development of the whole primary student, in the classroom and in the world outside, through other environments where children learn. The International Baccalaureate Primary Years Program curriculum centers around six subject areas that are supported by six instructional themes. The subjects are language, math, science and technology, social studies, arts, and personal, social and physical education. The themes involve six questions that ask: Who are we? Where are we in place and time? How do we express ourselves? How does the world work? How do we organize ourselves? How do we share the planet? (IBO, 2003). To gain IBPYP, authorization a school staff must participate in on-site and regional teacher training, implement the PYP and host an authorization visit (Singh, 2002).

International Baccalaureate: Positive Impact on Student Achievement

A thorough search of EBSCO Academic Search, ERIC OCLC/First Search and Dissertation Abstracts International databases resulted in one statistical study of the IBDP and its effects on academic achievement and one comparative study of the IBMYP. Poelzer and Feldhusen (1996) compared the achievement of students in biology, physics, and chemistry in HLIB science programs with that of students in SLIB science programs and the achievement of students in IB science programs with that of students in regular Alberta science programs. The quasi-experimental factorial design used the standardized AP science achievement test as pre-post comparative test. The AP test form used in this study met the psychometric requirements for reliability. The data distinguished increases

in academic growth by course of study (SLIB physics, HLIB physics or regular physics; SLIB biology, HLIB biology or regular biology; SLIB chemistry, HLIB chemistry or regular chemistry) by gender. The results showed that the IB physics, biology and chemistry students scored higher on the post-test than the regular physics, biology and chemistry students. However, SLIB and HLIB students showed equal increases in achievement gains in both biology and physics. In terms of gender males and females scored equally well in IBHL and IBSL biology. In physics males scored higher than females. In chemistry males in HLIB scored higher than all other students; males in SLIB scored higher than females in HLIB. The study also included interviews with the teachers who taught both IB and regular students. The interview results revealed that the teachers of the IB students taught content at a more advanced level and faster pace. IB students were identified by the teachers as having higher levels of motivation, commitment and intelligence than regular students in the same content courses. Teachers who instructed both groups of students stated that IB students were taught differently and given more laboratory assignments than regular students. The rigorous academic standards of the IBDP resulted in different instructional standards for the students in regular science classes. This study concluded that the demanding curriculum of the IBDP resulted in greater academic gains by students in the IBDP.

While there were no other statistical studies found that focused on the academic outcomes of the IBDP, there are many positive perceptions associated with the IBDP. A ranking of the 100 Best High Schools in America attributed the superiority of the top ranked school, International Academy-Bloomfield Hills, Michigan, to the IBDP (Matthews, 2003). Twenty-six of the top 100 schools offered the IBDP. Students who

successfully complete the IBD course requirements and pass all portions of the final examinations earn the prestigious International Baccalaureate Diploma.

The most positive outcome of earning an IBD is the number of universities that accept the IBD as evidence of a superior education and a predictor of post-secondary academic success (IBO, 2003). In the booklet *How North American Colleges and Universities Recognize the International Baccalaureate Diploma Program* (IBO, 2001) the IBDP was recognized by the National Council on the Evaluation of Foreign Educational Credentials, a committee of the American Association of Collegiate Registrars and Admissions Officers (AACRAO) in 1973. This designation certified that the IB HL courses were academically equal to the National College Board's AP courses. This designation provided further evidence of the academic rigor of the IBDP and laid a foundation for the acceptance of the IBD by colleges and universities in North America (IBO, 2001).

The IBD is currently recognized by over 1075 universities in North America. Most of the universities allow students holding an IBD first year credits (Marsh & Coddling, 1999). A select group of colleges and universities developed exemplary IB recognition policies (FAQ, 2003). The recognition policies include factoring the IBD in the admission formula, granting a full year of college credit for students earning an IBD, recognizing the TOK and CAS courses for college credit and offering special scholarships for IBD students. A study by the National Research Council (2002) found that the rigorous academics and assessments in the IBDP were better indicators of student success in college than the ACT and SAT. The strenuous requirements of writing an EE and the unique requirements of the TOK and CAS courses provided students with a broad

academic knowledge and an extensive range of skills (Gazda-Grace, 2002). The standardized curriculum and the recognition from colleges and universities internationally add to the prestige associated with the IBD. Financial savings were a positive advantage for parents of IBD students. Earning college credit for high school courses reduced college expenses. Additional savings were realized through scholarships provided to IBD recipients (IBO, 2003).

The IBDP and the National College Board's Advanced Placement courses are associated with gifted, talented and honors students. The association with gifted, talented and honors programs provide opportunities for college-bound students to earn college credits while in high school. The College Board and the IBO issued a joint publication (IB & AP, 2002) that compared the components of each program. The document showed that the major difference in the two programs was that students may take AP exams without taking the AP courses. Contrarily, students must complete the required IB courses to take IB examinations. The IB courses have criterion-referenced test that assess students on what they have studied (Gazda-Grace, 2003). A study examining teachers' strategies in different policy context found that the external assessments in the IB and AP programs affected the types of instructional strategies used by teachers (Sheehy, 1999). According to the same study, the external exams placed more accountability on the teachers, forced them to assist the students in preparing for the exams and teach content in the exam format.

The College Board offers an Advanced Placement International Diploma to accommodate international students who complete AP courses. American high school graduates with AP credits who apply to international universities are also awarded the

APID (College Board, 2004). The APID is not intended for use by universities in the United States. However, the IBDP is a prescribed course of study offered in the same format to students internationally at IBO authorized schools. All students who complete the requirements earn the IBD. While this document compared and contrasted the academic components of the IBDP and AP courses, no empirical data comparing academic achievement of either program were offered. Thus, participants in the IBDP are perceived as gifted, talented or honors students and often gain advantages from those academic labels.

Another positive attribute of the IBDP is that it is inclusive of students of all ability levels including students with special needs. The IBO guidelines allow accommodations for students with special needs during administering of examinations. This provided a positive incentive for students with special needs to pursue the IBD. IBDP Candidates with Special Assessment Needs (IBO, 2002) informed parents and IB Coordinators of the policy for diploma and certificate candidates with special needs. The accommodations include providing extended time, rest periods, scribes, augmentative speech equipment, readers, voice activated technology, communicators, prompters, and print adjustments and change of examination venue. Schools must seek authorization for the accommodations from the IBO as directed in the policy document.

International Baccalaureate: Criticisms

While the IBO is internationally known for its rigorous academics there are some criticisms of IB programs. A comprehensive search of the OCLC Dissertations database resulted in many studies on the IBDP. Many of the studies provided historical overviews of the IBO, descriptions of the components of the IBDP, perceptions of students and

teachers affiliated with the IBDP and requirements for systemic prerequisite skills for success in the IBDP.

The fact that all participants do not earn the full diploma certificate provided criticism of the IBDP. Annually over 45,000 students are assessed for the IBD and 80% of the candidates complete all requirements and earn the full IBD (School's guide to the IBDP, 2003). To earn the IBD students must score four or higher on each of the six academic areas, write an Extended Essay (EE), complete the Theory of Knowledge (TOK) course, and complete 150 hours of a Creativity, Action and Service (CAS) project. IBDP participants have the option of completing the entire battery of exams in all six areas or testing in specific areas to earn Certificates in one or more content areas (FAQ, 2003).

According to the IBO statistical summary of May 2003 exams, 36% of IBDP students took one exam, 2.36% took two exams, 4.69% took three exams, 12.14% took four exams, 15.18% took five exams and 8.29% took six exams. The average number of exams taken per candidate was 2.72. The cost of IB exams may have attributed to the number of exams taken. According to local high school parent information packets, all fees associated with the IB Diploma were \$579.00 and paid by the student. A report by the National Research Council (2002) stated that by the time students take final IB exams acceptance decisions have been made by colleges and universities. Earning an IBD or Certificate in a particular course only aids the student in obtaining college credit for those specified courses. Credit was not automatic; students usually take a departmental exam to gain final college course credit. The completion of IB courses was seen as an indication of the students' ability to consistently perform academically (NRC, 2002).

Berkey (1994) examined the factors associated with success in earning the IBD. The factors that contribute to the success of the IBDP include a pre-IB curriculum, articulation adjustments, adequate release time for the IB Coordinator, investment in staff development and a broad base of support. Torre-Halscott (1992) in a study of prerequisites for the IBDP found that there was a relationship between teacher predictor scores for students and success in the IBDP. The researcher suggested that teacher recommendations should be considered for African American students with lower standardized test scores.

Some studies levied criticism against the personal toll faced by students who participated in the IBDP. A qualitative research study involved interviews of participants in the IBDP about academic dishonesty (Taylor, Pogrebin and Dodge, 2002). The results showed that students felt pressure from parents, teachers and peers to maintain good grades in the highly competitive environment. The students responded that the rigorous academics of the IBDP required an exorbitant amount of time for studying for exams, completing assignments and developing projects. The pressure of time constraints also led to dishonest behaviors for which students showed no remorse. Students in this study did not report unethical behavior of others. The cheating seemed justified by the pressures to compete academically.

The rigorous IB curriculum was also criticized because it limits the amount of time participants have for extra curricular activities or jobs (Parker, 1996). In this study the researcher surveyed IBDP participants in Minnesota high schools. The results showed that most of the students agreed that lack of time was an issue. However, most of the participants had attended a pre-IB program and were taught time management skills. As

a result most students opted to work only in summers. Students who participated in extra curricular activities usually chose leadership positions in student government. The students also stated that an active social life was important to their success in the IBDP.

At an IBDP Open House at the local high school studied, students shared this sentiment. A panel of students representing 9th and 10th grade IBMYP students and 11th and 12th grade IBDP students spoke at the meeting. All of the students emphasized the need for an active social life. However, these students stated that they often met to study and then watched movies or played video games. Thus, they socialized mostly with other IBDP students.

The pressure to constantly perform better academically was also a criticism of IBDP participants (Parker, 1996). Teachers also responded that the pressures of maintaining the superior standards of the IBDP were stressful. Many teachers spend a portion of their instructional time preparing students for the IB examinations by assigning exercises that mirror the IB exams. In a study on the influence of the IB experimental science program format on classroom learning environment and student attitudes, Raiford (1998) found that the HL science teachers used instruction, laboratory experiences and tests to review material on the IBDP final science examination. A study from the National Research Council (2002) indicated that students in IB math courses were instructed over a breath of content to meet the needs of the exam but were not taught the content in depth.

The IB experiences of African American students provide further criticisms. African American students in the IBDP experienced extra pressure from their non-IB African American peers (Parker, 1996). In the same study African American students

mentioned the lack of diversity in the teaching staff as a negative aspect of the IBDP. The African American students also believed that the curriculum was too Eurocentric.

Summary

From the foundation of this nation, schools were established to provide the next generation with academic and vocational skills to continue building this country. Schools were required to build curriculum that developed skills so that individuals could contribute to society and to exhibit characteristics of democratic citizenship. Contradictions were inherent in the goals of schools in the United States because of the historical blemish of slavery and the second-class status of students from low socio-economic families. However, the nation's schools have developed to provide a variety of academic programs through a system of a la carte curricula and optional programs. School renewal, as developed by John Goodlad, focused on providing a balanced curriculum, democratic values and competent teachers.

The school district discussed in this study offers the International Baccalaureate Diploma Program (IBDP) as one of many School Choice options (SD, 2003). The rapid growth of the IBDP, IBMYP and the IBPYP in North America added credibility to the acceptance of the rigorous academic standards established nearly four decades ago by the International Baccalaureate Organization. The IB curriculum represented an exemplary model of rigorous academics. The components of the curriculum offered through the IBPYP, IBMYP and IBDP reflect some of the recommended guidelines for Schooling in the United States (Goodlad, 1984). The IBMYP provided students with critical thinking opportunities to facilitate learning. As students matriculated through the IBMYP instruction was guided by the Essential Question, What will I learn from this? Students

in the IBMYP could reach self-actualization through a variety of academic, vocational, civic, social and personal learning experiences.

While the curriculum components of the programs offered by the IBO are generally positive, some criticisms exist. The IBDP has earned a reputation of an elitist program that serves socio-economically advantaged students. The students enrolled in the IBDP have also encountered problems with stress, time management, academic dishonesty and test-driven instruction. Teachers in the IBDP have also faced the issue of test-driven instruction.

CHAPTER 3

METHODS

This chapter describes the methods followed in this study. A brief introduction states the purpose of the study. The research design describes the overall paradigm selected and the rationale for using this approach. The population, sample, and variables are identified. The method for collecting and analyzing the data concludes the chapter.

Introduction

This study of the International Baccalaureate Middle Years Program (IBMYP) at a high school located in the mountain west region of the United States was a quantitative research design. The study explored the relationship between an academic program of study (IBMYP) and student achievement. The purpose of this study was to add to the limited empirical data on the academic outcomes of students who participate in the IBMYP. The IBMYP at the high school studied provided a rigorous academic course of study to students in grades six through ten. The IBMYP concentrates on the interrelatedness of language, math, science, geography, history and the arts and provides students with the prerequisite skills to enter the IB Diploma Program (IBO, 2003).

Research Design and Rationale

The research design was quantitative. The ex-post facto, posttest only design was appropriate for the exploration of the relationship between academic program of study and achievement. A quasi-experimental design is best used when random assignment is not possible (Shadish, Cook & Campbell, 2002). In this study the participants were self-assigned to the intervention. The intervention was participation in the IBMYP. The students in the comparison group were selected based on ninth grade enrollment status. Eleventh-grade students who attended the high school in this study as freshman were coded as IBMYP students. Eleventh-grade students who were not enrolled at this school as freshman and did not attend a junior high school that offered the IBMYP were coded as non-IBMYP students.

In the school district studied students attend elementary school for grades kindergarten – sixth, junior high school for grades seventh – ninth and senior high school for grades tenth - twelfth. However, the IBMYP students in this study are able to attend senior high school as ninth grade students and are engaged in a rigorous academic program during the ninth and tenth grade years. The ninth grade IBMYP students are enrolled in Introduction to Classical & World Literature; World Geography and History; Introduction to Chemistry, Physics and Earth Science or Biology; Integrated Mathematics Level 1, 2 or 3; French, Spanish or German and Pre - IB Art and Design. Ninth grade students in traditional junior high schools are enrolled in general English Composition; Reading Literacy; Introduction to Chemistry, Physics and Earth Science or Standards Based Biology; Integrated Mathematics 2 or 3; French, Spanish or German and elective courses.

The IBMYP courses provide students with an international perspective. Tenth grade IBMYP students are enrolled in American/British Literature; Pre-IB World Geography and History 2; Pre – IB Calculus or IB Mathematics Subsidiary Level; Pre-IB Chemistry; French, Spanish or German Levels 1, 2 or 3; Pre-IB Music Theory and Composition; and Pre-IB Theatre. Tenth grade students in traditional senior high school courses are enrolled in Composition and World Literature or English and Technology; World Geography; Integrated Mathematics 2 or 3; General Science, Advanced Biology or Chemistry. The study does not differentiate between eleventh grade students enrolled in the IBDP and non IBDP students. Eleventh grade students are sorted based on participation in IBMYP.

Analysis of Covariance (ANCOVA) was selected as the statistical test to compare the two groups IBMYP and Non-IBMYP to reduce bias when comparing intact or self-selected groups (Stevens, 1999).

| | | | |
|----|----|----|---|
| NR | E: | X | O |
| NR | C: | ~X | O |

The ACT scores of eleventh grade students during the 2002-2003 academic year served as the posttest. To strengthen the study a covariate was used to control for initial achievement (Mertler and Vannatta, 2002). Achievement Levels Test (ALT) scores were used as the covariate. The purpose of the covariate was to increase the likelihood of similar participant characteristics in reference to the dependent variable, ACT scores (Shadish, Cook & Campbell, 2002). The Statistical Packages for the Social Sciences (SPSS) software, version 12.0, was used to analyze the data using ANCOVA. The SPSS software used the ALT scores as a covariate and matched the students by prior levels of

achievement.

Variables

An active independent variable is an intervention that is given to one group of participants but not to another (Gliner & Morgan, 2000). Participation in the IBMYP was the intervention evaluated. The variables explored were: active independent variable - Participant or Non-Participant in the IBMYP; attribute independent variables - Gender (Male/Female) and Ethnicity (American Indian or Alaskan Native, Asian or Pacific Islander, Black (Not Hispanic), Hispanic and White (Not Hispanic)). The school district's student data files list all of the independent variables as indicators in individual student profiles. Ethnicity was categorized according to the ethnic groups listed above. The dependent variable was ACT scores (Reading and Math) and the covariate was the ALT Scores (Reading and Math).

Under the Colorado Student Assessment Program (CSAP) guidelines the ACT is required and administered to all eleventh-grade students (CDE, 2003). ACT scores were used as the dependent variable and posttest to compare academic outcomes of IBMYP students with non-IBMYP students. The Colorado legislature (through C.R.S. 22-7-409 91.5) required that all eleventh-grade students take the ACT assessment (CDE, 2004). Only students who have been expelled, incarcerated, homebound or are enrolled in GED programs are exempt from the test. School districts may apply for exemptions to the ACT examination for students who are deemed non-English proficient based upon a valid language proficiency examination or those who are profoundly disabled. The ACT assessment is aligned to the Colorado model content standards and is curriculum based.

The school district developed and administers Achievement Levels Test (ALT) to

assess academic progress of students. Students are evaluated in reading and math at the elementary and junior high levels. The ALT scores served as a covariate to provide a means for statistical matching because random assignment was not possible (Mertler & Vannatta, 2002). Levels tests are achievement tests that are aligned to the local curriculum and state standards (NWEA, 2004). ALT are utilized annually in the local school district to assess student abilities and make decisions about placement, monitor student progress in content areas and measure academic gains. School district teachers in collaboration with Northwest Evaluation Association staff developed the ALT. The levels tests were aligned to the Colorado State Standards for Reading, Language and Mathematics. Levels test scores are reported on a RIT scale. The Rasch unit uses individual item difficulty values to estimate student achievement (NWEA, 2004)

Theoretical Population

The theoretical population included all participants to whom the research is generalizable (Gliner & Morgan, 2000). In this study all eleventh-grade students in Colorado are the theoretical population. The ACT is administered to all eleventh grade students as required by law.

Sample

The sampling frame included eleventh-grade students (during the 2002-2003) from a high school located in the U.S. mountain west region. The school has been authorized by the International Baccalaureate Organization to offer the IBMYP and the IB Diploma Program. Attribute variables of gender and ethnicity were considered as factors in this study. Enrollment data obtained from the CDE for 2002-2003 are given in Table 1.

Table 1

Eleventh Grade Enrollment by Ethnicity and Gender, 2002-2003

| Ethnicity | American Indian or Alaskan Native | | Asian or Pacific Islander | | Black (Not Hispanic) | | Hispanic | | White (Not Hispanic) | | Totals by Gender | |
|-----------|-----------------------------------|---|---------------------------|----|----------------------|---|----------|----|----------------------|-----|------------------|-----|
| | F | M | F | M | F | M | F | M | F | M | F | M |
| | 3 | 6 | 5 | 13 | 3 | 3 | 51 | 38 | 225 | 249 | 287 | 309 |

Research Questions

The research questions in this study are (a) Is there a difference between IBMYP students and non-IBMYP students in regard to ACT scores in Reading and Math when controlling for achievement on 8th grades Achievement Levels Test (ALT)? (b) Is there an interaction between participation in IBMYP and non-IBMYP participation and gender in regard to ACT scores in Reading and Math when controlling for achievement on 8th grade ALT? (c) Is there an interaction between participation in IBMYP and non-IBMYP participation and ethnicity in regard to ACT scores in Reading and Math when controlling for achievement on 8th grade ALT?

Data Collection

The data set was requested and obtained from the school District Office of Student Achievement, Data and Assessment. The requested data was archived information. The students' anonymity was protected by the School District's alias identification number system which links student data by gender, ethnicity and program

type. Standardized test scores were also available and linked to students through their alias identification number.

Data Analysis

The mean ACT scores of IBMYP and non-IBMYP students were compared by gender and ethnicity and controlling for entering achievement levels. Analysis of Covariance allows for statistical adjustment when participants are not randomly assigned to treatment groups (Mertler & Vannata, 2002). The Statistical Packages for the Social Sciences (SPSS) software, version 12.0, was used to analyze the data using ANCOVA.

CHAPTER 4

RESULTS

This chapter presents the results of the analysis of the research data. The data analysis exploration processes are discussed. Demographics of the independent variables, dependent variables and covariate are displayed as descriptive statistics. General assumptions for inferential statistics are discussed followed by assumptions specific to the analysis of covariance (ANCOVA). The data generated is presented in tables and figures.

Data Analysis

The purpose of this study is to add to the limited empirical data on the academic outcomes of students who participate in the International Baccalaureate Middle Years Program (IBMYP). The study explored ACT scores of students who were IBMYP participants and non- IBMYP participants. The sampling frame consisted of eleventh grade students (2002-2003). The data set was obtained from the school district's archives of assessment results. Assessment results were linked to individual students by the district's alias identification numbering system.

Demographic Data

Descriptive statistics of the demographic data for attribute independent variables (gender, ethnicity and socio-economic status), dependent variables (ACT Reading and Math scores) and covariate (ALT Reading and Math scores) are presented. Table 2 shows the demographic characteristics of the students by gender and ethnicity.

Table 2

Demographic Characteristics of Students (n=486)

| Characteristic | n | % |
|---------------------------|-----|------|
| Gender | | |
| Females | 271 | 55.8 |
| Males | 215 | 44.2 |
| Ethnicity | | |
| American Indian/Alaskan N | 5 | 1.0 |
| Asian/Pacific Islander | 12 | 2.5 |
| Black (non-Hispanic) | 8 | 1.6 |
| Hispanic | 50 | 10.3 |
| White (non-Hispanic) | 394 | 81.1 |
| Missing | 17 | 3.5 |

The demographic data showed that there were more females than males in the sampling frame and a small percentage of non-white students. Because of the small

number in each of the Non-White ethnic categories, ethnicity was recoded as White and Non-White. Table 3 shows the recoded demographic characteristics of the participants.

Table 3

Demographic Characteristics of Students - Recoded (n=486)

| Characteristic | n | % |
|----------------------|-----|------|
| Ethnicity | | |
| Non – White | 75 | 15.4 |
| White (non-Hispanic) | 394 | 81.1 |
| Missing | 17 | 3.5 |

The recoded data showed that 81% of the students were white and 15% were non-white. This is greater than the Colorado average for high school students in 2003 which reflected 64.5% white and 35.5% non-white (CDE, 2004).

Spring 2000 Reading and Math Levels Test scores were the covariates in this study. Spring 2003 ACT Reading and Math scores were the dependent variable. Table 4 displays descriptive data for the scores of covariates and dependent variables.

Table 4

Descriptive Statistics for Covariate and Dependent Variable

| Variable | Min | Max | M | SD |
|-----------------------|-----|-----|--------|-------|
| Reading ALT RIT Score | 155 | 269 | 230.08 | 14.39 |
| Math ALT RIT Score | 170 | 279 | 239.26 | 18.91 |
| ACT Reading | 5 | 36 | 22.49 | 7.00 |
| ACT Math | 11 | 36 | 22.13 | 5.78 |

General Assumptions

An examination of the data was conducted to clarify general inferential statistical assumptions. According to Mertler & Vannatta (2002) the general assumptions are random assignment of the sample, normal distribution of scores on the dependent variable and homogeneity of variances for the dependent variable.

Random Assignment

The assumption of random assignment was addressed in the research design. The ANCOVA was selected to simulate random assignment through matching and to increase the likelihood of similar participant characteristics (Shadish, Cook & Campbell, 2003).

Normality

The data set was explored for missing values, outliers and to assess the range of scores for the dependent variable. Further review of the dependent variables ACT Math and Reading showed levels of skewness with values within the + or – 1 range indicating a

normal distribution (Mertler & Vannatta, 2002).

Additionally, normal probability plots or normal Q-Q plots were examined to determine the normal distribution of the dependent variable. The Q-Q plots for the dependent variable (ACT Reading and Math scores) were observed. The dependent variable scores are displayed in Figures 1 and 2.

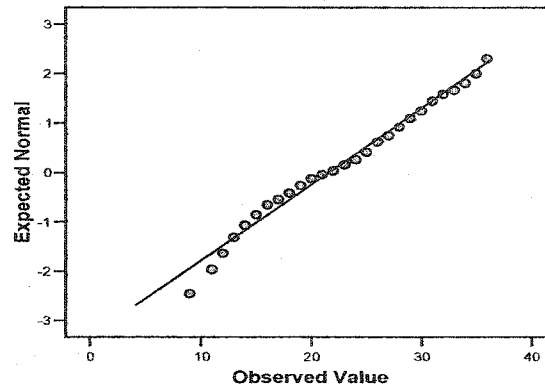


Figure 1. Q-Q Plot for normality of ACT Reading scores

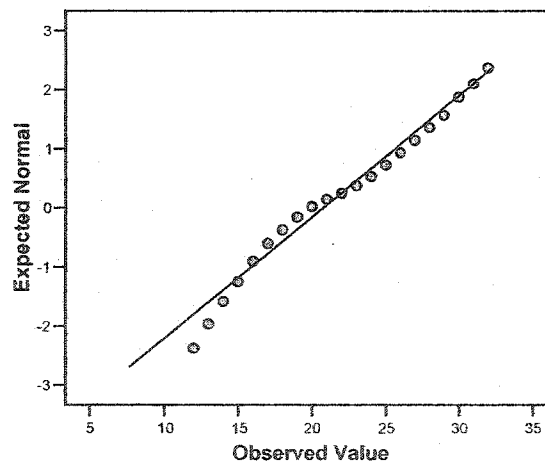


Figure 2. Q-Q Plot for normality of ACT Math scores

A visual inspection of the Q-Q plots for dependent variable scores reveal an approximate normal distribution for all scores. Visual observation of the Q-Q plots indicate that most scores fall within the normal distribution as evidenced by data points aligned with a straight line.

Homogeneity of Variances

Levene's Test of equality was conducted to determine equality of variances across groups. As Field (2000) stated, the Levene's test indicates the equality of variances for the groups of independent variables on the dependent variable. ACT Reading was not significant $F(7,339) = .66, p = .70$ for gender, ethnicity and IB/Non-IB. ACT Math was not significant $F(7, 273) = .74, p = .63$ for gender, ethnicity, and IB/Non-IB. As a result equal variances across groups were assumed. The assumptions of normality and equality of variances were satisfied. The ANCOVA assumptions were tested next.

ANCOVA Assumptions

The assumptions for ANCOVA are linearity between the dependent variable and covariate, reliability of the covariate and homogeneity of regression slopes for the covariate.

Linearity

A linear relationship must exist between the dependent variable and covariate. Scatterplots were analyzed to determine if a linear relationship existed between the dependent variable and the covariate.

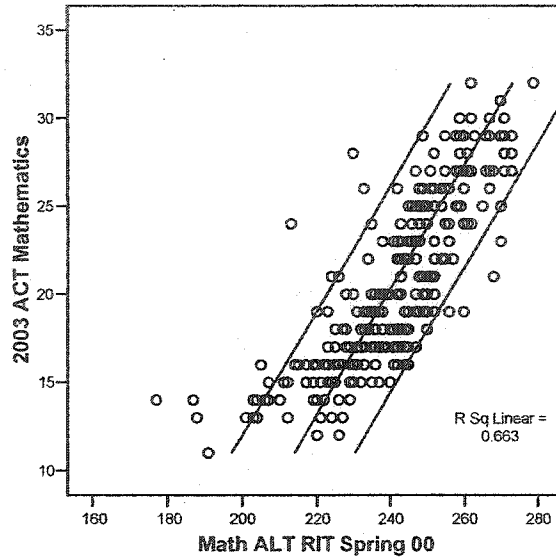


Figure 3. Scatterplot of ALT Math and ACT Math

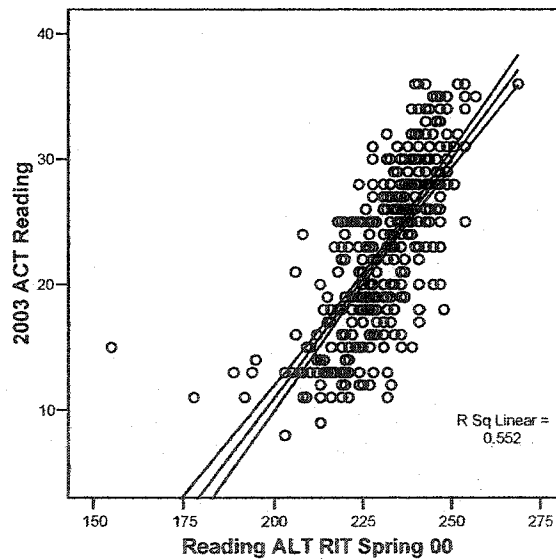


Figure 4. Scatterplot of ALT Reading and ACT Reading

Inspection of scatterplots revealed linear trends for the relationship between the covariate (ALT Reading and Math RIT scores) and the dependent variable (ACT Reading and Math scores). A linear trend should be indicated when both variables are normally distributed (Mertler & Vannata, 2002).

Covariate Reliability

Correlations were examined to determine if the covariate was reliable. Table 5 outlines the correlation values.

Table 5

Intercorrelations for Covariates and Outcome Variables

| Variable | 1 | 2 | 3 | 4 |
|------------------------------------|-------|-------|-------|----|
| 1. Reading Level RIT ₀₀ | -- | | | |
| 2. Math Level RIT ₀₀ | .78** | -- | | |
| 3. 2003 ACT Math | .74** | .81** | -- | |
| 4. 2003 ACT Reading | .74** | .60** | .71** | -- |

** Correlations significant at $p < .01$ level

Correlations were all positive with values for ACT Math and Math ALT $r = .81$ and ACT Reading and Reading ALT $r = .74$. The r value showed that the covariate was a reliable indicator of the outcome variable.

Homogeneity of Regression Slopes

The regression slopes for the covariates (in relations to the dependent variable) needed to be the same for each group. This assumption was checked with a univariate analysis of the interaction of the covariate and the independent variables. The interaction for factors on ACT Reading was not significant $F(1, 308) = .307, p = .58$. The interaction for factors on ACT Math was not significant $F(1, 272) = .012, p = .91$. The assumption of homogeneity of regression slopes was fulfilled because there were no significant interactions.

Summary of ANCOVA

An ANCOVA was conducted with IB participation and non-IB participation as the active independent variable. The outcome variable was ACT scores (Reading and Math) while adjusting for prior achievement using ALT RIT scores (Reading and Math) as the covariate. Preliminary analysis of the data showed that the assumptions of linearity, normality, and homogeneity were satisfied and the relationship between the covariate and outcome variable was tenable.

Descriptive statistics of the raw mean and covariate adjusted ACT Reading mean scores are presented in Table 6 and the raw mean and covariate adjusted ACT Math mean scores are presented in Table 7.

Table 6

Raw and Covariate Adjusted ACT Reading Mean Scores

| Variable | <i>n</i> | IB | | | Non-IB | | | Effect Size <i>d</i> | |
|-------------|----------|-----------------|------------------|---------------------------------------|-----------------|------------------|---------------------------------------|-------------------------|-----|
| | | <u><i>M</i></u> | <u><i>SD</i></u> | Covariate Adjusted <u><i>M</i></u> | <u><i>M</i></u> | <u><i>SD</i></u> | Covariate Adjusted <u><i>M</i></u> | | |
| ACT Reading | | | | | | | | | |
| Females | | | | | | | | | |
| White | 74 | 27.22 | 5.42 | 23.76 | 105 | 22.08 | 6.45 | 23.04 | .26 |
| Non-White | 8 | 27.75 | 8.30 | 24.99 | 15 | 18.80 | 6.42 | 21.63 | .52 |
| Total | 82 | 27.27 | 5.67 | 24.37 | 120 | 21.67 | 6.51 | 22.33 | .33 |
| Males | | | | | | | | | |
| White | 33 | 27.09 | 5.30 | 23.67 | 91 | 19.56 | 5.64 | 21.64 | .36 |
| Non-White | 5 | 26.20 | 7.30 | 24.04 | 16 | 16.81 | 5.32 | 21.10 | .52 |
| Total | 38 | 26.97 | 5.49 | 23.85 | 107 | 19.15 | 5.65 | 21.36 | .44 |
| Grand Total | | | | | | | | | |
| White | 107 | 27.18 | 5.36 | 23.71 | 196 | 20.91 | 6.19 | 22.34 | .23 |
| Non-White | 13 | 27.15 | 7.67 | 24.51 | 31 | 17.77 | 5.86 | 21.36 | .49 |
| Total | 120 | 27.18 | 5.61 | 24.11 | 227 | 20.48 | 6.23 | 21.85 | .37 |

Table 7

Raw and Covariate Adjusted ACT Math Mean Scores

| Variable | <i>n</i> | IB | | | Non-IB | | | Effect Size | |
|-------------|----------|-----------------|------------------|---------------------------------------|-----------------|------------------|---------------------------------------|-------------|-----|
| | | <u><i>M</i></u> | <u><i>SD</i></u> | Covariate Adjusted <u><i>M</i></u> | <u><i>M</i></u> | <u><i>SD</i></u> | Covariate Adjusted <u><i>M</i></u> | | |
| ACT Math | | | | | | | | | |
| Female | | | | | | | | | |
| White | 44 | 23.32 | 4.25 | 21.21 | 93 | 19.90 | 4.43 | 20.32 | .20 |
| Non-White | 6 | 19.67 | 4.60 | 21.01 | 16 | 17.81 | 4.56 | 19.48 | .33 |
| Total | 50 | 22.88 | 4.11 | 21.11 | 109 | 19.60 | 4.45 | 19.90 | .28 |
| Male | | | | | | | | | |
| White | 21 | 25.90 | 4.60 | 23.11 | 84 | 20.06 | 4.67 | 20.62 | .53 |
| Non-White | 2 | 26.00 | 4.24 | 23.68 | 15 | 17.93 | 4.28 | 20.26 | .80 |
| Total | 23 | 25.91 | 4.47 | 23.39 | 99 | 19.74 | 4.65 | 20.44 | .64 |
| Grand Total | | | | | | | | | |
| White | 65 | 24.15 | 4.50 | 22.16 | 177 | 19.98 | 4.53 | 20.47 | .37 |
| Non-White | 8 | 21.25 | 5.12 | 22.35 | 31 | 17.87 | 4.36 | 19.87 | .55 |
| Total | 73 | 23.84 | 4.62 | 22.25 | 208 | 19.66 | 4.56 | 20.17 | .45 |

The raw mean scores indicated that IB students scored higher than Non-IB students on ACT Reading and Math. In terms of gender males scored higher than females on ACT Math but females scored slightly higher than males on ACT Reading. In terms of ethnicity Whites scored higher than Non-whites in most areas. The exceptions were Non-White, IB male students scored one-tenth of a point higher than White, IB, male students on the ACT Math and Non-White, IB, female students scored fifty-three hundredths of a point higher than White, female, IB students on the ACT Reading.

The ACT Reading mean scores were adjusted at covariate value of Reading ALT RIT Spring₀₀ = 231.56. The ACT Math mean scores were adjusted at covariate value of Math ALT RIT Spring₀₀ = 241.78. The covariate adjusted mean scores showed that IB students scored higher than Non-IB students on ACT Reading and Math. In terms of gender males scored higher than females on ACT Math but females scored slightly higher than males on ACT Reading. In terms of ethnicity Whites scored higher than Non-Whites in most areas. The exceptions were males and females Non-White; IB students scored a few hundredths of a point higher than White, IB students on ACT Reading and Math.

The ANCOVA output is summarized in Tables 8 and 9.

Table 8

ANCOVA of ACT scores Reading as a function of IB/Non-IB adjusted for covariate

| Source | <u>df</u> | <u>SS</u> | <u>MS</u> | <u>F</u> | <u>Sig.</u> |
|-------------------------|-----------|------------|-----------|----------|-------------|
| Covariate | 1 | 5478.185 | 5478.185 | 287.251 | .000 |
| Group | | | | | |
| IB/Non-IB | 1 | 135.297 | 135.297 | 7.094 | .008 |
| Gender | 1 | 17.102 | 17.102 | .897 | .344 |
| Ethnicity R | 1 | .236 | .236 | .012 | .911 |
| IB/Non-IB x Gender | 1 | 1.512 | 1.512 | .079 | .778 |
| IB/Non-IB x Ethnicity R | 1 | 24.170 | 24.170 | 1.867 | .261 |
| Error | 338 | 6446.028 | 19.071 | | |
| Total | 347 | 196364.000 | | | |

Table 9

ANCOVA of ACT scores Math as a function of IB/Non-IB adjusted for covariate

| Source | <u>df</u> | <u>SS</u> | <u>MS</u> | <u>F</u> | <u>Sig.</u> |
|-------------------------|-----------|------------|-----------|----------|-------------|
| Covariate | 1 | 3499.258 | 3499.258 | 474.563 | .000 |
| Group | | | | | |
| IB/Non-IB | 1 | 75.104 | 75.104 | 10.185 | .002 |
| Gender | 1 | 35.727 | 35.727 | 4.845 | .029 |
| Ethnicity R | 1 | .755 | .755 | .102 | .749 |
| IB/Non-IB x Gender | 1 | 13.580 | 13.580 | 1.842 | .176 |
| IB/Non-IB x Ethnicity R | 1 | 2.850 | 2.850 | .386 | .535 |
| Error | 272 | 2005.633 | 7.374 | | |
| Total | 281 | 127736.000 | | | |

The ANCOVA results showed that after adjustment by the covariate, the main effect of the difference between ACT Reading scores of IB students and Non-IB students was significant $F(1,338)=7.094, p=.008$. The main effect of the difference between ACT Math scores of IB students and Non-IB students was significant $F(1,272)=10.185, p=.002$. The magnitude of the difference in covariate-adjusted means for IB and Non-IB students was determined by the calculation of effect sizes.

Mean Line Plots

Line plots of mean scores were generated to graphically display the mean ACT Reading and Math scores by independent variables of gender and ethnicity. Figures 5 – 8 display the mean line plots for all variables.

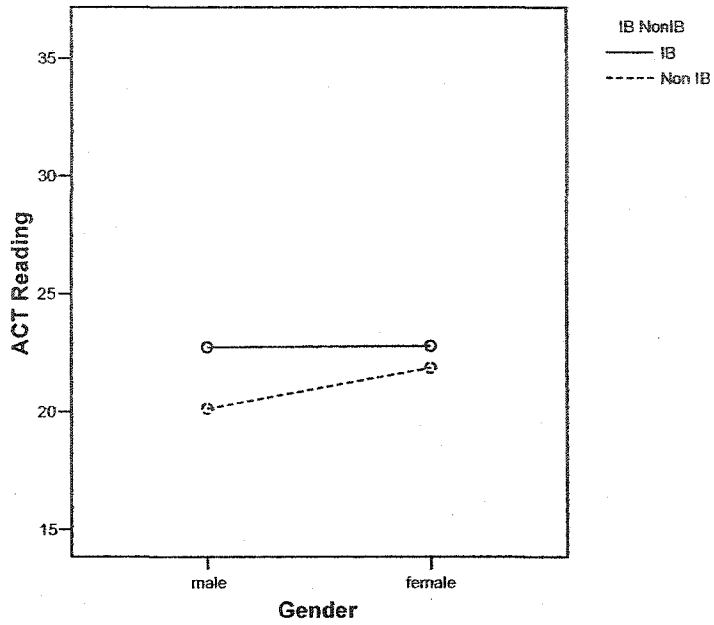


Figure 5. Line Plot of ACT Reading Mean Scores and Gender

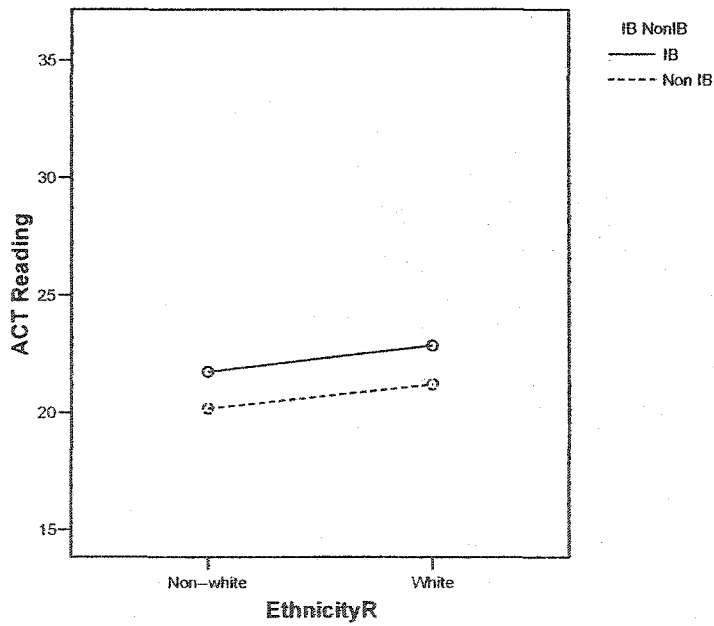


Figure 6. Line Plot of ACT Reading Mean Scores and Ethnicity Revised

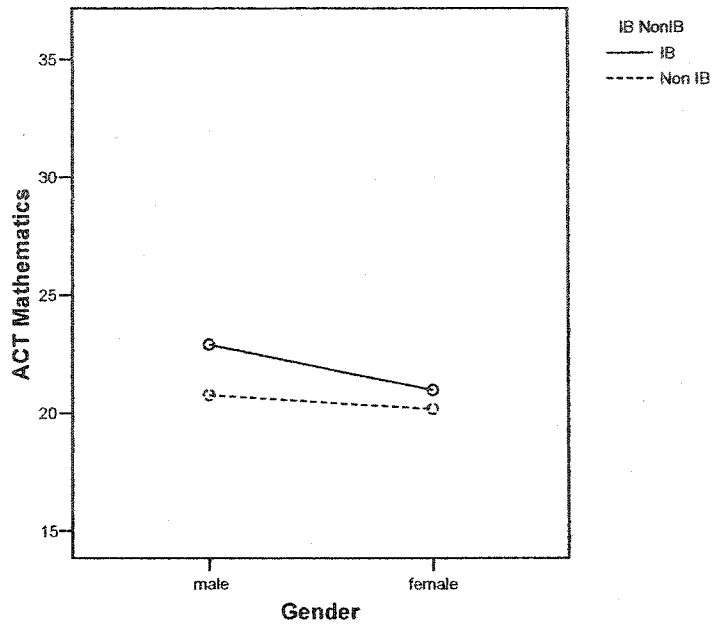


Figure 7. Line Plot of ACT Math Mean Scores and Gender

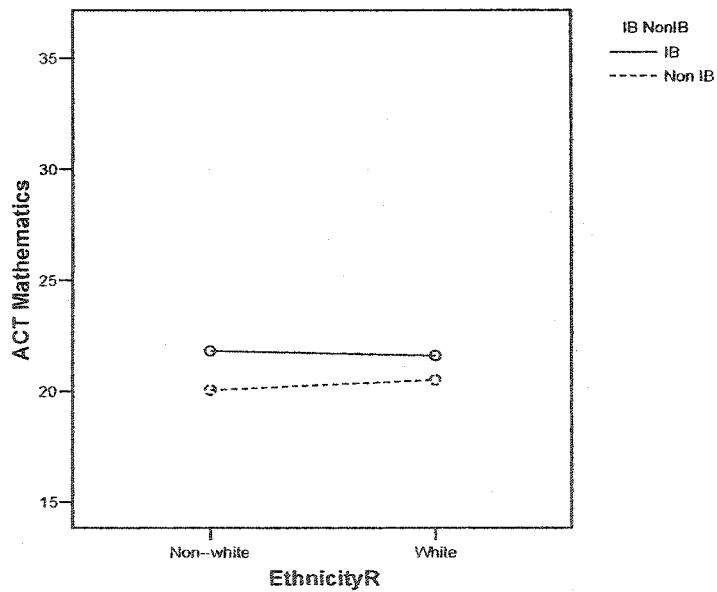


Figure 8. Line Plot ACT Math Mean Scores and Ethnicity Revised

The line plots of mean scores for ACT Reading and Math graphically displayed that IB students scored higher than Non-IB students in terms of gender and ethnicity. In terms of gender males scored higher than females on the ACT Math in both the IB and Non-IB groups. Females scored slightly higher than males on the ACT Reading in both the IB and Non-IB groups. In terms of ethnicity White students scored higher than Non-White students in the Non-IB group for ACT Reading and Math and Non-White IB students scored slightly higher than White IB students for ACT Reading and Math.

Effect sizes were calculated using covariate-adjusted means only for statistically significant differences (APA, 2001). The calculations yielded a medium effect size for IB and Non-IB students in Reading $d = .37$ for the covariate adjusted means. In Math for IB and Non-IB students the calculations yielded a medium effect size of $d = .45$ for covariate adjusted means.

The first research question asked, Is there a difference between IBMYP students and non-IBMYP students in regard to ACT scores in Reading and Math when controlling for achievement on 8th grades Achievement Levels Test (ALT)? IB students' ACT Reading mean scores were higher than Non-IB students'. The ANCOVA results of $F(1,328) = 7.094, p = .008$ were statistically significant. The magnitude of the difference was expressed with a medium effect size, $d = .37$. The ACT Math ANCOVA results of $F(1,272) = 10.185, p = .002$ was statistically significant. The magnitude of the difference was expressed with a medium effect size of $d = .45$. These results indicated that IB students' scores were statistically significantly higher and practically more

significant than Non-IB students.

The remaining research questions focused on interactions between Reading and Math ACT scores for IB and Non-IB students by gender and ethnicity. The ANCOVA data resulted in no statistically significant interactions for gender and ethnicity.

CHAPTER 5

DISCUSSION

The research design included an ANCOVA to determine if there were differences between and interactions among participants in the IBMYP and Non-IBMYP participants in terms of gender and ethnicity on achievement. Achievement was measured by the dependent variable ACT Reading and Math scores. The research design included ALT scores as a covariate to reduce the error variance attributed to prior achievement and to provide a more accurate assessment of the effect of the IBMYP on student achievement as measured by ACT scores.

Research question one asked, Is there a difference between IBMYP students and non-IBMYP students in regard to ACT scores in Reading and Math when controlling for achievement on 8th grades Achievement Levels Test (ALT)? Questions two and three asked if there would be interactions between IB/Non-IB, gender and ethnicity. The findings in this study revealed that ACT Reading and Math scores for IB participants were higher than Non-IB participant scores. The differences in ACT Reading and Math scores were statistically significant.

Based on these findings the conclusions from the data analysis will be presented.

Recommendations for educational policy and suggestions for future research will be offered.

Conclusions

The raw and covariate adjusted mean scores revealed that the IB participants generally scored higher than Non-IB participants on the ACT Reading and Math. The results of the ANCOVA showed that the main effect of IB and Non-IB participation was statistically significant using ACT Reading and Math scores as the dependent variable when adjusting for prior achievement with ALT Reading and Math scores as covariates. The magnitude of the difference was determined to be a medium effect size.

The ANCOVA results showed that there was statistical significance for the main effect of IB participation and Non-IB participation for ACT Reading and ACT Math scores. There was no statistical significance in the interactions of IB/Non-IB with gender and ethnicity. The results of this study revealed patterns of higher ACT Reading and Math scores for IBMYP students when controlling for prior achievement levels.

These findings are consistent with an earlier study of IBMYP students. Remington (2000) conducted a comparative study of IBMYP 6th grade students to matched peers who attended the same school but were enrolled in an exemplary middle school program. The 4th grade Cognitive Skills Index (CSI) was used to match students on prior achievement. The California Achievement Test, 5th Edition (CAT5) was administered to both groups after seven months in the different programs. The results revealed that mean scores for IBMYP students were higher than their matched peers in language, social studies, study skills and math. Only the differences in math scores were statistically significant. The findings of the current study added to the evidence of

IBMYP students scoring higher than Non-IBMYP students using a covariate to control for prior achievement.

Achievement Test: Gender and Ethnicity

The literature review revealed consistent patterns in the achievement test scores of males and females. Males tend to score higher than females in Math and females tend to score higher than males in Reading (Mau & Lynn, 2001).

The results of this study are consistent with the findings in a comparable analysis of IBDP and non-IBDP students. Poelzer & Feldhusen (1996) compared the achievement of students in HLIB biology, chemistry and physics to SLIB biology, chemistry and physics with students in regular science programs. The results showed that IBDP students scored higher than students in the regular science courses. Both HLIB and SLIB science students made academic gains in science knowledge. In terms of gender males and females scored equally well in HLIB and SLIB biology. However, males scored higher in SLIB and HLIB physics and chemistry. While this study found differences in pre- post standard achievement test scores the scores were not statistically significant. Thus the pattern in another study (Mau & Lynn, 2001) of males scoring higher than females in math was supported. The analysis of data in this study substantiated the trend of differences in achievement scores by gender. Males in IBMYP and Non-IBMYP groups scored higher than females in math and females in both groups scored higher than males in Reading.

In terms of ethnicity, White students scored higher than Non-White students on ACT Reading and Math with one exception. Within the IB participant group, Non-White males had slightly higher mean ACT math scores than White males when controlling for

prior math achievement.

The literature review also identified gaps in the achievement scores of White and Non-White students, specifically African Americans (Jencks & Phillips, 1998). One theory attributes the gap between African American and White student achievement to the definition and measurement of intelligence (Hillard, 1994). Another theory states that the pattern of African American students generally scoring lower than White peers often poses a threat for African American students. The stereotype threat results in African American students scoring below their aptitude level because of the pressure to score higher (Steele & Aronson, 1995).

African American students in predominantly White school settings expressed feelings of inadequacy and intimidation over being the only Black person in advanced classes (Fine, 2004). African American students enrolled in the IBDP listed pressure from Non-IB African American peers, lack of teachers of color and the Eurocentric curriculum as criticisms against the IB program.

Disaggregated demographic data in this study revealed that there were only eight African American students, 1.6% of the sampling frame. However, the ethnicity data was recoded into two categories because of the small number of Non-White students so the achievement gap issue between White and African American students could not be analyzed. However, Non-White males scored slightly higher than White males on ACT Reading and Math but there was no statistical difference in the scores.

Limitations

The literature review revealed two fundamental flaws in schooling in the United States. Historically African American students and students from families with lower

income have faced inequalities in public schools in America (Spring, 1994). The legal sanctions against education for slaves did not improve after the Civil War. The 1954 Supreme Court decision in *Brown versus Board of Education* prohibited the racially segregated and inferior schools that had existed since reconstruction (Spring, 2001). Currently urban schools with predominantly African American students and students from families with lower income face an array of social and economic problems (Noguera, 2003).

To analyze the data with the intent to determine if historical inequalities of African Americans and students from lower socio-economic levels impacted outcomes, ethnicity and socio-economic levels were considered as factors in the original research design. Socio-economic status (SES) was removed from the design because the school district studied relied solely on eligibility or ineligibility for Free or Reduced lunches as an indicator of SES. The school district had only two categories of SES; eligible or ineligible for meal benefits. The ineligible category consisted of students who applied and were ineligible and all students who did not apply for meal benefits. This single indicator was not a reliable determiner of SES.

Ethnicity was identified as an independent variable. However, the recoding of the ethnicity as White and Non-White categories prohibited the analysis of data between African American and White students. A research study (Jencks & Phillips, 1998) revealed a gap in the achievement of African Americans and White students but the small numbers of African American students in this sample prevented any comparisons. The descriptive data showed that 17 students did not identify an ethnic category. These cases may have added to the data on ethnicity.

While the focus of the study was the IBMYP, students would have completed that program by the end of tenth grade. Thus, during the seven months prior to the ACT test being administered, IBMYP students who chose to would have begun the IB Diploma Program (IBDP). Although brief, the time in the IPDP could possibly have accounted for some differences in ACT scores.

The school renewal research emphasizes teacher competency. The IB authorization process for schools includes specialized professional development training for teachers. These professional development opportunities provide teachers in IB authorized programs with expertise that teachers of non-IB students do not have access to this training.

Recommendations

Based on the results of this study the IBMYP is recommended as a curriculum option that positively impacts student achievement. The data revealed that ACT Reading and Math mean scores of IBMYP students were higher than the scores of Non-IBMYP students when controlling for prior achievement. The results were statistically significant for Reading and Math. The results also revealed that the IBMYP worked equally well for all students regardless of gender or ethnicity. A review of the mean scores graphically displayed as line plots (see *Figures 5-8*) showed that IBMYP students scored higher than Non-IBMYP in terms on ACT Reading and Math. The data showed consistently higher ACT Reading and Math scores for IBMYP students.

The literature review revealed that a positive impact of IB participation was the acceptance of the IBD as evidence of a superior education and a predictor of post-secondary success (IBO, 2003). Thus, the IBMYP is recommended as a curriculum

choice that will positively impact opportunities for students who choose to continue in the IBDP and apply to universities.

Another positive impact of IB program participation highlighted in the literature stated that the IB program accommodates students with special needs. Therefore the IBMYP is recommended as an option for students with special needs who intend to pursue the IBDP and university acceptance. The IBMYP provides families and students with a curriculum choice that positively impacts achievement and increases the opportunities for acceptance to major universities.

However, the recommendations are offered with caution as the subjects in this study self-selected participation in the IBMYP. Differential growth in subjects can confound the interpretation of results (Stevens, 1999). Therefore, it is recommended that other highly correlated covariates (i.e. grade point average) are included in subsequent studies to strengthen the design and adjust for confounding factors.

In reference to ethnicity, families were allowed to select Biracial or Multiracial for the first time in the 2000 census data collection. Lopez, (2003) discussed the implications of the change in reporting ethnicity and examined the school-aged population and listed statistics by region and state. The data revealed that in Colorado 5.02% of the population was identified as Biracial (two races excluding Latino), 5.88% Biracial (Latino and Non-White) and 16.62% Biracial (Latino and White). The same article discussed a National Center for Educational Statistics survey that showed that 41% of school administrators reported that the five standard ethnic categories did not accurately reflect their student populations. It is recommended that the school district in this study consider the community demographics and reassess its policy on ethnic

descriptors.

While the difference in ACT Reading and Math scores of IB and Non-IB students yielded only tenable statistical differences, there are some implications for educational policy. Nearly two decades ago in *A Place Called School*, (1984), John Goodlad proposed ten goals to guide states in providing an educational system. The goals recommended schooling that helped students to develop academically, socially and with the ability to make career decisions. The components of the IBMYP are guided by the essential question prompt, what will I learn from this? The five areas of interaction are approaches to learning, community and service, homo faber, environment and health, and social interaction. The areas of interaction provide a thematic framework that is reflective of the guidelines to states advocated by the research of John I. Goodlad.

In *Educational Renewal* (1994) Goodlad recommended an essential undergraduate curriculum with six knowledge domains. The six areas are the nature of the human species; social, political and economic systems, the global village; the world as a physical system; the world as a biological system; evaluative and belief systems; and communicative and expressive systems. The six domains share commonalities with the IB five areas of interaction. The nature of the human species and homo faber are similar as are the global village and approaches to living. The comprehensive IB curriculum contains elements of the undergraduate curriculum recommended by Goodlad. The IBDP Theory of Knowledge course is reflective of evaluative and belief systems. The IBDP category of Individuals and Societies includes a broad range of content; economics, geography, history, Islamic history, information technology in a global society, philosophy, psychology and social and cultural anthropology. This content is reflective

of political and economic systems, the global village.

While the curriculum offered by the IBMYP is not the elusive silver bullet often sought by educators, it does provide a viable option for families and students. The IB programs are suitable for families seeking a comprehensive education. The curriculum lays a foundation for both academic and vocational post secondary career options. Therefore, it is recommended for the school district studied that the availability of IB programs be increased to accommodate more students.

The literature review exposed a misconception that IB programs are available only to gifted and talented or honors students. Gifted and talented is a special education category determined through an evaluation process. District data collection policies and educational privacy laws did not allow students in the study to be identified by special education categories. District policy does not require assessment and placement as gifted and talented as a prerequisite for acceptance in IB programs at any level. Enrollment capacity limits the number of students accepted in the IB programs offered in the school district studied. Because the IBMYP is offered as an honor's track in the school district and applicants are screened for prerequisite skills, the misconception is perpetuated. The IBO does not require gifted and talented or honor's designation as a prerequisite for acceptance. Annually students complete the IBD exams with accommodations for special needs (IBO, 2002). The IB programs are opened to all students who show evidence that they can complete the programs. In the Frequently Asked Question section the IBO stated that the program invites highly motivated students to participate. It is recommended that the school district advertise the availability of IB programs for all students and dispel the misconception of gifted and talented or honor's designation.

One junior high school in the district studied offers the IBMYP as a school-wide program. This is an important first step toward dispelling the myth that IB programs are suited for gifted and talented students only. In *Common Schools for the Common Weal: Reconciling Self-Interest with the Common Good*, (Goodlad, 1994), the idea that the self-interest of a few took precedence over the good of all was discussed. The school district in this study should actively recruit Non-White students and students from lower socio-economic groups to participate in the IB programs offered throughout the district. These efforts would promote the rigorous academic programs authorized by the IBO for the good of all students and not only for a selected few.

The disparities between funding for urban and suburban schools impact educational opportunities for students in these communities. The public schools in wealthy neighborhoods spend ten times more than public schools located in poorer communities (Darling-Hammond, 2004). Rural schools face greater levels of poverty than urban schools (Tompkins, 2004). Therefore, incidental expenses like the \$579.00 fee for assessments required to earn the IBDP should be considered when encouraging families from lower economic levels to participate in IB programs.

The IBNA Deputy Regional Director announced that federal funds are solicited to help defray the cost of IB exams. Under the Advanced Placement Reduction Act, the U.S. Department of Education has allocated funds to increase access to advanced academic courses for traditionally underrepresented students and has made funds available to reduce the cost of AP and IB exams since 1998 (Campbell, 2002). The original annual allotment of three million dollars has been increased to 20 million dollars under sections 1704 and 1705 of the NCLB Act (NCLB, 2001). Under current guidelines

local school districts, non-profit organizations and IB sub-regional groups can apply for funds.

Under the Advanced Placement Reduction Act school districts can remedy the fundamental flaws that resulted in educational inequalities for African American students and students from families with low incomes. It is recommended that fiscal incentives like the Advanced Placement Reduction Act be procured by school districts as an option for students in urban and rural schools to access advanced curriculum opportunities.

The NCLB Act mandates current school reform policies. The purpose of the NCLB Act is to provide a fair, equal, and significant opportunity for all children in America to obtain a high-quality education and demonstrate, at a minimum, proficiency on challenging State academic achievement standards and state academic assessments. On the other hand, School Renewal seeks to educate the next generation by providing a balanced academic and vocational curriculum, comprehensive teacher education and simultaneous community renewal for the betterment of our democratic society. The need to revive and sustain urban and rural communities has been tied to the need to improve the conditions of public education (Noguera, 2003; Tompkins, 2004).

The Children's Defense Fund (CDF) was founded over 30 years ago by Marion Wright Edleman (1999) a civil rights attorney and advocate for the poor in America.

The mission of the Children's Defense Fund is to Leave No Child Behind® and to ensure that every child a Healthy Start, a Head Start, a Fair Start, a Safe Start, and a Moral Start in life and successful passage to adulthood with the help of caring families and communities.

The NCLB Act reflects the letter of the law for attaining the goals of schooling in the

U.S. but the CDF addresses the heart of the matter. To address historical inequalities against African Americans and students from low-income families, simultaneous renewal of schools and communities is essential. A final recommendation is that the IBPYP, IBMYP and IBDP be implemented in urban and rural communities to provide America's neediest students with opportunities to access a balanced academic and vocational curriculum that develops democratic character.

Future Research

The purpose of this study was to assess the academic achievement of students in the IBMYP. The findings indicated that there is a pattern of IB students scoring higher than Non-IB students on the ACT Reading and Math tests when controlling for prior achievement. This empirical study adds to the research on IB programs and contributes to the discussion of optional curriculum models.

One area for future research is the academic progress of students in the school-wide IBMYP as compared to students in the honor's track IBMYP. The IBO policy requires the same curriculum in all IBMYP authorized schools internationally. Research in this area would provide important information on the IBMYP across different student ability levels.

The intent of the NCLB Act (2001) is to promote national school reform through standards-based instruction and high-stakes tests. The NCLB Act specifically proposes to ensure that all students earn a quality education with highly qualified teachers in every classroom. Research is needed to determine if the IB authorization process is aligned with the provisions of the NCLB Act.

The goals of schooling in the United States as articulated in the school renewal

research of John I. Goodlad (1984) are to provide for the academic, vocational, social/civic and personal development of individual students while developing democratic character in the next generation. It is essential that teachers charged with the responsibility of attaining these goals are trained in centers of pedagogy. The goals of schooling should be interwoven throughout the teacher preparation courses. Partnerships between university teacher education programs and school districts add to the renewal process as prospective teachers gain immediate experiences in the schools that serve the neediest students.

The findings of this study show that the components of the IB curriculum are reflective of recommended guidelines for a balanced curriculum. Therefore, longitudinal research is needed to track students who matriculated through the IBMYP and IBDP to assess the impact of those curricula on the post-secondary academic or vocational options pursued.

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APPENDIX A – SCHOOL DISTRICT CONSENT FORM



April 19, 2004

Deidre Magee
Colorado State University
Fort Collins, CO 80523

RE: Empirical Study of the International Baccalaureate

Poudre School District has given approval of your project to increase the knowledge base and the understanding of school administrators and educational researchers on the impact of the International Baccalaureate courses versus traditional and AP courses on student achievement. Approval for this project is based upon the following:

1. Chris Hayes, IB Coordinator, has agreed to participating in this study.
2. Results and data analysis will be available for any interested PSD administrator upon request.
3. Human Regulatory Compliance procedures will be followed to ensure confidentiality.
4. A final report will be submitted to interested PSD participants and will be available at the Research and Development Center.

If you have questions or need additional information, please call me at 491-4062.

Sincerely,

Ellyn Dickmann, Ph.D.
Director, Research, Development and Planning

C Gary Bamford
PSD Curriculum Generalists
Chris Hayes

APPENDIX B – HUMAN SUBJECTS RESEARCH APPLICATION

MEMORANDUM

TO: Brian Cobb, School of Education, 1588

FROM: Janell A. Meldrem, *Janell Meldrem*
Administrator for the
Human Research Committee

SUBJECT: **PROJECT APPROVAL**
Title: International Baccalaureate Middle Years Programs: An Empirical Study
Protocol No.: 04-242H
Funding Agency: N/A

DATE: September 13, 2004

I am pleased to inform you that the above-referenced project was approved by the Human Research Committee on September 2, 2004 for the period September 2, 2004 to September 2, 2005. Because of the nature of this research, it will not be necessary to obtain a signed consent form. Consent is waived under § __.116 (d) as secondary data analysis. **Approval is for data analysis of 596 records.**

A status report of this project will be required within a 12-month period from the date of approval. Renewal is the Principal Investigator's responsibility, but as a courtesy, you will be sent a reminder approximately two months before the protocol expires. The Principal Investigator will report on the number of subjects who have participated this year and project-to-date, about problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary form (H-101) is available from the Regulatory Compliance web page (see below). Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

It is the responsibility of the investigator to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research. It is also the investigator's responsibility to notify the Committee of any changes in experimental design, participant population, or consent procedures or documents. This can be done with a memo which completely describes the changes and their consequences (new consent form or cover letter, or altered survey instrument, for example). Students serving as Co-Principal Investigators may not alter projects without first obtaining PI approval. The PI is ultimately responsible for the conduct of the project. Upon completion of the project, an H-101 form should be submitted as a close-out report.

This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647 issued July 1, 2001. If approval did not accompany a proposal when it was submitted to a sponsor, it is the researcher's responsibility to provide the sponsor with the approval notice.

Please direct any questions about the Committee's action on this project to me for routing to the Committee.

xc: *Y*Deidre Houston Magee

PART A. COVER SHEET

New Protocol Resubmission

1. Project Title (identical to proposal or thesis/dissertation):
International Baccalaureate Middle Years Program: An Empirical Study
2. Principal Investigator (PI): *R. Brian Cobb, Ph. D.*
3. Telephone: *(970) 491-3168*
4. Department: *School of Education*
5. E-mail: *cobb@cahs.colostate.edu <mailto:cobb@cahs.colostate.edu>*
6. Co-Principal Investigator: *Deidre Houston Magee*
7. Telephone: *(970)491-7834*
8. Department: *School of Education*
9. E-mail: *dhmagee@lamar.colostate.edu <mailto:dhmagee@lamar.colostate.edu>*
10. If Co-PI is a student, is this project for a: Thesis Dissertation Neither
(Attach thesis/dissertation prospectus, abstract, or methodology chapter.)
11. Date recruitment anticipated to begin: *8/30/04*
12. Will this project be supported by external funds? Yes (answer 13-15) No (go to signatures)
13. Funding Agency (attach full proposal including budget):
14. Grant/contract number or PASS number:
15. Proposal deadline:

As the PI submitting this proposed research and signing below, I agree to conduct the research involving human subjects as presented in the protocol or modifications to it and as approved by the Department and the Human Research Committee; to obtain and document informed consent and provide a copy of the consent form to each subject unless this is waived by the HRC; to present any proposed modifications in the research to the HRC for review and approval prior to implementation; to retain records for the mandated lengths of time; and to report to the HRC any problems or injuries to subjects.

PI Signature: *R. Brian Cobb* Date: *8/26/04*

My signature below confirms that I have read this protocol and approve of this research.
Department Chair/Head or Acting (circle which) Signature

Signature: _____ Date: _____

PART B. ATTACHMENTS

Indicate those which apply to and are included for this protocol.

- Advertisements or posters
- Telephone scripts or other recruitment scripts
- Consent form(s), including parental permission and child assent for minors (model form available)
- Cover letter(s), on departmental letterhead, include main elements of informed consent, with faculty signature
- Letter(s) from counselors/specialists itemizing credentials, on letterhead
- Letter(s) of agreements from organizations, on letterhead, with original signatures
- Instruments/tests/photos to be used; note if purchased or provide documentation allowing use
- Debriefing materials
- Principal Investigator's current résumé, if one is not currently on file with the Regulatory Compliance Office
- Proposal copy or methodology section (only one copy)

OR

- Thesis/dissertation prospectus, abstract, or methodology chapter (only one copy)

I think this qualifies for the following type of review:

Exempt Category number _____ Expedite Category number _____ Full

Office Use Only:

Tracking number: _____

Type of Review: Exempt Expedite Full

Category # _____

FDA: Yes No Elapsed time:

Other:

Revised 7/02; supercedes all other versions

Part C. PROTOCOL INFORMATION

List every question by number, brief heading, and your response. Using a different font for your response aids the reviewer. Mark "N/A" if question does not apply to your protocol, but do not use N/A for benefit or risk questions. (Note: Focus your responses to approximately 3 pages. DO NOT replicate the proposal here.)

Objectives

1. Objectives of proposed research and background. (Will be used in assessing the risk/benefit ratio for participants. The hypotheses to be tested may be listed.)

The objective of this proposed study is to determine if there is a difference in the ACT scores of students who participated in the International Baccalaureate Middle Years Program and non participants.

Human Participants description

2. Source of participant population

The participant population includes 11th grade students at a high school located in the mountain west region of the United States. The Spring 2003 ACT scores of 11th grade students will be explored in this study.

3. Number of participants (for example, number of surveys to be distributed)
 2003 11th Grade students - 596 participants

4. Characteristics of participants (such as age, gender, student, disease conditions, behavioral abnormalities; affiliations or memberships). Why are these appropriate for this study? If excluding a category, such as minors, explain why.

Quantitative Section of Study

Participants are eleventh grade students' ages range from approximately 16-17 years.

Participants by gender and ethnicity

| Ethnicity | American Indian or Alaskan Native | | Asian or Pacific Islander | | Black (Not Hispanic) | | Hispanic | | White (Not Hispanic) | | Totals by Gender | |
|-----------------------------|-----------------------------------|---|---------------------------|----|----------------------|---|----------|----|----------------------|-----|------------------|-----|
| | F | M | F | M | F | M | F | M | F | M | F | M |
| Gender 2002-2003 Enrollment | 3 | 6 | 5 | 13 | 3 | 3 | 51 | 38 | 225 | 249 | 287 | 309 |

5. Recruitment procedures N/A

6. Recruiting materials (attach advertisements, posters, letters, scripts) N/A

7. Criteria for excluding participants involuntarily (such as "failed to keep food diary as required") N/A

8. Rationale for using “at-risk” populations (e.g., minors, pregnant women, prisoners)
N/A

9. Original letters of HRC agreement/approval from organization where participants sought (not concept support letters) N/A

10. Other matters pertinent to the human participants N/A

Procedures to be followed with participants (Methodology)

11. Specify location of study:

Data is archived in Poudre School District Student Assessment files.

12. List variables to be studied (what are you measuring or examining)

This study will compare academics outcomes (ACT scores) of International Baccalaureate Middle Year Program (IBMYP) students with matched samples of peers who were non- IBMYP participants.

Active independent variable - Participation in IBMYP and Non-IBMYP participant

Attribute Independent Variables - Gender, Ethnicity and Socio-economic

Dependent Variable - ACT Scores (Math and English composite)

Covariate - Levels Test Scores

13. Describe method of data collection (attach copies of surveys, instruments, etc. If using a copyrighted instrument, document authorization of use.)

Levels test and ACT scores are archived in Poudre School District Student Assessment files. Data will be requested from the Director of Student Data.

14. Describe activities involving participants, including frequency and duration of each activity (this could be an experimental stimulus, a survey, what questions would be asked in an interview, for example) Diagramming helps.

N/A

15. Describe equipment used with subjects, if any

N/A

16. Specify what factors will lead to stopping procedures causing physical or emotional stress.

N/A

17. Describe biological samples to be taken, method, and qualifications of individuals taking samples

N/A

18. Provide de-briefing method and materials for participants (required for concealed or deceptive research, desirable for other research).

N/A

19. Other aspects of the procedures

N/A

Risks to participants

20. Describe potential risks and assess the likelihood, severity, duration, and effects of each. (Use "no known risks" if none are anticipated.) **N/A is not an acceptable response for this question.** Common risks include:

- | | |
|-----------------------------------|----------------------------|
| a. physical injury | d. legal risk |
| b. psychological trauma or stress | e. loss of confidentiality |
| c. social/economic harm | |

While the proposed study has no known risks, it is not possible to identify all potential risks in an experimental procedure, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks. Student data is compiled using alias identification numbers. The researcher does not have access to actual student identification information.

21. Describe methods for minimizing risks. For example, document how potential psychological distress will be addressed, by whom, and with what credentials (provide letter of agreement to serve as a counselor)

There are no known risks in this study. It is not possible to identify all potential risks in an experimental procedure, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks. Student data is compiled using alias identification numbers. The researcher does not have access to actual student identification information.

22. Describe other methods, if any, that were considered alternatively and why they will not be used N/A

23. Other matters relative to risk to participants

N/A

Benefits to participants

24. Describe the direct benefits to these participants because of their participation. **N/A is not an acceptable response for this question.**

The data used in this study will inform the School District about the impact of the IBMYP on student achievement.

25. Describe the benefits accruing to the class of participants these individuals represent
Future students, parents and teachers will benefit from knowing if the International Baccalaureate Middle Years Program had an impact on student

achievement.

26. Describe the benefits accruing to society-at-large or other
The results will serve as a source of information for community members interested in student achievement based on participation in the IBMYP .

27. Other aspects of benefits to participants
Participants will benefit by providing data that will contribute to the discussion of the School Choice Programs available in the school district. The data may also be helpful in understanding issues around curricular decisions and selecting a course of study in a high school.

Consent procedures

28. Describe how potential participants will be informed about the project activities
N/A

29. Attach the consent form (*use reading level and terminology understandable to participants*) or cover letter, script, or other substitution for a consent form. Check 45 CFR 46.117(c) for criteria for waiver of documentation of consent, and 45 CFR 46.118(d) for waiver of consent entirely. If you employ these, provide complete justification of how this project meets the criteria.

N/A

30. Other aspects of the consent process

N/A

Confidentiality

31. Describe the method(s) used to protect the identity of individual participants. If a linked list is used, when will it be destroyed? *The participants' confidentiality will be protected by the School District alias identification number.*

32. Describe plans for maintaining data after study is complete. Faculty should keep a copy, so the data are auditable. Who retains copies, stored where/how, how is confidentiality maintained, for how long.

Copies of data will be maintained in the files of R. Brian Cobb for a period of three years after the completion of the study.

33. Describe how federal requirement will be met for consent forms to be retained for 3 years following the conclusion of the project. Typically this entails the faculty member storing the documents in locked storage.

Copies of data will be maintained in secured files of R. Brian Cobb for a period of three years after the completion of the study.

34. If audio- or video-taping, specify tape storage, use, and when and how disposition of the tapes will take place.

N/A

35. Other aspects of confidentiality

The school and school district will not be identified in the dissertation.