The National Math & Science Initiative's Partnership to Increase Student Achievement and College-Readiness

Investing in Innovation Fund Grant Application

May 12, 2010

COMPETITIVE PREFERENCE PRIORITIES

The Advanced Placement Training and Incentive Program (APTIP), as implemented and managed by the National Math & Science Initiative (NMSI), uses the College Board Advanced Placement curriculum and exam as a framework that provides students with high academic content, standards, and assessments. By increasing the number and diversity of students taking and passing AP courses and exam in math, science, and English, APTIP increases access to this rigorous coursework and sets a standard of high expectations, especially for high-need students.

Competitive Preference Priority 6--Innovations that Support College Access & Success.

1. NMSI's APTIP Increases Students' Preparedness & Expectations for College

Research shows that passing AP exams positively impacts college matriculation and graduation.[1] These studies find that an AP course that culminates in an AP exam grade of 3 or higher has a significant, positive impact on a student's likelihood of college success among academically comparable students. This is also true for low-income, African-American, and Hispanic students. This table shows 5-year college graduation rates in relation to AP courses:

Student Group	Passing AP Exam	AP Exam Grade of 1, 2	Took AP Course only
African American	28% higher	22% higher	16% higher
Hispanic	28% higher	12% higher	10% higher
White	33% higher	22% higher	20% higher
Low Income	26% higher	17% higher	12% higher
Not Low Income	34% higher	23% higher	19% higher

[1] Geiser, Saul & Santelices, Veronica, "The Role of Advanced Placement and Honors Courses in College Admissions." 2004. Research & Occasional Paper Series No. CSHE 4.04). University of California, Berkeley. Web. <http://cshe.berkeley.edu/publications/docs/ ROP.Geiser.4.04. pdf>; and Dougherty, C., Mellor, L., Jian, S. "The Relationship Between Advanced Placement and College Graduation." February 2006. National Center for Educational Accountability: 2005 NCEA Study Series, Report 1. Web. 4 May 2010. <http://www.nc4ea.org/files/ relationship_between_ap_and_college_graduation_02-09-06.pdf>.

Additional research shows that AP students who received credit for introductory college-level math and science courses earned the same or higher grades in the second-level college courses as students who took the introductory course in college.[2] Finally, a recent study shows that African-American and Hispanic students who were exposed to APTIP in particular were 69% and 83% more likely, respectively, to graduate from a four-year university than students who were not.[3] Thus, a high-quality, AP course in high school fortifies students for a successful transition into and graduation from college. NMSI's APTIP achieves statistically significant increases in students who pass AP math, science, and English (MSE) Exams.[4]

2. NMSI's APTIP Helps Students Understand College Affordability, Financial Aid, & the College Application Process

Issues of college affordability, including financial aid, and the college application process are imbedded in APTIP. Schools host parent nights that specifically address these issues with presentations on how AP makes college more affordable and discussions on the financial aid and college application processes. Many schools coordinate these APTIP parent nights with college nights where college representatives address the financial aid and college application process.

3. APTIP Provides Support to Students from Peers & Knowledgeable Adults

---

[2] Morgan, R. and Ramist, L. "Advanced Placement Students in College: An Investigation of Course Grades at 21 Colleges." ETS Statistical Report NO. 98-13. 1998. Web. 8 May 2010. <http://www.collegeboard.com/ap/pdf/sr-98-13.pdf>

[3] Jackson, C. Kirabo. "A Stitch in Time: The Effects of a Novel Incentive-Based High-School." Feb. 2010. Intervention on College Outcomes. Web. 4 May 2010. <http://www.nber.org/papers/w15722>. Paper is currently under review.

[4] Holtzman, Deborah. J. The Advanced Placement Teacher Training Incentive Program (APTIP): Estimating the Impact of an Incentive and Training Program on Students." 2010. Submitted for review to Educational Evaluation and Policy Analysis.

APTIP provides peer-to-peer support that creates a culture of college-readiness beginning in middle school. High school students with high visibility who are taking AP courses, such as football players, cheerleaders, and school leaders, talk with younger students about the benefits of AP and encourage those middle school students to expect nothing less than college success. In addition, Saturday student study sessions in high school are also designed to encourage student support and confidence as they bring together students from multiple schools. When traditionally underrepresented students sit next to other students during these sessions, they realize that they know just as much as their peers from other schools, that AP brought them equality of intellect.

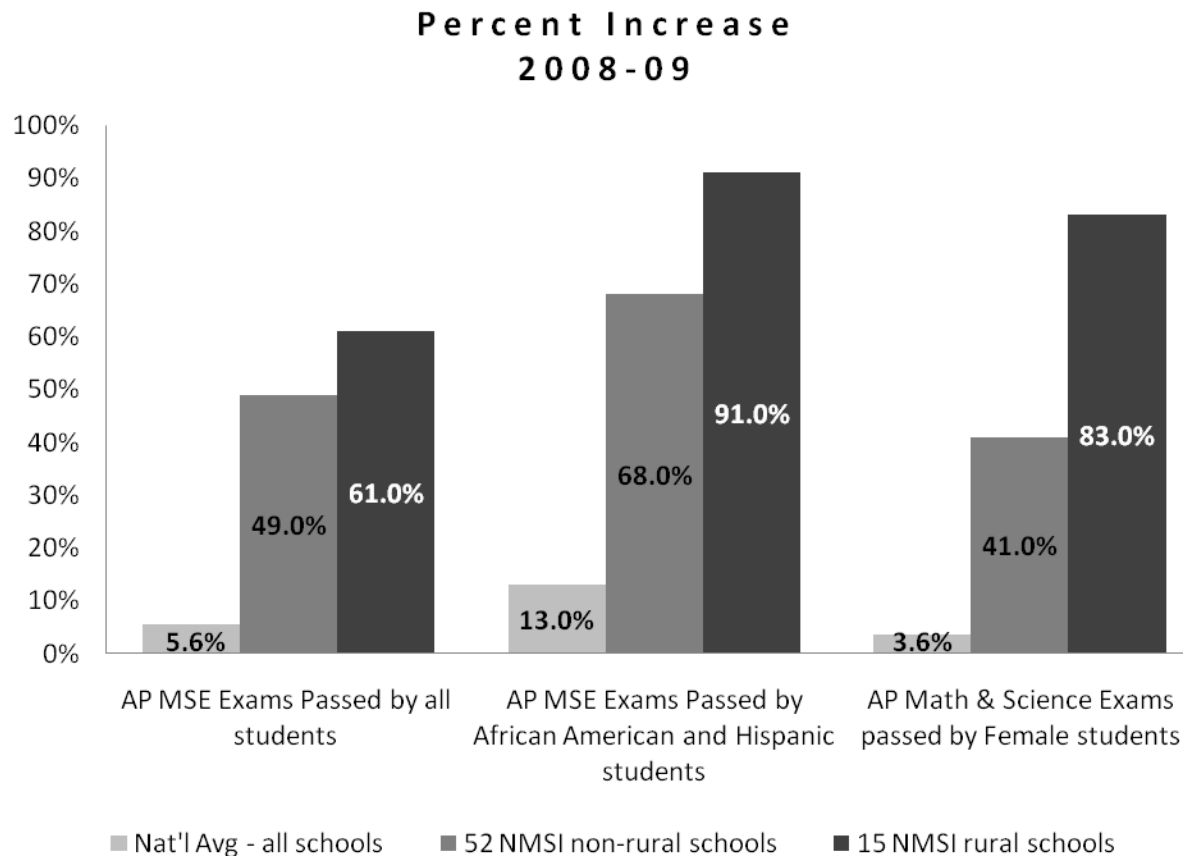
Teachers also provide support and knowledge to APTIP students. Saturday study sessions are led by the most knowledgeable AP teachers in the area, state, and country. AP teachers in the classroom also provide significant tutoring outside of class time, at least 40 hours per course. Each teacher at every level is mentored and monitored to ensure that they provide exceptional support and encouragement that creates a culture of college-readiness for all students.

Competitive Preference Priority 8--Innovations that Serve Schools in Rural LEAs

APTIP creates a culture of college-readiness that has particularly significant results in Rural schools. NMSI has always included Rural schools as roughly one-quarter of its APTIP partners. Thirty-seven of the 140 schools currently implementing APTIP (26%) are classified by the U.S. Department of Education as Rural. Similarly, of the 227 schools implementing APTIP this Fall, fifty-six, or 26% are classified as Rural. Finally, of the 293 schools named in this proposal 60 schools, or 21% are Rural.

These Rural schools have thrived with APTIP, improving student access, student achievement, and teacher effectiveness at a pace that even outperformed their city-type

counterparts. As the results for the first cohort[5] of 67 APTIP schools show below, APTIP created large percent increases for all students, and especially for African-American and Hispanic students, in passing AP math, science and English (MSE) exams in Rural schools across six states. Rural schools also outpaced city-type counterparts in the percentages of females taking and passing AP MSE exams. This means that the APTIP is closing the college-readiness gap for both African-American students and female students (for math and science) in Rural schools at an accelerated rate. NMSI's APTIP thus addresses the unique challenges of high-need students within Rural LEAs and provides a culture of college-readiness to Rural schools at a rate faster than counterpart schools in urban areas.



[5] NMSI's first cohort of APTIP schools began implementing the program in Fall 2008-2009.

TABLE OF CONTENTS

I. NEED FOR THE PROJECT & QUALITY OF PROJECT DESIGN 1

1. An Exceptional Approach to Fulfilling i3's Purpose 1

a. APTIP Addresses a Largely Unmet Need, Particularly for High-Need Students 5

i. Why AP?: Vertical Alignment with Rigorous College Standards 6

ii. AP Courses Are More Rigorous Than State Standards 8

b. Description of High-Need Students Served by APTIP in Partner LEAs 8

c. APTIP is a Program That Has Not Already Been Widely Adopted 11

2. APTIP: A GOAL-ORIENTED STRATEGY OF ACCOUNTABILITY TO ADDRESS ABSOLUTE PRIORITY 3 (Innovations that Complement the Implementation of High Standards & High-Quality Assessments) 11

a. NMSI's APTIP Replication Structure 12

b. APTIP Elements of Success 16

i. Program Management 16

ii. Student Support: Open Enrollment & Extra Time on Task 17

iii. Teacher Support: Teacher Training, Mentoring, & Vertical Teaming 18

iv. Incentives for Teachers & Students Based on Student Performance 19

c. APTIP is Expected to Achieve Its Program Goals, Objectives, & Outcomes 20

II. STRENGTH OF RESEARCH & SIGNIFICANCE & MAGNITUDE OF EFFECT. 20

1. The Jackson Studies of APIP 21

2. The Holtzman Study of APTIP 24

III. EXPERIENCE OF THE ELIGIBLE APPLICANT 27

1. NMSI's Past Performance Implementing Large, Complex, Growing Projects 27

2. NMSI's Record of Significantly Improving Student Achievement in Schools 29

3. The NSAs' Records of Significantly Improving Student Achievement in Schools. 30

4. The American Institutes of Research's Record of Significantly Improving Student Achievement in Schools 33

IV. STRATEGY & CAPACITY TO BRING APTIP TO SCALE 33

1. Feasibility of APTIP Replication 33

a. NMSI's Expertise & Scaling Strategy to Ensure Replication with Fidelity 33

b. APTIP's Success in Multiple Settings & Student Populations 36

2. Partnership Capacity For APTIP Replication 38

a. NMSI's Resources & Capacity to Continue Scaling APTIP Nationally 38

i. NMSI's Programmatic & Financial Resources 38

ii. NMSI's Personnel Capacity 39

b. NMSI State Agent Capacity to Implement APTIP 40

3. Number of & Cost Per Student to be Reached by APTIP 41

4. APTIP's Demonstrated Ease Of Use & User Satisfaction 42

5. APTIP Dissemination Mechanisms to Support Replication 43

V. SUSTAINABILITY OF APTIP BEYOND THE GRANT PERIOD 45

1. Support from Stakeholders Who Are Critical to Long-Term APTIP Success 45

2. APTIP's Multi-Year Financial & Operating Model & Accompanying Plan 46

VI. NMSI'S APTIP MANAGEMENT PLAN & PERSONNEL 47

1. NMSI's Comprehensive Fiscal & Program Management Plan 47

a. *Setting & Monitoring Milestones* 47

b. *NMSI's Electronic Management System, Created by Dell Perot Systems* 48

c. *NMSI's Budget Management System* 48

d. *NMSI's Programmatic Quality Control Management System* 49

2. Qualifications & Experience of NMSI Staff in Managing Program Scaling 50

3. AIR Staff Qualifications & Experience as Independent Evaluators 50

VII. PROJECT EVALUATION 51

1. Purpose of the Evaluation 52

2. Evaluation of Program Impacts 52

3. Evaluation of Program Implementation 57

VIII. CONCLUSION 59

I. NEED FOR THE PROJECT & QUALITY OF PROJECT DESIGN

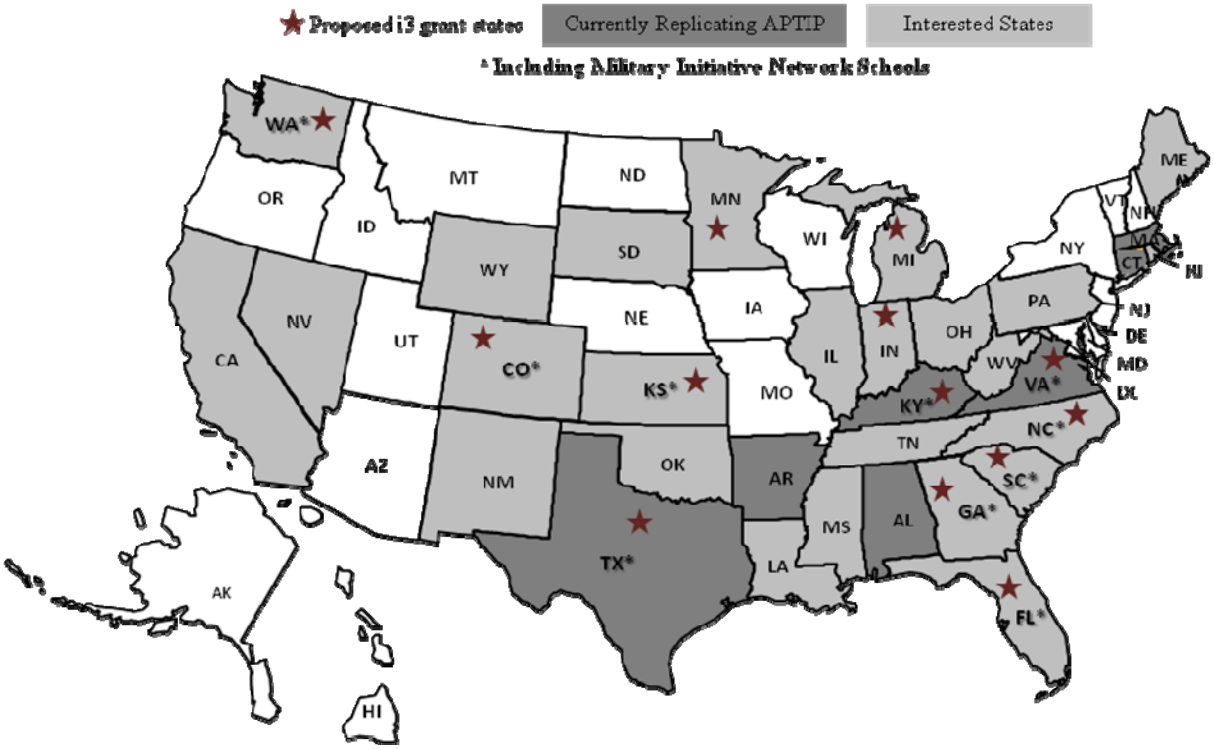
1. An Exceptional Approach to Fulfilling i3's Purpose

The National Math and Science Initiative (NMSI) shares a common purpose with the Scale-Up category of the i3 grant: to be **an agent of change** that scales proven programs nationally in order to improve student achievement. NMSI's Advanced Placement Training and Incentive Program (APTIP) is a proven program that can produce national impact. APTIP empowers high-need, traditionally underrepresented students to succeed in rigorous courses, thereby elevating participating schools' expectations for their students and transforming schools' cultures into ones of college-readiness. It does so by increasing the number and diversity of students taking and passing College Board Advanced Placement courses and exams in math, science, and English in order to provide students with academic content that is tied to high standards and high-quality assessments.[6] APTIP supports students and teachers by providing intensive teacher training, teacher and student support, vertical teaming, open and encouraged enrollment in AP courses, financial incentives based on academic achievement, specific and individualized annual achievement goals, and robust data collection to ensure accountability at all levels. APTIP sets a standard of high expectations and achieves it.

---

[6] See Dougherty, C., Mellor, L., Jian, S. "The Relationship Between Advanced Placement and College Graduation." February 2006. National Center for Educational Accountability: 2005 NCEA Study Series, Report 1. Web. 4 May 2010. <http://www.nc4ea.org/files/relationship_between_ap_and_college_graduation_02-09-06.pdf> (noting that schools should use AP exams, "not as a special set of courses for their already well-prepared students, but as a comprehensive program to prepare large numbers of students, starting in the early grades and including disadvantaged students, to be able to do college-level work before they leave high school"); see also Klopfenstein, K. "The Advanced Placement Expansion of the 1990s: How Did Traditionally Underserved Students Fare?" *Education Policy Analysis Archives, 12*(68). 2004. Web. 20 April 2010. <http://epaa.asu.edu/epaa/v12n68/> (analyzing the need to increase access to AP classes for traditionally underrepresented students).

In 2007, non-profits from 28 states applied to NMSI's Request for Proposal to replicate APTIP. NMSI selected non-profit partners in six states (Alabama, Arkansas, Connecticut, Kentucky, Massachusetts, and Virginia) to scale APTIP. NMSI seeks $49,976,886 in funding for this proposed i3 Scale-Up Grant to continue meeting the national demand for APTIP by scaling it further, to reach **406,438 additional students** in 206 high schools plus their feeder middle schools. First, NMSI will replicate APTIP in four states – Colorado, Indiana, Michigan, and Minnesota – by partnering with 153 LEAs and a non-profit in each state to establish an infrastructure that will support continued statewide expansion after the grant period. Second, NMSI is collaborating with the Military Child Education Coalition to establish the Military Initiative Network, which will implement APTIP in schools that serve a significant portion of children in active duty military families. The Military Initiative Network includes 13 LEAs and 50 schools in 10 states (Colorado, Florida, Georgia, Kansas, Kentucky, North Carolina, South Carolina, Texas, Virginia, and Washington). See Appendix A for a list of the 166 LEA partners.



APTIP's objectives are to increase student achievement,[7] college enrollment, and college completion. **APTIP accomplishes these objectives** by: making rigorous courses more accessible to high-need students; establishing an expectation that these students can succeed at that level; and supporting students and teachers who aim for those high standards. APTIP's track record reveals that even students who are not at the top of the class can (and want to!) rise to the challenge of advanced courses. **Independent research confirms**, based on past APTIP replication, that **expected outcomes of APTIP** are: (1) significantly increased numbers and diversity of students taking and scoring 3 or higher on (passing) AP math, science, and English (MSE) exams, and (2) increased college enrollment and persistence, especially for traditionally underrepresented students.[8]

NMSI identified APTIP as an effective program that should be scaled nationally when it was recommended by the National Academies in the landmark report, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. APTIP was implemented in 1996 in 10 schools in the Dallas Independent School District, the nation's 12th largest school district with a 93% free and reduced lunch enrollment. The demonstrated success of that pilot led to APTIP's replication in 26 LEAs in Texas with success in 92 schools of all sizes, demographics, and locations. NMSI's APTIP results to date demonstrate that APTIP can

---

[7] According to the Notice Inviting Applications, Student Achievement can be defined to include "measures of student achievement that are rigorous and comparable across classrooms." This application measures Student Achievement by the rigorous, national College Board Advanced Placement examination.

[8] Holtzman, Deborah. J. The Advanced Placement Teacher Training Incentive Program (APTIP): Estimating the Impact of an Incentive and Training Program on Students." 2010. Submitted for review to Educational Evaluation and Policy Analysis; Jackson, C. Kirabo. "A Stitch in Time: The Effects of a Novel Incentive-Based High-School." Feb. 2010. Intervention on College Outcomes. Web. 4 May 2010. <http://www.nber.org/papers/w15722>. Paper is currently under review; see also Section II below.

rapidly improve student performance by expanding this proven program. In the past two years, NMSI has taken APTIP to 140 schools across six states and has trained 3,585 existing AP and Pre-AP teachers in curriculum development, effective pedagogy, and specialized content knowledge. APTIP produced significant improvement in participating schools across six states: a 52% increase in AP math, science, and English (MSE) exams **passed**; a 72% increase in AP MSE exams **passed by African-American and Hispanic students**; a 48% increase in AP exams **passed by female students** in math and science. Additionally, $30.1 million in matching funds were raised by APTIP entities in each of the six states, indicating local commitment and investment and helping ensure future sustainability.

AP courses offer nationally recognized rigorous curricula and objective assessments with strong positive outcomes for students. Research shows that students who take and pass an AP exam are **more likely to graduate from college** than students who do not take an AP exam.[9] Furthermore, American students in AP math and science courses **outperform their international counterparts** on the Trends in International Mathematics and Science Study.[10] In short, APTIP carries out i3's purpose by increasing student achievement and college enrollment,[11] and NMSI and its partners can continue rapidly scaling this positive impact with an i3 award.

---

[9] See Jackson, C. Kirabo. "A Little Now for A lot Later: An Evaluation of a Texas Advanced Placement Incentive Program." forthcoming Journal of Human Resources. 45.3 (2010).

[10] Gonzalez, E. J., O'Connor, K. M., & Miles, J. "How well do Advanced Placement students perform on the TIMSS Advanced Mathematics and Physics tests?" June 2001. The International Study Center: Boston College. Web. 4 May 2010. <http://apcentral.collegeboard.com/apc/public/repository/ap01.pdf.ti_7958.pdf>.

[11] See Section II below for strong evidence supporting these conclusions.

a. APTIP Addresses a Largely Unmet Need, Particularly for High-Need Students

It is well-documented that our nation desperately needs to increase student achievement and college-readiness as well as college enrollment and success.[12] Despite the national publicity and attention focused on these needs, they stubbornly persist. The problem of low college-readiness and success rates is evidenced by the fact that, of students who were seeking a bachelor's degree in 2000, only 58% graduated within six years.[13] The problem is even more pronounced for African-American and Hispanic students: the gap between white students and African-American students is 18 percentage points, and the gap between white students and Hispanic students is 11 percentage points.[14] The academic intensity of programs offered in high school, however, is an indicator of college success, and AP courses contribute to increased academic intensity.[15] APTIP offers a **proven program** that increases access to and success in AP courses, thereby addressing the need to **increase academic intensity and student achievement in order to decrease the college-readiness gap**,[16] especially among traditionally underrepresented students.

---

[12] McKinsey & Company. "The Economic Impact of the Achievement Gap in American Schools." April 2009. Web. 4 May 2010. <http://www.mckinsey.com/App_Media/Images/Page_Images/Offices/SocialSector/PDF/achievement_gap_report.pdf>; Dougherty, 14 (noting "a major college preparation gap for low-income students).

[13] U.S. Department of Education, National Center for Education Statistics, 2001-02 to 2007-08 Integrated Postsecondary Education Data System, Fall 2001, and Spring 2002 through Spring 2008.

[14] *Id.*

[15] Adelman, C. "Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment." 1999. Washington, DC: U.S. Department of Education.

[16] For purposes of this application, the college-readiness gap is measured by the number of high-needs students who take and pass AP exams because the AP exam is one of the few nationally accepted proxies for "college ready."

Further, APTIP addresses these needs for an often overlooked group: high school students. "America's achievement gap worsens the longer children are in school."[17] Closing that widening rift remains a largely unmet need. NMSI refuses to accept that another generation of high school students will be allowed to fall short of achievable goals. APTIP's track record disproves the notion that high school students are beyond help, while also using vertical teaming to build a pipeline of students who enter high school prepared for rigorous coursework.[18]

i. Why AP?: Vertical Alignment with Rigorous College Standards

APTIP focuses on the AP curriculum because it has benefits that are relatively unique among high school courses: it is a **rigorous curriculum** that **represents college standards** and provides a **metric of evaluation that is common across all 50 states**. As a common assessment tool of rigorous, college-ready standards,[19] AP provides the structure necessary to bring high standards to national scale with efficiency and accountability for results that can be shown nationwide.

Some critics of AP suggest that the curriculum design and supporting pedagogy are not the best approach to producing student learning, especially for diverse students.[20] While this criticism may be true if AP classes are taught in the traditional college lecture style, it does not apply to APTIP. NMSI is mindful of the efficacy of teaching approaches that use active student engagement, hands on demonstration and experimentation, and challenging problem solving and

[17] McKinsey & Company, 10.

[18] Jackson, "A Little Now" 19.

[19] NMSI recognizes that states are currently developing state-led common standards and assessments that will also provide a common metric. But it will take significant time until they are fully implemented such that data can be collected and tracked nationally. In the meantime, the AP exam provides rigorous assessments that allow national data collection and analysis.

[20] See Wood, William, B. "Revising the AP Biology Curriculum." Science 25. September 2009: 1627-1628.

analysis. These approaches are ingrained and emphasized in APTIP's teacher training and course curriculum. Therefore, although the AP courses may reflect traditional, entry-level college courses in content, APTIP uses pedagogical approaches designed to maximize achievement among broad and diverse groups of secondary students.

AP's Vertical Alignment with College Standards: The AP curriculum provides more than vertical alignment with college standards; ***AP courses represent college standards***. Students in college who had merely *taken an AP course* in high school (without regard to whether they took or passed the AP exam) significantly outperform other college students, after controlling for SAT score and low-income status.[21] Other research found that "students' scores on the AP exams are remarkably strong predictors of performance in college."[22] In fact, students who pass AP exams had higher grade averages in intermediate college courses than did the non-AP students who had taken an introductory college course.[23] This shows that AP courses are, indeed, vertically aligned with and accurate representations of college standards.[24]

---

[21] Hargrove, L., Godin, D., & Dodd, B. "College Outcomes Comparisons by AP and Non-AP High School Experiences." 2008. College Board Research Report No. 2008-3. Web. 4 May 2010 < http://professionals.collegeboard.com/profdownload/pdf/08-1574_CollegeOutcomes.pdf>.

[22] Geiser, Saul & Santelices, Veronica, "The Role of Advanced Placement and Honors Courses in College Admissions." 2004. Research & Occasional Paper Series No. CSHE 4.04). p 18. University of California, Berkeley. Web. <http://cshe.berkeley.edu/publications/docs/ROP.Geiser.4.04. pdf>; see also Morgan, R. & Klaric, J. "AP Students in College: An Analysis of Five-Year Academic Careers." Research report no. 2007-4. 2007. The College Board: New York, NY; see also Dougherty, 14.

[23] Morgan 9; see also Dodd, B. G., Fitzpatrick, S.J., De Ayala, R.J., & Jennings, J.A. "An Investigation of the Validity of AP Grades of 3 and a Comparison of AP and Non-AP Student Groups." 2009. College Board Research Report No. 2002-9. New York: The College Board.

[24] Note also that of the 4,140 two- and four-year colleges and universities in the U.S., 3,667 have registered AP college credit acceptance policies with the College Board as of 2010. See "AP Credit Policy Info." The College Board. 2010. Web. 6 May 2010. <http://collegesearch.collegeboard.com/apcreditpolicy/index.jsp>

AP's High Academic Content, Achievement Standards, & Assessments: AP exams are academically rigorous even when internationally benchmarked. Universities in 57 other countries around the world accept qualifying scores in AP courses as college credit.[25] Students who take and pass AP Calculus or AP Physics exams ***ranked first*** on the international Trends in International Mathematics and Science Study (TIMSS) Advanced Mathematics and Physics test.[26] Even students who take AP Calculus or AP Physics but who do not pass the AP Calculus exam ranked better than all but France (in Calculus) and Norway and Sweden (in Physics) on the TIMSS. By using AP courses and exams as a tool for providing high-need students with strong academic content, APTIP controls quality by ensuring that all students, regardless of where the APTIP high school is located, will receive the same, rigorous, college-level instruction.

ii. AP Courses Are More Rigorous Than State Standards

The philosophy and learning goals of Advanced Placement courses are specifically designed to meet and are anchored in college-level expectations (see Section I.1.a.i); they, therefore, meet or exceed the rigor of all state secondary education standards as well as the proposed *College and Career Readiness Standards*.

b. Description of High-Need Students Served by APTIP in Partner LEAs

With this grant, NMSI will partner with 166 LEAs in order to bring APTIP to 206 high schools plus their feeder middle schools in 13 states and reach two categories of high-need students: (1) **traditionally underrepresented students**, including economically disadvantaged

---

[25] See *Id.*

[26] See Gonzalez.

students, African-American and Hispanic students, females in STEM fields, and those who perform at the lower end of achievement scales; and (2) **children from military families**.

Traditionally Underrepresented Students: APTIP increases student achievement and decreases the college-readiness gap by providing traditionally underrepresented students with access to high-quality instruction and support necessary to succeed in demanding coursework. Providing economically disadvantaged, African-American, Hispanic, and female students with access to rigorous STEM courses is particularly crucial as they are underrepresented in these fields. A March 2010 survey by the Bayer Corporation identified two of the top three causes or contributors to their underrepresentation in STEM: the lack of quality science and math education programs in poorer school districts (75%) and a persistent stereotype that STEM is just "not for girls or minorities" (66%).[27] APTIP addresses both of these obstacles by offering (1) high-quality math and science courses in high-needs schools, including low-income districts and (2) a proven program that has increased exams passed by female students (by 48%) and African-American and Hispanic students (by 72%) in the six states currently replicating APTIP.

The college-readiness gap also disproportionately affects African-American and Hispanic students, as shown, in part, by their underrepresentation in taking and passing AP exams. For every 1,000 African-American and Hispanic Juniors and Seniors in the U.S., there are *only 29.5 AP math, science, and English (MSE) exams passed*, compared to 107.9 exams passed for every 1,000 Juniors and Seniors of all ethnicities nationally. These numbers are even more pronounced in Colorado, Indiana, Michigan, and Minnesota. The following represents the number of exams passed by African-American and Hispanic Juniors and Seniors in each state for every 1,000 in

[27] Bayer Corporation. "Bayer Facts of Science Education XIV: Female and Minority Chemists and Chemical Engineers Speak about Diversity and Underrepresentation in STEM." Survey. March 2010.

the state, compared to the number of exams passed by all Juniors and Seniors in each state for every 1,000 in the state: **CO** – 29.0 v. 140.8; **IN** – 17.1 v. 69.0; **MI** – 15.2 v. 93.7; **MN** – 16.9 v. 101.4.

National Assessment of Education Progress (NAEP) outcomes also reveal the college-readiness gap. Only 2% of students participating in the Free and Reduced Price Lunch program (FRPL) scored at the advanced level in mathematics on NAEP exams in 8th grade in 2009 (compared to 11% of students without economic need), and zero percent of economically disadvantaged students scored at that level in high school in 2005. NAEP science exams in 2005 also reveal a gap: only 1% of FRPL students tested at the advanced level in 8th or 12th grades.

APTIP can help increase student achievement and close this college-readiness gap for traditionally underrepresented students in Colorado, Indiana, Michigan, and Minnesota. The schools that this application will reach in these states have an average student population that is 26.0% African-American and Hispanic and 32.3% economically disadvantaged, which is higher than the four states' total high school averages of 21.6% African-American and Hispanic and 24.0% economically disadvantaged. Moreover, even though the schools in these states are, on average, 26.0% African-American and Hispanic, only 4.9% of the passing math, science, and English AP scores were earned by African-American and Hispanic students.

President Obama articulated a vision that the nation will once again lead the world in college graduation rates by 2020. APTIP can help convert this dream to a new reality. The strong evidence in Section II shows that African-American and Hispanic students who were exposed to APTIP were 69% and 83% more likely, respectively, to graduate from universities than African-American and Hispanic students who were not exposed to APTIP. Given the Census Bureau's estimate that African-Americans and Hispanics will constitute a majority of Americans under

age 18 in about a decade, APTIP's success with these traditionally underrepresented groups should be seriously considered in relation to both the nation's long-term economic success and a lingering civic inequality that threatens to become a majority concern.

Children of Military Families: The proposed project also targets students whose families are active in the military. Per the U.S. Department of Education's i3 FAQ B-20 published on April 21, 2010, the definition of high-need student "may include children from military families." A recent research study conducted by RAND Health research staff entitled *Children on the Homefront: The Experience of Children from Military Families*[28] supports this conclusion. This study found that children in military families are at greater risk of being negatively affected academically.[29] As a group, 26.8% of the students in The Military Initiative Network LEAs come from military families, which amounts to almost 80,000 military-connected students. With full implementation of APTIP's consistent curriculum and assessments, children in military families, who frequently relocate, can build a future of college-readiness that will travel with them wherever military duty calls.

c. APTIP is a Program That Has Not Already Been Widely Adopted

While NMSI's APTIP is currently implemented in six states, and has been proven effective throughout those states, APTIP has not yet been widely adopted nationwide. This Partnership would use an i3 grant to help APTIP become a more widely adopted, national program.

2. APTIP: A Goal-Oriented Strategy Of Accountability To Address Absolute Priority 3 (Innovations that Complement the Implementation of High Standards & High-Quality Assessments)

[28] Chandra, Anita, et. al. "Children on the Homefront: The Experience of Children from Military Families." Pediatrics. 125:1 (2010): 13-22.

[29] *Id.*, 13.

APTIP complements the implementation of high standards and high-quality assessments. Previous rigorous research documents that APTIP significantly increases the number of public high school students, especially high-need students, taking and passing AP math, science, and English Exams, as well as attending and succeeding in college.[30] The studies that generated this evidence are described in Section II.

a. NMSI's APTIP Replication Structure

NMSI, the Scaling Coordinator: As a national entity and scaling entrepreneur, NMSI is well-positioned to guide immediate, expanded adoption of APTIP while ensuring fidelity to APTIP's model and also allowing creativity and collaboration with schools and LEA partners. NMSI scales APTIP to cohorts of schools across large geographical areas by leveraging characteristics that delineate natural groupings. This proposal focuses on (1) schools arranged by state's geographic boundaries and (2) the Military Initiative Network of schools serving concentrated numbers of students in military families. NMSI partners with non-profits in each state (NMSI State Agents, or NSAs) who manage APTIP activities in state groupings and act as NMSI's agent with the LEAs and the schools. NMSI's NSA partners for this proposed project are named and described in Sections III and IV. NMSI directly manages APTIP implementation in the Military Initiative Network.

For all geographic groupings, the replication and implementation methods are identical. NMSI will phase in APTIP implementation by scaling APTIP in annual cohorts of high schools plus their feeder schools as follows: 35 schools in 2010-2011; 80 schools in 2011-2012; 91 schools in 2012-2013. Another set of schools will serve as comparisons for the purpose of the evaluation (see Table 1 below). For the 150 schools involved in the evaluation, decisions about

[30] Jackson, "A Little Now"; Holtzman; Jackson, "A Stitch in Time"

which schools will begin in 2011-12, 2012-13, or will be comparison schools will be based on random assignment (see Section VII). Each cohort of participating schools will receive guidance and support from NMSI for a full three-year period, with the expectation that the schools will be self-sustaining after three years. Phasing in cohorts over time allows the scaling partners to master APTIP implementation with a manageable number of schools in the beginning and then use that capacity and experience to rapidly expand throughout the state or network of schools.[31] As scaling progresses, each school requires less direct support, and economies of scale develop.

Table 1: Roll-Out of APTIP, by Year

	Number of Schools	Condition	Year 1 2010–11	Year 2 2011–12	Year 3 2012–13	Year 4 2013–14	Year 5 2014–15
	35	**Cohort 1**	1st year of APTIP	2nd year of APTIP	3rd year of APTIP	*Self-sustained APTIP*	*Self-sustained APTIP*
Random	**80**	**Cohort 2**	Non-APTIP	1st year of APTIP	2nd year of APTIP	3rd year of APTIP	*Self-sustained APTIP*
Random	**91**	**Cohort 3**	Non-APTIP	Non-APTIP	1st year of APTIP	2nd year of APTIP	3rd year of APTIP
Random	**50**	**Control**	Non-APTIP	Non-APTIP	Non-APTIP	Non-APTIP	Non-APTIP

NMSI uses well-developed products and services that have proven successful in the current six replication states and that provide a framework for implementation, replication support, performance management, and quality control. NMSI supplies immediate access to a wealth of resources to direct replication, including a comprehensive Operations Manual (see Appendix H, Exhibit 1), guidance from experienced and successful National Content Directors in each discipline who mentor and train AP Teachers and Lead Teachers, and numerous professional

[31] Phasing in implementation cohorts throughout the grant period also supports the rigorous evaluation method described below in Section VII by facilitating the selection of and comparison between randomly chosen implementation and control schools.

development and teacher training sessions. NMSI also provides the following support services: (1) online and face-to-face support events; (2) APTIP design and start-up consultations; (3) Web-based data collection and reporting; (4) on-site consultations and data collection through regular, multi-monthly site visits; (5) coordination of teacher professional development and training sessions; and (6) Web-based instructional AP materials.

NMSI's personnel includes experienced replication staff who provide guidance, support, training and quality control to ensure faithful replication. They frequently and personally review and evaluate APTIP operations, resulting data, and goals in each region in order to ensure that implementation aligns with NMSI's expectations for quality, quantity, cost, and timeliness. NMSI then helps prioritize operational activities and documents a performance plan that includes measures, desired results, and standards. NMSI conducts ongoing observations and analyses of these outcomes to ensure that each APTIP's progression aligns with its predetermined milestones. By tracking these data and conducting multi-monthly, face-to-face meetings, NMSI detects very early if APTIP replication falls behind, and can quickly intervene with assistance to ensure that replication moves swiftly back on track.

Increasing Student Achievement, the School District Partners: The LEA is a critical partner that is responsible for providing the actual AP courses and teachers, and for cultivating the environment of rigorous expectations and a broad culture of opportunity for college-readiness. Most importantly, the LEA takes ownership and pride in this venture to improve student achievement. To that end, LEAs provide the following support: substitute teachers when AP teachers attend training; fees for all 10th graders' PSAT exams or equivalent; Lead Teachers' release time; and equipment match. Within the school districts, there are several crucial positions: Lead Teachers, AP Teachers, pre-AP Teachers, and Principals.

Lead Teachers are outstanding AP math, science, and English teachers (one per discipline) who serve as the hub of APTIP at that school, taking ownership for significantly increasing the number of students who enroll in AP courses and pass AP exams in that subject. The Lead Teacher shares high-quality instructional materials and apprises AP Teachers of opportunities for advanced level, content-focused professional development, while also mentoring AP and Pre-AP Teachers and modeling lessons as necessary. The Lead Teacher also develops a Vertical Team comprised of all AP and pre-AP Teachers at each school in their respective subject areas and facilitates and conducts study sessions for AP students.

AP Teachers are on the front lines of achieving annual increases in the number of students succeeding in AP. To that end, AP Teachers have specific goals each year for the number of students expected to pass AP exams and receive incentive payments if they reach their goals. Lead Teachers and other expert NMSI and/or NMSI State Agent staff monitor and support AP Teachers to help them reach these goals and to ensure their instructional methods meet the rigor and quality required by APTIP. AP Teachers also tutor students during the year, including during at least three, seven-hour weekend study sessions per year.

Pre-AP Teachers are the key to increasing the pipeline of students who enter high school prepared for AP-level coursework. They receive training in adding rigor, student engagement, inquiry-based instruction, and attend Vertical Team meetings to better understand the progression students require in order to meet AP requirements by high school.

Principals set the overall tone for school culture and are an integral part of APTIP success. They also take responsibility for significantly increasing the number of students who pass AP MSE exams by mitigating barriers, such as by resolving scheduling conflicts with AP course administration and assigning appropriate teachers to teach the AP and Pre-AP courses. Principals

also host parent meetings to generate interest and raise awareness of APTIP, and they serve as the community advocate for the goals of the program. Principals also receive specific goals for the number of students expected to pass AP exams and are provided incentives for school-wide success. These funds are most often used as additional resources to meet school needs.

b. APTIP Elements of Success

NMSI has identified the key factors of APTIP that are indispensible to implementing the program with fidelity to the original model. These Elements of Success (see Figure 1, right) are the foundation for successfully scaling APTIP, and, as such, NMSI requires strict adherence to each.

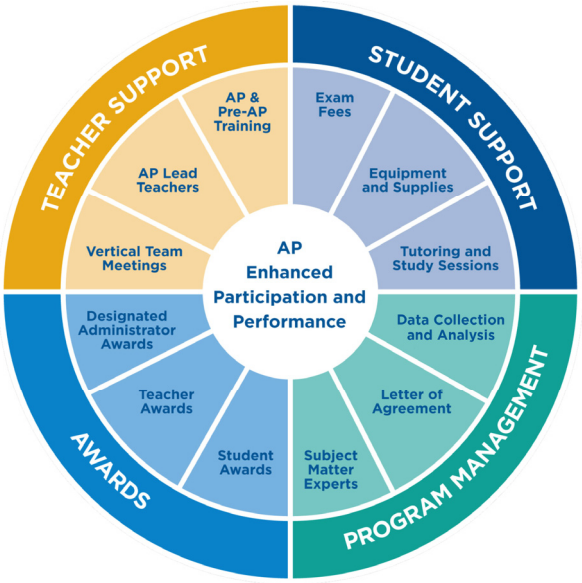


Figure 1.

i. <u>Program Management</u>

The primary management responsibilities include:

Assessment, Setting Goals, Planning: NMSI and the NSAs conduct a thorough, initial assessment of the current AP environment at participating schools, establish performance goals, and set plans for meeting those goals, including ensuring that the teachers are dedicated to APTIP, and evaluating and recommending appropriate amendments to school policies (such as grading, scheduling, and course admittance policies) in order to maximize success.

Letter of Agreement: Each LEA and school signs a formal Letter of Agreement with NMSI or an NSA that outlines the responsibilities of APTIP implementation. This clearly delineates responsibilities and establishes the expectations for faithful APTIP replication for all parties.

Ongoing operational aid is the largest responsibility and includes overseeing day-to-day implementation, monitoring APTIP according to NMSI's operational milestones, and providing direct assistance to the schools.

Policy support requires championing policies that promote NMSI's over-arching goal of improving access to quality education for all students, improving student achievement and student growth for all students, and closing the college-readiness gap. It also includes working with state and local governments to promote quality education by, in part, sustaining and incorporating APTIP into the state's education policy.

Data Collection. NMSI insists that APTIP remain a data-driven program that constantly evolves and improves based on feedback generated from each LEA. LEA partners must also participate in data collection by releasing (with FERPA compliance) class enrollment data, including school, course name, teacher, and student details, such as gender, ethnicity, socio-economic status, and grade level. These data are then used to measure and report outcomes. (See Section VI.1 for NMSI's complete data collection, management, and analysis structure).

ii. Student Support: Open Enrollment & Extra Time on Task

The culture at APTIP schools must frequently be transformed into one that recognizes that students can often achieve well beyond our expectations. Accordingly, APTIP schools must establish an inclusive environment that encourages students to enroll in rigorous courses. While some schools require students to prove their way into challenging courses, which limits enrollment to just the top few, this policy erroneously reinforces stereotypes about what AP students "look like." In contrast, APTIP schools rethink their AP culture by adopting **open enrollment** and **recruiting more students, including high-need students,** to AP courses, thereby allowing many more students to succeed at that level.

This culture shift must be accompanied by tangible academic support so that students have tools to succeed in this new environment of high expectations. As such, the APTIP model includes at least three AP extracurricular study sessions per subject, which are led by state and national experts, as well as after-school tutoring, at a minimum of 40 hours per teacher per year. The strong evidence provided in Section II below suggests that this academic support, in combination with APTIP's other Elements of Success, generates measurable increases in student achievement and creates a culture of college-readiness.

iii. Teacher Support: Teacher Training, Mentoring, & Vertical Teaming

APTIP is more than a rigorous curriculum: APTIP insists on training teachers with relevant pedagogical methods and providing continual support of teachers as they adopt these skills. This intensive teacher support and training is critical to building the capacity and in-depth content knowledge required to successfully teach AP courses. NMSI ensures **national quality control and high standards** for APTIP training by either directly providing training or working with the College Board, which approves professional development instructors who have demonstrated and met high standards of performance in teaching rigorous AP courses. APTIP's teacher support includes (See Appendix H, Exhibit 2 for a full description of teacher support):

- A State or Network Content Director for each discipline who coordinates the subject area's curriculum to ensure consistency across the state or network;
- Summer Sessions for Lead Teachers regarding monitoring and mentoring for APTIP;
- Two content-based training sessions and one workshop to ensure quality and standards for AP Teachers;

- Vertical Teams in each APTIP subject, so that instructors, beginning in 6th grade, can understand how to teach the building blocks that prepare students to comfortably achieve in the rigorous AP courses they will be offered in high school;
- Pre-AP training provided by Laying the Foundation; and
- Continuous monitoring with guidance, feedback, and training by Lead Teachers and State Content Directors.

iv. Incentives for Teachers & Students Based on Student Performance

Offering incentives for performance and extra pay for extra work sends a message to students and teachers alike that success in rigorous courses is valued. They focus the attention of all involved in a student's academic achievement on meeting very high standards, and they acknowledge that accomplishment. In recognition of the fact that teachers take a risk by teaching more rigorous courses with students who traditionally have not been represented in AP classes, incentives also reward teachers for their dedication to increasing student achievement and encourage them to participate in the professional development necessary to teach to a broader array of students.

Importantly, research shows that students who participated in APTIP in high school actually attended college in greater numbers, had improved college GPAs, and that African-American and Hispanic students were more likely to stay in college beyond their freshman year.[32] Concerns that incentive-based interventions may lead to "teaching-to-the-test" and cheating were not realized, while the benefits of the APTIP incentives that induce students to reach for higher standards lasted in post-secondary education.[33] APTIP's incentives are, therefore, an effective

[32] Jackson, "A Stitch in Time," 32.

[33] *Id*.

means of helping students transition to standards and assessments that measure, and indeed improve, students' progress toward college-readiness.

Incentives for AP Teachers include a bonus of $100 to each math, science, and English AP teacher for each student who appears on their roster and passes the AP exam; an opportunity to earn a $1,000, $2,000, or $3,000 bonus based on pre-determined thresholds of students in their classes who pass AP exams; and a stipend of $500 for the extra work teachers contribute.

Incentives for AP Students include a bonus of $100 to each student who passes an AP math, science, or English exam; payment of the entire cost of the AP exam fee for low-income students and one-half of the cost of the AP exam fee for other students.

Incentives for School Administrators include a bonus of $3,000 based on pre-determined thresholds of students passing AP math, science, and English exams for their schools.

c. APTIP is Expected to Achieve Its Program Goals, Objectives, & Outcomes

NMSI expects APTIP to achieve its goals, objectives, and outcomes because APTIP has a record of increasing access to rigorous instruction, student achievement, and college-readiness under both statewide and national scaling implementations. NMSI's accomplishments and results on these outcomes are described in detail in Sections II and III. As Section II affirms, NMSI's expansion of APTIP is expected to continue producing the statistically significant increases in student achievement and college-readiness that APTIP has produced since 1990.

II. STRENGTH OF RESEARCH & SIGNIFICANCE & MAGNITUDE OF EFFECT

Strong evidence demonstrates that APTIP increases student achievement, decreases the college-readiness gap, and increases college success. Two recent quasi-experimental studies examined the impact of APTIP, and both found positive effects (studies attached at Appendix H, Exhibit 3). The first study (Jackson 2007) had a follow up component (Jackson 2010) with a

broader set of outcomes that analyzed data from the Advanced Placement Incentive Program (APIP). APIP has been implemented in Texas since 1990, and NMSI now replicates it in other states (renamed APTIP). Since APIP and APTIP are the same program—the same Elements of Success and replication strategies are applied in both—the findings from these Jackson studies apply to NMSI's current APTIP model. The second study analyzed data from NMSI's scaling of APTIP in six states.

1. The Jackson Studies of APIP

Jackson's (2007) first study found that APIP is associated with increased student achievement and college enrollment, as demonstrated by **robust positive effects on AP course enrollment, SAT/ACT scores, and college matriculation** for APIP students.[34] The study used a differences-in-differences (DID) regression approach that examined cohorts within and across APIP schools. The sample included the 1,438 schools in Texas during 1994-2005 that had SAT/ACT data and was drawn from several publicly available sources, including Texas's Academic Educational Indicator System, the Common Core of Data (CCD), and the Texas Higher Education Coordinating Board. Descriptive analyses showed that APIP schools had higher proportions of African-American, Hispanic, Limited English Proficient, and economically disadvantaged students than non-APIP schools.

Because APIP and non-APIP schools were not randomly selected, Jackson accounted for the selection process by (1) examining cohorts from the same school before and after APIP adoption and (2) comparing a carefully matched set of non-APIP comparison schools, which were interested in adopting APIP, over the same time period. By examining cohorts from the same high schools over time, the design eliminated within cohort self-selection issues, e.g., the self-

[34] Jackson, "A Little Now" 23.

selection that makes some students more likely to enroll in AP courses than others. By including a carefully matched set of comparison schools that did not adopt APIP, the design accounted for any policy or demographic changes that might have occurred within or across schools over time.

Jackson's (2007) study design was also strengthened by taking advantage of the staggered roll-out of APIP among the schools. The fact that not all schools implemented APIP at the same time produced treatment and comparison groups that were not only similar in terms of observable characteristics, but also similar in their desire to adopt APIP. This aspect increases the internal validity of the design and confidence in the causal inferences derived because it addressed the endogeneity concern that adopters and non-adopters might be different in ways that cannot be captured in a statistical model.

Using this strong, quasi-experimental design, Jackson (2007) found that **APIP produced significant increases in AP course enrollment, SAT/ACT scores, and college matriculation, and that these effects continued to increase over time**.[35] To measure changes in AP course enrollment, Jackson (2007) compared AP enrollment to non-AP course enrollment in program schools and found that enrollment increased by 6% after the first year of APIP, 12% after the second year, and 21% in subsequent years. To measure differences in SAT/ACT scores and college matriculation, comparisons of APIP schools to non-APIP schools were conducted and found that the number of APIP students scoring above 1100/24 on the SAT/ACT increased each year, by 19% after the first year of APIP, 22% after the second year, and 33% after the third year. In addition to significant positive effects on average student outcomes, Jackson (2007) notably found that APIP had similarly positive effects for African-American and Hispanic students taking AP exams and scoring above 1100/24 on the SAT/ACT. In a further analysis of

[35] Jackson, "A Little Now" 4.

the same samples, Jackson (2010) reported that the number of **students who earned a passing score on an AP exam increased immediately**, with 45% more APIP students passing than non-APIP students by the fourth year.

Jackson's (2010) research clearly indicates that APIP's benefits also extended beyond high school to college enrollment, which increased by about 9% for APIP students in comparison to non-APIP students. Moreover, Jackson's (2010) second study found that the positive effects of the program endured through college. Using the same rigorous design and sample of students from APIP and non-APIP comparison schools, Jackson (2010) examined longer-term effects of APIP. The results demonstrate that the ***increases in student achievement caused by APIP persist into college*** with particularly positive effects on college outcomes for African-American and Hispanic students.[36] Not only did APIP increase college matriculation by 8% relative to non-APIP students, APIP students also performed better as college freshman: their average freshman GPA was 0.09 points higher than non-APIP students. Additionally, 22% more APIP students persisted in college than non-APIP students,[37] indicating APIP improved the overall educational attainment of participating students.

The study found that the benefits of APIP for African-American and Hispanic students were even more significant. **African-American and Hispanic students who participated in APIP were more likely to graduate from a four-year college than non-APIP students.**[38] This likelihood increased with each year that schools participated in APIP. By the fourth year,

---

[36] Jackson, "A Stitch in Time" 27-28.

[37] Jackson classified college persistence as persisting to the sophomore year, since the majority of college attrition occurs in the freshman year.

[38] Jackson, "A Stitch in Time" 28.

African-American and Hispanic students were 2.5% and 2.7%, respectively, more likely to graduate from a four-year college than non-APIP students. This represents increases in graduation rates of **69% for African-American students and 83% for Hispanic students**.[39]

2. The Holtzman Study of APTIP

Holtzman (under review)[40] focused on the APTIP program currently operational in six states. This study found that **APTIP significantly increases student achievement**, including the percentages of students taking AP exams and scoring 3 or higher on AP exams. This study used a comparative interrupted time series design (CITS) to compare 64 schools in the six states that implemented APTIP in 2008-09 with 128 non-APTIP schools matched on prior performance. Holtzman examined 10 AP exam-related outcomes: high schools' percentages of students (a) taking and (b) scoring 3 or higher on at least one AP exam in each of the following five areas: (1) mathematics; (2) science; (3) English; (4) mathematics, science, or English; and (5) any subject area. Percentages for each of the 10 outcomes were calculated for every high school, including non-APTIP schools, in each of the six states by dividing each school's count of students on the AP outcome by the school's total enrollment in grades 11 and 12.

From a potential comparison pool consisting of 1,069 schools, 128 comparison schools (two per APTIP school) were selected. The comparison schools were identified using a regression-based approach where the AP outcomes of interest for spring 2008 (the year prior to implementation) were regressed on the outcomes for spring 2007 and spring 2006. The resulting regression parameters were then used to predict a hypothetical (not actual) 2009 score for each school based on the 2008 and 2007 outcomes. These hypothetical 2009 scores represented an

[39] *Id.*

[40] Holtzman.

estimate of how schools would have performed, based on their own prior trends, in the absence of APTIP in spring 2009 (the year of APTIP implementation). Each APTIP school was then matched with the non-APTIP schools having the next-highest and next-lowest predicted 2009 scores.

The 128 selected comparison schools closely resembled the 64 APTIP schools on every one of the 10 outcomes of interest in all three pre-implementation years: 2006, 2007, and 2008. Figures 2 and 3 below illustrate the similarities between the APTIP schools and the comparison schools prior to 2009. The equivalence of the groups is clear.

Holtzman (under review) based the CITS analysis on the sample of 64 program and 128 non-program schools to analyze the impact of APTIP on each of the 10 outcomes. This method, one of the strongest quasi-experimental designs available, statistically analyzes the post-implementation outcomes of the treatment schools in relation both to their own performance prior to implementation and to the performance of comparison schools that never implemented APTIP. The analyses included fixed effects for years and for schools, thereby controlling for systematic variations in the percentages across time and for schools' differing background characteristics.

In all five of the subject areas/combinations, results show that **implementation of APTIP is associated with large, statistically significant increases in the percentages of students taking AP exams**. For example, implementation of APTIP was associated with a 12-point increase—more than a full standard deviation—in the percentage of students taking at least one mathematics, science, or English AP exam.[41] The percentage increases associated with APTIP implementation for taking at least one exam in math, science, and English, individually, were 3

[41] Holtzman, 13.

points, 6 points, and 9 points, respectively.[42] The latter two, again, represented increases of more than a full standard deviation.

The results for MSE AP exam-taking are shown in Figure 2. The sharp uptick of the APTIP schools to the right of the vertical line, which represents the time of APTIP implementation, indicates the positive effect of the program on this outcome. A similar, statistically significant pattern was also observed for AP exam taking in each subject individually and for all AP exams.

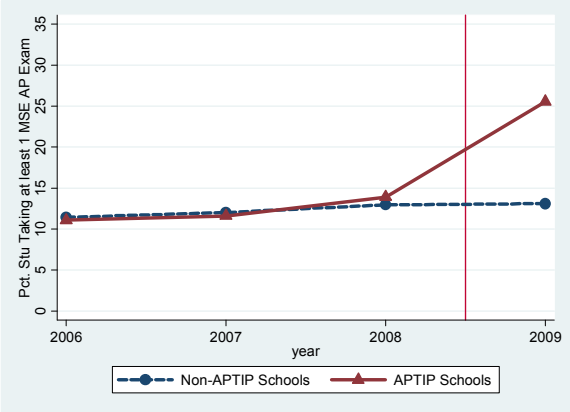


Figure 3: Percentage Taking Math, Science, or English AP Exams, APTIP Average (n=64) vs. non-APTIP Average (n=128)

Holtzman (2010) also found **strong, statistically significant positive impacts of APTIP on AP exam passing** (scoring a 3 or higher). The percentage point differences due to APTIP were 0.7 for math, 0.9 for science, 2.4 for English, and 3.0 for all three subject areas combined. For the latter two, these results translate to effect sizes of approximately 0.5 (half a standard deviation[43]). These results are notable because, while the effects on exam-taking clearly indicate that more students take AP exams in APTIP schools than in non-APTIP schools, it is also true that exam passing rates increase as well, despite the broader array of students taking the exams. Additional analyses also suggested that the increases in the percentages of students passing were

[42] Holtzman, Table 6.

[43] Calculated based on the pooled standard deviation for the sample of 192 schools that includes the APTIP schools and all of the potential matched comparison schools in Spring 2008 (the year prior to APTIP implementation).

partly due to the increased percentages taking the exams. Taken together, these results suggest the possibility that, while access is expanded by APTIP, APTIP also offers support to help an expanded pool of students succeed. Figure 3 shows the results on MSE exam-passing.

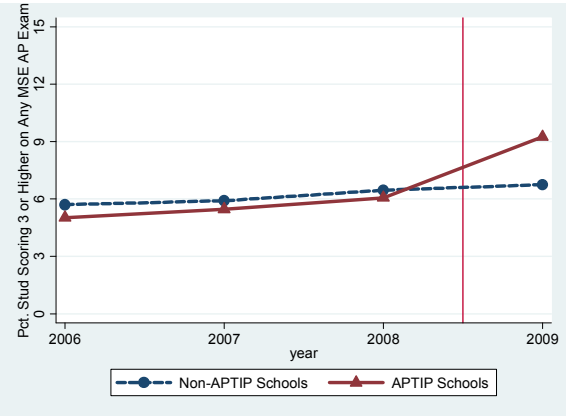


Figure 3: Percentages Scoring 3 or Higher on MSE AP Exams, APTIP Average (n=64) vs. non-APTIP Average (n=128)

In sum, Holtzman (under review) demonstrates ***APTIP's substantial and statistically significant effects on AP-related outcomes***. Taken together, the results of the Holtzman and Jackson studies suggest that **the project proposed in this application is expected to have significant effects for students on average and particularly for students traditionally underrepresented in AP courses**.

III. EXPERIENCE OF THE ELIGIBLE APPLICANT

1. NMSI's Past Performance Implementing Large, Complex, Growing Projects

NMSI has a strong record of effectively and efficiently implementing large, complex, and rapidly growing projects to positively impact students. This experience is demonstrated through NMSI's: (1) ability to quickly scale two complex programs simultaneously; (2) development of a unique scaling methodology that ensures efficiency and fidelity to the program model; and (3) collaboration with a variety of stakeholders who support NMSI's scaling initiatives.

NMSI has quickly scaled two large and complex programs to six states and 13 universities in just three years, putting itself on a steep trajectory of producing increased student achievement

and STEM teacher preparation. Less than three months after becoming operational, NMSI had already issued two national requests for proposals (for APTIP and UTeach[44] replication), and just five months after that, NMSI began implementing both programs across 13 universities and 67 schools in a total of 13 different states. The 13 universities have enrolled approximately 2,697 students in UTeach programs through this spring. In the past year, the number of UTeach university partners increased to 22. NMSI has also increased the number of schools replicating APTIP in the current six states each year: 140 schools now implementing; approximately 227 schools that will be scaling APTIP by next fall; and over 180,000 students currently impacted by APTIP. NMSI has also trained 3,585 AP and Pre-AP teachers in that time. If the NMSI high schools were a state, they would have the 33rd largest student enrollment and the 28th largest African-American and Hispanic student enrollment.

NMSI truly sets itself apart in its past performance replicating these programs using a systemic scaling model, described in detail below in Section IV.1.a. This model ensures that replication sites produce the same or better results than the original pilot. NMSI's success in replicating and maintaining program fidelity has produced quantifiable results, described in Sections II and III, and proves that NMSI can successfully scale APTIP to generate the desired student outcomes across a variety of settings.

Finally, NMSI's past performance in collaborating with numerous partners, stakeholders, and government entities is a strong show of confidence in NMSI's proven expertise in national scaling. NMSI has raised over $155 million from and formed partnerships with respected private entities such as the Bill & Melinda Gates Foundation, the Michael and Susan Dell Foundation, the Carnegie Corporation of New York, Perot Systems (now Dell Perot Systems), IBM, Texas

[44] The UTeach program is an innovative, four-year plan for undergraduate students to obtain secondary teaching certification while concurrently earning a mathematics or science degree.

Instruments, Exxon Mobil, and Lockheed Martin. NMSI has also helped the six states currently replicating APTIP raise an additional $30.1 million in matching funds from local supporters. NMSI's past success in rapidly scaling complex programs is also demonstrated by the fact that 10 states included at least one NMSI program in their RTT applications, helping nine of those states receive Competitive Preference Priority points for their STEM initiatives. President Obama has also recognized the impressive past performance of NMSI by highlighting NMSI in his January 6, 2010 speech regarding his Educate to Innovate campaign.

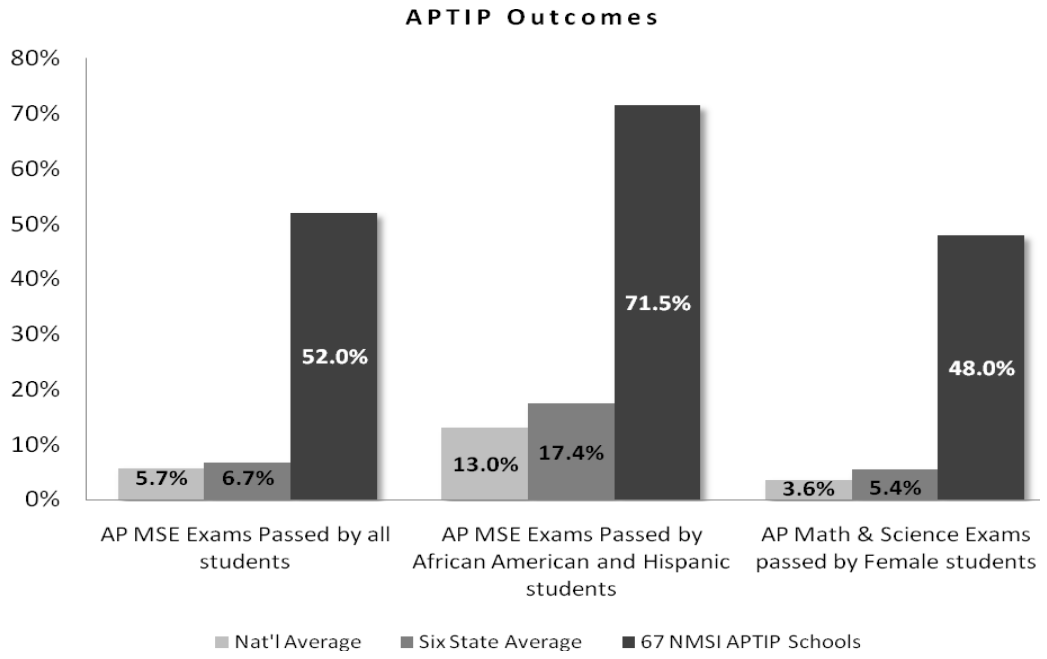
2. NMSI's Record of Significantly Improving Student Achievement in Schools

NMSI's past performance implementing large, complex, rapidly growing projects has also translated into significant results, some of which have already been described. Further examination of the same schools as those in the Holtzman study (Section II) against state and national averages puts APTIP's impact in even greater context. In those same 67 APTIP schools, NMSI's APTIP created statistically significant increases in student achievement[45] and produced a **52% increase in AP math, science, and English (MSE) exams passed**, ***which is over nine times higher than the national average***. APTIP also fosters a culture of college-readiness by increasing participation in college-level work. In just the first year, over 12,500 AP MSE exams were taken, *which is an 80 percent increase over the previous school year.* While students have not yet taken AP exams for the current academic year, NMSI expects similar or better trends, with students taking over 30,000 AP MSE exams in the 140 APTIP schools this year. To put that figure in perspective, only 13 other states recorded over 30,000 AP MSE exams taken in 2009.

Significantly, these increased expectations and the culture of college-readiness reaches high-need students and helps close the college-readiness gap that continually holds back traditionally

[45] See discussion of Holztman (under review), above at Section II.

underrepresented students. APTIP has led to impressive increases in participation and performance for traditionally underrepresented students, producing a 134% increase in AP MSE exams taken by African-American and Hispanic students, and a 72% increase in AP MSE exams passed by African-American and Hispanic students. APTIP's impact on AP MSE exams passed by African-American and Hispanic students is almost ***five and a half times*** the national average increase of 13%. APTIP has a similar impact on female passing rates, initiating a 48% increase in female passing scores in AP Math and Science exams, which is ***over 10 times*** the national increase of 3.6%.



As these results and the strong evidence described in Section II above demonstrate, not only does NMSI have significant experience and strong past performance in bringing the large, complex APTIP to national scale, NMSI produced increases in student achievement and growth, especially for high-need students.

3. The NSAs' Records of Significantly Improving Student Achievement in Schools

As described in Section I.2, NMSI conducts statewide scaling by working with NMSI State Agents (NSAs) who act as NMSI's intermediaries. NMSI selected these partners, in part, because they each have strong leadership, determination to close the college-readiness gap, and a record of significantly improving student achievement in schools. These qualities provide a solid foundation for producing results, such as those described above.

Notre Dame University has a history of significantly improving student achievement in schools throughout Indiana. For example, Notre Dame's Upward Bound (NDUB) program has helped approximately 5,000 first-generation and low-income students in the South Bend community successfully graduate from high school and enroll in a post-secondary institution. NDUB has significantly increased student achievement: 100% of NDUB scholars graduate from high school, and 90% of NDUB scholars enroll in a college or university. Additionally, Karen Morris, the NSA President in Indiana, helped design, develop, and implement professional development activities that provided guided inquiry pedagogical training to over 140 elementary teachers in the School City of Mishawaka through a Math-Science Partnership. The professional development activities included one-week workshops, classroom visitations, assessment programs, and modeling of instruction. At the beginning of the Partnership period, 44% of 5th grade students passed the state-wide science assessment (ISTEP+ test), but by the end of the Partnership period, 66% of 5th grade students were at passing.

The Michigan Mathematics & Science Centers Network (the Network) has a strong record of significantly improving student achievement through its work with schools and teachers across Michigan. Working in collaboration with the Michigan Department of Education to bring the High School Math and Science Success program to Michigan schools, the Network provides to high school math and science teachers professional development opportunities that improve

teaching and learning consistent with the Michigan Merit Curriculum and the associated Michigan Merit Exam. In the 2007-2008 school year, the Network conducted training for 636 high school mathematics teachers and 580 high school science teachers. Students of the teachers who participated in the professional development showed an increase in scores for both math and science across the Network: in math, 90% of the Centers showed a statistically significant increase; in science, 87% showed a statistically significant increase.

The Colorado Legacy Foundation (CLF) was founded by the Colorado Department of Education (CDE) and works as their non-profit, strategic arm. In a unique alliance, CDE selected CLF to take priority programs to statewide scale. As part of this collaboration, CLF designed and implemented a school- and district-based grant program, currently serving 10 districts and more than 24,500 students. In addition to impacting schools and districts with programs that significantly improve student achievement, the CLF provides technical assistance and regional trainings for administrators.

Friends of Education has been improving K-12 education for 10 years. Friends of Education initially worked with Ascension Grade School, located in a Minneapolis neighborhood where a third of the community is below the poverty level and 80% qualify for free or reduced price lunch. Friends of Education implemented a new curriculum (the core knowledge sequence developed by E.D. Hirsch, Jr. and the Core Knowledge Foundation), provided teacher training, and directed the use of data to identify individual student learning needs. The school's achievement on Minnesota's state assessment test quadrupled in two years, from 21% proficiency to 80%, and their success on the state assessment tests continues to date. Friends of Education also coordinated professional development programs in more than a dozen schools. Academic achievement results for classrooms whose teachers participated in the training showed

a statistically significant increase in performance. For example, the 2009 Minnesota Comprehensive Assessment tests results reflect a 4-16 percentage point difference in student proficiency rates between classrooms of teachers who received training and those that did not.

4. The American Institutes of Research's Record of Significantly Improving Student Achievement in Schools

NMSI's evaluation partner in this project is the American Institutes for Research (AIR). While primarily known for its evaluation and technical assistance projects, AIR has also conducted projects that significantly improve student outcomes. For example, through a grant from the Bill & Melinda Gates Foundation, AIR worked with the San Diego Unified School District (SDUSD) to plan, design, and establish new small high schools. AIR helped convert three comprehensive high schools into 14 small schools in fall 2004, and an additional four new small school centers were started in fall 2007. From 2003 to 2008, the 14 small high schools averaged a 62 API (California's Academic Performance Index) point growth, while the district's comprehensive schools averaged a 41-point increase during this same period.

IV. STRATEGY & CAPACITY TO BRING APTIP TO SCALE

1. Feasibility of APTIP Replication

a. NMSI's Expertise & Scaling Strategy to Ensure Replication with Fidelity

NMSI has developed a strategic scaling model that is grounded in experience and past success and that provides an effective blueprint for scaling. While many entities recognize the need to replicate innovations that are working, some do not understand or know how to identify and transport the successful elements of one program into a different setting. NMSI understands that scaling requires a deliberate methodology and continuous management, and its replication of APTIP has proven that its strategy of scaling is successful. NMSI has detailed its scaling strategy

in its publication "Taking Effective Programs to Scale" (see Appendix H, Exhibit 4). NMSI's basic scaling tenants are:

Selecting programs already proven to be successful with documented results – Programs that are ideal for scaling have: (1) multi-year, measurable success across demographic groups; (2) evaluation results based on objective measures, such as standardized tests results, graduation rates, increased college matriculation, etc.; and (3) evaluation results that show significant and sustained improvement. APTIP has over 10 years of sustained, significant impact on student achievement, as shown through commonly benchmarked, objective evaluation results (i.e., AP exams) (see Section II). Results from scaling APTIP in Texas and across six states demonstrate that APTIP achieves significant, sustained success in a wide variety of schools (see Section II).

Identifying the program's key components – Successful replication depends on identifying a common core of indispensable elements that produce the significant results shown in the pilot program. These core factors serve as the crux, or Elements of Success, that must be faithfully preserved in any replication plan. While variation in how the Elements are implemented in various environments is permitted, the core Elements must be maintained in order to establish benchmarks for replication. APTIP's Elements of Success are described in Section I.2.b.

The program should not be cost prohibitive – Some programs are simply too expensive to be effectively scaled. Not only is APTIP cost effective, it also provides a variety of effective interventions that have lasting, long-term impacts on school districts (such as teacher training and vertical teaming) that continue to produce results even after initial development support activities end. APTIP also produces a tangible return on investment for students in the form of college course credit, which decreases college tuition costs.

Selecting the right entity to implement the program – The entity implementing replication must have the capacity to stay faithful to the Elements of Success, provide expert support, attract partners, influence policy-makers, and understand the importance of meeting benchmarks and timelines established for accountability. For example, when NMSI works with NMSI State Agents to scale APTIP across states, it selects NSAs that have a framework to produce results, access to state policymakers, commitment to performance management, and strong partners who advocate for APTIP expansion.

Instituting performance management and rigorous program monitoring – Clear performance goals and milestones are not only a vital element of successful replication, they are also a useful management tool. The milestones are activities that indicate timely implementation of the Elements of Success. NMSI ties periodic release of funds to fulfilling these pre-determined milestones so that carrying out these activities becomes the implementer's top priority. At the same time, NMSI monitors implementation to ensure that, if milestones are not met, NMSI can immediately provide technical and substantive assistance to resolve any issues.

Establishing simple and effective collection of evaluation data – Without objective data collection and analysis, efforts at scaling can be futile. NMSI links data collection to the pre-determined milestones described above to ensure faithful replication of the APTIP model. Data collection and evaluation also allows NMSI to identify trends and generate statistics on teacher effectiveness and student achievement so that APTIP's model can continually improve. Additionally, data are a fundraising tool. For example, high APTIP enrollment numbers in the current six APTIP states attracted funding partners before the first year exam results were even released. This did not happen by accident. It required timely and meticulous data collection coupled with a planned and focused effort toward the ultimate goal – scaling the program.

Building partnerships and advocacy – There is no substitute for strong, influential partners who serve as mentors, donors, supporters, and advocates. Advocacy, as used here, means ensuring that state and local decision-makers hear about APTIP, see it in action, receive periodic updates, and even serve in partnership roles. The six states currently scaling APTIP have positioned themselves as leading and effective advocates for policies and funding to support APTIP. They have raised over $30 million in matching funds (far ahead of the required matching schedule), succeeded in having APTIP included in Race to the Top applications, and spurred introduction of legislation backing increased advanced course requirements and appropriations.

Communicating success – Communication includes more than just media, brochures, editorial opinions, and presentations; it requires events that serve as a physical display of success for recognized and respected officials, policymakers, elected officials, business leaders, parents, and students who all share aspirations for continued program expansion. These events create program awareness, recognize accomplishments of key players, highlight students, enlist commitment from partners, and are the ingredient that builds and sustains momentum. For example, in Alabama, Governor Riley attended the APTIP-sponsored back-to-school event to personally present each school with its APTIP goals for the coming year. His presence showed statewide commitment to APTIP and emphasized its priority at a high, statewide level.

b. APTIP's Success in Multiple Settings & Student Populations

APTIP creates a culture of high expectations, increased opportunity, and college-readiness, especially for high-need students, that can be easily replicated in a variety of settings and for a variety of students.

Variety of Settings: In the first full academic year of scaling APTIP, NMSI has created a culture of college-readiness in states as diverse as Massachusetts and Arkansas, as Connecticut

and Kentucky. For example, in Massachusetts, 284 schools had students with passing scores in AP math, science, and English (MSE) exams in 2009, but of all those schools, **APTIP schools produced the top two largest increases in raw numbers** of students passing AP MSE Exams. In comparison, APTIP schools in Kentucky and Arkansas produced five and six (respectively) of the top eight schools with the largest increases in raw numbers of students passing AP MSE exams. From the Northeast to the Appalachia region to the South, APTIP schools increased student achievement and produced significant increases in the number of college-ready students.

APTIP has also been successful across types of school settings, from urban to rural. The schools currently implementing APTIP in six states are almost evenly split between urban/suburban and rural/town settings: 68 of the current 140 schools (49%) are Rural (37) or Town (31), and 114 of the 227 schools (50%) that will be implementing APTIP in the current six states this fall are Rural (58) or Town (56).

These schools are not just scaling APTIP; they are succeeding with APTIP. Rural/town locations, especially, generated large percent increases in passing AP MSE exams: passing scores for all students increased by 74.8%; passing scores for African-American and Hispanic students doubled; and passing scores for females on AP math and science exams nearly doubled. Urban settings are thriving as well, with a 40% overall increase in passing AP MSE exams. With a 66% increase in African-American and Hispanic students passing AP MSE exams, the urban settings are also closing the college-readiness gap.

Variety of Students: APTIP has also increased student achievement in a diverse range of student populations, including among traditionally underrepresented students. Sections II and III.1 & 2 show APTIP's broad impact. It is increasingly noted that providing a quality education for all students, of all backgrounds, is the civil rights issue of our time. Secretary Duncan

recognized as much before his March 8, 2010 speech to commemorate "Bloody Sunday," lamenting that "despite how far we've come as a country over the last 45 years, we know there are still ongoing barriers to equal educational opportunity in this country." APTIP helps break down those barriers by significantly increasing access to and achievement in rigorous courses that are proven to successfully prepare African-American and Hispanic students for success in four-year colleges.

2. Partnership Capacity For APTIP Replication

a. NMSI's Resources & Capacity to Continue Scaling APTIP Nationally

If funded with an i3 grant, this Partnership will bring the success of APTIP to 206 high schools plus feeder middle schools in four more states and the Military Initiative Network. NMSI has the resources and capacity, as well as the drive and commitment, to continue increasing student achievement, encouraging student growth, and closing the college-readiness gap.

i. NMSI's Programmatic & Financial Resources

Programmatic Resources: While NMSI's Elements of Success (see Section I.2.b) define APTIP's programmatic structure and vision, NMSI also provides concrete resources to guide the logistics of APTIP replication. First, NMSI provides a comprehensive Operations Manual (Appendix H, Exhibit 1) that details each aspect of APTIP implementation. In addition, NMSI's programmatic support also incorporates face-to-face engagement, assistance, and intervention that is tailored to each state and the Military Initiative Network. This constant support and monitoring is provided by a Regional Director, the National Content Directors, and the Lead Teachers. See Section I.2.a for a full description of these individualized support services.

Financial Resources: NMSI has significant financial capacity to continue scaling APTIP nationally. To date, over $155 million has been invested in NMSI by the Bill & Melinda Gates

Foundation, the Michael and Susan Dell Foundation, the Carnegie Corporation of New York, Perot Systems (now Dell Perot Systems), IBM, Texas Instruments, Exxon Mobil, Lockheed Martin, and others. NMSI does not ask for a waiver of the i3 match requirement. In addition to the 20% match that NMSI will provide, NMSI requires that its implementation partners match NMSI's commitment to ensure sustainability. The NMSI State Agents for the four states that would implement APTIP with i3 funds have already raised over half a million dollars toward that goal. Thus, the total financial resources applied to scaling APTIP far exceed the Department's i3 grant requirements.

In addition to NMSI's own financial capacity, NMSI also provides its implementation partners with financial resources and a system of assistance, accountability, and human resources support for APTIP fiscal management. NMSI helps each NMSI State Agent and the Military Initiative Network develop financial reporting structures, including annual and monthly financial reports, and collaborates with the fiscal managers to develop, implement, and supervise the annual APTIP budget, including providing a budget tool (see the Operations Manual, Appendix H, Exhibit 1). NMSI also helps generate fundraising strategies and assists in advocacy efforts to promote APTIP sustainability. Finally, NMSI offers public relations and communications management: NMSI helps prepare publications for both internal and external audiences, assists in planning, developing, and communicating accomplishments, and arranges public appearances, lectures, or speeches to increase APTIP support.

ii. <u>NMSI's Personnel Capacity</u>

NMSI personnel provide comprehensive implementation guidance and assistance, and NMSI has capacity to offer this support to all partners in the proposed project. NMSI's programmatic support team includes: the APTIP developer and designer responsible for taking APTIP to scale

across Texas and, with NMSI, across the six states currently replicating the program; a former Assistant Secretary of Education who has decades of experience bringing data-driven reform to education; a former state Commissioner of Education who was instrumental in scaling a similar incentive program for AP courses across the state; and AP Content Directors who are nationally respected as among the best AP instructors for their disciplines. Additionally, NMSI's APTIP technical support team includes a Regional Director who has eight years of experience assisting in APTIP implementation and technical support, as well as a Chief Operations Officer and a Chief Financial Officer who oversee implementation milestones and immediately deploy technical or programmatic assistance as needed. See Appendix C for resumes of NMSI's key personnel.

b. NMSI State Agent Capacity to Implement APTIP

When working with NMSI State Agents, NMSI partners with entities that have proven leadership, access to state policymakers, and connections with strong partners who have fundraising and convening power. In addition, **NMSI enhances the capacity of each NSA** by providing the training, monitoring, leadership, and assistance necessary to rapidly scale APTIP. (see Section I.2.a for details of NMSI's support structure). NMSI's national resources combined with each NSA's statewide capacity form a partnership that ensures successful APTIP replication. Each NSA's statewide capacity is summarized below and resumes of key personnel are in Appendix C.

The NSA for Indiana is Notre Dame University. The NSA President, Karen Morris, has helped advance the state's AP initiatives, giving her the understanding of both the AP curriculum and of what students must master in order to become college ready. Further, the Indiana

Department of Education is a valuable resource and a principal partner. Indiana also has notable private sector support, with a $170,000 grant from The Lumina Foundation for Education.

The Colorado Legacy Foundation (CLF) is Colorado's NSA. CLF supports the Colorado Department of Education's (CDE) work improving public schools. The President harkens from the CDE as well. The direct connection to the CDE makes CLF uniquely suited to act quickly, assist CDE in leveraging scarce education resources, and be in a strong position to scale APTIP. CLF has raised a total of $187,280 from the Daniels Fund, the AMGEN Foundation, and others.

Friends of Education (FOE) is Minnesota's NSA. FOE is extremely data driven, an element that aligns well with NMSI's emphasis on data collection and analysis. FOE also has strong ties to the Minnesota Department of Education (MDOE), which recommended them to NMSI. The MDOE has decided to act as the APTIP liaison for the moment, wanting to take personal responsibility for pre-implementation activities until an i3 grant is awarded.

Michigan's NSA is the Michigan Mathematics & Science Centers Network (MMSN), an organization with 33 regional centers that provide leadership, curriculum support, professional development, and student services to educators in local school districts and that act as a resource clearinghouse for educational materials and information. The MMSN has experience to scale APTIP as it has successfully implemented many statewide projects for the Michigan Department of Education. The President, Drew Isola, is a current AP Physics teacher who is keenly aware of the work and dedication required to implement successful AP programs and curricula. MMSN has raised $350,000 from The WK Kellogg Foundation for APTIP support and implementation.

3. Number of & Cost Per Student to be Reached by APTIP

In this proposed project, NMSI will expand student access to rigorous courses and increase student achievement in order to transform 206 high schools plus their feeder middle schools to

an environment of high expectations and a culture of college-readiness for approximately **406,438 students** at a cost of $76,770,458 (i.e., the cost of the project, including NMSI's 20% match and all NMSI State Agents' matches, but excluding the cost of the independent evaluation) (see Budget and Budget Narrative). Both NMSI and the NSA have capacity and resources to reach these students, as described in Sections IV.2.

Further, the estimated cost of scaling APTIP is only $189 per student. This figure is based on a project cost of $76,770,458 (see above), which is expected to reach 406,438 students who are taught by APTIP-trained teachers. Note that this cost per student is not a "per year cost," but a one-time cost that provides multiple years of service to all students, with the exception of seniors in the first year of APTIP. The annual cost per student is only $99, since the total number of students impacted, if each student is counted each year, is 776,826.

APTIP generates economies of scale as it reaches more students. APTIP costs $297 per student to reach 100,000 students; $184 per student to reach 500,000 students; and $173 per student to reach 1 million students. This economy of scale is generated because in comparison to reaching 100,000 students, NMSI does not require additional capacity to scale APTIP to reach 500,000 students, and very little extra capacity at 1,000,000 students.

4. APTIP's Demonstrated Ease Of Use & User Satisfaction

Although APTIP is a comprehensive program, the implementation activities required by APTIP actually layer over and enhance services that LEAs and schools might already provide. Because schools and school districts do not have to create or import entirely new education products, APTIP is easy to incorporate into schools' existing structures. For example, curriculum development is not necessary because AP curricula and courses are already fully developed; assessment development is not required because AP exams exist and are widely used; rubrics for

student achievement are already firmly established, with a score of 3 and above accepted as a benchmark for student success; school reorganization is unnecessary because AP courses fit easily into school schedules; introduction of new technology and equipment goes smoothly because the required lab equipment is not foreign to AP teachers; and there is little need to convince students and teachers of APTIP's value because of the widespread understanding that AP courses provide rigorous study and college credit.

The activities that are required for APTIP implementation are easily integrated into schools. APTIP activities focus on teacher training, student recruitment into new courses, scheduling AP courses, providing adequate classroom equipment, setting school goals, providing assistance to teachers, providing additional help to students, and reporting progress. While APTIP requires teachers to hone skills through professional development, the basic skill sets are not new to educators. APTIP also provides significant guidance, support, and instructional resources to teachers, as described in Sections I.2 and IV.2.a, to ensure that APTIP is not burdensome.

5. APTIP Dissemination Mechanisms to Support Replication

NMSI recognizes that having a calculated and strategic plan to disseminate information regarding progress on its replicated programs is critical. As such, dissemination is not an afterthought for NMSI; it is ingrained in the culture and plays a central role in NMSI's scaling model. NMSI has developed multiple levels of dissemination procedures. First, NMSI helps each NMSI State Agent or network of schools develop local support for APTIP through a dissemination model that is built into the APTIP milestones. These include: (1) briefing key State officials (Governor, Commissioner of Education, State Board of Education), key legislative leaders, superintendents, chambers of commerce, key business leaders, and editorial boards of major print media regarding APTIP replication; (2) including updates on APTIP outcomes in

supporting partners' newsletters, Board meetings, and community events; (3) providing information via webinars and presentations to interested LEAs describing how to replicate APTIP; and (4) hosting back-to-school events featuring elected officials, education officials, business partners and other state and local leaders.

Second, NMSI seeks national support for scaling APTIP through: regular communications and office visits with Congressional members representing APTIP districts to inform them about NMSI's progress both in their districts and on a national scale; cultivating collaborative partners, such as the National Academies, the Carnegie Corporation, The Bill and Melinda Gates Foundation, The Michael and Susan Dell Foundation, Lockheed Martin, and the National Defense Industry Association; participating in a biennial convocation on NMSI's active efforts to respond to the "Rising above the Gathering Storm" report; and scheduling presentations to policy and education leadership organizations that have an interest in supporting NMSI, such as the Council of Chief State School Officers, the National Council of State Legislatures, and the Education Commission of the States.

NMSI also engages in more common forms of dissemination, such as: press releases, newsletters, blogs, media alerts regarding grant awards and notable outcomes; broad distribution of brochures, annual reports, videos, presentations and reports on issues relating to improving STEM education; and updating the NMSI website, including NMSI in the News (a blog for commenting on STEM education issues, resources, and partners). Finally, NMSI and its partners will facilitate academic studies and submit for publication findings regarding this replication cohort. NMSI will also encourage researchers to study specific components of APTIP and scaling (e.g., the strength of the replication model or the consistency of teacher training) during

and after the funding period. NMSI also agrees to participate in, organize, or facilitate Communities of Practice, as required by the i3 Notice Inviting Applications.

V. SUSTAINABILITY OF APTIP BEYOND THE GRANT PERIOD

Scaling is worthless if not sustainable. Because NMSI aims to transform schools' underlying cultures, sustainability is built into APTIP's program, financial, and partnership structures as a component that tracks the entire scaling process. Before NMSI will commit to scaling APTIP in a state, NMSI articulates to state leaders, business and education partners, and the NMSI State Agent that it is expected that they sustain APTIP after initial funding has phased out. The strength of these commitments is a key criterion in selecting states and state partners.

1. Support from Stakeholders Who Are Critical to Long-Term APTIP Success

To avoid any surprises regarding the APTIP "hand off" after the funding period, NMSI clearly articulates the goals of APTIP to state level officials, including the Governor and Commissioner of Education. Both are briefed on the proposed scaling model, matching requirements, and the expectation that support for APTIP will be provided by the state following NMSI's investment. NMSI's replication and scaling model reinforces these expectations by regularly engaging these state officials in APTIP's progress. In addition to receiving updates on ATPIP's accomplishments in their states, these officials are invited to and regularly attend events such as back-to-school kick-offs, celebrations of end-of-year performance, and announcements of new LEA cohorts. NMSI and the NSAs strengthen and reinforce state-level support by encouraging constant involvement from these state officials. These public stakeholders, from Governors and State Departments of Education to senators and legislatures, have, in turn, shown remarkable support for APTIP. (See Letters of Support at Appendix D, Exhibit 1).

Private stakeholders also show strong support for APTIP. For example, NMSI is partnering with the Military Child Education Coalition to take APTIP to scale in the Military Initiative Network. They have been critical partners in garnering both LEA and private fundraising support and in ensuring long-term sustainability in these schools. With their help, NMSI has secured funds from Lockheed Martin in order to bring APTIP to four Military Initiative Network schools, irrespective of i3 award outcomes. Similarly, private sector stakeholders in Michigan, Colorado, Minnesota, and Indiana, including The Lumina Foundation, the Daniels Fund, the AMGEN Foundation, and the WK Kellogg Foundation, have also already pledged over half a million dollars to support APTIP's long-term sustainability. By committing funds before APTIP has been implemented in those locations, these stakeholders pave the way for incorporation of APTIP into the ongoing work of the LEAs.

2. APTIP's Multi-Year Financial & Operating Model & Accompanying Plan

Sustainability is also built into APTIP's budget structure. NMSI requires that the NMSI State Agent raise an increasing percentage of matching funds over the course of the grant period. By decreasing the portion of the budget that is provided by the grant each year and increasing the portion of the budget that is raised by the NSA each year, NMSI helps instill a culture of financial independence that is crucial to avoiding a funding cliff. By the end of the three-year grant period, the NSA has learned how to operate APTIP independent of the initial grant funds, and APTIP is self-sustaining. They may develop strong relationships with corporate or philanthropic donors, apply for federal or state competitive grants, and many will have secured state funding. For example, Alabama's governor announced last year that all $1.3 million in state funds traditionally used in conjunction with AP courses and exams would flow through the NSA operating in Alabama for use in its APTIP schools. The six states currently replicating APTIP

have already raised $30.1 million in matching funds, a figure that demonstrates strong support, especially in this economic climate. By requiring the NSA to shoulder an increasing portion of the operating budget each year, NMSI builds APTIP sustainability into the budget structure.

VI. NMSI'S APTIP MANAGEMENT PLAN & PERSONNEL

1. NMSI's Comprehensive Fiscal & Program Management Plan

Even the best educational program can only be successfully taken to national scale if an appropriate management structure exists to ensure proper program implementation at all replication sites. NMSI's comprehensive, standardized fiscal and program management systems set it apart from other scaling projects by providing a structured mechanism that ensures effective, faithful replication of APTIP. The data reporting system provides **frequent, timely feedback** to program participants, partners, funders, and third parties (such as policy makers or local governments). This system is essential for performance accountability and allows NMSI to **tailor its technical and programmatic assistance** to guide successful implementation.

a. *Setting & Monitoring Milestones*

Performance measurement is a cornerstone of NMSI's APTIP. NMSI believes APTIP partners must have a clear understanding of the mechanics and goals of the program. To establish these goals and to track APTIP progress in reaching them, NMSI identified 34 unique, required milestones to ensure that APTIP is always on pace to achieve increased student achievement and to encourage APTIP expansion and sustainability. These milestones cover three main categories: (1) general areas of review: milestones that require monthly monitoring and relate to APTIP's general components; (2) specific areas of accomplishment: milestones that satisfy major divisions of responsibility; and (3) measures: milestones containing metrics with specific, quantifiable goals designed to drive improvement and characterize progress made under each

APTIP Element of Success. NMSI's **34 milestones define the APTIP deliverables** by which NMSI monitors APTIP at the national level. By keeping track of these milestones and tying completion of milestones to quarterly distribution of funds, NMSI ensures accountability for results and program fidelity.

NMSI also sets milestones for its own operations to ensure that it effectively manages not only school-level APTIP implementation, but also the entire APTIP scaling effort. Both sets of milestones will be integrated into the project evaluation (see Section VII), thereby adding another layer of accountability for the proposed project as a whole. See Appendix H, Exhibits 5 and 6 for the full charts of milestones.

b. *NMSI's Electronic Management System, Created by Dell Perot Systems*

NMSI's online data management system provides **timely, Web-based quality control** that also allows NMSI to gather and analyze national-, regional-, and school-based data at any given moment. This user-friendly management vehicle tracks and gathers the essential APTIP data components that are critical to evaluating and measuring results. This allows NMSI to provide APTIP monitoring, feedback, and support and is an essential and effective technological solution to **organizing and processing the day-to-day operations of APTIP at all levels**.

The data collection and management system has the following operational features: a Web application program; user-ID and password protected access; systems "dashboard" portals allowing access to data and program information; toolbar buttons/icons that allow manipulation and storage of Word, Excel, and PDF files; and data storage and retrieval files, including student enrollments and AP MSE national exam results, disaggregated by demographics. See Appendix H, Exhibit 7 for a complete list of the capabilities of the data collection and management system.

c. *NMSI's Budget Management System*

Each NMSI State Agent and the Military Initiative Network prepares an annual budget that includes expenditures for administrative and program funds. In order to ensure the milestones are complied with as requirements, rather than as aspirational goals, NMSI provides administrative funding on a quarterly basis *only after verifying compliance with the financial and operational milestones*. Additionally, each site submits invoices for program expenses on an on-going basis throughout the year. NMSI personnel, including the National APTIP Director as well the Chief Financial Officer, review these invoices to ensure those amounts comply with the budget limits and guidelines. APTIP also requires that the budget segregate the monies that are expected from grants and from required matching fund sources.

Each NSA and network of schools must also report operations results and metrics for all expenditures on a **monthly basis on NMSI's Web-based reporting system**. The Chief Financial Officer reviews these expenditure reports to compare the budgeted expenditures with the actual results in order to determine compliance with the agreed-upon, budgeted financial milestones, including all match requirements. If, for any reason, financial milestones are not met in a reasonable time, NMSI management intervenes to understand the issues and the necessary steps to return to compliance. If it is determined that compliance is not possible, funding will be discontinued.

d. *NMSI's Programmatic Quality Control Management System*

NMSI incorporates multiple layers of quality control into APTIP replication. First, NMSI's implementation structure, as detailed in Section I.2.a above, clearly defines the responsibilities that each partner must assume to ensure faithful replication. Second, the resources that NMSI provides for APTIP implementation, as detailed in Section IV.2.a. above, also allow NMSI to continually monitor APTIP replication. Third, the data management structure described

throughout Section VI.1 ensures that APTIP implementation proceeds per NMSI's requirements and timeline and also allows NMSI to provide prompt and tailored assistance where needed.

2. Qualifications & Experience of NMSI Staff in Managing Program Scaling

NMSI's personnel who monitor APTIP each have experience scaling large, complex, rapid-growth education programs and are exceptionally practiced in program oversight. See Section IV.2.a.ii regarding NMSI staff qualifications and experience.

3. AIR Staff Qualifications & Experience as Independent Evaluators

The American Institutes for Research (AIR) is a not-for-profit corporation engaged in independent research, development, evaluation, and analysis in the behavioral and social sciences. AIR's work spans a range of substantive areas including education, student assessment, international education, and statistical and research methods. AIR is headquartered in Washington, D.C., with 12 other offices around the nation, a staff of more than 1,300 employees, and an annual (2009) business volume of about $300 million. AIR's "Education, Human Development, and the Workforce" program provides research, evaluation, and technical assistance services to support improvement efforts in schools across the country. AIR is a leader in the use of rigorous research to evaluate policies and practices in education, combining complex, mixed-method, multi-year studies as well as short-term data collection and analysis tasks. See Appendix C for resumes of key AIR personnel involved in this proposed project. The following examples illustrate AIR's capacity to design and conduct studies to gather and analyze data as part of evaluation of educational interventions.

Through a grant from the Institute for Education Sciences (IES), AIR is conducting a five-year study of the *Impact of Professional Development in Middle School Mathematics.* This randomized trial tests promising professional development models for instruction. The study

evaluates the impact of professional development on teacher knowledge, classroom instruction, and student achievement. As with many of our evaluation projects, AIR works closely with LEAs to recruit schools, teachers, and students to participate in the study.

The *Professional Development Impact – Reading* project, completed last year for IES, was a randomized field trial that examined the impact of summer institutes and coaching on reading instruction and student achievement. Combining scientific rigor with an understanding of how schools operate, researchers measured the levels and changes in teacher knowledge, teacher practice, and student achievement over six years.

Approaches to Measuring Teacher Quality and Effective Professional Development, started in 2009, involves gathering and analyzing data on the implementation of ESEA provisions related to the equitable distribution of teachers, as well as developing improved measures of teacher professional development experiences and their likely effectiveness.

Late last year, the U.S. Department of Education contracted with AIR to conduct a study to identify schools that have achieved rapid improvement in student outcomes in a short period of time. The project, *Identifying Potentially Successful Approaches to Turning Around Chronically Low Performing Schools*, investigates the complex range of policies, programs, and practices used by these turnaround schools and compares them to strategies employed by chronically low-performing schools.

VII. PROJECT EVALUATION[46]

[46] As required by the Notice Inviting Applications, NMSI agrees to comply with the requirements of any evaluation of the program conducted by the Department of Education (the Department). NMSI and AIR agree to cooperate with any technical assistance provided by the Department or its contractor. NMSI will make broadly available through formal or informal mechanisms, and in print or electronically, the results of any evaluation it conducts of this project. The data from the evaluation described in this Section will be made available to third-party researchers consistent with applicable privacy requirements.

1. Purpose of the Evaluation

The evaluation of NMSI's scale-up of APTIP is guided by two primary objectives: (1) to assess the impacts of APTIP over time using a rigorous and robust study design with high internal and external validity, and (2) to study program implementation—both of the APTIP program in participating schools and of NMSI's scale-up strategy.

2. Evaluation of Program Impacts

The American Institutes for Research (AIR) will assess the impact of APTIP on student-level outcomes over time with a randomized control trial (RCT) with school-level random assignment. The study design will allow estimation of the effects of APTIP on outcomes that include AP exam-taking, AP exam-passing, and rates of college application, matriculation, and persistence. The primary research questions that guide the impact evaluation are:

(1) What is the impact of APTIP on the likelihood that students will take and pass AP exams in mathematics, science, and English (MSE)?

(2) *What is the impact of APTIP on the likelihood that students will apply to, matriculate, and persist in college?*

Table 1 in Section I.2.a above summarized the roll-out strategy for NMSI's scale-up of APTIP. The design for the impact evaluation is directly aligned to this roll-out strategy, which involves schools that begin APTIP in either 2010-2011, 2011-2012, 2012-13, or serve as comparison schools.

Due to the anticipated i3 award date and the pre-award groundwork already laid with interested LEAs and schools, the first, Year 1 cohort of APTIP implementation will not be selected at random. The RCT will begin in Year 2 and continue through the end of the project.

Approximately 293 schools are included in this application, and a subset of those will be involved in the evaluation. The 293 include 243 schools in 4 states, plus 50 Military Initiative Network schools. The 293 schools are located in 166 LEAs, most of which include a single high school. Some of the LEAs have multiple high schools and in these LEAs, not all high schools will necessarily participate in APTIP. The evaluation involves two phases: Phase 1 will occur in the first cohort of schools, prior to the start of the random assignment study; Phase 2 is the implementation of the full random assignment study, which uses a "waiting list" design with staggered implementation to establish 3 groups of statistically equivalent schools. A description of each phase follows.

Phase 1: Cohort 1 School Selection and Program Implementation. Phase 1 enables NMSI to begin implementing APTIP in fall 2010, or Year 1 of the project. In Phase 1, approximately 35 schools will implement APTIP. Twenty-nine of the schools will be "initial implementers" and designated as Cohort 1 schools. Cohort 1 schools will not participate in the random assignment study that will be used to rigorously evaluate effects of APTIP. NMSI will select, not at random, 29 schools in the four states plus six Military Initiative Network schools (approximately 35 total) for Cohort 1. To get an early sense of first-year impacts of APTIP, AIR will carefully match the Cohort 1 schools with other schools involved in the project, using a matching procedure similar to that used in Holtzman (under review), and compare them on outcomes at the end of Year 1. However, this design is less rigorous than the random assignment study that begins in Year 2.

Phase 2: Random Assignment Study. Phase 2 will begin during Year 1. In this phase, the AIR research team and NMSI will narrow down the 293 schools that were identified, but not selected as Cohort 1 schools, to approximately 150 schools. The following criteria will guide narrowing the pool of schools for random assignment: (1) schools' willingness to participate in

APTIP and comply with random assignment; (2) schools' plans to secure funding from another source that otherwise enables them to participate in a similar program; and (3) eligibility to participate in the NMSI program. That is, schools that are not interested in participating or are not eligible to participate, or that plan to secure other funding to participate in a similar program will be dropped from the pool. Information relevant to these criteria will be obtained by contacting all of the 293 schools and briefly interviewing a school leader. After applying these criteria, if there are more than 150 schools that are eligible participants, we will randomly select 150 schools to establish the pool for random assignment. The 150 schools eligible for random assignment will be categorized by state, school size, and minority student composition, and within block, randomly assigned to one of three conditions:

(1) **Cohort 2** schools that begin APTIP in Year 2 of the project (2011-2012) (N=50);

(2) **Cohort 3** schools that begin APTIP in Year 3 of the project (2012-2013) (N=50); and

(3) **Control** schools that will not participate in APTIP during the project (N=50).

Sample Size and Power Analysis. Power analyses appropriate for binary outcomes in cluster randomized trials determine that the minimum sample size required to detect a difference of approximately 3 percentage points on a key outcome of interest (e.g. AP exam-passing) between 11th and 12th graders in treatment schools and 11th and 12th graders in control schools is approximately 50 per condition. See Appendix H, Exhibit 8 for the assumptions employed for these power analyses.

Measures and Data Collection. As described earlier, APTIP intends to provide training and incentives that result in expanded enrollment in AP MSE courses, increases in AP exam-taking and success, and increases in college readiness and success. The outcome measures for this APTIP evaluation are directly aligned with these program objectives. The intermediate outcomes

are AP course-taking in MSE subjects. The primary short-term outcomes include AP exam-taking and AP exam-passing (with a score of 3 or higher) in MSE subjects. The primary longer-term outcomes include application to college, enrollment in college (two-year as well as four-year), and persistence through the first year of college.

AIR will collect these outcome measures for every 11th and 12th grade student in all high schools participating in the evaluation. These will be student-level binary data, and analyses will reveal the impact of APTIP on the probability of (1) individual students taking and passing AP exams in the core subjects, and (2) students applying to, enrolling, and persisting in college. To collect data related to AP courses (course-taking, exam-taking and exam-passing) and college applications, NMSI and AIR will work with each school to establish a study coordinator to whom a nominal stipend will be provided (e.g. the school guidance counselor). The school study coordinator will be asked to provide the requested information for all of the students in the school using a secure data collection system established for the purpose of the study.[47] College matriculation data (i.e. whether students enrolled in college and whether the college is two-year or four-year) will be collected as well as data on persistence in the first year of college by using the National Student Clearinghouse (NSC). Over 3,300 colleges and universities participate in the NSC, and 92% of U.S. students attend participating schools.[48]

AIR will use student characteristics including grade, demographics (race/ethnicity, gender, age, free/reduced price lunch status, special education status, English learner status), and prior

[47] The AIR study team has successfully created such data collection systems for other longitudinal school-level random assignment studies. The system provides maximum flexibility so that school staff can enter relevant information by student or can simply upload relevant documentation that study team members can receive securely and transfer into study-specific datasets.

[48] According to the NSC website: http://www.studentclearinghouse.org/.

achievement on 8th grade state assessments in English and mathematics for the purpose of descriptive analyses and for use as covariates in impact analyses. NMSI and AIR will collect these student-level data from the LEAs and schools. AIR will collect information about school characteristics using the U.S. Department of Education's Common Core of Data.

Analytic Strategy. The basic logic behind the analytic strategy is to compare outcomes for students from schools that are randomly assigned to participate in APTIP with those for students from schools that do not participate in APTIP. Because random assignment to conditions is determined at the school level, the primary unit of analyses is the school. Students are nested within schools and, to account for that clustering, AIR will estimate two-level statistical models (where level 1 is students and level 2 is schools).[49] Specifically, to examine the effects of APTIP on the outcomes of interest, AIR will use hierarchical generalized linear models, which are appropriate when categorical outcomes are of interest.[50] See Appendix H, Exhibit 8 for specification of the analytic models for the evaluation. AIR will conduct this analysis after the completion of each school year on all of the specified outcomes that are relevant for that year of the project.

After Year 2, analyses will determine the impact of one year of APTIP on AP course-taking (intermediate outcome), AP exam-taking and –passing, college application, and matriculation by comparing 11th and 12th graders in Cohort 2 schools to those in control schools. **After Year 3**, the effects of one year of participation across Cohort 2 and Cohort 3 will be pooled and compared to control schools. In addition, by comparing Cohort 2 schools to control schools, an estimation of the impact of two years of APTIP on the AP-related outcomes plus first-year

[49] Raudenbush & Bryk, 2002.

[50] *Id.*

college persistence can be calculated. **After Year 4**, the pooled effects of two years of APTIP across Cohorts 2 and 3, compared to control schools, will be estimated and a comparison of Cohort 2 schools to control schools will be calculated to estimate three-year impacts of APTIP. **At the end of Year 5**, pooled effects of three years of APTIP across Cohorts 2 and 3 (vs. control schools) will be estimated. Also, by comparing Cohort 2 schools to control schools at the end of Year 5, the impact of four years of APTIP (including one year of self-sustaining participation) on all outcomes can be estimated. Analyses of pooled effects across Cohorts 2 and 3 will also include estimation of cohort and time effects, which will help determine the effectiveness of NMSI's scale-up strategy.

3. Evaluation of Program Implementation

The goals of the APTIP implementation evaluation are to: (1) provide formative feedback to NMSI on APTIP implementation, (2) measure implementation fidelity, (3) describe the service contrast between APTIP and non-APTIP schools, and (4) summarize information related to the successful scale-up of APTIP. These goals will be accomplished in two phases of the evaluation.

Cohort 1 (Year 1: 2010-11). In Year 1, the first cohort of schools will implement APTIP according to NMSI's established milestones, and implementation data will be entered into the Web-based Dell Perot system (see Section VI.1.b; APTIP Operations Manual at Appendix H, Exhibit 1 for a description of NMSI's implementation support system). In fall 2010, AIR will review the Dell Perot system and develop an auditing plan that will be implemented and refined, as necessary, throughout Year 1. AIR's auditing approach will involve analyzing a random selection of implementation records for fixed time periods. Thus, during Year 1, AIR will establish the number, type, and timing of implementation records to ensure that NMSI's system is sufficiently monitored during the full study. AIR will also develop protocols and conduct

interviews with the NMSI State Agents and State Content Directors to provide NMSI with third-party feedback on how its key partners view their relationship to NMSI as the project prepares for the full study.

In addition to this formative feedback, AIR will develop data collection instruments that will be used to (1) expand NMSI's evaluation of APTIP implementation and (2) measure the service contrast between APTIP and non-APTIP schools. For both of these purposes, AIR will adapt relevant instruments developed for other studies, including RCTs that have included school-based professional development measures and teacher leader and student surveys. To measure APTIP implementation, AIR will develop and field test electronic logs for Lead Teachers and Content Directors to capture the types and duration of school-based professional development activities that are not currently captured in the Dell Perot system. Once the logs have been finalized, they will be incorporated into the Dell Perot system to streamline data collection for the full study. AIR will also develop and refine instruments that will be used to monitor the fidelity of implementation during the 2011, 2012, and 2013 AP teacher summer trainings.

To measure the service contrast between APTIP and non-APTIP participants, AIR will (1) develop surveys for AP teachers, Lead Teachers (or their equivalent) and students at APTIP and non-APTIP schools and (2) develop and test the feasibility of using an online system for non-program AP teachers to upload their syllabi and other course content information. The teacher and Lead Teacher surveys will address topics such as teachers' background characteristics, AP organization at the school, and AP-specific training and support systems for teachers. The student survey will include topics such as number and type(s) of AP courses, participation in AP-specific tutoring and support, and attitudes and other behaviors related to AP course taking. The electronic course content system for non-APTIP teachers will mirror the system that NMSI uses

for APTIP teachers. AIR will explore ways to streamline and incentivize this system for non-APTIP teachers. For all implementation instruments developed during Year 1, AIR will communicate regularly with NMSI's National APTIP Director and conduct a limited number of in-depth interviews with APTIP and non-APTIP teachers to inform and improve the development process.

Phase 2: Measure Program Implementation (Years 2-5: 2011-2015). At the conclusion of Year 1, AIR will have a complete set of implementation instruments and procedures to use in the full study. Appendix H, Exhibit 8 provides a timeline and description of all data collection instruments that will be used to measure implementation. In **Year 1**, an AIR evaluation team member will attend the first teacher training to test the fidelity form and will review the form to ensure that it captures the desired data. Also during the first year, AIR will monitor the AP Teacher, Lead Teacher, and NMSI Content Director logs on a monthly basis to: measure implementation; administer the teacher and student surveys (spring) and collect syllabi from non-program AP teachers (spring) to measure the service contrast; conduct site visits to a subset of APTIP and non-APTIP schools (spring) to measure implementation; and interview NMSI State Agents and Content Directors (spring) to provide formative feedback to NMSI. This data collection plan will be repeated during **Years 2-5**, except that the school site visits to schools will only occur every other year – in Years 2 and 4.

VIII. CONCLUSION

This Partnership addresses persistent challenges (improving student achievement and increasing college enrollment and success) for high-need students by scaling the Advanced Placement Training and Incentive Program. APTIP provides equity, access, and equal opportunity to traditionally underrepresented students. The strong evidence presented in two

well-designed, quasi-experimental studies described in Section II confirms that scaling APTIP to 117 LEAs with 206 high schools plus their feeder middle schools to reach 406,438 students across 13 states will have a substantial and important effect on improving student achievement and increasing college enrollment and completion rates, especially for high-need students. This evidence verifies that APTIP will move America towards reaching President Obama's goal of the U.S. once again have the highest college completion rate.

NMSI has already made significant progress in an increasing number of schools across six states. NMSI is prepared to build on this success and scale APTIP even more broadly. NMSI has a strong methodical scaling strategy, programmatic and financial capacity and resources, management plan, and support of dedicated partners from public, corporate, and philanthropic sectors to noticeably address the nation's needs to increase student achievement, college enrollment, and college completion rates. With i3 funding, APTIP can continue to be a model for best practices in creating a culture of college-readiness in schools to support students, especially high-need students, as they reach to achieve beyond their expectations.