Final Findings from Impact and Implementation Analyses of the Northeast Tennessee College and Career Ready Consortium

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ANALYSIS & SOLUTIONS

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Abstract

In Fall 2010, the Niswonger Foundation received a five-year validation grant from the Investing in Innovation Fund (i3) to create the Northeast Tennessee College and Career Ready Consortium of 29 high schools and five colleges. This report evaluates the Consortium's impact on student outcomes during each of the four years of program implementation. The findings from the confirmatory impact analyses indicate that students in Consortium schools had higher ACT scores, were more likely to participate in Advanced Placement (AP) courses, score a 3 or higher on an AP exam, enroll in college, and persist in college than students in matched comparison schools. Also, about half of all program components scored 2.0 or higher on a 3-point scale, indicating moderate fidelity of implementation. This report contains the results submitted to the National Evaluation of i3 (NEi3), which determines the overall impact of the federal investment in the i3 program.

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Executive Summary

The U.S. Department of Education awarded the Niswonger Foundation a five-year Investing in Innovation Fund (i3) grant in Fall 2010 to create the Northeast Tennessee College and Career Ready Consortium, a network of 29 high schools and five colleges across 15 counties. The purpose of the Consortium is to ensure that high school students in Northeast Tennessee are provided the opportunity to graduate from high school "college or career ready," and to improve the likelihood that students will be successful in college.

The intervention consists of six components: (1) providing management and communication, (2) promoting a college-going culture, (3) increasing quality of instruction, (4) increasing access to academically rigorous courses through distance and online technology, (5) expanding opportunities for college-level courses, and (6) providing resources and services to expand and sustain program capacity. The intervention is implemented by Niswonger Foundation leadership, a College and Career Ready Counselors Team, a Learning Resources Team, a course review team, and a group of online course liaisons.

These components are designed to achieve specific outcomes: increase students' college and career readiness, enrollment in Advanced Placement (AP) courses, performance on AP exams, enrollment in college, and persistence in college.

Analysis

This report provides an independent, external evaluation of the impact of the intervention on these outcomes through school year (SY) 2014/15, or after up to four full years of exposure to the implementation. It also examines the extent to which the components of the Consortium were implemented as originally intended in the grant application.

Students in the Consortium schools were compared with students in a group of matched comparison schools in school systems in other regions of Tennessee. These comparison schools were similar to the Consortium schools in measurable ways prior to the start of the grant, but they are not part of the Consortium and do not have access to its programs or services. This matched comparison technique provides a way to benchmark the progress of students in the Consortium over time.

Findings

Using student-level data, we find statistically significant, positive impacts of the Consortium on student composite ACT scores at the end of grade 12 (after three years of exposure to the intervention), AP participation by the end of grade 12 (after two, three, and four years of exposure to the intervention), AP exam performance (after three and four years of exposure to the intervention), and college persistence (after two and three years of exposure to the intervention). Consortium students also were more likely than comparison students to enroll in college by the fall semester following the end of grade 12 (after one year and three years of exposure to the intervention), although in year 1 this is likely attributable to differences in the samples due to missing pretest data.

Summary of the impacts of the Niswonger Foundation i3 grant on student outcomes.

Outcome	Cohort	Years of exposure	Regression Adjusted Mean or Predicted Probability		
			Consortium group	Comparison group	Difference
Mean composite ACT scores at the end of grade 12 (Spring 2014)	Grade 11	2 years	19.5	19.5	0.0
	Grade 10	3 years	19.9	19.6	0.3*
	Grade 9	4 years	19.7	19.7	0.0
Probability of enrollment in an AP course by the end of grade 12 (SYs 2012/13, 2013/14, and 2014/15)	Grade 11	2 years	25.6%	22.8%	2.8%*
	Grade 10	3 years	27.8%	21.5%	6.3%*
	Grade 9	4 years	26.4%	21.9%	4.5%*
Probability of earning a score of 3 or higher on an AP exam by the end of grade 12 (SYs 2013/14 and 2014/15)	Grade 11	2 years	9.6%	8.7%	0.9%
	Grade 10	3 years	10.3%	8.8%	1.5%*
	Grade 9	4 years	11.1%	8.7%	2.4%*
Probability of enrollment in college by the fall semester after the end of grade 12 (Fall 2012, Fall 2014)	Grade 12	1 year	60.1%	55.5%	4.5%*
	Grade 11	2 years	58.6%	56.3%	2.3%
	Grade 10	3 years	57.7%	54.3%	3.4%*
	Grade 9	4 years	64.6%	60.6%	4.0%
Probability of persistence in college for two consecutive fall semesters after the end of grade 12 (Fall 2014, Fall 2015)	Grade 11	2 years	42.5%	39.5%	3.1%*
	Grade 10	3 years	40.6%	37.9%	2.7%*

* Coefficient (of estimated intention-to-treat impact) is statistically significant at the 95 percent confidence level using a two-tailed test.

This means that, on average, students in the Consortium tend to have higher ACT scores, are more likely to enroll in an AP course during high school, are more likely to earn a score of 3 or higher on an AP exam, are more likely to enroll in college, and more likely to persist in college relative to similar students in the comparison group.

The results from the implementation evaluation indicate that many of the Consortium's components either were implemented with fidelity or were rated very close to the threshold of meeting moderate fidelity. The components of the intervention that consistently received high implementation ratings throughout the portion of the grant period examined were in the areas of Consortium leadership, resources and services to provide program infrastructure, and collaboration with district partners.

Summary

This evaluation provides evidence of the impact of the Niswonger Foundation i3 grant that may be useful for applying for future grants to scale up or expand upon the Consortium's current activities.

These results have been submitted to the National Evaluation of i3 (NEi3) to be included in a U.S. Department of Education report to Congress on the overall impact of the federal investment in the i3 program. The NEi3 report will examine the effects of interventions funded by i3 on student outcomes, the strength of the evidence generated by the independent i3 evaluations (including CNA's of the Consortium), and the extent to which i3-funded interventions were implemented with fidelity.

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Glossary

AP	Advanced Placement
CACC	College and Career Counselor
CTE	career and technical education
EOC	end-of-course
FAFSA	Free Application for Federal Student Aid
FY	fiscal year
GPRA	Government Performance and Results Act
i3	Investing in Innovation Fund
IRB	Institutional Review Board
LEA	Local Education Agency
NEi3	National Evaluation of i3
STEM	science, technology, engineering, and mathematics
SY	school year
TCAP	Tennessee Comprehensive Assessment Program
TCAT	Tennessee College of Applied Technology
THEC	Tennessee Higher Education Commission
WWC	What Works Clearinghouse

Introduction

In 2010, the U.S. Department of Education sponsored the Investing in Innovation Fund (i3) competition to expand a limited number of promising practices with the potential to be broadly applied to improve education systems across the country. The Niswonger Foundation proposed to create the Northeast Tennessee College and Career Ready Consortium, a network of 29 high schools in 15 neighboring districts, along with five area colleges.[1] The U.S. Department of Education selected the Niswonger Foundation as one of 49 submissions to receive funding from a pool of nearly 1,700 submissions.

Within the i3 program, the Niswonger Foundation i3 grant is classified as a validation grant, designed to validate the effectiveness of promising practices for possible scale-up elsewhere at a later date. The grant provided the Consortium with $17.8 million in funding for five years, starting in Fall 2010. The Consortium also secured $3.6 million in matching funds from the Niswonger Foundation, the Bill and Melinda Gates Foundation, the Rural School and Community Trust, and the J.P. Morgan Foundation.

The Consortium aims to improve high school students' college and career readiness by increasing their access to, participation in, and completion of advanced courses. It seeks to achieve these goals by scaling up local promising practices to offer a wide array of advanced high school and college credit–bearing courses, particularly in mathematics, science, foreign languages, and career and technical education. The Consortium uses distance and online learning, as well as college partnerships, to increase offerings of Advanced Placement (AP), dual enrollment, and other upper-level high school courses. The grant also was used to create a regional coordinating body to analyze course supply and demand in the region and determine course needs; offer professional development for teachers in an effort to improve the rigor of courses; and provide college and career counseling to encourage college access and help students with the college application process.

[1] The Consortium added a 30th school in the 2013/14 school year. This report includes data for only the original 29 schools, since we are examining changes in student outcomes and implementation of grant activities over the first three years of participation in the grant.

One of the requirements of the i3 program is that each grantee must select an external evaluator to conduct an independent analysis of the impact of the intervention on educational outcomes and to assess the extent to which the intervention was implemented as intended. In the last year of the grant, the information must be submitted to the Department of Education's National Evaluation of i3 (NEi3), where it will be included in a report for Congress that aggregates the results of all programs funded through i3 grants. These results will be of interest to a wide range of stakeholders, including program participants and leadership, federal and state policymakers, local administrators and teachers, and the educational research community.

This report provides the findings that were submitted to the NEi3 on the Niswonger Foundation i3 grant.[2] It includes results on the impact of the Consortium after up to four years of implementation (SY 2011/12 through SY 2014/15) on student outcomes of college readiness, AP participation, AP performance, and college enrollment. It also provides data on implementation that are used to examine the fidelity with which the intervention was carried out as originally intended.

We begin by providing context for understanding the NEi3 process. Next, we describe the components of the Niswonger Foundation i3 grant, as they were originally intended to be implemented and how implementation changed over time in the intervention. Then we describe the data and methods for the impact and implementation evaluations, followed by the findings of each evaluation. We conclude with a summary of the results.

[2] This study was conducted under an Institutional Review Board (IRB) exemption from Western IRB (WIRB #289900).

The National Evaluation of i3 (NEi3)

Purpose of NEi3

The first round of i3 grants was awarded in 2010, consisting of 30 development grants (interventions with limited evidence that are implemented on a small scale), 15 validation grants (interventions with moderate evidence that are implemented on a medium scale), and 4 scale-up grants (interventions with strong evidence that are being scaled up to other contexts or settings). Each year since, an additional round of i3 grants has been awarded, so there currently are five "cohorts" of grantees.

The Niswonger Foundation i3 grant is classified as a validation grant in the fiscal year (FY) 2010 cohort.

The overarching purpose of the NEi3 is to determine whether the i3 program is working (Abt Associates, 2012). It seeks to answer the following questions:

1. What are the effects of interventions funded by i3 on student outcomes?
2. What is the strength of the evidence generated by the independent i3 evaluations?
3. To what extent were i3 interventions implemented with fidelity?

Type of information collected for NEi3

The NEi3 is collecting data on each i3 grant, on both the impact of the intervention on student outcomes (impact estimates) and the extent to which the intervention was implemented as intended (fidelity of implementation). To ensure that the results are comparable across a wide range of evaluations, the NEi3 research team developed a data collection survey that requires external evaluators such as CNA Education to report the results of their evaluations in a consistent manner. NEi3 is using the information provided to prepare a project profile for each evaluation, to include a description of the characteristics of the intervention implemented by the i3 grantee, an assessment of the strength of the evidence provided by the external evaluation, and results from analyses to estimate the effect of the intervention.

Criteria for assessing the strength of evidence

The NEi3 team is assessing the strength of the evidence for each evaluation using criteria largely based on the standards defined by the U.S. Department of Education's What Works Clearinghouse (WWC).

Validation grants such as the Niswonger Foundation i3 grant will receive one of three possible ratings for the impact evaluation (Abt Associates, 2012):

- **Meets i3 criteria**: This is the highest possible rating, which provides rigorous evidence of the impact of the intervention. In order to be eligible for this rating, a study must use either a randomized controlled trial design (which randomly assigns participants into a treatment group or a control group) or a regression discontinuity design (which compares outcomes for students just above or below a threshold used to determine participation in the intervention). Studies must also meet other criteria defined by the WWC.

- **Meets i3 criteria with reservations**: This is the second-highest rating, which can be received by studies that use a randomized controlled trial design, a regression discontinuity design, or a quasi-experimental design (which uses nonexperimental methods to define intervention and comparison groups). Studies must also meet other criteria defined by the WWC.

- **Does not meet criteria**: This is the lowest rating, which is assigned to grants that do not qualify for the ratings of "meets i3 criteria" or "meets i3 criteria with reservations."

The highest rating that the Niswonger Foundation i3 grant impact evaluation can receive is "meets i3 criteria with reservations." It was not possible to conduct a randomized controlled trial for the evaluation, because all of the Consortium schools agreed to participate in the intervention prior to the award of the grant and the Consortium leadership did not want to withhold services to a subset of the Consortium in order to create a randomly assigned comparison group. It also was not possible to use a regression discontinuity design, because the Consortium's services are available to all students, not just those who meet certain criteria such as a test score requirement. As a result, the CNA team developed a quasi-experimental design using a technique known as propensity score matching, which we used to identify a comparison group of schools from other regions of Tennessee that are similar to the Consortium schools on a comprehensive set of observable characteristics.

There are three additional criteria used to assess the strength of the evidence of the external evaluations, as described in Appendix A. CNA designed the impact

evaluation for the Niswonger Foundation i3 grant to meet all of the NEi3 criteria needed to receive a rating of "meets i3 criteria with reservations."

Criteria for assessing the quality of implementation findings

For each i3 grantee, its external evaluator was required to develop a logic model that illustrated the key components of the intervention as it was intended to be implemented, the mediators (or intermediate outcomes) through which the intervention was designed to work, and the program's expected outcomes. The evaluator also was required to develop a fidelity of implementation system that defined for each component in the logic model the data sources that could be used to measure implementation, a numeric scale for measuring the fidelity of implementation, and a criterion for determining whether the component was implemented with fidelity.

These data are helpful for exploring the mechanisms through which the intervention achieves its impact (or the lack thereof), supporting or challenging claims of causality, and identifying challenges to future implementation and scale-up activities.

The NEi3 team developed its own criteria for assessing the grantees' logic models and plans for measuring fidelity of implementation, as described in Appendix A. CNA designed the implementation evaluation for the Niswonger Foundation i3 grant to meet all of the NEi3 criteria for high-quality implementation data.

Timeline for NEi3

The NEi3 began collecting data annually in the spring of 2015. This data collection period was timed to allow FY 2010 grants such as the Niswonger Foundation's to provide findings on implementation fidelity and outcomes through school year (SY) 2013/14, or after three full years of exposure to the implementation. The NEi3's year 1 report to Congress is scheduled for release in 2016. The report will consist of an individualized project profile with findings for each i3 evaluation, as well as a cross-site summary that identifies effective and promising interventions and assesses the overall results of the i3 program.

There will be annual opportunities for a grantee's external evaluator to report findings to the NEi3 even after the end of its grant period. Profiles for each i3 grant will be updated in the NEi3's annual addenda. The first addendum to the report on the NEi3 is scheduled for release in the spring of 2017, and a new addendum will be released each subsequent spring for as long as the U.S. Department of Education continues to fund the i3 program.

Description of the Niswonger Foundation i3 Grant

This section summarizes the components of the Niswonger Foundation i3 grant as they were intended to be implemented, and discusses the changes that have occurred since the grant began in Fall 2010. Prior to the start of SY 2013/14, the Consortium experienced significant changes in leadership and organization. As a result, the evaluation team, in collaboration with Niswonger Foundation i3 leadership, updated its original logic model for the remaining years of the intervention. (Because it is the updated logic model that must be reported to NEi3, that is the version described below.)

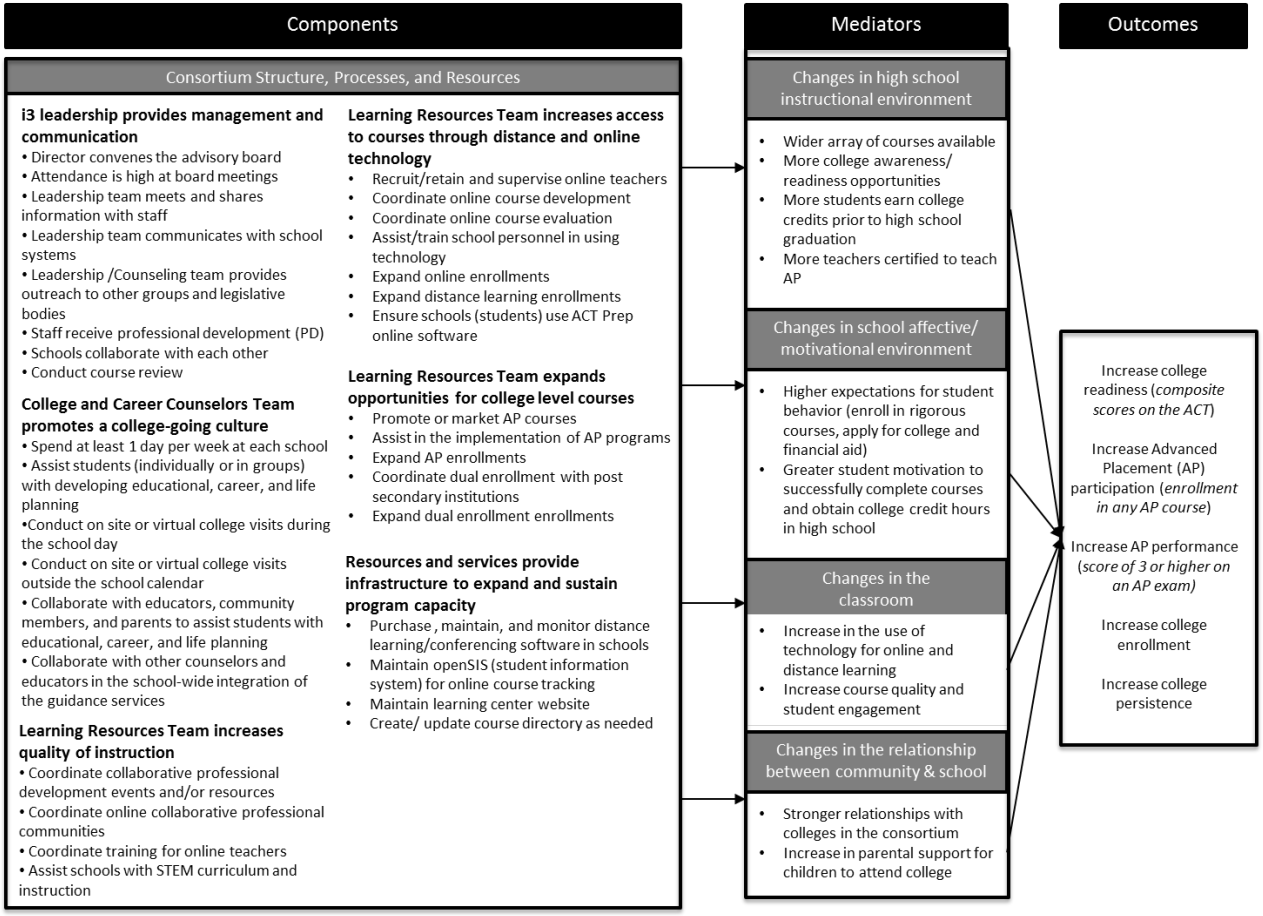
Description of each component of the intervention

The logic model shown in figure 1 illustrates the key components of the Niswonger Foundation i3 grant as it is intended to be implemented in SY 2013/14 and 2014/15, the mediators (or intermediate outcomes) through which the intervention is designed to work, and the program's expected outcomes. Differences between the activities described in this model and activities from the beginning of the grant (SYs 2011/12 and 2012/13) are described in the text.

Below is a list of the key components of that logic model, each of which is described in further detail in this section:

- i3 leadership provides management and communication
- College and Career Counselors Team promotes a college-going culture
- Learning Resources Team increases quality of instruction
- Learning Resources Team increases access to courses through distance and online technology
- Learning Resources Team expands opportunities for college-level courses
- Resources and services provide infrastructure to expand and sustain program capacity

Figure 1. Logic model for the Northeast Tennessee College & Career Ready Consortium in SYs 2013/14 and 2014/15



i3 leadership provides management and communication

The Consortium's Executive Director monitors and manages the Consortium's day-to-day operations. The Executive Director is an educator with more than 25 years of experience as an assistant principal of curriculum and instruction and a school counselor. The Executive Director is supported by the Consortium's Leadership Team, composed of the Niswonger Foundation's Executive Vice President and the Consortium's Director of Learning Resources, Director of Technology, and Compliance Officer.

The Leadership Team regularly communicates with Consortium staff through meetings and with Consortium school systems through correspondence and in-person visits. These channels of communication are intended to provide a rich and continuous flow of information to the Executive Director and Leadership Team about the progress of Consortium initiatives in each of the districts and schools. The Leadership Team also conducts outreach to other organizations and policymaking entities regarding the Consortium's activities.

The Executive Director co-chairs the Niswonger Foundation i3 grant Advisory Board with the Foundation's Executive Vice President. The Executive Director reports quarterly to the Advisory Board on the activities of the Consortium and seeks their help and guidance to ensure continuous progress toward Consortium goals. The Consortium's Advisory Board is composed of representatives from member schools and districts, partner colleges, the Tennessee Department of Education, and supporting privately funded organizations. The Board hears reports from the co-chairs as well as from the Leadership Team, Learning Resources Team, Director of College and Career Counseling, and the external evaluation team. These meetings allow Board members to have evidence-based discussions, make recommendations, and offer assistance based on the progress made and barriers inhibiting further gains toward the Consortium's goals. High attendance at the Board's meetings is critical to develop buy-in on the Consortium's activities from all constituents and ensure that everyone has a chance to provide feedback.

In addition, the Executive Director and Leadership Team ensure Consortium staff receives professional development each year in areas of interest. The Leadership Team also works to have each school collaborate with others in the Consortium, through providing an online teacher, sending or receiving a distance learning course, or having counselors and teachers collaborate in an online forum. The Leadership Team also conducts regular course review meetings at which school and district representatives review current courses offered through the Consortium, as well as discuss which new courses should be added each year and the preferred delivery method for them.

College and Career Counselors Team promotes a college-going culture

The Niswonger Foundation i3 grant supports a Director of College and Career Counseling and eight College and Career Counselors (CACCs). Each CACC is assigned a set of Consortium schools and spends at least one day a week in each of them. CACCs work closely with school counselors to support the school-wide integration of college and career guidance services.

The CACCs work directly with students to inform and advise them about high school, college, and career topics both individually and in groups. Topics can range from ACT™ test preparation and online course taking to completing college applications or the Free Application for Federal Student Aid (FAFSA). Many of the topics covered also are developed into informational materials intended for students, parents, and the community. These materials are shared at outreach events designed to assist students with educational, career, and life planning.

CACCs also set up onsite and virtual college visits for Consortium students both during the regular school day and at other times to ensure that the visits are widely accessible to students and their parents.

Learning Resources Team increases quality of instruction

The Learning Resources Team is composed of Consortium staff. Team members have individual responsibilities to specific goals of the grant. There is a Director of Learning Resources who oversees the team and is responsible for online learning. There is also a Director of Professional Learning in charge of providing professional development opportunities for teachers and administrators in the Consortium as well as staff from the Niswonger Foundation supporting the grant. In addition, there are Learning Resources Coordinators for each of the following areas: AP; dual enrollment; distance learning; career and technical education (CTE); and science, technology, engineering, and mathematics (STEM). These Coordinators work closely with Consortium schools to develop, enhance, and expand these various programs within each school.

One major strategy of the i3 grant to improve college and career outcomes for Consortium students is to increase the quality of instruction in these schools. The Learning Resources Team is responsible for ensuring teachers in Consortium schools have collaborative professional learning opportunities offered through the grant. Most recently, these opportunities came in the form of teacher academies held in the summer for various aspects of the grant or in specific subject areas, as well as attendance by AP teachers at College Board trainings in their subject area. The

academies provided teachers with information, resources, and opportunities for discussion on particular issues such as teaching in a distance learning or online setting and teaching an AP course. In addition, opportunities have been provided to teachers and administrators to attend meetings of various professional associations at the state and national levels.

Another strategy identified by the Learning Resources Team to improve instructional quality is the development of an online collaborative professional community for principals, teachers, and counselors. These online communities are designed to give educators the opportunity to discuss successes and challenges associated with various aspects of their instruction.

The Learning Resources Team also assists with other tasks designed to improve the quality of instruction such as coordinating training for online teachers. This ensures that teachers who have never taught online classes before have the training needed to properly implement them. In addition, the STEM Coordinator works with schools to implement new mathematics and science curriculum. This includes activities such as observing classroom instruction and providing feedback, or working with teachers to identify curricular resources.

Learning Resources Team increases access to courses through distance and online technology

Distance and online learning courses are two key strategies used by the Niswonger Foundation i3 grant to achieve its goals for expanding students' access to advanced courses in high school. Both delivery methods provide students in remote locations with more course options during the school year than they would otherwise have available to them through traditional face-to-face courses in their schools.

The Learning Resources Team handles all aspects of online course development in order to expand course enrollments through online technology. They actively recruit and supervise online teachers for these courses. In addition, they develop, maintain, and evaluate the online courses offered through the grant and assist school personnel in the use of the required technology. The Learning Resources Team also works with school administrators and other staff to identify and facilitate distance learning partnership opportunities in order to expand course enrollments through distance learning.

The Niswonger Foundation i3 grant also provides the Consortium schools with access to the ACT Online Prep™ program with the goal of increasing students' college readiness and access. Developed by ACT, Inc., the online preparation program includes practice and diagnostic ACT tests, as well as comprehensive review materials, in each of the ACT assessment's four required subject tests—English, mathematics, reading, and science.

Learning Resources Team expands opportunities for college-level courses

Two other key strategies to improve college and career outcomes for Consortium students are to develop and expand AP and dual enrollment programs in schools. AP and dual enrollment programs offer rigorous college-level courses and provide opportunities for students to gain college credit while in high school. The AP Coordinator works closely with principals, teachers, and counselors to create and expand AP course offerings and enrollments within a school and promote these courses to students and parents. The Coordinator emphasizes working with schools that have not previously offered AP courses to their students, so that AP courses become more widely available across the Consortium.

Similarly, the Coordinator works with schools to expand dual enrollment opportunities for students. For dual enrollment, the Coordinator collaborates with program staff at partner colleges to support implementation of courses in schools, including coordination of tuition or textbook assistance.

Resources and services provide infrastructure to expand and sustain program capacity

The grant funding, as well as in-kind services from participating schools and districts, allows the Consortium to afford necessary technology (including high-speed Internet, servers, computers, and distance learning equipment), online courses or their development, delivery of online courses, and teacher training and stipends. The funding also is used for other resources for Consortium courses, such as tuition stipends and books for dual enrollment students when there is financial need. The Consortium also is responsible for maintaining a functioning distance learning website, maintaining a student information system that provides up-to-date online course offerings, and creating a course directory schools use to coordinate course offerings.

Changes over time in the intervention

While the underlying goals of the Niswonger Foundation i3 Consortium have remained consistent from the beginning, Consortium leadership and organization significantly changed before the start of SY 2013/14. These changes play a significant role in setting the direction of the Consortium in the last two years of the grant.

In Spring 2013, the Executive Director stepped down. The Consortium's Director of College and Career Counselors was appointed in that role, and the Niswonger Foundation's Executive Vice President took on a larger role in overseeing the direction of the project.

In Summer 2013, the Consortium staff was reorganized in order to better meet the needs of the project. A challenge previously had been that no one person was responsible for the major strategies of the grant, such as development and expansion of AP, distance learning, dual enrollment, and online programs in Consortium schools. Instead of a Learning Resources Team, there had been independent curriculum specialists who focused their efforts on particular subject areas such as English, mathematics, or science, and they planned activities and supports around these individual subject areas. Each specialist had contributed to the grant's strategies in different ways, and it was difficult to attribute successes and challenges to specific activities of the staff.

As a result of the reorganization, the role of the curriculum specialists was changed to Learning Resources Coordinators, with each responsible for one of the major strategies of the Consortium. Ideally, this reorganization would ensure that someone was actively working toward the specific goals of the Consortium. The career counseling staff also was realigned to ensure consistency and continuity of services through the remainder of the grant period.

Despite the leadership and organizational changes, however, many of the underlying supports to schools and students, such as professional development opportunities for staff, dual enrollment tuition assistance, and the type of college and career counseling provided for students, remained largely unchanged.

Meantime, the Consortium has been able to expand support to districts and schools through a mini-grant program. These mini-grants began in Summer 2013 as a way for schools to individually work toward Consortium goals. In their proposals to the Consortium leadership, schools identified objectives of the support they requested, how the support related to Consortium goals, and a timeline, budget, and sustainability plan. Between July 1, 2013, and May 1, 2014, the Consortium approved 62 mini-grant proposals with a total funding amount of $1.3 million. Examples of projects funded include technology purchases (e.g., computers, laptop carts, software, and calculators), resources for starting up new AP courses, and support for summer "boot camps" and afterschool study programs. The mini-grant program was not originally a part of the i3 grant proposal or logic model, but Consortium staff saw opportunities to support innovation specific to individual schools.

Data and Methods

This section describes the data and methods for both the impact evaluation and the implementation evaluation.

Funding for the Consortium began in Fall 2010, but SY 2010/11 was used primarily for planning and building necessary program infrastructure. Thus, SY 2010/11 serves as the baseline period, because it represents student and school conditions prior to the intervention. Program implementation, including teacher training for AP instruction and the addition of online courses for Consortium students, began in Summer 2011. The first full year of implementation, therefore, is SY 2011/12. This means that during the five-year grant period, there are four years of implementation from which data can be collected (Fall 2011 through Fall 2014). The Niswonger Foundation also received a one-year extension of the evaluation period to collect college enrollment and persistence data through Fall 2015.

Impact evaluation

The impact evaluation seeks to determine whether the Niswonger Foundation i3 grant is an effective approach for increasing college readiness, AP participation, AP performance, college enrollment, and college persistence. To assess the Consortium's effectiveness, the evaluation team compared outcomes in these domains for students in Consortium schools with those of students in similar schools that are not part of the Consortium.

It is important to note that these impacts should not be interpreted as causal, as there may be unobserved differences between the Consortium and comparison groups that are not accounted for in the analysis and may influence student outcomes.

Research questions for the impact evaluation

The NEi3 categorizes research questions into two categories: confirmatory and exploratory. *Confirmatory* research questions answer the main policy questions using the most rigorous design possible (Burghardt, Deke, Kisker, Puma, and Schochet, 2009). *Exploratory* research questions provide an opportunity to further

examine relationships in the data and examine how the impact of the intervention differs for various groups of students, teachers, or schools. The evaluation of the Niswonger Foundation i3 grant includes both confirmatory and exploratory research questions, as described below.

Confirmatory research questions

The confirmatory research questions are based on four domains of interest: college readiness, AP performance, college enrollment, and college persistence. The confirmatory research questions include the full sample of students from the cohort with the longest duration of exposure to the intervention at the time of the last possible data collection during the grant period. These cohorts were selected for the confirmatory analyses because we expect to find the greatest impact of the intervention for students with the most exposure to the intervention. There are four confirmatory research questions:

What is the impact of the Niswonger Foundation i3 grant on

1. College readiness, as measured by composite scores on the ACT by the end of grade 12 (after up to three years of exposure to the intervention)?

2. AP performance, as measured by an earned score of 3 or higher on an AP exam by the end of grade 12 (after three years of exposure to the intervention)?

3. College enrollment, as measured by enrollment in a degree-granting two-year or four-year college or at a Tennessee Technology Center by the fall semester in the year after high school graduation (after three years of exposure to the intervention)?

4. College persistence, as measured by enrollment in a degree-granting two-year or four-year college or at a Tennessee Technology Center in the fall semester one year and two years after high school graduation (after two years of exposure to the intervention)?

After the initial grant period ended, the Niswonger Foundation received a one-year no-cost extension of the evaluation period to collect an additional year of data on all four outcomes.[3] These additional results were submitted to NEi3's first addenda.

[3] While the additional year of data for each of these outcomes represents the longest duration of exposure to the intervention, they are not classified as confirmatory or exploratory because they were added after the data collection for the original grant period.

Exploratory research questions

The specific questions to be addressed in the exploratory analysis are the following:

1. What is the impact of the Niswonger Foundation i3 grant for students with fewer years of exposure to the treatment on:
    a. College readiness (after two and three years of exposure to the intervention)?
    b. AP performance (after two and three years of exposure to the intervention)?
    c. College enrollment (after one year and two years of exposure to the intervention)?
2. Does the impact of the Niswonger Foundation i3 grant differ for student subgroups (free and reduced-price lunch status, CTE concentrator status) and school locale (rural/town versus city/suburban)?
3. What is the impact of the Niswonger Foundation i3 grant on the additional domain of AP participation, as measured by enrollment in one or more AP courses by the end of grade 12?
4. What is the impact of the Niswonger Foundation i3 grant on AP exam performance for the subgroup of students who enrolled in an AP course?
5. What is the impact of the Niswonger Foundation i3 grant on ACT scores at the end of grade 11 (after three years of exposure to the intervention)?

The first exploratory research question addresses whether the Niswonger Foundation i3 grant had an impact on outcomes for cohorts with fewer years of exposure to the intervention. The effectiveness of educational interventions can vary by exposure and dosage (Century, Rudnick, & Freeman, 2010). For example, Consortium and school personnel will gain more experience over time and may become more effective in implementing the intervention's activities. Conducting subgroup analyses for cohorts of students with different years of exposure to the intervention will improve our understanding of the conditions under which the intervention may work. This information also would be useful if the intervention were scaled up or replicated, so that implementers would know when they might expect to begin finding changes in student outcomes.

The second exploratory research question examines whether the impact of the grant differs for student and school subgroups. These subgroup analyses are conducted only if there is an overall effect of the intervention on student outcomes. Research shows that college enrollment and persistence rates tend to be lower for low-income students (Bastedo & Jaquette, 2011; Tinto, 2006) and students in rural schools

(Doyle, Kleinfeld, & Reyes, 2009; McDonough & McClafferty, 2001); so we may expect students in these subgroups to respond differently to the intervention than their peers do. In addition, the Consortium's counselors note that students who complete high school CTE concentrations often believe that they do not need postsecondary education to find a job in their CTE program area. The counselors have been advising these students to at least enroll in a short-term postsecondary certificate program in their CTE program area, so outcomes for CTE concentrators may differ in Consortium schools and comparison schools.

The third question assesses whether the Niswonger Foundation i3 grant has an impact on an additional outcome for AP participation. This outcome is categorized as exploratory because the literature provides mixed evidence for the association between college outcomes and participation in AP courses for students not taking an AP exam (Adelman, 2006; Dougherty, Mellor, & Jian, 2006; Geiser & Santelices, 2004; Hargrove, Godin, & Dodd, 2008; Mattern, Shaw, & Xiong, 2009; Speroni, 2011). Evidence is also mixed on whether students benefit from taking an AP course and exam even if they do not pass the exam (Dougherty, Mellor, & Jian, 2006; Hargrove, Godin, & Dodd, 2008; Jackson, 2010; Mattern, Shaw, & Xiong, 2009).

The fourth question examines the impact of the Niswonger Foundation i3 grant on AP exam performance for the subgroup of students enrolled in an AP course. This analysis examines whether students in Consortium schools who enroll in AP courses perform better than students in comparison schools in AP courses do. There are several reasons why an effect may be anticipated here. Consortium students may be better prepared academically because they may have greater access to rigorous courses prior to their enrollment in AP courses. The Consortium also provides professional development to AP teachers, which may enable them to teach their courses more effectively.

The fifth exploratory research question examines the impact of the Niswonger Foundation i3 grant on ACT scores at the end of grade 11 instead of the end of grade 12. The original analysis plan for the evaluation had grade 11 ACT scores as the confirmatory outcome. We obtained SY 2011/12 and 2012/13 ACT scores from the Tennessee Department of Education, but a preliminary examination of the data showed that 41 percent of students in the sample were missing ACT scores in grade 11. The state also provided a file with ACT scores for high school graduates, which includes ACT scores from tests taken at any time in high school. This file had a much lower missing data rate of 20 percent. Since there are fewer problems with missing data in the graduates file, we revised our plan, examining the ACT outcome at the end of high school (grade 12)—instead of ACT scores in grade 11—for the confirmatory analysis. We, however, still include the grade 11 ACT scores as an exploratory outcome in accordance with the scientific process requirements outlined under "other relevant factors for assessing i3 evaluations" in Appendix A of this report describing the NEi3.

Sources of data for the impact evaluation

The outcome measures were selected because they are manifestations of the goals of the Consortium, as shown in the logic model. Table 1 describes each of the outcome variables for the impact evaluation, including the variable type (continuous or dichotomous), the data source, and the timing of the variable.

Table 1. Summary of outcome variables for the impact evaluation, by research domain.

	Research Domain				
	College Readiness	**AP Performance**	**AP Participation**	**College Enrollment**	**College Persistence**
Outcome	Composite scores on the ACT	Score of 3 or higher on an AP exam	Enrollment in any AP course during the intervention period	College enrollment in a degree-granting 2-year or 4-year college or at a TCAT	College persistence in a degree-granting 2-year or 4-year college or at a TCAT
Variable Type	Continuous (1–36)	Dichotomous (0=did not take any AP exam or only had AP exam scores less than 3, 1= score of 3 or higher)	Dichotomous (0=did not enroll in any AP courses, 1= enrolled in one or more AP courses)	Dichotomous (0=no college enrollment, 1=college enrollment)	Dichotomous (0=no college persistence, 1=college persistence)
Data Source	Tennessee Department of Education	Tennessee Department of Education	Tennessee Department of Education	Tennessee Higher Education Commission and National Student Clearinghouse	Tennessee Higher Education Commission
Timing of Variable	Administrated statewide in Spring of grade 11, although students may take the exam on their own at another time	End of grade 12	End of grade 12	Fall semester following grade 12	Fall semester following grade 12 and one year after grade 12

The Tennessee Department of Education provided data on college readiness, AP performance, and AP participation for all students statewide; the Tennessee Higher Education Commission (THEC) provided college enrollment records. THEC collects college enrollment data from the National Student Clearinghouse, which has records from more than 3,600 colleges and universities, accounting for more than 98 percent of all students enrolled in public and private U.S. postsecondary institutions.[4] THEC also supplements the National Student Clearinghouse data with its own records on students who attend a Tennessee College of Applied Technology (TCAT) or any other public, in-state postsecondary institutions that do not participate in the National Student Clearinghouse.[5] THEC also has data on enrollment at in-state private colleges for recipients of Tennessee Hope, a lottery-funded academic scholarship program for in-state colleges. THEC also provided data on college persistence during the fall semester one year after grade 12 for students enrolled at in-state colleges and TCAT. However, data from the National Student Clearinghouse were not available for the college persistence outcome, so students are excluded from the analyses if they were enrolled in a postsecondary institution from the National Student Clearinghouse records during the fall semester immediately following grade 12.

The cohorts of students eligible for the impact evaluation differ for each research question because the amount of follow-up time required to collect data differs by outcome, as shown in table 2. The cohorts selected for the confirmatory analysis represent students with the longest exposure to the intervention in the time available for the evaluation period.

Students in grade 12 in SY 2010/11 had only one year of exposure to the intervention. There may be an impact on college enrollment because these students had access to the Consortium's College and Career Counselors in their senior year. These students, however, had low exposure to the intervention, with few opportunities to take the new rigorous courses added by the Consortium, so no impact is expected on ACT scores, AP outcomes, or college persistence. Thus college enrollment is the only outcome analyzed for this cohort.

[4] http://www.studentclearinghouse.org/about/

[5] Tennessee has a statewide system of 27 Tennessee Colleges of Applied Technology (TCATs) that offer one- to two-year technical/occupational postsecondary programs (see http://www.completecollege.org/docs/Tennessee%20Technology%20Centers-%20A%20Preliminary%20Case%20Study(1).pdf).

Table 2. List of cohorts and outcomes to be analyzed for each year of the intervention.

Cohort	2011/12 Intervention Year 1	2012/13 Intervention Year 2	2013/14 Intervention Year 3	2014/15 Intervention Year 4	Fall 2015 Post Intervention
Grade 9	**Grade 9**	**Grade 10**	**Grade 11** ACT scores (exploratory)	**Grade 12** ACT scores (exploratory) AP exam 3+ (confirmatory) AP course enroll (exploratory)	**College year 1** College enroll
Grade 10	**Grade 10**	**Grade 11**	**Grade 12** ACT scores (confirmatory) AP exam 3+ (confirmatory) AP course enroll (exploratory)	**College year 1** College enroll (confirmatory)	**College year 2** College persist
Grade 11	**Grade 11**	**Grade 12** ACT scores (exploratory) AP exam 3+ (exploratory) AP course enroll (exploratory)	**College year 1** College enroll (exploratory)	**College year 2** College persist (confirmatory)	
Grade 12	**Grade 12**	**College year 1** College enroll (exploratory)	**College year 2**	**College year 3**	

Methods for assessing the impact of the intervention on student outcomes

The intervention group consists of 29 high schools in 15 school districts that agreed to participate in the Consortium prior to the award of the grant. This is a

convenience sample of districts in Northeast Tennessee that had previously worked in partnership with the Niswonger Foundation on other projects.

For the impact evaluation, a school-level propensity score model was used to identify a matched comparison school for each of the intervention schools. This is important because there may be other changes over time independent of the i3 grant that may influence student outcomes, such as activities under Tennessee's Race to the Top award or the adoption of new Tennessee Core Standards. The comparison group provides a way to benchmark the progress of the Consortium against other schools that are subject to the same changes in state policy over time. The comparison schools operate under business-as-usual conditions, without membership in the Consortium or access to the Consortium's activities or resources.

All regular public high schools in the state of Tennessee were included in a propensity score model used to identify the 29 comparison schools. This statistical technique requires estimating a logistic regression equation of the likelihood that a school is a member of the Consortium, controlling for demographic characteristics of the student population, test scores of the student population, school resources, and community characteristics. From this equation we calculate a score for each school, based on those characteristics, and then match Consortium schools to non-Consortium schools that have the closest scores. The impact analysis compares the outcomes for students enrolled in Consortium schools with outcomes for students enrolled in schools with similar characteristics in the comparison group (see Appendix B for additional information on the methods for propensity score matching).

The matched comparison schools identified from the propensity score model had to be recruited to participate in the evaluation. The primary responsibility of the comparison schools is to participate in a bi-annual survey about course enrollments. The comparison schools also were asked to allow the evaluation team to conduct classroom observations in the first and last years of the grant. These data provide descriptive formative feedback on program implementation and are not included in the impact evaluation. Comparison schools do not need to provide outcome data for the impact evaluation because data about their students' outcomes are available statewide from administrative records.

The Consortium staff called the principals at all 29 matched comparison schools to request their participation in the study, offering them an annual financial incentive. Only one school declined to participate. This school was replaced with the school with the next-highest propensity score value. The final comparison group consists of 29 high schools in 20 districts.

The analysis sample for the impact evaluation consists of all students enrolled in a Consortium school or a matched comparison school at the beginning of the first year of program implementation (as of October 1, 2011) who have outcome and pretest

data. Regression models are used to estimate the impact of the intervention while controlling for students' pretest scores, school-level average pretest scores, student demographic characteristics, and school characteristics (see Appendix B for additional information on the model specification). Inclusion of these covariates in the models reduces bias in the estimate of the intervention's effect and improves the precision of the estimates.

If students in Consortium schools show positive and statistically significant differences relative to the comparison schools, this will indicate that the Consortium's programs and activities may have had a positive impact on its students' college and career readiness.

Baseline equivalence of the impact evaluation sample

After estimating the school-level propensity score model, we conducted a preliminary analysis to establish whether the intervention and matched comparison groups were similar at baseline. We compared the average values for the two groups on a set of observed school-level factors representing student and community characteristics, test scores of the student population, attendance and graduation rates, and school resources.

After matching, there are no statistically significant differences between the Consortium schools and the matched comparison schools on any of the observed characteristics (additional details provided in the Appendix B).

The most important comparison for the impact evaluation is whether student outcomes prior to the i3 grant differ between the Consortium schools and the matched comparison schools. Student pretest scores are the primary indicator of baseline equivalence for each of the outcome measures.

The specific tests for baseline equivalence differ depending on the grade level of the students in the sample prior to the start of the grant, and include both state and national assessments. The state assessments are the Tennessee Comprehensive Assessment Program (TCAP) exams and end-of-course (EOC) subject exams administered at the end of high school courses in the corresponding subject area. National assessments used for the pretests are PLAN™ (grade 10) and ACT™ (grade 11), which are part of the ACT's Educational Planning and Assessment System. All pretests were administered statewide in SY 2010/11, the school year prior to the start of full implementation of the i3 grant in Fall 2011.

Baseline equivalence is established if the mean difference between pretest scores for students in the intervention group and the comparison group is less than or equal to 0.05 standard deviation unit, or if the difference is greater than 0.05 standard

deviation unit but less than 0.25 standard deviation unit and the pretest is included in the impact model.[6] Table 3 shows that the standardized intervention-comparison differences in pretests are less than 0.25 standard deviation unit for all cohorts and outcomes. Because there are still small baseline differences for most variables, however, we include pretest covariates in all statistical models of the impact of the intervention.

Table 3. Test of baseline equivalence of the intervention and comparison groups on pretest measures.

Cohort	Pretest	Outcome	Intervention Comparison Difference	Effect Size Difference	Included in Impact Model?
Grade 9	Grade 8 TCAP in reading & math	ACT scores (gr. 11)	13.813 (reading) 16.309 (math)	0.125 (reading) 0.147 (math)	Yes
		ACT scores (gr. 12)	9.584 (reading) 12.188 (math)	0.099 (reading) 0.125 (math)	Yes
		AP participation	9.366 (reading) 11.660 (math)	0.082 (reading) 0.101 (math)	Yes
		AP performance	9.366 (reading) 11.660 (math)	0.082 (reading) 0.101 (math)	Yes
		College enrollment	-4.859 (reading)	0.076 (reading)	Yes

[6] In order to determine baseline equivalence, we estimate a two-level hierarchical model with students nested in schools, where the dependent variable is the pretest score and there is one independent variable for intervention status (0=matched comparison group, and 1=Consortium group). This model has the same structural components as the impact model but does not include the other student- and school-level covariates. The coefficient on the intervention variable represents the estimated intervention-comparison group difference in pretest measure after adjusting for the nested nature of the data. This difference is divided by the standard deviation of the outcome for the control group to compute the baseline difference in effect-size units.

Cohort	Pretest	Outcome	Intervention Comparison Difference	Effect Size Difference	Included in Impact Model?
			-7.437 (math)	0.095 (math)	
Grade 10	Grade 9 EOC test in English	ACT scores (gr. 12)	2.240	0.062	Yes
		AP participation	-0.922	-0.024	Yes
		AP performance	-0.922	-0.024	Yes
		AP performance (subgroup of students in an AP course)	-3.273	-0.139	Yes
		College enrollment	-0.922	-0.024	Yes
		College persistence	-1.266	-0.033	Yes
Grade 11	Grade 10 PLAN composite score	ACT scores (gr. 12)	0.201	0.055	Yes
		AP performance	0.019	0.005	Yes
		AP performance (subgroup of students in an AP course)	-0.310	0.091	Yes
		AP participation	0.019	0.001	Yes
		College enrollment	0.019	0.005	Yes
		College persistence	-0.018	-0.005	Yes
Grade 12	Grade 11 ACT composite score	College enrollment	0.186	0.039	Yes

Implementation evaluation

Methods for assessing fidelity of implementation

The second part of the evaluation assesses the fidelity of implementation for the intervention. The logic model (see figure 1) illustrates the key components of the Niswonger Foundation i3 grant as it is intended to be implemented. Fidelity of implementation is measured separately for each of these components in each year of the intervention. Due to changes over time in the measurement of some of the indicators, however, the results are not directly comparable across all years. This report includes data from SYs 2011/12 to 2014/15.

To calculate the numeric fidelity score for a component required looking separately at the fidelity of each of several indicators comprising that component. Each indicator was rated by the evaluation team on a 3-point scale where 1="low,"

2="moderate," and 3="high" implementation. In SYs 2011/12 and 2012/13, each indicator also was assigned a weight based on the relative importance of that activity in achieving the objective of the larger component. These weights were developed in consultation with Consortium leadership and applied as percentages so that the sum of all indicators within a component added up to 100 percent. Finally, a weighted average of the fidelity scores for all indicators was calculated for each component.

Components are defined as being implemented "with fidelity" if this weighted average is greater than or equal to 2.5 on a 3-point scale. While this benchmark is somewhat arbitrary, it was determined prior to the collection of the fidelity data, so it was not selected to make the findings appear more favorable.

With the change in Consortium leadership in Summer 2013 came changes to the structure of the components. Given that, in SY 2013/14, each indicator was weighted *equally* in the average fidelity score for each component. Fidelity still was determined using the 2.5 benchmark, however. Again, all changes to the scoring scheme were made prior to the collection of the fidelity data.

Sources of data for assessing fidelity of implementation

The fidelity of implementation for the Consortium was measured using multiple sources of data, most of which fall into one of five categories. First, all Consortium staff members regularly kept activity logs that included the schools they worked with, the activities they completed, and the amount of time they spent on each task. The activity logs were sent to the evaluation team at least once per semester for inclusion in the implementation analysis. Second, the evaluation team kept notes from the Consortium Executive Director's regular meetings with the staff and with the evaluation team. The type of information collected during these meetings included any hiring and retention changes in Consortium staff and updates from the Director reporting on presentations to outside groups.

Third, each year the Compliance Officer sent the evaluation team copies of the annual report submitted to the U.S. Department of Education as part of the i3 grant's federal reporting requirements. These reports contain information such as the amount of money spent on various resources and the extent to which districts are picking up recurring costs. Fourth, the evaluation team requested copies of deliverables produced by Consortium staff, such as the Learning Resources Team's course directory and the College and Career Counselors' Consortium-wide informational materials.

Fifth, the evaluation team collected its own data through surveys and interviews. Each year the evaluation team administered a survey to all Consortium high schools with questions about the names of advanced courses offered, course enrollment, and

the mode of delivery. In addition, the evaluation team conducted interviews with Consortium school and college staff by phone or during site visits about barriers to and progress toward program implementation.

Findings: Impact of the Intervention

This study examines the effects of the Niswonger Foundation i3 grant on student outcomes for (1) college readiness, (2) AP participation, (3) AP performance, (4) college enrollment, and (5) college persistence. This chapter presents the impact findings for each of these outcomes based on multilevel models that account for the clustering of students within schools. We also discuss the results of additional exploratory analyses conducted to examine the impact of the intervention for cohorts of students with fewer years of exposure to the intervention, for student and school subgroups, and for a subsample of the full analysis sample.

For each outcome, we provide an illustrative graphical display of the impact results using bar charts. For the continuous outcome variable (composite ACT scores), a bar is provided with the unadjusted mean for students in the comparison group. A second bar is provided for the Consortium group that adds the coefficient of the intervention variable from the multilevel model to the comparison group mean. For the remaining dichotomous variables, the value for the comparison group in the bar chart is computed by using the estimated equation to calculate each individual student's probability of a successful outcome (enrolling in an AP course, earning a score of 3 or higher on an AP exam, or enrolling in college) using his or her individual characteristics and setting the value of the intervention variable to 0 for everyone in the sample. We then repeated the process, setting the value of the intervention variable to 1 to calculate the predicted probability for students in the Consortium group.

The notes at the bottom of each figure provide the *p*-value, which is used to assess the statistical significance of the impact estimate. The *p*-value represents the likelihood of obtaining a finding due to random chance rather than to the investigated effect. Using a two-tailed test, we consider an impact to be statistically significant if there is less than a 5 percent chance of obtaining a random finding (a *p*-value of less than 0.05). The figures also include an asterisk next to the value for the Consortium if the results are statistically significant.

More detailed results from the regression models can be found in Appendix C, Table 10. This table shows how the results were presented for the NEi3 report.

College readiness

The composite scores on the ACT at the end of grade 12 are used as the primary indicator of college readiness. The confirmatory analysis for college readiness uses the sample of students from the grade 10 cohort, who had up to three years of exposure to the intervention at the time of the outcome (Spring 2014). This is the longest follow-up period possible within the timeframe of the original grant. During the extension of the evaluation period, an additional year of data was added for the grade 9 cohort, who had a full four years of exposure to the intervention.

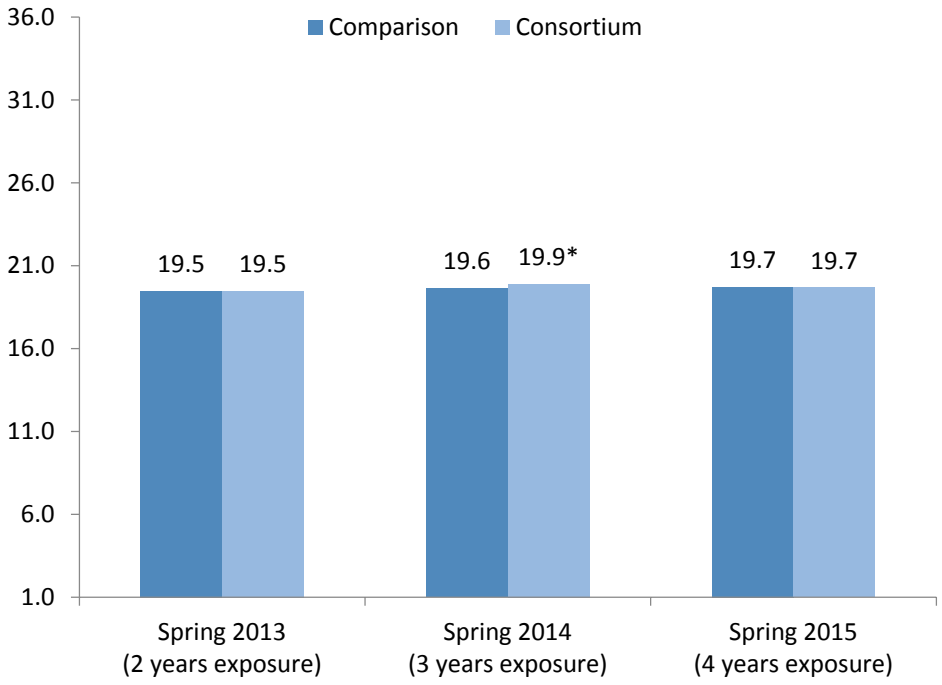
We also conduct an exploratory analysis of the impact of the intervention on college readiness (composite ACT scores) for the sample of students from the grade 11 cohort, who had up to two years of exposure to the intervention at the time of the outcome (Spring 2013). This analysis is considered exploratory because the students had fewer years of exposure to the intervention. The Niswonger Foundation i3 grant did not have a statistically significant impact on college readiness in Spring 2013 for students with up to two years of exposure to the intervention (figure 2). The regression-adjusted mean is 19.5 for students in both the comparison and Consortium groups. There was also no statistically significant impact on college readiness in Spring 2015 for students with four years of exposure to the intervention. The regression-adjusted mean is 19.7 for both groups.

For students with up to three years of exposure to the intervention, however, the intervention is associated with a statistically significant impact on college readiness in Spring 2014. For this cohort, the regression-adjusted mean is 19.6 for the Consortium group and 19.9 for the comparison group, a difference of approximately 0.3. The pooled standard deviation for the sample is 0.25, which means that the effect size is 0.05 standard deviation unit.[7]

Although the effect size for the Niswonger Foundation i3 grant is small in magnitude, it is statistically significant, with a *p*-value of 0.004. This means that students in the Consortium group achieved higher composite scores on the ACT at the end of grade 12 than did students in the comparison group, after up to three years of exposure to the intervention.

[7] In comparison, a study that summarized 468 achievement effect sizes from random assignment studies of educational interventions found that the mean effect size was 0.27 standard deviation unit for studies of high schools (Hill, Bloom, Black, & Lipsey, 2008).

Figure 2. Regression-adjusted mean composite ACT scores at the end of grade 12 for students in the comparison and Consortium groups, Spring 2013, Spring 2014, and Spring 2015.



Notes: Results are from a two-level hierarchical linear model that accommodates for clustering of students within schools. The value for the comparison group is the unadjusted mean. The value for the Consortium group adds the estimated intention-to-treat impact from the model to the comparison group mean. The estimated intention-to-treat impact is 0.019 (p=0.760) in Spring 2013,0.246 (p=0.004) in Spring 2014, and -0.034 (p=0.772) in Spring 2015.

* Coefficient (of estimated intention-to-treat impact) is statistically significant at the 95 percent confidence level using a two-tailed test.

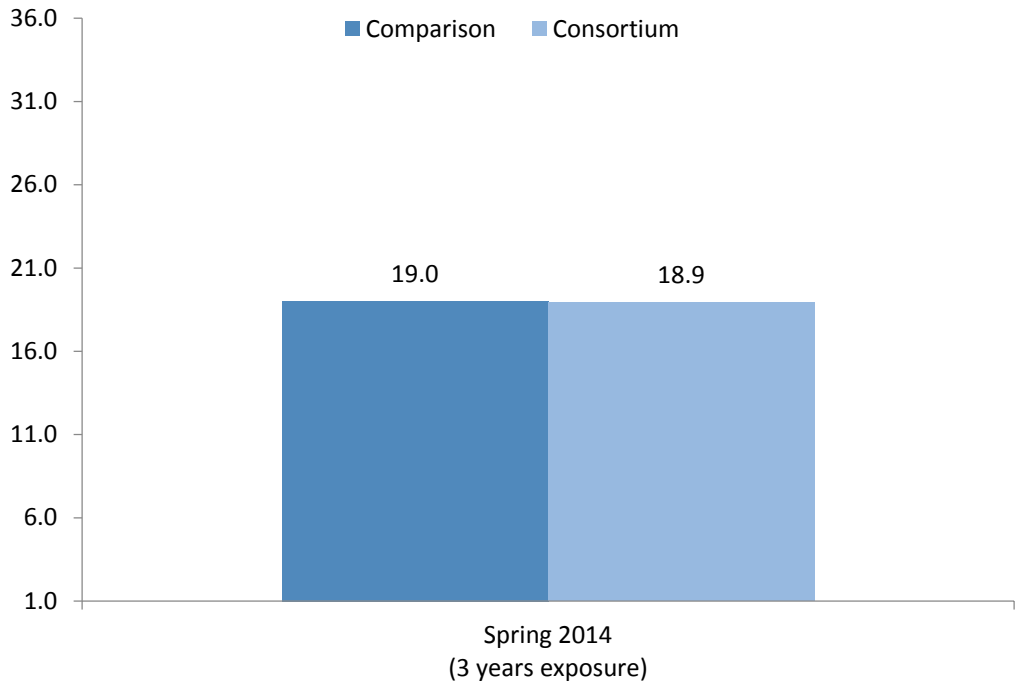
We also examined whether the impact of the intervention on composite ACT scores after up to three years of exposure differed by student subgroups (free and reduced-price lunch, CTE concentrator status) and by school subgroup (locale).[8] There is no difference in the impact of the intervention by either of the student subgroups. But we did find that the impact of the intervention is greater for students in non-rural

[8] School locale is defined using the urban-centric locale codes of the National Center for Education Statistics (see http://nces.ed.gov/ccd/rural_locales.asp). For this analysis, we compare schools located in rural and town locales with schools located in suburb and city locales.

schools. The regression-adjusted mean composite ACT scores are about half a point higher for students in non-rural Consortium schools compared with students in non-rural comparison schools. For students in rural schools, the regression-adjusted mean composite score is a tenth of a point lower for the Consortium group relative to the comparison group.

An additional exploratory analysis examined the impact of the Niswonger Foundation i3 grant on composite ACT scores at the end of grade 11 instead of at the end of grade 12. The sample for this analysis is students in the grade 9 cohort with three years of exposure to the intervention who took the ACT exam in Spring 2014. The results indicate that the Niswonger Foundation i3 grant does not have a statistically significant impact on college readiness for this sample. The regression-adjusted mean is 19.0 for students in the comparison group and 18.9 for students in the Consortium group (figure 3).

Figure 3. Regression-adjusted mean composite ACT scores at the end of grade 11 for students in the comparison and Consortium groups, Spring 2014.



Notes: Results are from a two-level hierarchical linear model that accommodates for clustering of students within schools. The value for the comparison group is the unadjusted mean. The value for the Consortium group adds the estimated intention-to-treat impact from the model to the comparison group mean. The estimated intention-to-treat impact is –0.086 (p=0.492).

Advanced Placement participation

We took a similar approach to estimate the impact findings for enrollment in one or more AP courses by the end of grade 12, an indicator of students' AP participation. This was a dichotomous variable for whether the student enrolled in an AP course at any time during the intervention period (1=yes, 0=no). Because this was a dichotomous dependent variable, we estimated the model using a logit link function, specifically a hierarchical generalized linear model.

This outcome is categorized as exploratory because the literature provides mixed evidence for the association between college outcomes and participation in AP courses for students not taking an AP exam. The effects are estimated for students who have up to four years of exposure to the intervention.

The analysis for SY 2012/13 includes the sample of students in the grade 11 cohort who had two years of exposure to the intervention; the analysis for SY 2013/14 includes the sample of students in the grade 10 cohort who had three years of exposure to the intervention; and the analysis for SY 2014/15 includes the sample of students in the grade 9 cohort who had a full four years of exposure to the intervention.

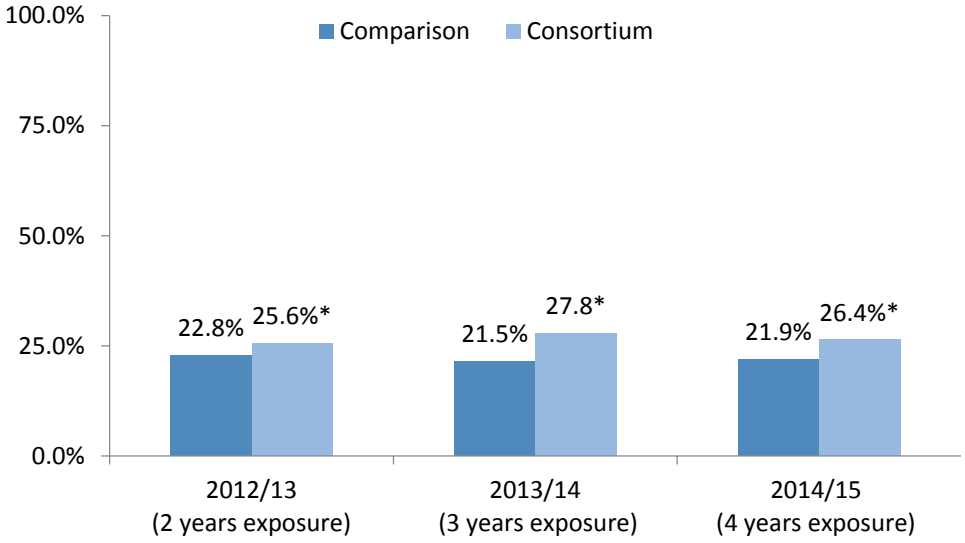
We find that the Niswonger Foundation i3 grant does have a statistically significant impact on participation in AP courses in all three years. In SY 2012/13, the comparison group probability of 22.8 percent represents, for students in the sample, the probability that a student from a comparison school will enroll in an AP course by the end of grade 12 (figure 4).

The predicted probability for students in the Consortium schools is 25.6 percent, a difference of approximately 3 percentage points. In SY 2013/14, the predicted probability that a student will enroll in an AP course increases to 27.8 percent, while the comparison group remains relatively constant at 21.5 percent. Results are similar for 2014/15, with a predicted probability of 26.4 percent for students in the Consortium, compared with 21.9 percent in the comparison group.

The difference between the two groups ranges from 2.8 percent in 2012/13 to 6.3 percent in 2013/14. In all three years of analysis, the difference between the two groups is statistically significant at the 95 percent confidence level with statistical tests based on the standard errors that take clustering into account.

We also examined whether the impact of the intervention on AP participation differed by student subgroups (free and reduced-price lunch status, CTE concentrator status) and by school subgroup (rural locale). There are no statistically significant differences in the impact of the intervention on AP participation for any of these subgroups.

Figure 4. Predicted probability of enrolling in an AP course by the end of grade 12 for students in the comparison and Consortium groups, SYs 2012/13, 2013/14, and 2014/15.



Notes: Results are from a two-level hierarchical generalized linear model that accommodates for clustering of students within schools. The model is used to calculate each individual student's probability of enrolling in an AP course using his/her individual characteristics, and then generating group-level means for the comparison and Consortium groups using the intervention variable. The coefficient on the intervention variable is 0.826 (p=0.033) in SY 2012/13 ,1.204 (p<0.001) in SY 2013/14, and 0.817 (p<0.001)_in SY 2014/15 .

* Coefficient (of estimated intention-to-treat impact) is statistically significant at the 95 percent confidence level using a two-tailed test.

Advanced Placement performance

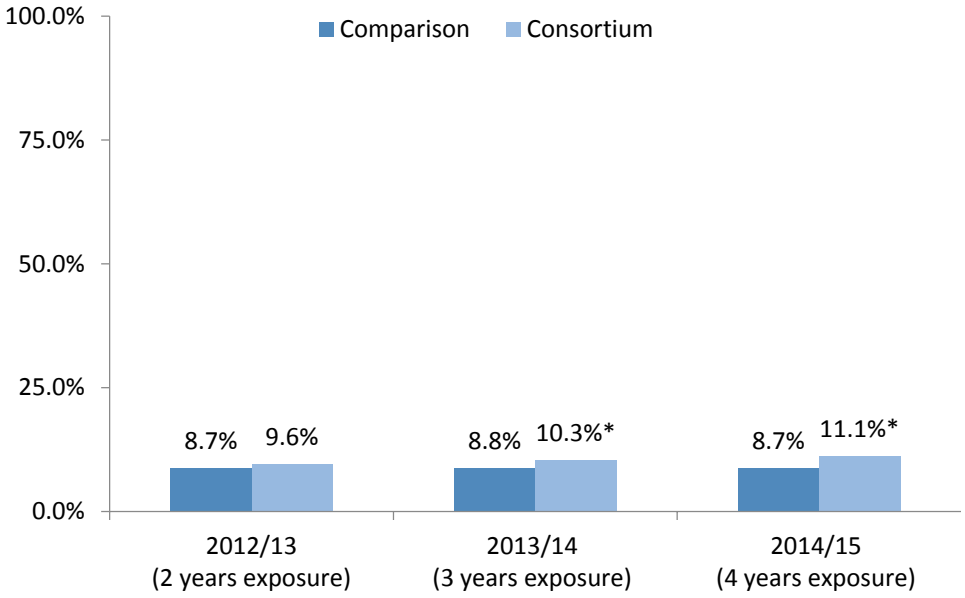
Next we examine the impact of the intervention on AP exam scores, an indicator of students' AP performance. This was a dichotomous variable for whether the student earned a score of 3 or higher on one or more AP exams at any time during the intervention period (1=yes, 0=no).[9]

[9] Most state colleges in Tennessee will grant students college credit for AP courses if they score at least 3 on the associated AP exam, although some colleges may require a higher score.

The exploratory analysis for this outcome includes students from the grade 11 cohort who had two years of exposure to the intervention at the time of the outcome (2012/13); the confirmatory analysis uses students from the grade 10 cohort who had three years of exposure to the intervention at the time of the outcome (2013/14). During the extension of the evaluation period, an additional year of data is added for the grade 9 cohort in 2014/15, who had exposure to the intervention for a full four years.

We find that the Niswonger Foundation i3 grant does have a statistically significant impact on performance on AP exams in 2013/14 and 2014/15. While the predicted probability of earning a score of 3 or higher remains constant around 8.7 percentage points for the comparison group, the predicted probability for the Consortium group is 10.3 percent in 2013/14 and 11.1 percent in 2014/15 (figure 5).

Figure 5. Predicted probability of earning an AP exam score of 3 or higher by the end of grade 12 for students in the comparison and Consortium groups, SYs 2012/13, 2013/14, and 2014/15.



Notes: Results are from a two-level hierarchical generalized linear model that accommodates for clustering of students within schools. The model is used to calculate each individual student's probability of earning a score of 3 or higher on an AP exam using his/her individual characteristics, and then generating group-level means for the comparison and Consortium groups using the intervention variable. The coefficient on the intervention variable is 0.098 (p=0.726) in SY 2012/13, 0.938 (p=0.013) in SY 2013/14, and 0.857 (p=0.016) in SY 2014/15.

We find also that for the subsample of students who enrolled in an AP course, the likelihood of earning a score of 3 or higher on an AP exam is greater in the Consortium schools. For students who enrolled in an AP course, the predicted probability of earning a score of 3 or higher on an AP exam is 40.7 percent in the Consortium group, compared with 37.2 percent in the comparison group (a difference of 3.5 percentage points). This means that even though overall enrollment in AP courses is increasing at a faster rate in the Consortium schools relative to the comparison schools (as shown in research question 2 on AP participation), the pass rates on AP exam are still higher in the Consortium schools relative to the comparison schools. This suggests that the Consortium is having a positive effect both on the *quantity* of students enrolled in AP courses and on the *quality* of performance in those courses as demonstrated by performance on AP exams.

For the exploratory analysis of students with two years of exposure to the intervention, there is no impact of the Niswonger Foundation i3 grant on students' AP performance. In SY 2012/13, the predicted probability that a student will achieve a score of 3 or higher on an AP exam is 8.7 percent for students in the comparison schools and 9.6 percent for students in the Consortium schools (figure 5).

The difference between the two groups is not statistically significant at the 95 percent confidence level with statistical tests based on the standard errors that take clustering into account.

College enrollment

The next outcome examined is the impact of the intervention on whether the student enrolled in a postsecondary institution after high school, an indicator of students' college enrollment. This was a dichotomous variable for whether the student enrolled in a postsecondary institution by the fall semester following the end of grade 12 (1=yes, 0=no). This includes two-year colleges, four-year colleges, and Tennessee Colleges of Applied Technology.

There are two exploratory analyses to examine the impact of the intervention on college enrollment (1) for students in the grade 12 cohort with one year of exposure to the intervention at the time of the outcome (Fall 2012), and (2) for students in the grade 11 cohort with two years of exposure to the intervention (Fall 2013). The confirmatory analysis examines the impact of the intervention on students in the grade 10 cohort with three years of exposure to the intervention. During the extension of the evaluation period, an additional year of data is added for the grade 9 cohort in Fall 2015, who had exposure to the intervention for a full four years.

For all analyses, the sample is limited to students who remained in a Consortium or a comparison school from the beginning of the grant until the end of grade 12, as we are otherwise unable to distinguish between students who did not enroll in college and students who were lost to attrition (e.g., students who left the public school system in Tennessee, such as by moving out of state).[10]

For the confirmatory analysis of students with three years of exposure to the intervention, the Niswonger Foundation i3 grant had a statistically significant impact on college enrollment. The predicted probability of enrolling in college by the fall semester after the end of grade 12 was 57.7 percent for the Consortium group, compared with 54.3 percent for the comparison group, a difference of 3.4 percentage points (figure 6). For the additional year of data in Fall 2015, there is a similar difference in the predicted probability of college enrollment between the two groups, but this difference is no longer statistically significant.

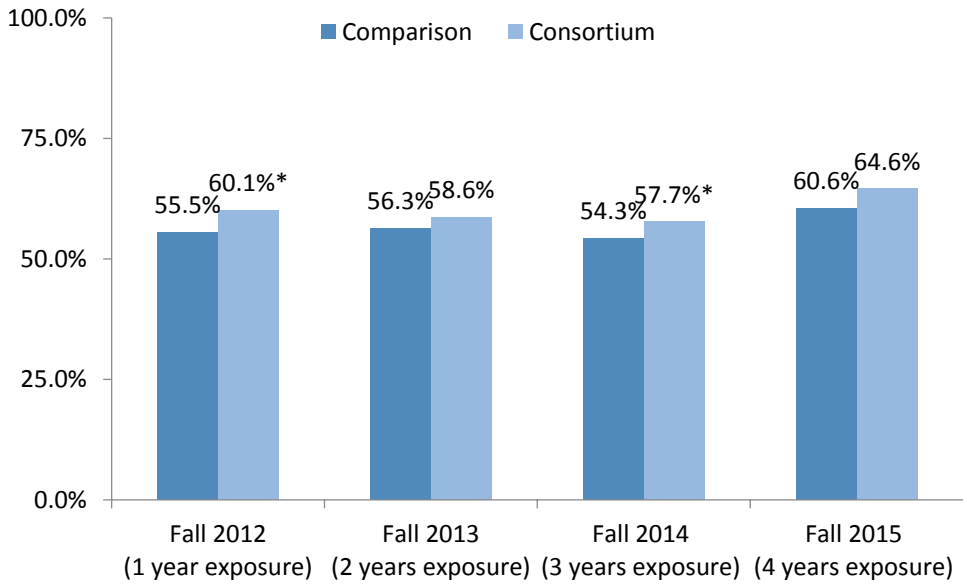
For the exploratory analysis of students with one year of exposure to the intervention, the Niswonger Foundation i3 grant had a statistically significant impact on college enrollment. The comparison group probability of 55.5 percent represents, for students in the sample, the probability that a student from a comparison school will enroll in a postsecondary institution by the Fall semester after the end of grade 12 (figure 6). The predicted probability for students in the Consortium schools is 60.1 percent, a difference of approximately 4.5 percentage points. For the exploratory analysis of students with two years of exposure to the intervention, however, there is no impact of the Niswonger Foundation i3 grant on students' college enrollment. The predicted probability of enrolling in a postsecondary institution is 56.3 percent in the comparison schools and 58.6 percent in the Consortium schools. This difference of 2.3 percentage points is not statistically significant.

When comparing the results from Fall 2012 and Fall 2013, it appears that the college-going rate in the Consortium has declined from 60.1 percent to 58.6 percent. The two years are not directly comparable, however, due to differences between the samples of the two cohorts. All analyses exclude students who are missing data on the pretest. The pretest for the grade 10 cohort is the PLAN, which was missing for 10 percent of students in the comparison group and 12 percent of students in the Consortium group in Fall 2013 (Table 4 4). The pretest for the grade 11 cohort is the ACT, which had a much higher rate of missing data, particularly for the Consortium group. The percentage of the analysis sample with missing pretest data for this cohort was 13.9 percent for the comparison group and 22.9 percent for the

[10] Students who do not graduate from high school due specifically to dropout are included in the analysis sample and coded as not enrolled in college.

Consortium group. When the evaluation team spoke with staff in the schools and districts with high rates of missing data on the ACT pretest, we learned that several Consortium schools made the ACT optional in 2010/11 (the pretest year for this group) even though all students in grade 11 should have been tested. The ACT is required for admission to many colleges, so students who voluntarily take this test are probably more likely to be planning on going to college than students who opt out. The unadjusted college-going rate *including* students with missing pretest data is 53.3 percent for the Consortium schools in Fall 2012. This rate increases slightly to 55.4 percent in Fall 2013.

Figure 6. Predicted probability of enrolling in college by the fall semester after the end of grade 12 for students in the comparison and Consortium groups, Fall 2013 through Fall 2015.



Notes: Results are from a two-level hierarchical generalized linear model that accommodates for clustering of students within schools. The model is used to calculate each individual student's probability of enrolling in an AP course using his/her individual characteristics, and then generating group-level means for the comparison and Consortium groups using the intervention variable. The coefficient on the intervention variable is 0.261 (p=0.028) in Fall 2012, 0.005 (p=0.928) in Fall 2013, 0.133 (p=0.022) in Fall 2014, and 0.089 (p=0.120) in Fall 2015.

* Coefficient (of estimated intention-to-treat impact) is statistically significant at the 95 percent confidence level using a two-tailed test.

It is also important to note that the unadjusted college-going rate is similar for the comparison schools and the Consortium schools in Fall 2012 when the analysis sample includes students with missing pretests. The unadjusted college-going rates

for the analysis sample including students with missing pretests is 50.9 percent for the comparison group and 53.3 for the Consortium group. This difference of 2.4 percentage points between the two groups is not statistically significant. These findings suggest that the differences in the predicted probabilities of enrollment in college for the comparison and Consortium groups in Fall 2012 (shown in table 4) are likely attributable to differences in the sample due to missing pretest data.

Table 4. Percentage of analysis sample with pretest data and missing pretest data, and unadjusted college-going rates for each in the comparison group and Consortium group, Fall 2012 and Fall 2013.

	Comparison		Consortium	
	Fall 2012	Fall 2013	Fall 2012	Fall 2013
Percent of analysis sample with pretest data	86.1%	89.7%	77.1%	88.1%
Percent of analysis sample missing pretest data	13.9%	10.3%	22.9%	12.0%
Unadjusted college-going rates for:				
Analysis sample *including* students with missing pretest data	50.9%	54.0%	53.3%	55.4%
Analysis sample *omitting* students with missing pretest data	55.6%	56.3%	60.7%	58.6%

We also examined whether the impact of the intervention on college enrollment differed by student subgroups (free and reduced-price lunch status, CTE concentrator status) and school subgroup (rural locale). There are no statistically significant differences in the impact of the intervention by free and reduced-price lunch status or rural locale. There were significant differences for CTE concentrators, however. Overall, CTE concentrators enroll in college at lower rates than non-CTE concentrators. Yet we find that the intervention has a greater impact for CTE concentrators. As a result, the gap in college enrollment between CTE concentrators and non-concentrators is smaller in the Consortium group relative to the comparison group. The probability of enrolling in college for students in the Consortium group is 52.7 percent for CTE concentrators and 64.0 percent for non-concentrators, a gap of 11.3 percentage points. In the comparison group, the probability of enrolling in college is 44.6 percent for CTE concentrators and 63.8 percent for non-concentrators, a gap of 19.2 percentage points.

College persistence

The last outcome examined is the impact of the intervention on whether the student enrolled in a postsecondary institution in both the fall semester immediately after high school and in the fall semester one year after high school, an indicator of students' college persistence. This was a dichotomous variable for whether the student enrolled in a postsecondary institution for two consecutive fall semesters after grade 12 (1=yes, 0=no). This includes in-state colleges and Tennessee Colleges of Applied Technology, but excludes students who attended an out-of-state college because these data were not available for the persistence outcome.

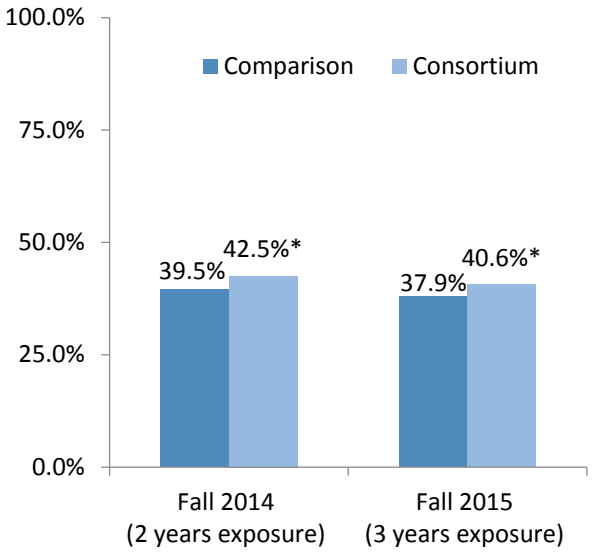
The confirmatory analysis examines the college persistence outcome in Fall 2014 for students with two years of exposure to the intervention. During the extension of the evaluation period, an additional year of data is added for the grade 10 cohort in Fall 2015, who had exposure to the intervention for three years.

Similar to the analyses for the college enrollment outcome, the sample is limited to students who remained in a Consortium or a comparison school from the beginning of the grant until the end of grade 12, as we are otherwise unable to distinguish between students who did not enroll in college and students who were lost to attrition (e.g., students who left the public school system in Tennessee, such as by moving out of state).[11]

The Niswonger Foundation i3 grant had a statistically significant impact on college persistence for students with two years and three years of exposure to the intervention. The predicted probability of enrolling and persisting in college for two consecutive fall semesters after grade 12 was approximately 3 percentage points higher for the Consortium group relative to the comparison group in both years (figure 7). These difference between the two groups are statistically significant at the 95 percent confidence level with statistical tests based on the standard errors that take clustering into account.

[11] Students who do not graduate from high school due specifically to dropout are included in the analysis sample and coded as not enrolled in college.

Figure 7. Predicted probability of persisting in college for two consecutive fall semesters after the end of grade 12 for students in the comparison and Consortium groups, Fall 2014 and Fall 2015.



Notes: Results are from a two-level hierarchical generalized linear model that accommodates for clustering of students within schools. The model is used to calculate each individual student's probability of enrolling in an AP course using his/her individual characteristics, and then generating group-level means for the comparison and Consortium groups using the intervention variable. The coefficient on the intervention variable is 0.130 (p=0.047) in Fall 2014 and 0.133 (p=0.022)) in Fall 2015.

* Coefficient (of estimated intention-to-treat impact) is statistically significant at the 95 percent confidence level using a two-tailed test.

Limitations

This study has several limitations relating to the generalizability of the findings to other settings and contexts. One is that all of the school systems participating in the Consortium had relationships with the Niswonger Foundation that had been established over many years prior to the grant. The Niswonger Foundation was established in 2001 with a mission to "create opportunities for individual and community growth through education" in Northeast Tennessee. In addition to providing funding for education, it also has operated its own programs and developed close working partnerships with schools in the region over this time. Foundation staff members regularly travel to local communities and work hand-in-hand with school leaders to identify specific needs, brainstorm solutions, and then provide training, resources, staffing, and materials needed to make improvements in

schools. It would likely be much more challenging to try to replicate the activities of the Consortium with another group of schools where the same level of trust and collaboration had not been previously established.

In addition, the Consortium is limited to the schools that volunteered to participate. They may differ from the broader population of Tennessee high schools and may be more willing to embrace educational reform initiatives. For these reasons, the findings are limited to the study schools and are not generalizable beyond the sample.

Another limitation is the use of quasi-experimental design to identify the comparison group. Propensity score matching was used to select schools that were similar to the Consortium in terms of demographic characteristics of the student population, test scores of the student population, school resources, and community characteristics. But it is possible that the Consortium and comparison groups differ on other characteristics not observed, such as school culture. Any unobserved differences may contribute to differences in student outcomes between the two groups.

The geographic proximity of the Consortium schools may be a potential confound, as well. All of the Consortium schools are located in adjacent counties in the First Congressional District of Tennessee, while the comparison schools are located throughout the state. This may lead to regional differences that contribute to differences in student outcomes.

Findings: Fidelity of Implementation

This section of the report reviews the findings from the fidelity of implementation analysis conducted between SYs 2011/12 and 2014/15. Because the first year of the grant (SY 2010/11) was used primarily for planning and building necessary program infrastructure, findings from this baseline year are not reported. The fidelity of implementation analysis examines the Consortium's efforts to successfully implement strategies to improve college and career readiness among high school students.

Overall fidelity of implementation for key program components

Table 5 summarizes for each of the four years of full implementation the fidelity of that implementation for each of the Consortium's key program components. It includes an overall assessment ("Met with fidelity?") and the number of indicators used to measure fidelity within each component.

The change in Consortium leadership in Summer 2013 resulted in changes in the organization of the program, adjustments to some activities, and revisions in the structure of each program component (see Appendix C, table 11). Even with these changes, however, the components remained consistent thematically throughout the three school years evaluated, even if their specific indicators changed over time. This means that any large differences in fidelity scores from one year to the next are likely attributable to the effect of those changes on the way the intervention was implemented over time. Smaller differences may be similarly due to differences over time in program implementation, or to changes in the way fidelity is measured. One indicator—measuring the Consortium's collaboration with Local Education Agency (LEA) partners—was dropped completely after SY 2012/13, so it is measured only for the first two years of implementation. Most of its indicators were moved to other components.

The pattern of components meeting or not meeting the fidelity benchmark (i.e., an average score of 2.5 or higher across its indicators) is mostly consistent across evaluation years. The three components Management and Communication, Resources and Services, and LEA Partners all met the benchmark in every year they were

measured. In contrast, the components College and Career Counselors Team, Learning Resources Team (distance/online technology), and Learning Resources Team (college-level courses) did not meet the benchmark in any of the four years. Looking simply at the yes/no fidelity assessment, however, obscures the fact that the Learning Resources Team component for distance and online technology nearly met fidelity in SYs 2012/13 and 2013/14 (as described below) before falling just below moderate fidelity in SY 2014/15 Likewise, the Learning Resources Team component for quality of instruction met moderate fidelity in SYs 2013/14 and 2014/15, having been implemented with fidelity the previous two school years.

We describe the fidelity of implementation of each of these key components in more detail below.

Table 5. Summary of key program component fidelity, SYs 2011/12 to 2012/13.

	2011/12		2012/13		2013/14		2014/15	
Component	Met with fidelity?	# of indicators	Met with fidelity?	# of indicators	Met with fidelity?	# of indicators	Met with fidelity?	# of indicators
1) i3 leadership management and communication	Yes	8	Yes	8	Yes	8	Yes	8
2) College and Career Counselors Team	No	8	No	8	No	6	No	6
3) Learning Resources Team: quality of instruction	Yes	5	Yes	5	No	4	No	4
4) Learning Resources Team: distance/online technology	No	7	No	7	No	7	No	7
5) Learning Resources Team: college-level courses	No	3	No	3	No	5	No	5
6) Resources and services	Yes	4	Yes	4	Yes	4	Yes	4
7) LEA partners	Yes	6	Yes	6	–	–	–	–

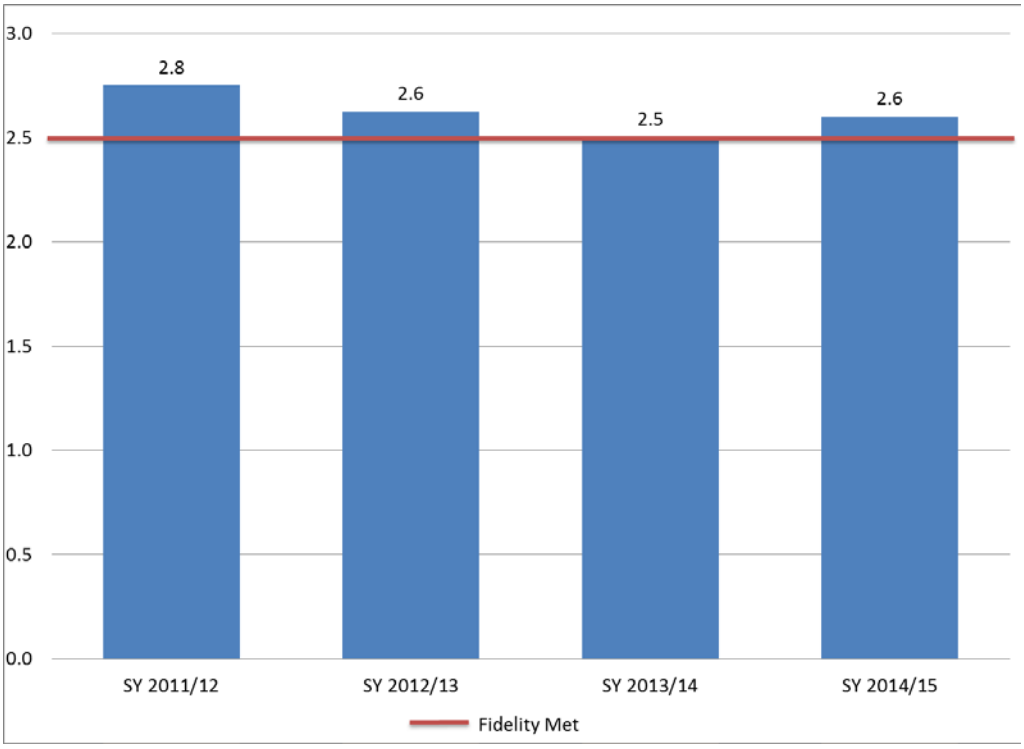
(1) i3 leadership provides management and communication

Measurements of this program component's indicators remained mostly consistent throughout the four evaluation years. The component is composed of eight indicators; however, after SY 2012/13, two indicators—frequency of Consortium leadership's contact with the evaluator, and level of staff participation in weekly

meetings—were replaced by two indicators measuring how often schools shared resources, and participation in course review meetings by school system representatives.

This component met the fidelity benchmark in all four evaluation years (figure 8). Over the years, the Consortium leadership typically earned high fidelity scores for their ability to convene the Advisory Board regularly, share information with all staff members, and communicate with school systems and outside stakeholders. In addition, Consortium staff members earned a high fidelity rating for completing professional development activities (e.g., attending conferences or training sessions) and conducting outreach to legislative bodies in SYs 2013/14 and 2014/15.

Figure 8. Fidelity of implementation scores for the component "i3 leadership provides management and communication," by year.



Advisory Board attendance at the quarterly meetings is the only area that declined over time. This indicator shifted from a high fidelity rating in SY 2011/12 to low fidelity in SY 2012/13 and beyond. Changes in the composition of the Advisory Board and the physical geography of the members likely explain this shift. In SYs 2011/12 and 2012/13, the Board was small and composed primarily of individuals located near the Board's meetings in Greenville, Tennessee. Beginning in SY 2013/14, the Leadership Team expanded the Advisory Board to include a representative from

every district in the Consortium. As a result, the Board became much larger and more diverse, so achieving high meeting attendance became more difficult.

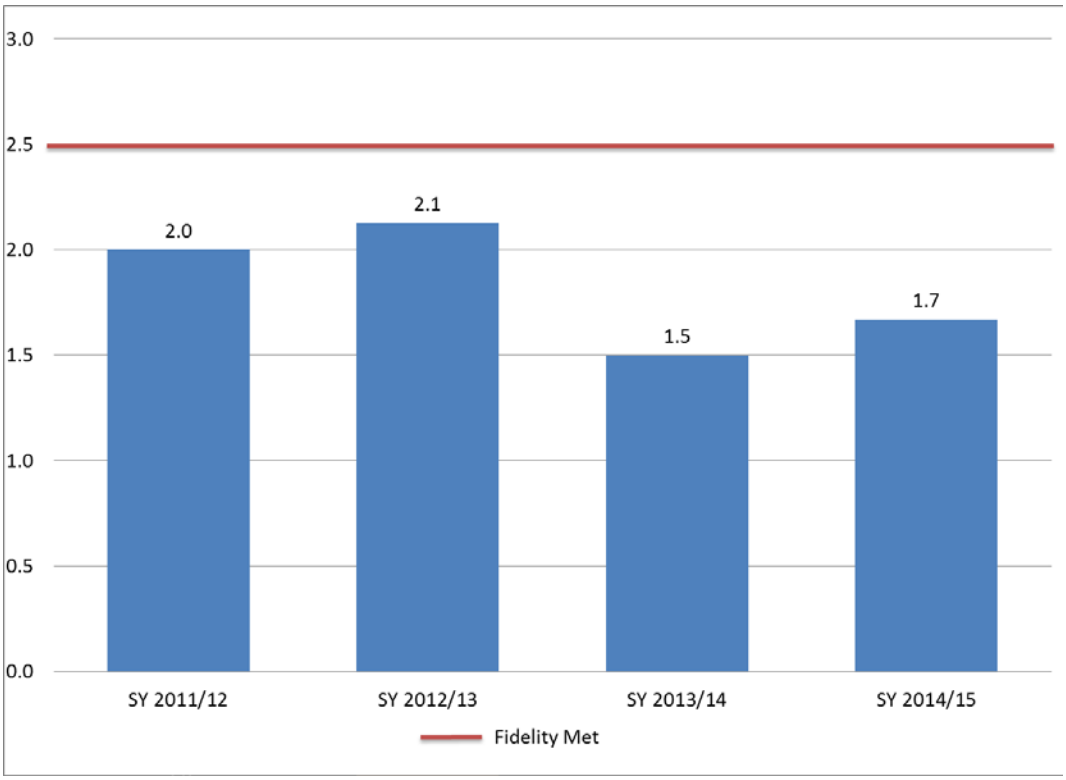
(2) College and Career Counselors Team promotes a college-going culture

The component measuring the College and Career Counselors Team's efforts to promote a college-going culture had eight indicators in SYs 2011/12 and 2012/13, and six indicators in SYs 2013/14 and 2014/15. Three indicators measuring the district's counselor-to-school ratio, number of group or class presentations, and creation of informational materials were eliminated after SY 2012/13. A new indicator was added in SY 2013/14 for collaboration with other counselors and educators in the school-wide integration of the guidance services. There were also some smaller changes over time to the indicators for the core activities of the counselors and the college visits they organized.

The results in figure 9 show that the component did not reach fidelity in any of the four evaluation years. Based on counselor logs, the indicators for setting up college visits received low fidelity ratings in all four evaluation years. Of the 29 Consortium schools evaluated, counselors from 6 schools set up onsite college visits during SY 2011/12 and this number did not change in SY 2014/15. No virtual college visits were set up during SYs 2013/14 or 2014/15 (these virtual visits could count toward fidelity scoring in these years only). The indicator measuring time spent on individual college and career counseling scored high fidelity in SYs 2011/12 and 2012/13, but dropped to low fidelity in SY 2013/14 before increasing to moderate fidelity in SY 2014/15.

Counselors also received low fidelity scores for indicators measuring their level of collaborative effort in SY 2013/14. Out of the 29 Consortium schools, 14 schools had CACCs who met with educators, community members, and parents about future planning for students, which met low fidelity for the indicator. The College and Career Counselors Team received higher fidelity ratings for their collaboration with other schools in SY 2014/15. For each Consortium school, if counselors averaged one communication per month with other counselors, the school was scored as meeting high fidelity. Out of the 29 Consortium schools, 21 met this criterion, four schools shy of high implementation.

Figure 9. Fidelity of implementation scores for the component "College and Career Counselors Team promotes a college-going culture," by year.



(3) Learning Resources Team increases quality of instruction

The fidelity score for the component measuring the Learning Resources Team's efforts to increase the quality of instruction consisted of five indicators in SYs 2011/12 and 2012/13, and four indicators in SYs 2013/14 and 2014/15. None of the indicators within this component was measured consistently in all four years of the evaluation, making it difficult to compare fidelity scores over time. Between SYs 2012/13 and 2013/14, the item measuring the district's instructional specialists-to-school ratio was eliminated, and the rest of the indicators were moved to other components.[12] Four new indicators for SYs 2013/14 and 2014/15 measure

[12] For example, the indicators measuring the quality of online instruction and the assessment of online courses for possible adoption were moved in SYs 2013/14 and 2014/15 to

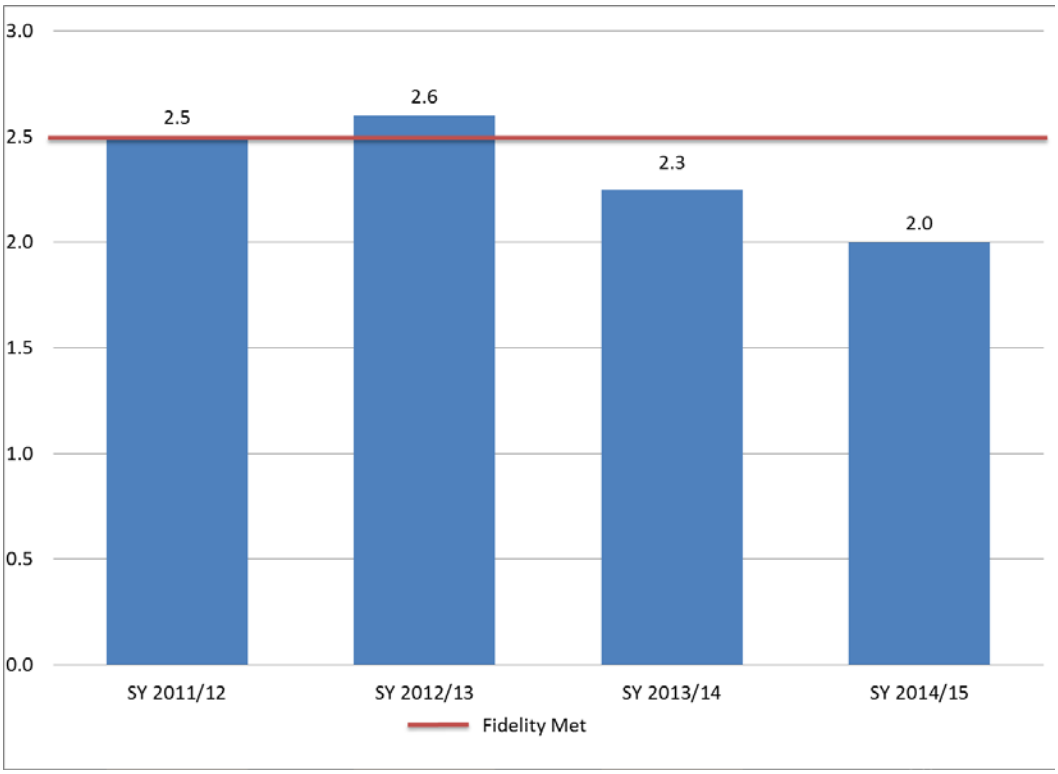
coordination efforts to offer professional development events for teachers, online communities where teachers could collaborate, training for online teachers, and STEM instruction assistance, respectively. Although this component consistently focuses on instructional quality across the four evaluation years, comparisons between school years should be interpreted with caution, since the composition of indicators changed substantially over the period.

Overall, this component met fidelity in SYs 2011/12 and 2012/13, but not in SY 2013/14 and SY 2014/15 (figure 10). During the first two evaluation years, the indicator measuring support provided to teachers of AP, online, and distance learning courses met low fidelity. The indicator for instructional specialists-to-school district ratio met moderate fidelity. The remaining three indicators for organizing events to share best practices, evaluating online courses for possible adoption, and creating a Consortium-wide course directory met high fidelity during SYs 2011/12 and 2012/13.

Among the component's four new indicators employed during SYs 2013/14 and 2014/15, the indicator measuring online collaborative professional communities was scored as low fidelity in both years because a planned online collaborative site for professional development was not created. In addition, the Consortium had a low fidelity rating for providing outreach efforts to mathematics, science, and technology teachers through the STEM professional development events and/or individual outreach efforts in SY 2014/15 after earning a moderate fidelity ranking in SY 2013/14. The Consortium's online Coordinator was still able to provide training to online teachers each semester, however, which earned a high fidelity rating for that indicator in SYs 2013/14 and 2014/15. And the Consortium staff provided 14 professional development events during Summer 2015. In SYs 2013/14 and 2014/15, since at least one teacher from almost all 29 Consortium schools attended a professional development event, that indicator earned high fidelity.

component 4: "Learning Resources Team increases access to courses through distance and online technology."

Figure 10. Fidelity of implementation scores for the component "Learning Resources Team increases quality of instruction," by year.



(4) Learning Resources Team increases access to courses through distance and online technology

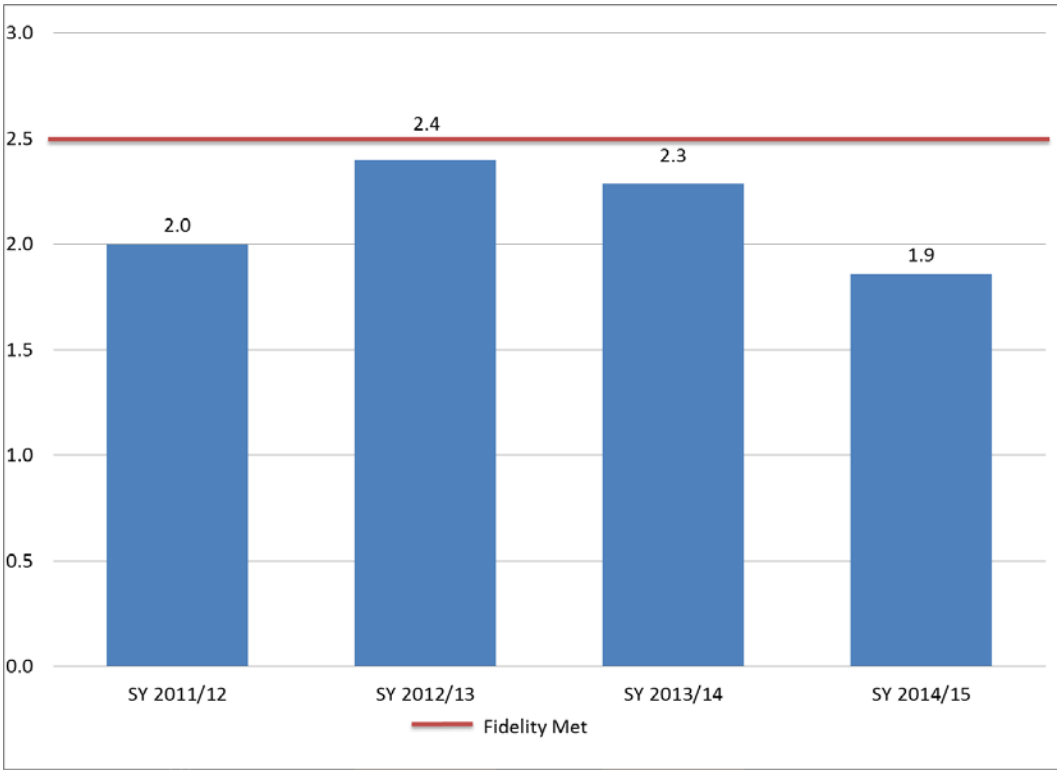
The component measuring the Consortium's efforts to expand access to online and distance learning courses had seven indicators, but they were not the same indicators in all four years. Five of the indicators in this component in SYs 2011/12 and 2012/13 were modified slightly and moved to the "Resources and Services" component in SYs 2013/14 and 2014/15. The five were monitor technology in schools and assist in using technology, identify and acquire technology to support distance and online learning, ensure reliability of equipment, create a distance and online handbook, and maintain a Consortium-wide online learning center. Two indicators in the component "Learning Resources Team: Quality of Instruction" in SYs 2011/12 and 2012/13 were moved from there to this component in SYs 2013/14 and 2014/15: recruit/retain and supervise online teachers, and assist/train school personnel in using technology. In addition, three new indicators were added in SYs

2013/14 and 2014/15 for coordinating online course development, coordinating online course evaluation, and ensuring schools use ACT Prep online software.

As shown in figure 11, this component did not meet fidelity in any evaluation year. In SY 2011/12, no fidelity score was calculated for three out of the seven indicators due to a lack of data, so the overall fidelity of the component for SY 2011/12 was based on an average of the other four indicators only. The lack of fidelity in subsequent years is attributable partially to the distance learning enrollment indicator. Among the 29 Consortium schools, actual enrollment versus the projected goal earned a low fidelity rating for distance learning courses between SYs 2012/13 and 2014/15. This may be partially the result of overly aggressive yearly goals under the i3 grant. The projected goal for distance learning enrollments was more than triple: from 377 students in SY 2010/11 to 1,497 students in SY 2014/15. In SY 2014/15, fewer than half of the courses identified in the supply and demand reviewing meeting were made online. In addition, less than 50 percent of the Consortium schools had a student who used the online ACT prep software. For these reasons, both items were scored low fidelity.

Despite these lower ratings, two items did meet high fidelity in SYs 2013/14 and 2014/15. Enrollment in online courses exceeded the projected goal, and the online coordinator reviewed at least 75 percent of courses evaluated to ensure they met Tennessee standards in these years.

Figure 11. Fidelity of implementation scores for the component "Learning Resources Team increases access to courses through distance and online technology," by year.



(5) Learning Resources Team expands opportunities for college-level courses

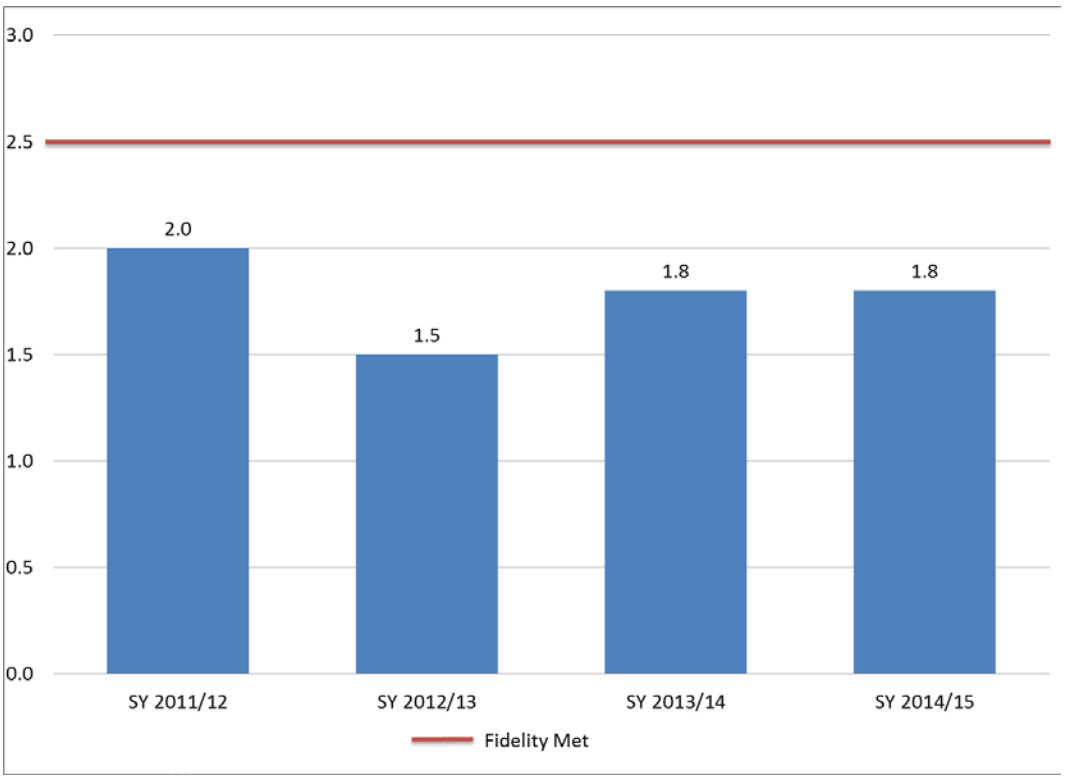
The component measuring the Consortium's efforts to expand high school students' access to college-level courses was composed of three indicators in SYs 2011/12 and 2012/13, then underwent several changes. An indicator measuring the expansion of dual enrollment courses was used consistently throughout all three evaluation years. Indicators measuring activities to review course supply and demand, and the delivery of professional development events to Consortium staff by college instructors were removed for SYs 2013/14 and 2014/15.

In their place, several indicators measuring college-credit course implementation were added: for marketing to promote the value of AP courses, expansion of AP course enrollments, and coordination efforts between high schools and postsecondary institutions to implement dual enrollment courses. A fourth indicator in SYs 2013/14 and 2014/15—assist in the implementation of AP programs—was

similar to an indicator from SYs 2011/12 and 2012/13 in the component "Learning Resources Team increases quality of instruction."

As shown in figure 12, this component did not meet fidelity in any of the evaluation years. The indicator measuring actual enrollment versus projected enrollment goals for dual enrollment courses earned a moderate fidelity rating in SY 2011/12 and low fidelity ratings between SYs 2012/13 and 2014/15. Professional development events delivered to Consortium staff members by college instructors also earned low fidelity during SYs 2011/12 and 2012/13 before the indicator was dropped.

Figure 12. Fidelity of implementation scores for the component "Learning Resources Team expands opportunities for college-level courses," by year.



The indicators measuring AP course enrollment and marketing efforts also earned low fidelity ratings in SYs 2013/14 and 2014/15. For the indicator measuring the expansion of AP courses, actual total enrollment versus the projected enrollment goal for SYs 2013/14 and 2014/15 fell below a 20 percent gain, the benchmark for moderate implementation fidelity. Despite the low fidelity rating for this indicator, among the seven Consortium schools that had not offered any AP courses at the beginning of the grant, five schools offered an AP course in SY 2014/15, which resulted in a high fidelity rating for the indicator measuring AP course implementation.

The Consortium also received a high fidelity rating on a new indicator in SYs 2013/14 and 2014/15 on coordination efforts, for maintaining good working relationships with the postsecondary institutions offering dual enrollment courses to Consortium schools.

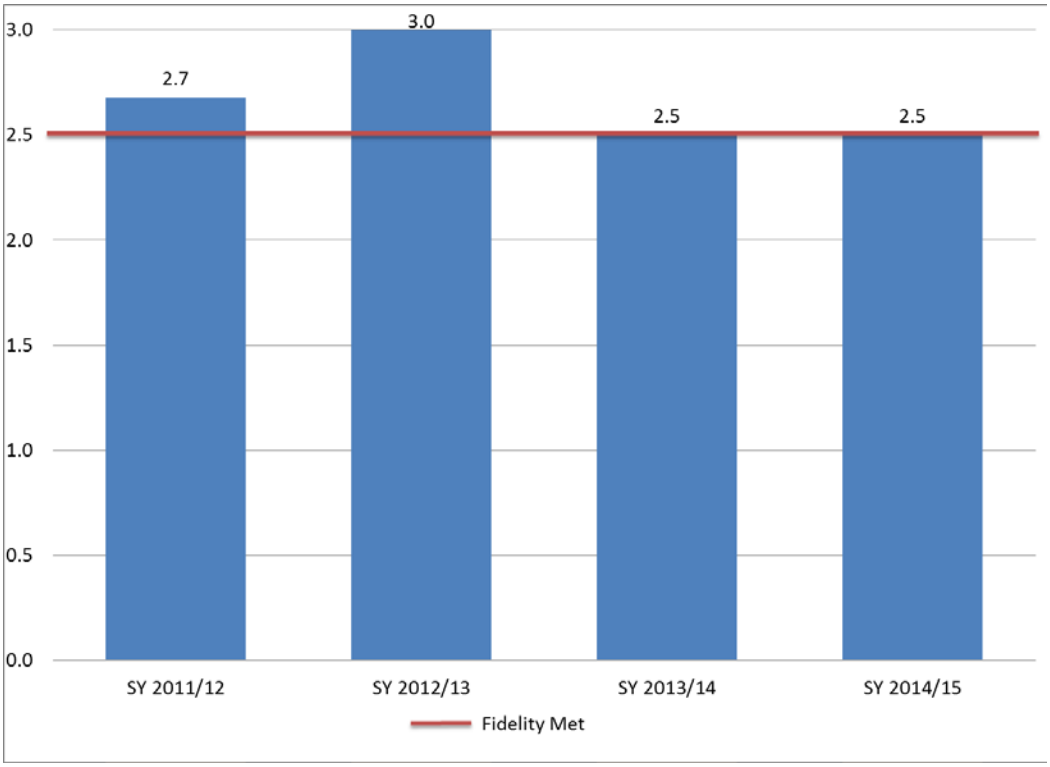
(6) Resources and services provide infrastructure to expand and sustain program capacity

The fidelity score for the component measuring the maintenance of resources and services needed to expand and sustain the program consisted of four indicators across all years of the evaluation, although the definitions of three of them changed over time. Only an indicator measuring the purchase and maintenance of distance and online learning technology was used in all four evaluation years.

One indicator measuring the availability of Internet access to support distance and online learning, and another indicator for the maintenance of a distance learning server were removed after SY 2012/13. Two indicators measuring the maintenance of an online course tracking system (openSIS) and a learning center website were added in their place beginning in SY 2013/14. An indicator about the creation and maintenance of a Consortium-wide course directory that had been included in the component "Learning Resources Team increases quality of instruction" in SYs 2011/12 and 2012/13 was moved to this component for SYs 2013/14 and 2014/15. Conversely, another indicator in this component in SYs 2011/12 and 2012/13—providing teacher and staff training—was moved to "Learning Resources Team increases access to courses" for SYs 2013/14 and 2014/15.

Fidelity was met in all four evaluation years, as shown in figure 13. Each indicator in every evaluation year scored at high fidelity, except two. The course directory was not created for SYs 2013/14 and 2014/15, which resulted in a low fidelity rating; and the purchase and maintenance indicator earned moderate fidelity in SY 2011/12 because some schools did not yet have a distance learning lab or computers available for distance and online learning.

Figure 13. Fidelity of implementation scores for the component "Resources and services provide infrastructure to expand and sustain program capacity," by year.



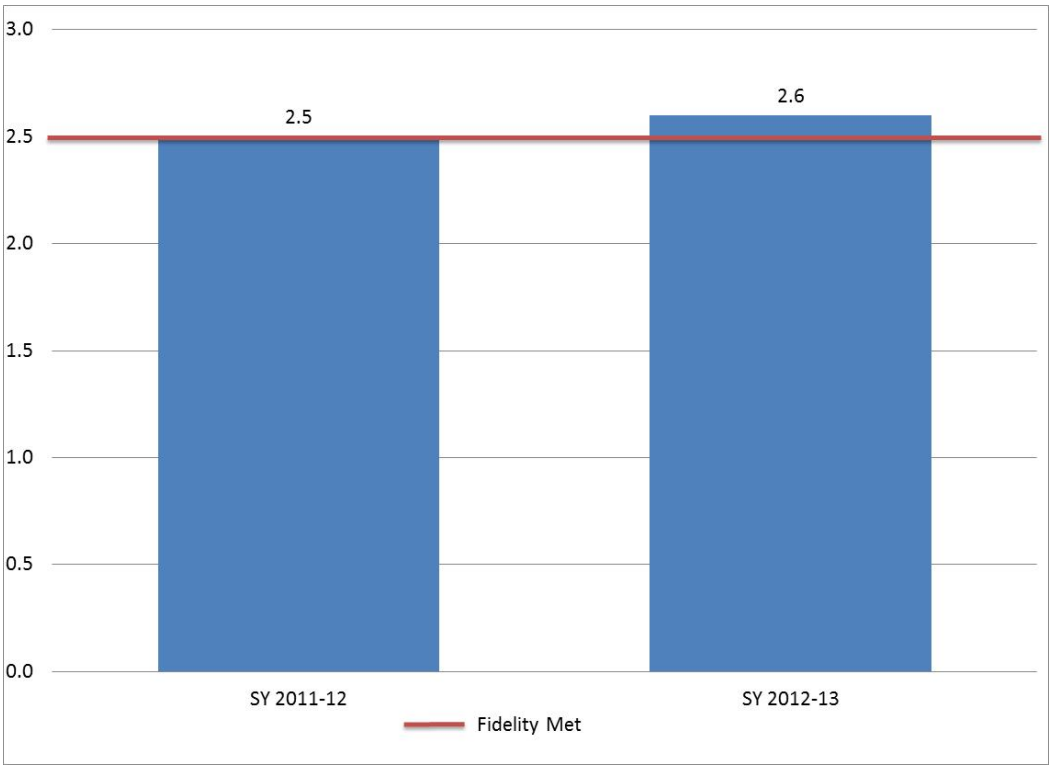
(7) LEA partners share mission and resources, adopt practices in their schools, and encourage cultural change

The last component, measuring the collaborative efforts of the Local Education Agency partners, comprised six indicators in SYs 2011/12 and 2012/13. This component was eliminated for SYs 2013/14 and 2014/15; however, most of its indicators were moved to other components.[13] The "LEA partners" component met

[13] An indicator measuring collaboration between the Consortium schools and staff was split for SY 2013/14 into three different indicators by course type (AP, online, and distance learning) and distributed among the various Learning Resources Team components. Other indicators measuring the expansion of AP course enrollments, collaboration among Consortium schools,

fidelity in both evaluation years (figure 14). The indicator measuring whether LEAs picked up recurring costs consistently received a low fidelity rating, but the other three indicators had moderate or high fidelity ratings in both years.

Figure 14. Fidelity of implementation scores for the component "LEA partners share mission and resources, adopt practices in their schools, and encourage cultural change," by year.



Overall assessment of implementation

Taken together, the scoring data reveal three areas of the i3 grant that consistently received high ratings for implementation fidelity throughout the evaluation period—Consortium leadership, resources and services to provide program infrastructure, and collaboration with LEA partners.

and participation in Consortium professional development events also were moved to other components for SY 2013/14.

Although the LEA partners component was eliminated before SY 2013/14, several of its indicators measuring collaboration between the Consortium staff and schools that were moved to other components still earned moderate or high fidelity ratings in SYs 2013/14 and 2014/15, such as assistance with the implementation of AP courses.

Even though there was only partial implementation on several other components, the Consortium still had statistically significant impacts on ACT scores, AP course taking, and college enrollment. If all components had been met with high fidelity, however, it is possible that the intervention might have led to larger or more meaningful impacts. There was also variation in the fidelity of implementation by school, which may have contributed to differences in the impact of the intervention from one school to the next.

It is important to note that most of the program components that did not meet the benchmark for implementation with fidelity were very close to meeting this threshold. The numeric fidelity scores are 2.0 or higher on a 3-point scale (equivalent to moderate fidelity of implementation) for all components and years with a few exceptions. The first is that the College and Career Counselors Team component received an overall weighted average score of 1.5 in SY 2013/14 and 1.7 in SY 2014/15. This is attributed to the low fidelity score assigned to the indicators measuring the number of college visits arranged by counselors. There were slight differences in fidelity ratings for specific indicators between SYs 2013/14 and 2014/15. In SY 2013/14, the amount of time counselors spent with students on education, career, or life planning earned a low fidelity rating. In SY 2014/15, this indicator earned a medium fidelity ranking but the indicator measuring counselors' efforts to collaborate with educators, community members, and parents to assist students with educational, career, and life planning changed to a low fidelity ranking from a medium fidelity ranking the previous school year. These areas in each school year made up half of the component's indicators, which led to low overall fidelity ratings for this component in each year.

Another exception is the Learning Resources Team component for the expansion of college-level courses, which received a score of 1.5 in SY 2012/13 and 1.8 in SYs 2013/14 and 2014/15. The primary reasons for the first low rating are that the Consortium did not conduct a supply and demand review, and limited professional development was provided to Consortium staff by partner colleges. Then the indicators within this component changed in SY 2013/14. The primary reasons for the second low rating are the lack of progress toward the Consortium's goals for student-level participation in dual enrollment and AP courses, and lack of activities to promote AP courses within Consortium schools. Lastly, the Learning Resources Team component to increase access to online and distance learning courses earned a score of 1.9 in SY 2014/15. Small changes in outreach activities would have moved this component to moderate fidelity.

Another important consideration is that there may be good reasons why some components were implemented differently than initially intended, so a low fidelity rating is not necessarily an indicator of poor performance. In some cases, fidelity may have declined because strategic decisions were made to focus efforts in a different direction. For example, distance learning courses did not expand as rapidly as originally intended because there were unanticipated challenges (e.g., differences in school calendars and bell schedules across districts) that made it difficult to implement these courses. As a result, the Consortium staff shifted their emphasis to increasing enrollments in online courses, because there were fewer barriers to that delivery method. In other cases, low fidelity may occur for unintentional reasons; for example, if Consortium schools implemented only some components because they didn't have the capacity or resources to participate in all of them.

Regardless, it is important to report on these indicators to show how the Consortium's activities were actually implemented, so that if the intervention were to be replicated elsewhere, there would be a better understanding of what the intervention looked like under the Niswonger Foundation i3 grant.

Conclusions

Summary of results

As summarized in table 6 below, we find that the Niswonger Foundation i3 grant has statistically significant effects on college readiness (after three years of exposure to the intervention), AP participation (after two, three, and four years of exposure to the intervention), AP performance (after three and four years of exposure to the intervention), college enrollment (after three years of exposure to the intervention), and college persistence (after two and three years of exposure to the intervention). There is also a positive effect on college enrollment (after one year of exposure to the intervention), although this is likely attributable to differences in the sample due to missing data.

These findings may demonstrate evidence that the Consortium has made progress toward its goals of ensuring that high school students in Northeast Tennessee are provided the opportunity to graduate from high school "college or career ready," and of improving the likelihood that students will be successful in college.

Table 6. Summary of the impacts of the Niswonger Foundation i3 grant on student outcomes.

Outcome	Cohort	Years of exposure	Regression Adjusted Mean or Predicted Probability		
			Consortium group	Comparison group	Difference
Mean composite ACT scores at the end of grade 12 (Spring 2014)	Grade 11	2 years	19.5	19.5	0.0
	Grade 10	3 years	19.9	19.6	0.3*
	Grade 9	4 years	19.7	19.7	0.0
Probability of enrollment in an AP course by the end of grade 12 (SYs 2012/13, 2013/14, and 2014/15)	Grade 11	2 years	25.6%	22.8%	2.8%*
	Grade 10	3 years	27.8%	21.5%	6.3%*
	Grade 9	4 years	26.4%	21.9%	4.5%*
Probability of earning a score of 3 or higher on an AP exam by the end of grade 12 (SYs 2013/14 and 2014/15)	Grade 11	2 years	9.6%	8.7%	0.9%
	Grade 10	3 years	10.3%	8.8%	1.5%*
	Grade 9	4 years	11.1%	8.7%	2.4%*

Outcome	Cohort	Years of exposure	Regression Adjusted Mean or Predicted Probability		
			Consortium group	Comparison group	Difference
Probability of enrollment in college by the fall semester after the end of grade 12 (Fall 2012, Fall 2014)	Grade 12	1 year	60.1%	55.5%	4.5%*
	Grade 11	2 years	58.6%	56.3%	2.3%
	Grade 10	3 years	57.7%	54.3%	3.4%*
	Grade 9	4 years	64.6%	60.6%	4.0%
Probability of persistence in college for two consecutive fall semesters after the end of grade 12 (Fall 2014, Fall 2015)	Grade 11	2 years	42.5%	39.5%	3.1%*
	Grade 10	3 years	40.6%	37.9%	2.7%*

* Coefficient (of estimated intention-to-treat impact) is statistically significant at the 95 percent confidence level using a two-tailed test.

The impact evaluation is designed to meet i3 criteria with reservations, the highest rating possible for studies with non-experimental designs. The results of this evaluation will provide evidence of the effectiveness of the Niswonger Foundation i3 grant that may be useful for applying for future grants to scale up or expand upon the Consortium's activities.

Data from the implementation evaluation are helpful for exploring the mechanisms through which the intervention achieved its impact. We find that the areas that were most consistently implemented as intended throughout the four years of the grant were Consortium leadership, resources and services to provide program infrastructure, and collaboration with LEA partners. Among the components of the intervention that did not meet fidelity, most had fidelity ratings that were very close to meeting this threshold. It is also important to consider that this is a new intervention and the components had never been implemented together before, so it is not surprising that there were some changes from what was originally planned in the grant application.

Appendix A: Criteria for the NEi3 Evaluation

This appendix provides additional details on the criteria used to assess the external evaluations submitted to the NEi3.

Criteria for assessing the strength of evidence

As mentioned in the report, the highest rating that can be received by an i3 evaluation that uses a quasi-experimental design is "meets i3 criteria with reservations." Below are three criteria that must be met to receive this rating.

- Criterion 1: The study must establish baseline equivalence in the analysis sample. That means that students in the intervention group (those who attend a Consortium school) must have similar characteristics to students in the comparison group prior to the start of the grant.

- Criterion 2: The outcome data must meet What Works Clearinghouse (WWC) outcome standards. The outcomes are the measures used to examine whether the i3 grant had an impact on students.

    - The first requirement is that the outcome measures have face validity, which means that they appear to measure the construct of interest. For example, a state's standardized reading test has face validity for measuring reading achievement, but it is unlikely to have face validity for measuring mathematics achievement.

    - The second requirement is that the outcomes must be able to be measured reliably, so that a student's score on the measure is a good representation of the student's true achievement.

    - The third requirement is that the outcome may not be overaligned with the intervention. An overaligned outcome provides an unfair advantage to students in the intervention group or the comparison group. For example, if students in a reading intervention have a test on reading comprehension that covers the same passages they have

studied as part of the intervention, while students in the comparison group take the same test but have not previously seen the passages.

- The fourth requirement is that the outcome data must be defined and collected consistently between the two groups. For example, a study would not meet this requirement if the outcomes for the comparison group were collected in the fall semester, while the outcomes for the intervention group were collected in the spring semester, giving the intervention group an unfair advantage of additional learning time.

- The fifth requirement is that the outcome data must not be imputed for any cases. This means that students' actual outcomes are used, and any students who are missing outcomes are excluded from the analysis.

- Criterion 3: The study must not suffer from a serious confound. A confound is an observed component that is part of only one study condition (the intervention group or comparison group) and is not part of the intervention being evaluated. For example, if all teachers in the intervention group had master's degrees and none of the teachers in the comparison group had a master's degree, it would not be possible to distinguish whether any differences in student outcomes were attributable to the presence of more-educated teachers or to the intervention itself.

The impact evaluation for the Niswonger Foundation i3 grant was designed to meet all of the NEi3 criteria needed to receive a rating of "meets i3 criteria with reservations."

Criteria for assessing the quality of implementation findings

The NEi3 team developed its own criteria for assessing the logic model and the plan for measuring fidelity of implementation, as described below (Abt Associates, 2012):

- Criterion 1: Fidelity must be measured separately for each of the key components of the intervention. For the Niswonger Foundation i3 grant, the evaluation team worked closely with the Consortium Director to identify the key components that should be included in the logic model and the fidelity measures.

- Criterion 2: Fidelity measures must include the entire sample participating in the intervention. For the Niswonger Foundation i3 grant, this means that the data must include all of the original 29 schools in the Consortium.

- Criterion 3: The evaluator must define specific thresholds (represented by quantifiable cut-off scores) for determining whether the key components were implemented with fidelity for the entire sample. For the Niswonger Foundation i3 grant, the evaluation team worked closely with the Consortium Director to define the specific threshold for each component.

- Criterion 4: The evaluator must assess and report whether each of the key components was actually implemented with fidelity or not implemented with fidelity. For the Niswonger Foundation i3 grant, the evaluation team has been collecting data on implementation for each year of the grant and assessing whether each component was implemented with fidelity based on the thresholds defined in Criterion 3.

Evaluations that satisfy these criteria will be described as "providing high-quality implementation data, performance feedback, and periodic assessments of progress for the intervention," which is one of the requirements for federal grants under the Government Performance and Results Act (GPRA). This assessment is used to characterize the quality of the implementation study only, and does not contribute to the NEi3 rating.

The implementation evaluation for the Niswonger Foundation i3 grant was designed to meet all of the NEi3 criteria for high-quality implementation data.

Other relevant factors for assessing i3 evaluations

The NEi3 team identified six additional factors that provide stakeholders with additional information about the quality of the i3 evaluations (Abt Associates, 2012). These factors are used to provide additional context only, and do not contribute to the NEi3 rating.

1. Independence: Key aspects of the evaluation must be conducted by an independent, third-party evaluator, and the findings of the evaluation are not subject to approval by the grantee.

2. Relevance: The evaluation must be relevant for assessing the impact of the intervention by using a representative sample of the population that received services, and by ensuring that the evaluation assesses the intervention as it was actually implemented.

3. Measuring the contrast: The evaluation must present differences in outcomes for the intervention group relative to a comparison group. It is not sufficient

to compare outcomes before and after the intervention only for the intervention group.

4. Statistical power: The NEi3 report will indicate whether the sample size was large enough to distinguish a minimum detectable effect on student, teacher, or school outcomes.

5. Internal validity: There are several factors used to determine internal validity, as described below.

    a. The intervention and comparison groups must not be subject to any confounds that make it difficult to distinguish whether any effects are attributable to the intervention or to some other factor. For example, if all the intervention students attended one school and all of the comparison students attended another single school, any differences in student outcomes could be due to the unique characteristics of the individual school in each condition rather than to the intervention itself.

    b. The person rating or scoring the outcome data must not be aware of the intervention status of the sample members from whom the rater is collecting data.

    c. The comparison group must not be subject to selection bias, meaning that the intervention group and the comparison group cannot be inherently different from each other. For example, schools that agree to participate in the intervention are likely to differ from schools that decline on factors such as their priorities for school improvement. If the schools that declined to participate were included in the comparison group, the results could be biased, because the intervention group would be compared with schools with no interest in participating in the intervention.

6. Scientific process: The evaluation team for each i3 grant was asked to prepare an analysis plan prior to conducting the analyses that outlined the procedures for defining the sample and any subgroups to be included in the analyses, identifying the outcomes for the evaluation, establishing the procedures for testing the baseline equivalence between the intervention and comparison groups, and the methods for conducting the impact analysis. Any changes from the prespecified analysis plan must be documented with an explanation. This prevents the evaluators from changing the analysis in an effort to obtain more favorable results.

The evaluation for the Niswonger Foundation i3 grant was designed to satisfy the requirements for all of these additional factors for assessing i3 evaluations.

Appendix B: Technical Information on Propensity Score Matching and Statistical Models

This appendix contains technical details on the procedures for the propensity score matching used to identify the comparison schools and the statistical models used to estimate the impact of the intervention.

Propensity score matching

Twenty-nine (29) high schools in 15 school districts were selected to participate in the intervention prior to the award of the grant. This is a convenience sample of districts in Northeast Tennessee that had previously worked in a partnership with the Niswonger Foundation on other projects.

A school-level propensity score model was used to identify 29 comparison schools among the 288 regular public high schools in Tennessee. A binary logit regression model estimates the probability that a school is a member of the Northeast Tennessee College and Career Ready Consortium. For each school, the propensity score is defined as:

$$P(Y=1)=\frac{e^{\beta' X}}{1+e^{\beta' X}}$$

In the formula, Y represents the outcome variable (which equals 1 if the school is a member of the Consortium and 0 otherwise), which represents a probability score. X is the set of observed school characteristics representing demographic characteristics of the student population, test scores of the student population, attendance and graduation rates, school resources, community characteristics, and CTE and AP course taking (table 7). β represents the estimated coefficients from the regression model. All covariates represent characteristics prior to the intervention, so their values are not influenced by treatment status.

Table 7. List of variables included in the propensity score model to select the matched comparison schools.

Type of Characteristic	Variables
Demographic Characteristics of the Student Population	• Percent of students who are minorities (races other than White) • Percent of students who are male • Percent of students who receive free or reduced-price lunch • Percent of students who are Limited English Proficient • Percent of students with an Individualized Education Program
Test Scores of the Student Population	• 3-year average ACT English score • 3-year average ACT mathematics score • 3-year average ACT reading score • 3-year average ACT science score • 3-year average algebra end-of-course exam score • 3-year average biology end-of-course exam score • 3-year average English end-of-course exam score • 3-year average history end-of-course exam score
Attendance and Graduation Rates	• Average school attendance rate (percent of days present) • High school graduation rate (percent of on-time graduates with a regular high school diploma)
School Resources	• Student/teacher ratio • Total expenditures per pupil ($) • School size (enrollment in grades 9–12)
Community Characteristics	• Percent of population with a college degree • Percent of population below the poverty line • Population's median annual income • Rural school locale (1=yes, 0=no) • Distance to nearest public college (miles)
CTE and AP Course Taking	• Number of CTE program areas offered by the high school • Percent of high school graduates with CTE concentrations • Number of AP courses offered by the school • Ratio of enrollment in AP courses to total enrollment in grades 11 and 12

A propensity score is calculated for each school in the sample by substituting that school's set of observed characteristics (X) and the estimated coefficients (β) from the logit regression into the propensity score formula as defined in equation (1). The propensity score is therefore the estimated probability that the school was selected to receive the intervention. The 29 non-Consortium schools with the highest propensity scores are each matched to a Consortium school. Matches are selected without replacement using nearest-neighbor matching.

Table 8. Comparison of the baseline characteristics of the Consortium schools versus all other Tennessee schools and the matched comparison schools from the propensity score model.

	Consortium Schools (N=29)		All Other Tennessee Schools (N=259)					Matched Comparison Schools (N=29)			
	Mean	Std. Dev.	Mean	Std. Dev.	Differ.		*p* value	Mean	Std. Dev.	Differ.	*p* value
Student Demographics											
% Minority	0.05	0.05	0.27	0.31	-0.22	**	<0.01	0.05	0.05	0.00	0.93
% Male	0.52	0.02	0.51	0.02	0.01		0.15	0.52	0.02	0.00	0.69
% Free or reduced-price lunch	0.55	0.18	0.54	0.21	0.01		0.84	0.54	0.14	0.01	0.79
% Limited English Proficiency	0.01	0.02	0.02	0.02	-0.01	*	0.01	0.01	0.01	0.00	0.92
% Individualized Education Program	0.07	0.01	0.08	0.01	-0.01	**	<0.01	0.07	0.01	0.00	0.37
Test Scores											
ACT English score (3 yr avg)	20.36	1.19	19.67	2.17	0.69		0.09	20.26	1.25	0.10	0.76
ACT Mathematics score (3 yr avg)	19.55	1.41	19.00	1.72	0.55		0.10	19.63	1.37	-0.08	0.82
ACT Reading score (3 yr avg)	21.02	1.05	20.09	2.02	0.93	*	0.02	20.83	1.13	0.19	0.51
ACT Science score (3 yr avg)	20.26	0.89	19.61	1.58	0.65	*	0.03	20.16	1.07	0.10	0.70
EOC Algebra score (3 yr avg)	538.71	11.65	529.15	16.51	9.56	**	<0.01	537.85	11.26	0.86	0.78
EOC Biology score (3 yr avg)	542.04	11.58	536.46	18.34	5.58		0.11	541.11	13.52	0.93	0.78
EOC English score (3 yr avg)	533.07	9.70	532.03	13.24	1.04		0.68	534.10	7.33	-1.04	0.65
EOC History score (3 yr avg)	522.82	7.97	518.42	13.31	4.41		0.08	520.89	8.63	1.93	0.38
Attendance & Graduation											
Attendance rate (% days present)	0.93	0.02	0.93	0.03	0.00		0.99	0.94	0.01	-0.01	0.18
Graduation rate	0.89	0.06	0.86	0.12	0.04		0.09	0.91	0.05	-0.02	0.26

	Consortium Schools (N=29)		All Other Tennessee Schools (N=259)					Matched Comparison Schools (N=29)				
	Mean	Std. Dev.	Mean	Std. Dev.	Differ.		*p* value	Mean	Std. Dev.	Differ.	*p* value
School Resources												
Student/teacher ratio	16.47	2.75	16.43	2.28	0.47		0.94	16.83	2.93	-0.36	0.63
Log of total expenditures per pupil	8.99	0.09	9.05	0.12	-0.03	**	0.01	9.00	0.10	-0.01	0.68
Log of school size (enrollment in grades 9–12)	6.73	0.59	6.74	0.56	0.04		0.91	6.65	0.58	0.07	0.64
Community Characteristics												
% population with college degree	0.16	0.06	0.21	0.12	-0.05	*	0.04	0.16	0.10	0.00	0.85
% population below poverty line	0.15	0.04	0.13	0.05	0.02	*	0.03	0.16	0.03	0.00	0.82
Log of population's median annual income	10.51	0.12	10.66	0.22	-0.15	**	<0.01	10.50	0.15	0.01	0.88
School locale=rural	0.38	0.49	0.53	0.50	-0.15	*	0.13	0.62	0.49	-0.24	0.07
Distance to nearest public college (miles)	9.42	6.69	10.49	8.08	-1.07		0.49	9.57	8.24	-0.15	0.94
CTE and Advanced Placement												
Number of CTE program areas at school	6.14	1.43	5.98	1.04	0.15		0.47	6.07	0.96	0.07	0.83
Percent of graduates with CTE concentrations	0.40	0.21	0.40	0.20	0.00		0.98	0.40	0.18	0.00	0.98
Number of AP courses at school	4.55	4.99	4.48	5.22	0.08		0.94	3.69	4.94	0.86	0.51
Ratio of AP enrollments to grades 11–12	0.22	0.25	0.23	0.37	-0.01		0.89	0.18	0.29	0.04	0.58

* The difference is statistically significant at the 95 percent confidence level using a two-tailed test.

** The difference is statistically significant at the 99 percent confidence level using a two-tailed test.

Note: The *p*-values are based on a t-test of the difference between the Consortium schools and groups of comparison schools.

Table 8 (above) illustrates the results from tests of the statistical significance of differences in characteristics of the Consortium schools and the non-Consortium schools before and after matching. Before matching, the Comparison schools and the non-Comparison schools show statistically significant differences in observed school characteristics representing demographic characteristics of the student population, test scores of the student population, attendance and graduation, school resources, community characteristics, and CTE and AP course taking. After matching, there are no statistically significant differences between the Consortium schools and the subset of 29 matched comparison schools on any of the observed school characteristics.

We also calculated the absolute standardized bias (ASB) as another diagnostic of the balance between the treatment and control groups on the covariates of interest. Stuart (2007) recommends that absolute standardized bias values greater than 0.50 are "particularly problematic," and ideally should be less than 0.25. After matching, no covariates have an absolute standardized bias greater than 0.50. The following covariates, however, have an absolute standardized bias between 0.25 and 0.50 after matching: rural school locale (ASB=0.49), percent of students with Individualized Education Programs (ASB=0.34), attendance rate (ASB=0.30), and graduation rate (ASB=0.27). All school-level covariates from the propensity score model are controlled for in the statistical models used to estimate the impact of the intervention, in order to remove any bias caused by these differences, to reduce unexplained variation in outcomes, and to improve the precision of the impact estimates.

Statistical models used to estimate the impact of the intervention

This study uses two-level hierarchical models to accommodate clustering of observations that we assume is present in the data (e.g., intraclass correlations) and to ensure that standard errors are measured correctly. The models also allow us to account for covariates that may be correlated with the intervention condition and with outcomes.

Model specification for the continuous outcome variable

Composite ACT scores is the only continuous outcome variable. We estimate a two-level hierarchical linear model (HLM) with students nested in schools. The intervention indicator appears in level 2, the school level. The model is estimated as follows:

Level 1 model (student level):

$Y_{ij} = \beta_{0j} + \beta_{1j}(Y^*_{ij}) + \Sigma\beta_{mj}(\chi_{mij}) + \varepsilon_{ij}$,

where

Y_{ij} is the composite score on the ACT (*Y*) for student *i*, in school *j*,

β_{0j} is the school-level intercept for school *j*,

β_{1j} is the average pretest slope for students at school *j*,

Y^*_{ij} is the pretest score for student *i* at school *j*,

β_{mj} are *M* coefficients corresponding to student-level demographic covariates,

χ_{mij} represents demographic characteristics of student *i* at school *j* for gender (dichotomous variable where male=0, female=1), minority race (dichotomous variable for whether the student is categorized as a race other than White, 0=no, 1=yes), Limited English Proficiency status (0=no, 1=yes), Individualized Education Program status (0=no, 1=yes), free or reduced-price lunch status (0=no, 1=yes), and

ε_{ij} is the random effect representing the difference between student *ij*'s score and the predicted mean for school *j*. These residual effects are assumed to be normally distributed with a mean of 0 and a variance of σ^2.

Level 2 model (school level):

$\beta_{0j} = \gamma_{00} + \gamma_{01}(I_j) + \Sigma\gamma_{0q}(W_{qj}) + \mu_{0j}$,

where

β_{0j} is the school-level intercept for school *j*,

γ_{00} is the conditional school-level mean,

γ_{01} is the coefficient corresponding to the intervention effect,

I_j represents the intervention status for school *j* (1=Consortium school, 0=matched comparison school),

γ_{0q} are coefficients corresponding to the school-level covariates,

W_{qj} are *Q* school-level covariates for school *j*, which consist of the propensity score and all of the covariates included in the school-level propensity score model (baseline

measures for percent of students who are minorities, percent of students who are male, percent of students who receive free or reduced-price lunch, percent of students who are Limited English Proficiency status, percent of students with an Individualized Education Program, three-year average ACT scores in English, mathematics, reading, and science; three-year average end-of-course scores in algebra, biology, English, and history; average school attendance rate; high school graduation rate; student/teacher ratio; log of total expenditures per pupil; log of school size; percent of the population with a college degree; percent of the population below the poverty line; log of the population's median annual income; rural school locale indicator; distance to nearest public college in miles; number of CTE program areas offered by the high school; percent of high school graduates with CTE concentrations; number of AP courses offered at the school; and ratio of enrollment in AP courses to total enrollment in grades 11 and 12; and

μ_{0j} is the deviation of school *j*'s mean from the grand mean, conditional on covariates. This effect is assumed to be normally distributed with a mean of 0 and a variance of τ^2.

Combined model

The combined model is:

$$Y_{ij} = \gamma_{00} + \gamma_{01}(I_j) + \Sigma\gamma_{0q}(W_{qj}) + \beta_{1j}(Y^*_{ij}) + \Sigma\beta_{mj}(\chi_{mij}) + \mu_{0j} + \varepsilon_{ij},$$

where the coefficient of interest is γ_{01}, which represents the difference between the Consortium schools' and matched comparison schools' conditional means. The intervention variable (I_j) is a dichotomous variable that indicates whether the student was enrolled in a Consortium school (I=1) or a matched comparison school (I=0). We examine whether the intervention effect is statistically significant using a two-tailed test and an alpha level of 0.05. Effect sizes are calculated using Cohen's *d* with the pooled standard deviation.

Model specification for the dichotomous outcome variables

The dependent variables for the remaining research questions are all dichotomous outcomes: enrolling in an AP course, earning a score of 3 or higher on an AP exam, enrolling in college, and persisting in college. We use the same covariates described previously, but replace the dependent variable with the binary outcome and estimate the model using a logit link function. The hierarchical generalized linear model is estimated as:

$$\eta_{ij} = \gamma_{00} + \gamma_{01}(I_j) + \Sigma\gamma_{0q}(W_{qj}) + \beta_{1j}(Y^*_{ij}) + \Sigma\beta_{mj}(\chi_{mij}) + \mu_{0j},$$

where

η_{ij} is the log of the odds of success on the outcome of interest for student *i* in school *j*,

γ_{00} is the school-level intercept,

I_j represents the treatment condition (intervention [1] versus comparison [0]),

W is the vector for school-level covariates,

χ is the vector for student-level demographic covariates,

and μ_{0j} is the unmodeled residual for school *j*.

The coefficient on the intervention variable in the model measures the marginal impact of being in the intervention group on the log of the probability of each outcome (enrolling in an AP course, earning a score of 3 or higher on an AP exam, enrolling in college, and persisting in college). Impacts are estimated using the regression equation to calculate each student's probability of successful completion of each outcome using individual student characteristics, and then generating group-level means for the intervention and comparison groups using the intervention variable. The impact estimates are calculated by the first difference between the intervention and comparison groups.

Missing data

We use case-wide deletion of observations with missing outcome measures or baseline equivalence pretest data. This method is appropriate when the outcome data are missing for students within schools in studies where the intervention is administered at the school level (Puma, Olsen, Bell, & Price, 2009). All of the pretest and outcome data for the impact analyses are available from state administrative records so there is no missing data at the school level. Some data at the student level are missing due to incomplete administrative records and student attrition (see table 9, below).

The data for the college enrollment outcome includes records only for students who attended a postsecondary institution, and it is difficult to determine which of the remaining students did not attend college at all and which ones were lost from the sample due to attrition. Attrition occurs when students leave Tennessee's public school system. This can occur due to withdrawal to a state institution (e.g., Tennessee Department of Human Services), transfer to out-of-state schools, transfer to non-public schools in Tennessee, doctor-certified health withdrawal, death,

transfer to mental or drug rehabilitation institute, transfer to a home school, or issuance of a court order. Attrition may also be for unknown reasons, if students have no withdrawal code or are missing from enrollment records after the baseline year. We categorize students as "missing" from the analysis sample of the college enrollment outcome if they do not have school enrollment or transcript records in grade 12, or if they have data indicating that they withdrew from a Tennessee public high school prior to the end of grade 12 for reasons other than dropout. All other students who do not have enrollment records at a postsecondary institution by the fall after high school graduation are categorized as not enrolling in college. This includes students who do not graduate from high school due to dropout.

There are low levels of missing data for the covariates in the statistical models because these data are also available from state administrative records. Some of these variables, such as date of birth and gender, are also self-reported on state assessments. The self-reported data are used for students missing records in the demographic files provided by the Tennessee Department of Education. The dummy variable adjustment method is used for remaining missing values for covariates. Using this approach, the value of the missing independent variables is set to a constant value of 0, and an additional dummy variable is added to the model to indicate whether the actual value is missing.

Table 9. Summary of attrition for the Consortium and comparison groups, by outcome.

			Consortium group				Comparison group			
Outcome	SY	Cohort	Full Sample N	Analysis Sample N	Difference	Attrition Rate	Full Sample N	Analysis Sample N	Difference	Attrition Rate
Composite ACT scores in grade 11	2013/14	Grade 9	6,430	4,139	2,291	35.6%	6,336	4,300	2,036	32.1%
Composite ACT scores in grade 12	2012/13	Grade 11	6,350	4,510	1,840	29.0%	5,814	4,477	1,337	23.0%
	2013/14	Grade 10	6,430	4,644	1,786	27.8%	6,206	4,765	1,441	23.2%
	2014/15	Grade 9	6,430	4,356	2,074	32.3%	6,336	4,425	1,911	30.2%
Enrollment in one or more AP courses	2012/13	Grade 11	6,350	4,905	1,445	22.8%	5,814	4,625	1,189	20.5%
	2013/14	Grade 10	6,430	5,134	1,296	20.2%	6,206	4,968	1,238	19.9%
	2014/15	Grade 9	6,430	5,076	1,354	21.1%	6,336	5,002	1,334	21.1%
Score of 3 or higher on an AP exam	2012/13	Grade 11	6,350	4,905	1,445	22.8%	5,814	4,625	1,189	20.5%
	2013/14	Grade 10	6,430	5,134	1,296	20.2%	6,206	4,968	1,238	19.9%
	2014/15	Grade 9	6,430	5,076	1,354	21.1%	6,336	5,002	1,334	21.1%

Outcome	SY	Cohort	Consortium group				Comparison group			
			Full Sample N	Analysis Sample N	Difference	Attrition Rate	Full Sample N	Analysis Sample N	Difference	Attrition Rate
College enrollment	Fall 2012	Grade 12	6,051	4,534	1,517	25.1%	5,583	4,723	860	15.4%
	Fall 2013	Grade 11	6,350	4,905	1,445	22.8%	5,814	4,625	1,189	20.5%
	Fall 2014	Grade 10	6,430	5,134	1,296	20.2%	6,207	4,968	1,239	20.0%
	Fall 2015	Grade 9	6,430	5,539	891	13,9%	6,336	5,454	882	13.9%
College persistence	Fall 2014	Grade 11	6,039	4,623	1,416	23.4%	5,500	4,339	1,161	21.1%
	Fall 2015	Grade 10	6,430	4,957	1,473	22.9%	6,207	4,814	1,393	22.4%

Appendix C: Supplemental Tables

This appendix provides supplemental tables for the report. Table 10 provides full results from the estimates of the impact of the intervention, as presented for the NEi3 report.

Table 11 shows a crosswalk of the indicators comprising the components for the fidelity of implementation for each year of the grant.

Table 10. Full results from the estimates of the impact of the intervention.

Sample	Contrast Name	Post test Measure Name	Treatment Group	Treatment Group N of Students	Comparison Group N of Clusters	Comparison Group N of Students	Treatment Group SD	Comparison Group SD	Standard Deviation Source (Code)[a]	Comparison Group Mean	Impact Estimate	Standardized Effect Size (optional)	Impact Standard Error	*p*-value	Degrees of Freedom
CONFIRMATORY CONTRASTS															
Grade 10 cohort	College readiness	ACT composite score – grade 12	29	4,644	29	4,765	5.029	4.968	A	19.641	0.246	0.049	0.087	0.004	9,407
	AP performance	Score 3 or higher on AP exam	29	5,134	29	4,968	0.304	0.284	A	0.089	0.938	NR	0.377	0.013	10,101
	College enrollment	Enrollment in college by fall after grade 12	29	5,134	29	4,968	0.494	0.498	A	0.543	0.138	NR	0.059	0.020	10,101
Grade 11 cohort	College persistence	Enrollment in college 2 consecut-ive fall semesters after fall of grade 12	29	4,623	29	4,339	0.494	0.489	A	0.395	0.130	NR	0.065	0.047	8,962

Sample	Contrast Name	Post test Measure Name	Treatment Group	Treatment Group N of Students	Comparison Group N of Clusters	Comparison Group N of Students	Treatment Group SD	Comparison Group SD	Standard Deviation Source (Code)[a]	Comparison Group Mean	Impact Estimate	Standardized Effect Size (optional)	Impact Standard Error	*p*-value	Degrees of Freedom
EXPLORATORY CONTRASTS															
Grade 9 cohort	College readiness	ACT composite score – grade 11	29	4,139	29	4,300	4.779	4.732	A	19.023	-0.086	-0.018	0.125	0.492	8,437
Grade 10 cohort	AP participation	Enrollment in AP course	29	5,134	29	4,968	0.448	0.411	A	21.479	1.204	nr	0.341	<0.001	10,100
Grade 10 cohort, enrolled in AP course	AP performance	Score 3 or higher on AP exam	29	1,433	29	1,073	0.484	0.492	B	0.408	0.670	nr	0.308	0.030	2,508
Grade 11 cohort	College readiness	ACT composite score – grade 12	29	4,477	29	4,510	5.046	4.975	A	19.467	0.019	0.004	0.063	0.76	8,985
Grade 11 cohort	AP performance	Score 3 or higher on AP exam	29	4,905	29	4,625	0.293	0.282	A	0.087	0.098	NR	0.28	0.726	9,528

Sample	Contrast Name	Post test Measure Name	Treatment Group	Treatment Group N of Students	Comparison Group N of Clusters	Comparison Group N of Students	Treatment Group SD	Comparison Group SD	Standard Deviation Source (Code)[a]	Comparison Group Mean	Impact Estimate	Standardized Effect Size (optional)	Impact Standard Error	*p*-value	Degrees of Freedom
Grade 11 cohort, enrolled in AP course	AP performance	Score 3 or higher on AP exam	29	1,262	29	1,059	0.483	0.482	B	0.367	-0.299	NR	0.518	0.564	2,319
Grade 11 cohort	AP participation	Enrollment in AP course	29	4,905	29	4,625	0.437	0.42	A	0.229	0.826	NR	0.387	0.033	9,528
Grade 11 cohort	College enrollment	Enrollment in college by fall after grade 12	29	4,905	29	4,625	0.493	0.496	A	0.563	0.005	NR	0.061	0.928	9,528
Grade 12 cohort	College enrollment	Enrollment in college by fall after grade 12	29	4,534	29	4,723	0.489	0.497	A	55.537	0.261	NR	0.119	0.028	9,257

Sample	Contrast Name	Post test Measure Name	Treatment Group	Treatment Group N of Students	Comparison Group N of Clusters	Comparison Group N of Students	Treatment Group SD	Comparison Group SD	Standard Deviation Source (Code)[a]	Comparison Group Mean	Impact Estimate	Standardized Effect Size (optional)	Impact Standard Error	*p* value	Degrees of Freedom
EXTENSION															
Grade 9 cohort	College readiness	ACT composite score – grade 12	29	4,356	29	4,425	5.031	4.950	A	0.074	-0.034	NR	0.119	0.772	8,781
	AP Participation	Enrollment in AP course	29	5,076	29	5,002	0.441	0.414	A	0.219	0.817	NR	0.197	<0.001	10,076
	AP performance	Score 3 or higher on AP exam	29	5,076	29	5,002	0.315	0.283	A	0.088	0.857	NR	0.356	0.016	10,076
	College enrollment	Enrollment in college by fall after grade 12	29	5,539	29	5,454	0.484	0.491	A	0.592	0.089	NR	0.057	0.120	10,811
Grade 10 cohort	College persistence	Enrollment in college 2 consecut-ive fall semesters	29	4,957	29	4,814	0.491	0.485	A	0.379	0.133	NR	0.058	0.022	9,770

[a] Source code for the standard deviations: A=student-level standard deviations calculated from the full sample; B=student-level standard deviations calculated from study data, specific to the subgroup analyzed in the current contrast.

NR=not reported

Table 11. Crosswalk of fidelity indicators for each program component in SYs 2011/12 and 2012/13 versus SY 2013/14.

Component	Indicator by School Year (SY)		
	SYs 2011/12 and 2012/13	Action Taken	SY 2013/14
1) Management and Communication	1. Director convenes the Advisory Board	None	1. Director convenes the Advisory Board
	2. Attendance is high at Board meetings	None	2. Attendance is high at Board meetings
	3. Director communicates with Consortium staff	None	3. Leadership Team meets and shares information with staff
	4. Director communicates with school systems	None	4. Leadership Team communicates with school systems
	5. Director communicates with the evaluator	Removed	—
	6. Director provides outreach to other groups and legislative bodies	None	5.Leadership/Counselors Teams provide outreach to other groups and legislative bodies
	7. Staff participate in weekly meetings	Removed	—
	8. Staff receive professional development	None	6. Staff receive professional development
	—	Moved from 7.2	7. Schools collaborate with one another
	—	New	8. Conduct course review
2) College and Career Counselors	1. Assign Lead Counselor and staff to high schools	Removed	—
	2. Spend at least 1 day per week in high school	None	1. Spend at least 1 day per week at each school
	3. Conduct core activities in high school	None	2. Assist students (individually or in groups) with developing educational, career, and life planning
	4. Provide individual college/career counseling to students	Collapsed into 2.2	—

Component	Indicator by School Year (SY)		
	SYs 2011/12 and 2012/13	Action Taken	SY 2013/14
	5. Make group or class presentation to students	Removed	—
	6. Create and distribute informational materials	Removed	—
	7. Organize college visits	Reworded	3. Conduct onsite and/or virtual college visits during the school day
	8. Bring family members on college visits	Reworded	4. Conduct virtual and/or onsite college visits outside of school calendar
	—	New	5. Collaborate with educators, community members, and parents to assist students with educational, career, and life planning
	—	New	6. Collaborate with other counselors and educators in the school-wide integration of the guidance services
3) Learning Resources Team: Quality of Instruction	1. Maintain instructional specialists-to-school district ratio	Removed	—
	2. Organize events to share best practices	Moved	[Similar to 1.5]
	3. Provide ongoing support to teachers of AP, online, and distance learning	Moved	[Similar to 4.6, 5.2]
	4. Evaluate online courses for possible adoption	Moved	[Similar to 4.4]
	5. Create Consortium-wide course directory and monitor course availability	Moved	[Similar to 6.4]
	—	New	1. Coordinate collaborative professional development events and/or resources
	—	New	2. Coordinate online collaborative professional communities
	—	New	3. Coordinate training for online teachers

Component	Indicator by School Year (SY)		
	SYs 2011/12 and 2012/13	Action Taken	SY 2013/14
	—	New	4. Assist schools with STEM curriculum and instruction
4) Learning Resources Team: Distance and Online Technology	1. Expand online enrollment	None	1. Expand online enrollments
	2. Expand distance learning enrollment	None	2. Expand distance learning enrollments
	3. Monitor technology in schools and assist in using technology	Moved	[Similar to 6.1]
	4. Identify and acquire technology to support distance and online learning	Moved	[Similar to 6.1]
	5. Ensure reliability of equipment	Moved	[Similar to 6.1]
	6. Create distance and online handbook	Moved	[Similar to 6.3]
	7. Maintain Consortium-wide online learning center	Moved	[Similar to 6.3]
	—	Moved from 3.1	3. Recruit/retain and supervise online teachers
	—	New	4. Coordinate online course development
	—	New	5. Coordinate online course evaluation
	—	Moved from 3.3	6. Assist/train school personnel (including teachers) in using technology
	—	New	7. Ensure schools use ACT Prep online software
5) Learning Resources Team: College-Level Courses	1. Expand enrollments in dual enrollment offerings	None	1. Expand dual enrollment enrollments
	—	Moved from 3.3	2. Assist in the implementation of AP programs
	2. Support supply and demand review	Removed	—
	3. Provide professional development to Consortium staff	Removed	—

Component	Indicator by School Year (SY)		
	SYs 2011/12 and 2012/13	Action Taken	SY 2013/14
	—	New	3. Promote or market AP courses
	—	Moved from 7.3	4. Expand AP enrollments
	—	New	5. Coordinate dual enrollment with postsecondary institutions
6) Resources and Services	1. Purchase and maintain technology for distance and online learning	None	1. Purchase, maintain, and monitor distance learning/conferencing software in schools
	2. Provide Internet access to support distance and online learning	Removed	—
	—	New	2. Maintain openSIS (student information system) for online course tracking
	3. Maintain a functioning distance learning server	Removed	—
	—	New	3. Maintain learning center website
	4. Provide teacher and staff trainings	Moved	[Similar to 4.6]
	—	Moved from 3.5	4. Create/update course directory as needed
7) LEA Partners	1. Schools collaborate with Consortium staff	Moved	[Similar to 3.4, 4.6, and 5.2]
	2. Schools collaborate with other Consortium schools	Moved	[Similar to 1.7]
	3. Schools expand AP enrollments	Moved	[Similar to 5.4]
	4. Schools provide access to Consortium courses	Removed	—
	5. Schools provide teachers or staff access to Consortium training	Moved	[Similar 3.1]
	6. LEAs pick up recurring costs	Removed	—

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