INVERNESS RESEARCH

Evaluation Brief

The Intensified Algebra Project

Cornerstone Claims and Evidence

An External Evaluation by Inverness Research

After four years of studying the Intensified Algebra (IA) Project, Inverness Research presents a summary of the project's key accomplishments and the ways in which the program benefits districts, teachers, and students. The findings are based on data collected from teacher and student surveys and district leader interviews. The following "cornerstone claims" are foundational to establishing the value of the program:

- **The IA program is well designed and of high quality.**
- **The IA program creates an efficient, effective, and coherent use of the double-period structure.**
- **IA supports students who traditionally have not been successful in mathematics.**
- **IA increases student engagement in meaningful mathematics.**
- **IA has a positive impact on student attitudes, beliefs, and behaviors that are more productive for learning.**
- **The IA program is educative for teachers and influences how they teach mathematics.**
- **The IA program can be successfully implemented in a wide range of school and district settings.**
- **The IA program is aligned with the Common Core State Standards for Mathematics (CCSSM).**

Intensified Algebra is a comprehensive program used in extended-time algebra classes, and is intended to help students who are one to three years behind in mathematics become successful in algebra. It is a research and development initiative of the Charles A. Dana Center at The University of Texas at Austin, the Learning Sciences Research Institute at the University of Illinois at Chicago, and Agile Mind that seeks to transform the teaching of algebra to students who struggle in mathematics.

Central to the program is the idea that struggling students need a powerful combination of a challenging curriculum; cohesive, targeted supports; and additional well-structured classroom time. Intensified Algebra seeks to address the need for a robust Algebra I curriculum with embedded, efficient review and repair of foundational mathematical skills and concepts. It aims to address multiple dimensions of learning mathematics, including social, affective, linguistic, and cognitive.

Intensified Algebra uses an asset-based approach that builds on students' strengths and helps students to develop academic skills and identities by engaging them in meaningful learning experiences. The program is designed to help struggling students succeed in catching up to their peers, equipping them to be successful in Algebra I and in their future mathematics and science courses.

The first four sections of this brief — Quality of the IA Program, Use and Fit of IA Materials, Benefits to Students, and Benefits to Teachers — present claims and provide supporting evidence. The fifth section — What More Should You Know About the IA Program? — discusses additional findings based on the data collected. And the final section — About the Surveys and Respondents — provides more details about the data collection. Unless otherwise noted, data in each section is ordered by responses first from teachers, then district leaders, then students. All direct quotes appear in italics.

I. QUALITY OF THE INTENSIFIED ALGEBRA PROGRAM

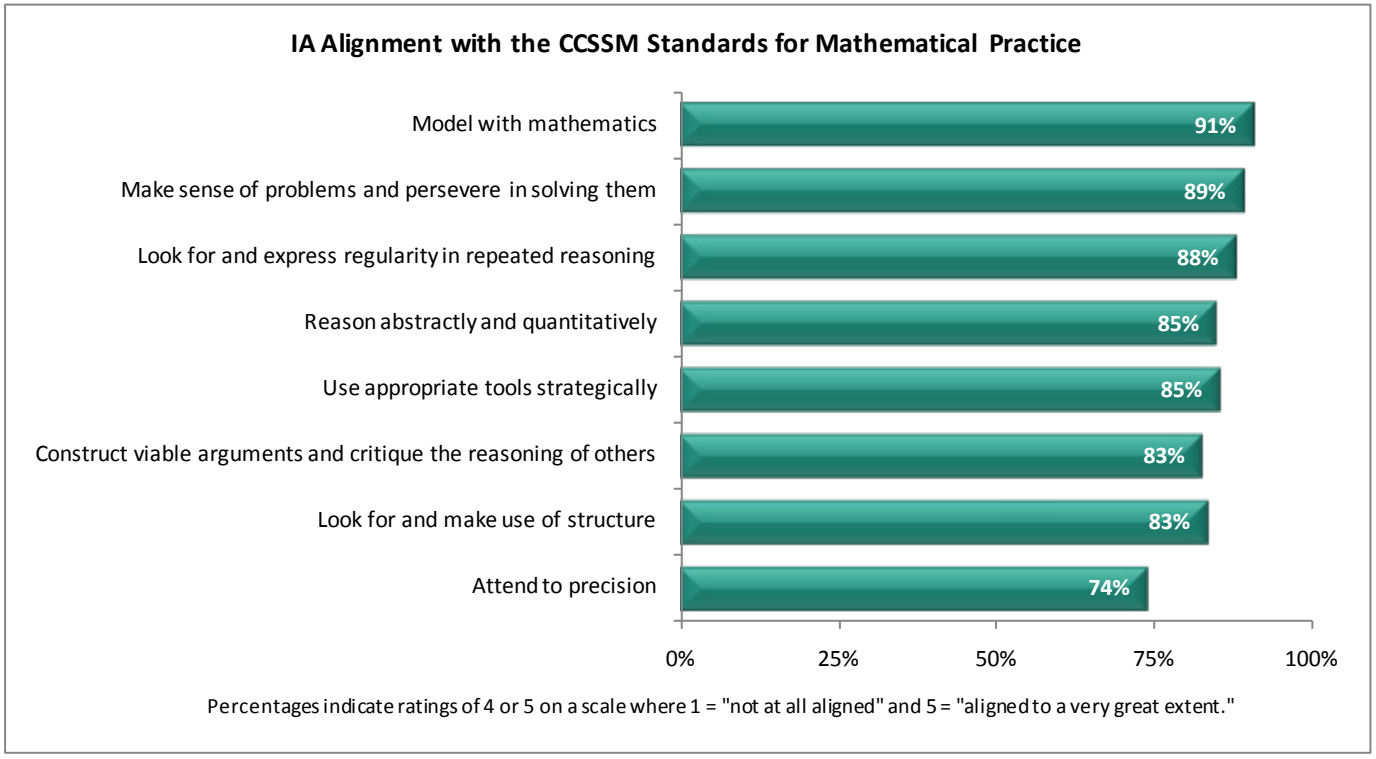
∞ The IA program is well designed and of high quality.

∞ The IA program is aligned with the Common Core State Standards for Mathematics (CCSSM).

A substantial majority of teachers report that the IA program is well designed (79%), of high quality (73%), and aligned with the CCSSM (87%).*

The materials are written well and with intentionality behind the problems that are used.

Teachers are nearly unanimous in their assessment that the IA units teach important content and provide students a chance to learn mathematics well. A large majority of surveyed teachers say that the IA program is aligned with each of the eight CCSSM Standards for Mathematical Practice, as shown in the graph below.



District leaders also rated the IA curriculum highly: four of eight gave the highest rating (a 5 on a 5-point scale), and the rest rated the program a 4. In addition, seven of the eight district leaders said the materials are "teacher friendly" to a large extent.

II. USE AND FIT OF INTENSIFIED ALGEBRA MATERIALS

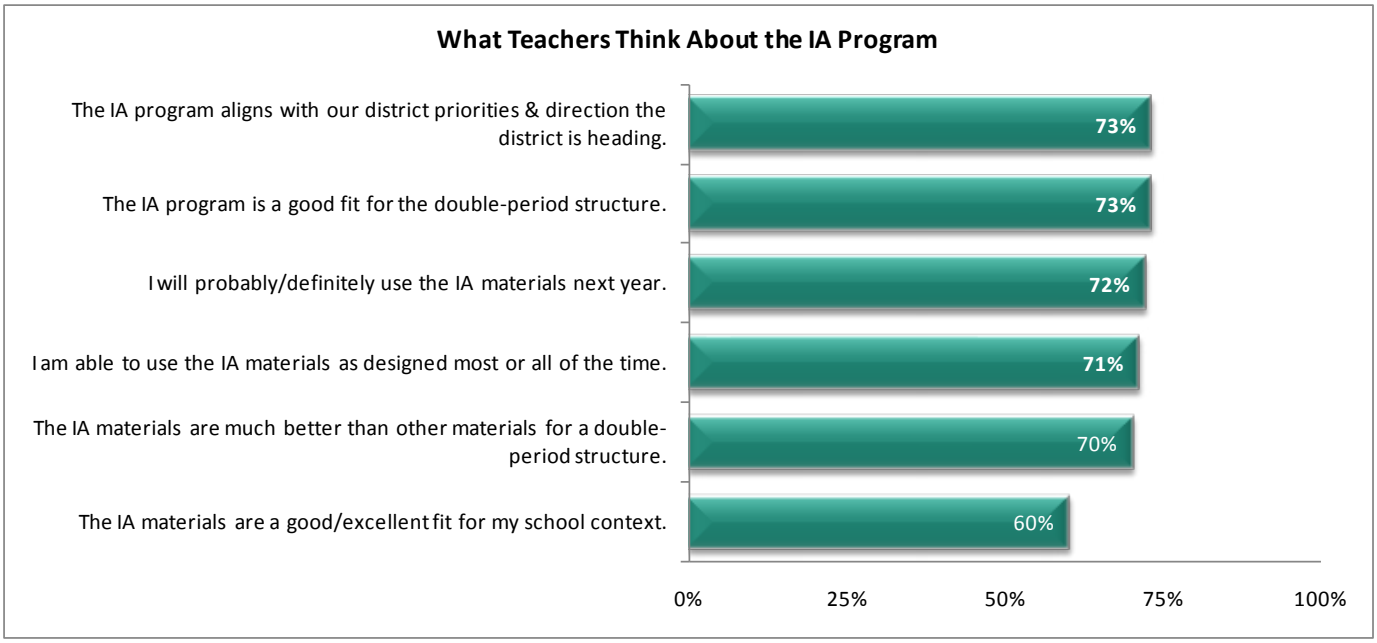
∞ The IA program can be successfully implemented in a wide range of school and district settings.

∞ The IA program creates an efficient, effective, and coherent use of the double-period structure.

The 128 teachers who responded to the 2013 survey are conservatively estimated to teach 3,800 students; 81% of these students rank in the bottom two quartiles on standardized mathematics tests. Forty-four percent of teachers teach in urban schools, 26% in suburban, 21% in small towns, 8% in rural settings.

* Unless otherwise noted, all percentages represent ratings of 4 or 5 on a 5-point scale where 5 is the most positive and 1 is the least.

As illustrated in the graph below, nearly three in four teachers say the IA program is a good fit for the double-period structure, is superior to other materials for that structure, and aligns with district priorities. More than 70% use the materials as designed most or all of the time and intend to use them next year. Slightly fewer say that it is a good fit for their school context.



District interviewees agree that the IA program is well aligned with their district's priorities and is a good fit for the double-period structure. IA was chosen because their districts were looking for an intervention for students below grade level that included structured, extended class time. A number of districts are using IA with special education students and English language learners.

> *Strengths of the IA program are the double periods… The extended time is really beneficial … The interactive pieces of the curriculum are highly engaging and really appropriate for a 9th-grade population.*

> *Students of teachers who use IA with fidelity are performing above their counterparts who were not in the program, testing at the same level as students that are above them in the regular Algebra I class. That convinced the district to put Intensified Algebra in all 27 high schools to reach all level-one students including ESL students.*

District leaders report that IA has been relatively easy to incorporate into their districts and that they would recommend the program to other schools and districts. Six of the eight districts definitely plan to continue IA. Two other districts plan to continue as long as their budgets allow.

When students noted what they liked about taking the IA class, they often mentioned the double period ("more time to go over things"). Fewer than 10% said they disliked the double-period structure.

III. BENEFITS TO STUDENTS

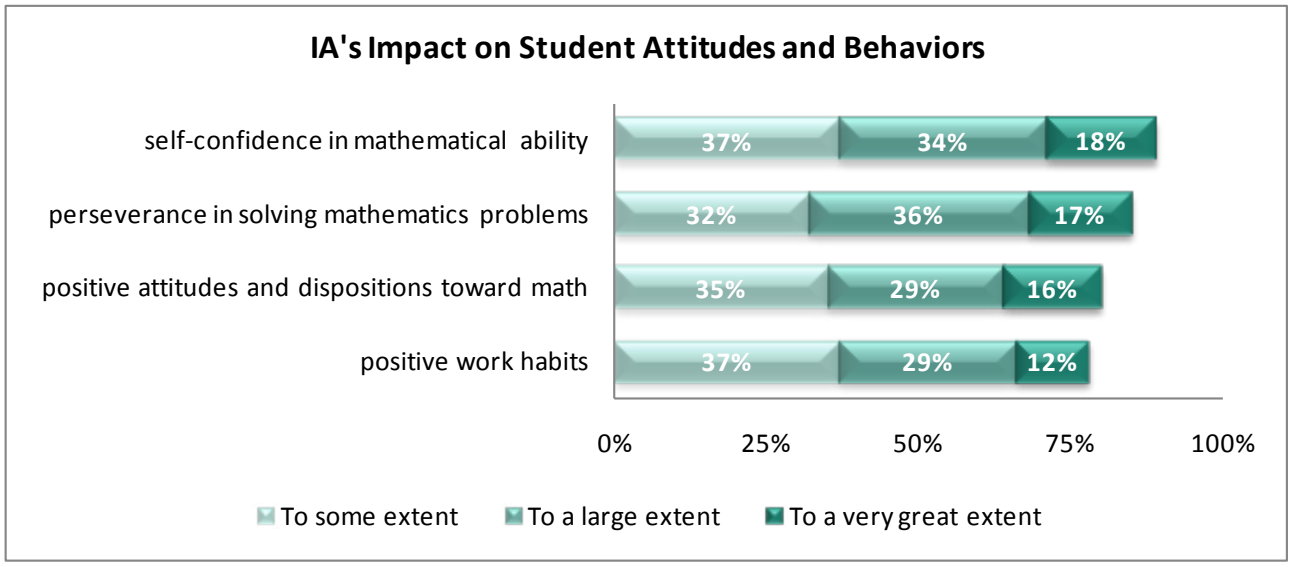
- **IA increases student engagement in meaningful mathematics.**
- **IA has a positive impact on student attitudes, beliefs, and behaviors that are more productive for learning.**
- **IA supports students who traditionally have not been successful in mathematics.**

A majority of teachers say IA is engaging for students (75%), likely to help students who traditionally have not been successful in mathematics to be more successful (59%), and better serves students than traditional materials (56% responded "yes" to the statement).

Specifically, teachers say their students benefit from being in the IA class in the following ways:

- gain problem-solving skills (72%)
- develop deeper conceptual learning of mathematics (70%)
- learn mathematics content (69%)
- prepare for future math courses (58%)
- acquire mathematics skills (57%)
- communicate mathematical ideas (56%).

A large majority of teachers report that IA has had a positive impact on student self-confidence, perseverance, positive attitudes and dispositions toward math, and positive work habits, as shown in the graph below.



Teachers' comments about using the IA program include:

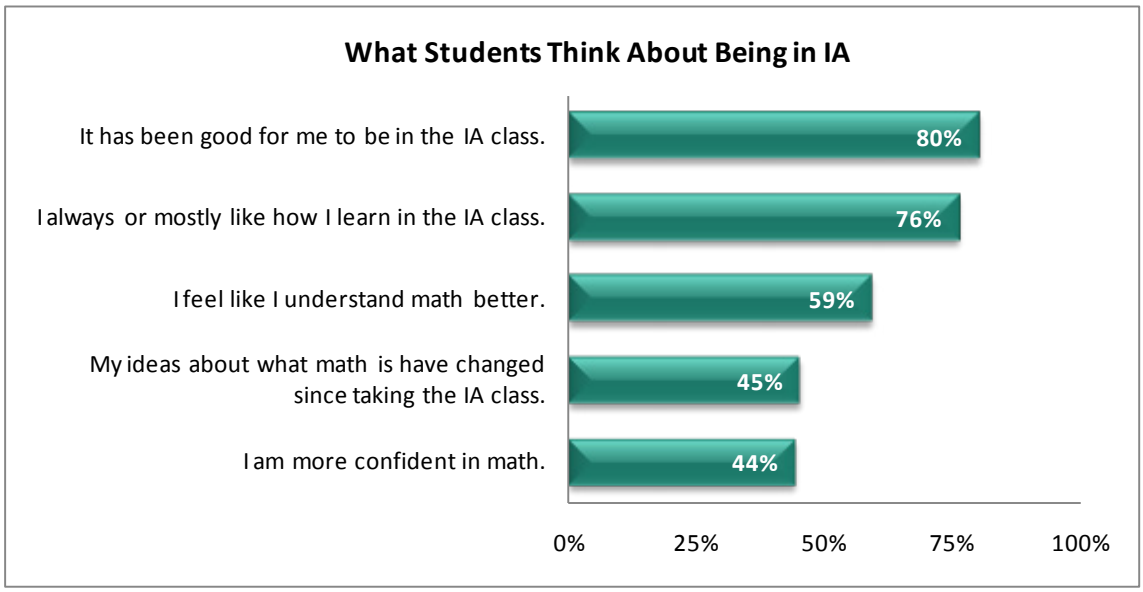
> *I think the lessons are engaging and students can relate to the problems.*
>
> *Using this curriculum has definitely increased student engagement in our double-period algebra classes. I've seen students much more motivated to persevere compared to the past three years I've taught the course, and it is much more rigorous than previous curricula.*
>
> *The content is very well done... I love when they have to make a poster or do a presentation of an engaging problem-solving situation. The engagement I see on these days is spectacular.*

When teachers were asked about the value of IA's explicit social-motivational supports — the inclusion of topics from social psychology that attempt to shape students' academic identities and abilities to contribute to a learning community — about a third said that students benefit from the inclusion of these topics. Nearly half of the teachers think these topics benefit students to some extent, and the rest see little benefit.

District leaders also consider the IA program highly beneficial for students. All interviewees think the IA program helps students who have traditionally not been successful in mathematics be more successful in algebra. They commented that IA deepens student understanding of content and helps them learn how to work well in groups.

> *The kids are actively taking a part in their own learning and it's very beneficial when a kid can see and understand the "why," then they are going to get "how" to do it.*
>
> *It helps them to have psychological skills and social skills and those qualities that make them a team player and a quality group partner, but that also teach them how to work with others on how to make sense of the problems they are encountering.*

Most students are generally positive about their IA class but are less certain about how it has changed their understanding of what mathematics is or their confidence in mathematics, as illustrated in the graph below.



Many students commented on what they like about taking the IA class and how they have benefitted from being in it. They report that they learned a lot and they received the help they needed. Often, they mentioned their teachers positively — that they took time to explain, were patient and clear. Students described how their understanding of mathematics has changed and how their thinking about themselves as mathematics learners has changed as well since being in the IA class.

Student Comments About Being in IA

Interest and confidence

- *I am more interested in math now.*
- *I'm not afraid to ask questions in class.*
- *I understand it a lot better and I know what I'm doing. Now I'm the one helping, not the one being helped.*
- *I feel more confident about my algebraic abilities.*
- *I am better in math and want to be challenged.*

Understanding and skills

- *I learned different types of math and I learned better ways to explain what I did.*
- *It's easier to learn when you have a visual of the problem.*
- *I learned different methods for solving problems.*
- *I learned I have the capacity of knowing how to do many functions.*

Perseverance and self-awareness

- *I understand it more and put more effort into my work.*
- *I don't give up when I get mixed up.*
- *Last year, I didn't want to learn math. Now I'm more engaged because I'm always working.*
- *I don't quit as much.*
- *Some of the papers we did helped us think about how we learn and not just getting work done.*

IV. BENEFITS TO TEACHERS

∞ The IA program is educative for teachers and influences how they teach mathematics.

Over half of the teachers who responded to our survey say that using the IA materials has influenced how they teach mathematics to a large (43%) or very great extent (13%).

All district leaders say the IA program is educative for teachers. District comments about the benefits to teachers include:

> *All of the teachers who have taught IA have borrowed many of the strategies and techniques for their other classes. I think it has really improved the practice and the toolbox of the teachers.*
>
> *It's educative for teachers themselves. It is professional development for the teachers.*
>
> *The Advice for Instruction is another benefit. It breaks up how teachers should spend their day and in which section they should be, so that reinforces and structures the routines for that level of learner. A major strength is the academic youth development piece.*

V. WHAT MORE SHOULD YOU KNOW ABOUT THE IA PROGRAM?

∞ Teachers who use the IA program with fidelity and teachers who have used the program for more than one year regard the materials more highly and indicate greater benefits.

Teachers who use the program with fidelity are those who responded that they use the IA materials as designed all or most of the time. When compared with their peers who modify the materials more often, teachers who use the program with fidelity were significantly more likely to:

- rate the IA program as well designed (88% vs. 59%), high quality (82% vs. 53%), and feasible given their school context (64% vs. 47%)
- want to use them in the future (82% vs. 47%)
- rate the IA materials superior to other materials designed for double-period structure (77% vs. 52%)
- give higher ratings to the program's routines and structures (58% vs. 26%)
- state that students in their IA classes have benefited in three areas: preparation for future mathematics courses (67% vs. 36%), deeper conceptual learning of mathematics (80% vs. 47%), and acquisition of mathematics skills (69% vs. 26%)
- report that the IA program will help students who have traditionally not been successful in mathematics to be more successful (67% vs. 38%)
- indicate that IA has had an influence on how they teach mathematics (65% vs. 32%).

Teachers who use the materials with fidelity also give significantly higher ratings regarding student benefit from the inclusion of topics from social psychology (39% vs. 16%) and topics that attempt to shape their academic identities and abilities to contribute to a learning community (38% vs. 13%).

Teachers who have used the IA program for more than one year are more likely to say that:

- the materials are a good fit for a double-period structure (88% vs. 61%)
- students in their IA classes have benefited in communicating mathematical ideas (68% vs. 45%).

As shown in the following table, both **teachers who use the materials with fidelity and teachers who have used the program more than one year** are significantly more likely to say that students in their classes are learning mathematics content to a large or great extent and are better served than their counterparts who are using traditional algebra materials.

	Used > 1 year	vs.	1st-year users	Use IA as designed	vs.	Do not use as designed
Teachers who say that students in their IA classes are learning mathematics to a large extent or great extent	75%		64%	78%		44%
Teachers who say that their students are better served than their counterparts who are using traditional algebra materials*	64%		50%	66%		30%

* Percentages represent teachers who responded "yes" to this statement.

Both groups of teachers also more often report a positive impact on students' attitudes, beliefs and behaviors. The gap between ratings given by experienced users and ratings given by new users is statistically significant in three areas of student benefit: perseverance, self-confidence, and positive attitudes and dispositions toward mathematics.

∞ Professional development is key to helping teachers understand the program and appreciate the Advice for Instruction.

All of the districts using IA have participated in some type of professional development from the project. The professional development is rated highly by district leaders:

> *The professional development was amazingly helpful to get us started.*
>
> *Best professional development I've seen in a very long time… the professional development provides strategies that can be applied to various scenarios.*

Teachers who have had IA professional development stated:

> *The Advice for Instruction was very thorough and I rarely had questions.*
>
> *The Advice for Instruction is excellent. As long as you review before the lesson, it prepares you well.*

∞ There is a learning curve to feeling prepared and comfortable using the IA materials.

> *I felt much less prepared at the beginning of the year than I do now. I feel well prepared to use the curriculum again next year. With a curriculum like this, I think classroom experience is necessary in learning how to implement it correctly.*
>
> *I find that I spend a lot of time preparing to teach the materials even though they are already written for me. However, now that I am teaching the program for a second time, I feel much more comfortable.*

Some teachers (40%) would like additional professional development, especially first year users (49%). Specific requests for additional professional development include help with reading strategies, promoting active engagement among reluctant learners, and opportunities to collaborate and to watch model lessons.

District leaders would like additional professional development to include more facilitated planning of the first units to be taught, options for rearranging sections to better fit their district's scope and sequence, sharing information about how to handle the transition to 10th grade geometry, and Spanish versions of IA.

∞ Some challenges with using the IA program were noted.

The challenges of using IA are mostly around scheduling a double-blocked class, but we also heard of issues with classroom management, pacing, lack of computer availability in the district, and the importance of having the right teachers to successfully teach the program.

> *From an administrative standpoint, the challenges are that IA is double-blocked, and so we made our schedule work…. The double blocking is what makes the class as valuable as it is.*

> *I hear teachers saying that getting through the prescribed scope and sequence of the curriculum has been a challenge, and we have to give state final exams, and that is proving to be a real challenge because the curriculum is different; they are not at the same place as the other Algebra I classes.*

Generally, the challenges of using IA don't inhibit a school's ability to successfully enact the program, although in one district the teachers opted to discontinue its use because no teacher was willing to have all the underprepared students in one class.

ABOUT THE SURVEYS AND RESPONDENTS

Teacher surveys

In spring 2013, surveys were sent to 267 teachers using the IA program in the 2012-2013 academic year; 128 surveys were submitted, for a response rate of 48%. Respondents teach in a range of settings: urban 44%, suburban 26%, small town 21%, and rural 8%. Over half (54%) were using the materials for the first time in 2012-2013; 31% began in 2011-2012; 12% in 2010-2011; and 3% earlier.

Student surveys

A total of 28 teachers in 7 states returned 875 student surveys in spring 2013. Over half of the students (55%) in these IA classes rank in the lowest quartile on standardized mathematics tests, 81% in the bottom two quartiles combined, and only 5% in the top quartile.

District interviews

Project staff recommended interviewees in districts where Intensified Algebra is being implemented. Eight district administrators were interviewed in fall 2013, representing eight districts in six states (FL, IL, NM, PA, TX, and WA).

Published September 2014

Inverness Research, a national education evaluation and consulting group headquartered in Northern California, has over 25 years of experience studying local, state, and national investments in the improvement of education.

Inverness Research * P.O. Box 313, Inverness, CA 94937 * Ph: 415-669-7156 * Fax: 415-669-7186
www.inverness-research.org