



2017-2018

Indicators of Student Achievement and Quality Programming

iu13
An Education Service Agency

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INTRODUCTION

Lancaster-Lebanon Intermediate Unit 13 (IU13) is an educational service agency with offices in Lancaster and Lebanon, Pennsylvania, that is committed to providing outstanding programming and professional development designed to improve student achievement. These services are provided through instruction to students in classes taught by IU13 staff and support provided by IU13 consultants that is designed to improve the skills of the educators that work with students.

As part of its ongoing commitment to continuous improvement, IU13 has developed a data collection system that will be used to identify, gather, and reflect on key areas of student learning and the impact of IU13 programming and services. Identified indicators include multiple types of information such as demographic, perceptual, and achievement/student learning data that have been selected to provide the most complete representation of the impact of IU13 services. Information was gathered from those programs that provide direct instruction to students (Early Childhood, Special Education Services, Community Education, and Nonpublic Services) or offer professional development for educators responsible for teaching students in districts or IU-operated classes (Curriculum and Instruction Services). When available, similar data for multiple years will be reported; however, in cases where multiple-year data is not available, single-year data will be reported, with additional data added over time. It should also be noted that in several cases, data represented is from 2016-17. This is true in those programs where data is gathered via an outside source such as state or partner agency data banks.

Indicators were selected by program supervisors based on how well data aligned with three defined criteria. They include:

1) Representation of the trend of student learning, attainment of desired goals such as graduation, or observable changes in behaviors;
2) Representation of the quality of services and/or the satisfaction levels of the recipients of services; and
3) Availability of the data in an accessible format at a system level vs. individual student level.

While the list of data indicators selected by the supervisors to be represented in 2017-18 is extensive, it is not designed to be exhaustive at this point in time. The indicators will continue to be refined, and the reliability, validity, and the depth of data will only increase in future years.

In addition to data on IU13's ongoing programs, the report includes a section designed to highlight several innovative initiatives – "Promising Practices" – recently implemented practices that, with their success, continued into the 2017-18 school year. These pilot or grant-funded programs are based on best practices in the field and are designed to offer fresh takes on educational practices in order to maximize outcomes for students. Data from these programs is included in this report to provide additional insight into IU13's commitment to enhancing the lives of students and educators in Lancaster and Lebanon counties.

TYPES OF DATA

Definitions of the types of data categories to be used by IU13 were designed as per the recommendations of Victoria Bernhardt, Ph.D., well-known for her work in school data analysis. In her book *Data Analysis for Continuous School Improvement* (2013), Dr. Bernhardt suggests using multiple measures of data including the following:

1. **Demographics on a school, student, and staff level:** This includes information such as enrollment, attendance, graduation rates, gender, etc. For the purposes of this report, demographic information will be shared when it is relevant to understanding the trends or outcomes identified.
2. **Perceptions:** This includes values, beliefs, attitudes and observations. Since much of the success of IU13 is related to the value of its services by its users, surveys and other feedback loops were collected and synthesized at a system level.
3. **Student Learning:** Both standardized and formative assessments are included in this category. Measures of student achievement from both IU classes and district classes where teachers received extensive and/or ongoing technical assistance and training were included.
4. **School Processes:** Descriptions of school programs and processes tell us about how we work and its relevance to issues that may be uncovered through data analysis. This type of data was gathered on a very limited basis and is not used in this report; however, it will become more relevant as the other types of data are analyzed and questions arise regarding root causes of identified issues.

By analyzing information from a variety of sources as well as different types of information, it is believed that a more accurate and complete picture of IU13 and its services will be provided. Ultimately, the analysis of the data will be used to answer the following questions:

- **Is IU13 providing quality instruction to the students it serves that results in improved student achievement?**
- **Is the professional development and training offered by IU13 of high quality and effectiveness, resulting in more highly trained educators who will in turn impact student achievement?**
- **Has the implementation of IU13's promising practices resulted in improved student outcomes?**

These questions will be considered across programs and age of learners, from early childhood to adulthood.

ANALYSIS OF DATA

Is IU13 providing quality instruction to the students it serves that results in improved student achievement?

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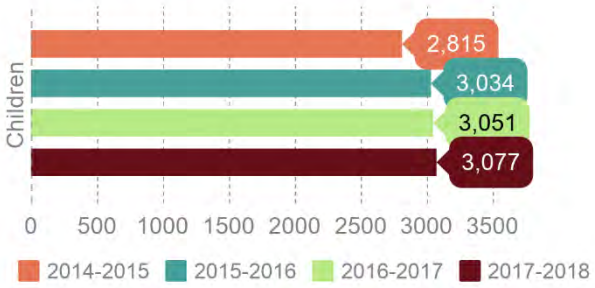
Early Childhood Programs

IU13 provides instruction to eligible students in its Early Childhood and Preschool Early Intervention program, including Early Head Start and Head Start, Pre-K Counts, and Early Intervention services for children identified with special needs.

These programs, serving children from infants to preschool, are designed to strengthen and encourage early literacy, social development, resourcefulness, and self-sufficiency through positive learning experiences.

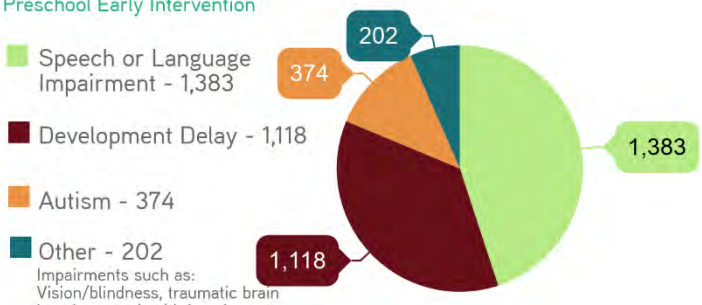
Early Literacy
Social Development
Resourcefulness & Self-sufficiency
Positive Learning Experiences

Growth in Preschool Early Intervention



Top Services Received

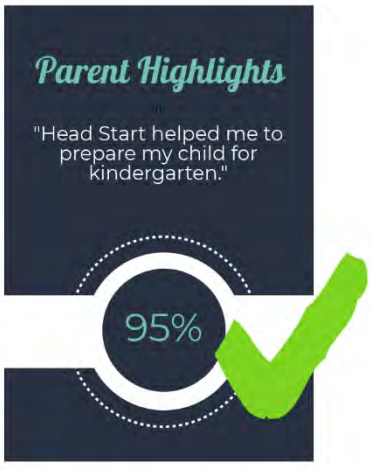
Preschool Early Intervention



3,077
Preschool Early Intervention
Children 3-5 years old (pre-kindergarten) served

470
Head Start & PreK Counts
Children 3-5 years old (pre-kindergarten) served

264
Early Head Start
Children birth-3 years served



Data is reflective of 2017-2018 school year.

Early Childhood and Early Intervention Programs

Demographic Information

Early Intervention

IU13 continues to impact a significant number of young children through its Early Intervention program. Data gathered through June 2018 indicates that IU13 has served a total of 3,077 children in the Early Intervention program in 2017-18. **Figure 1** shows the steady increase in the number of children that have received Early Intervention services over the last five years.

Figure 1: Number of Children Served in Early Intervention

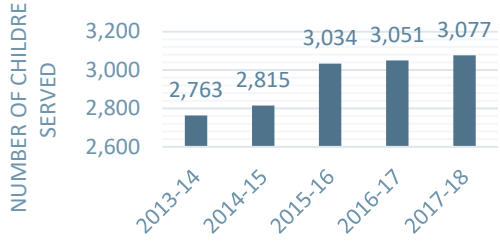
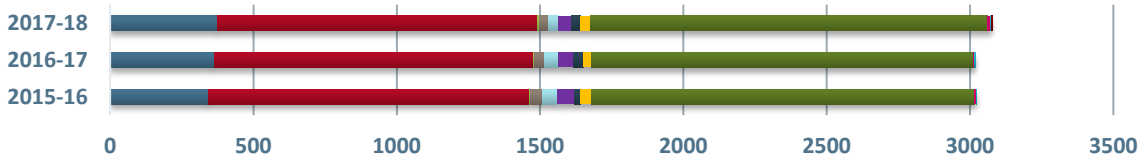


Figure 2 shows the number of children receiving services by their category of eligibility. The three most common eligibility categories continue to be Speech/Language Impairment, Developmental Delay and Autism. This is consistent with previous years' data.

Figure 2: Early Intervention Number of Children Served By Eligibility Category



	2015-16	2016-17	2017-18
Autism	343	364	374
Developmental Delay	1121	1112	1118
Emotional Disturbance	4	4	5
Hearing Impairment/Deaf	40	36	33
Intellectual Disability	52	47	34
Multiple Disabilities	59	53	46
Orthopedic Impairment	22	36	32
Other Health Impairment	37	28	35
Speech or Language Impairment	1338	1331	1383
Traumatic Brain Impairment	5	6	11
Visual Impairment/Blindness	3	3	5
Specific Learning Disability			1

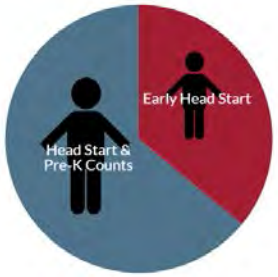
One hundred and seventy children (170) were exited from special education due to the demonstration of age-appropriate skills.

Early Childhood

During 2017-18, IU13 provided services to young children through a variety of programs. They include:

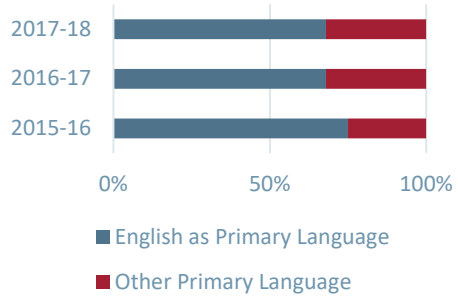
- Early Head Start (Lebanon home based and Lancaster & Lebanon counties child care partners), 264 children
- Head Start and Pre-K Counts, 470 children

2017-18 Children in Early Childhood Programs



While English continues to be the primary language spoken as reported by parents (68% of children), the Early Childhood programs serve students with a wide variety of primary languages, with 32% of the children having a language other than English as their primary language.

Figure 3: Primary Language of Head Start/Pre-K Counts Children



Achievement/Student Learning

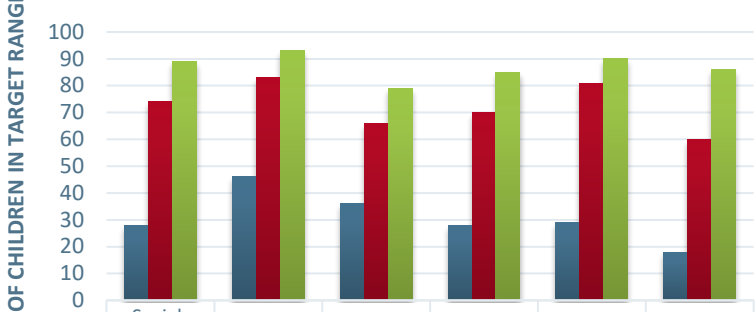
The curriculum and instructional practices provided by IU13 programs to young learners are designed to support the growth of early literacy and math skills, and other key developmental areas including physical, cognitive, language, and social abilities. Assessment of these skills in young children can be challenging since these learners are not developmentally ready for the demands of the types of assessments indicated for older students. Assessment at this level includes a variety of types of assessments and is accomplished over time to provide the most reliable and valid measure of their skill levels (Helm, 2014). IU13 has selected the **Teaching Strategies GOLD** assessments to use in tracking the impact of programming on achievement level and social-emotional learning. (See *Appendix A* for additional details on the assessments).

Indicators of Student Learning

Teaching Strategies GOLD

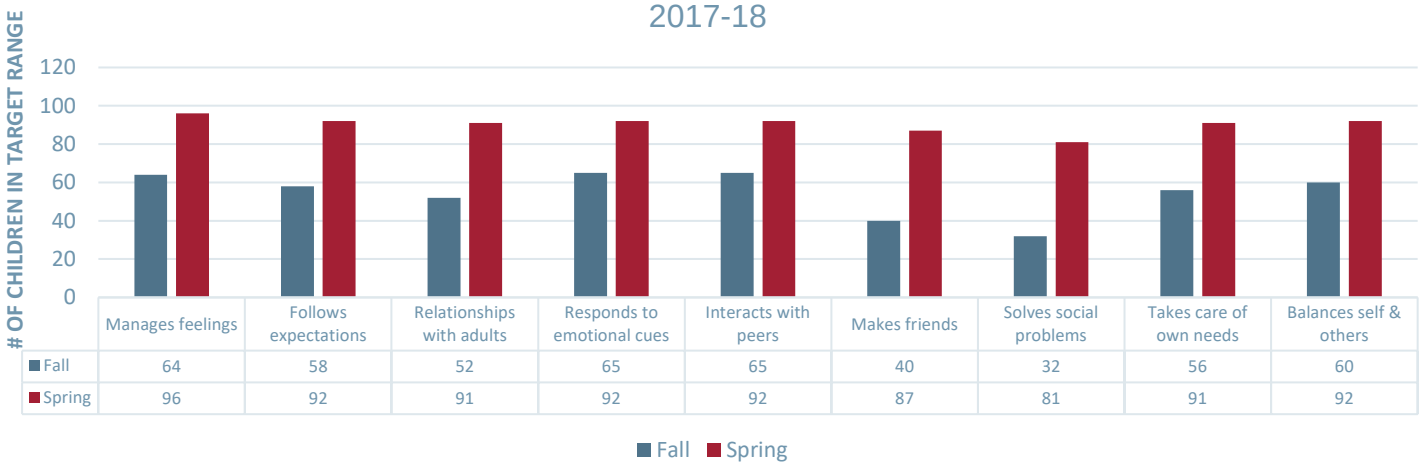
The Teaching Strategies GOLD assessments use multiple data points that include student performance and anecdotal notes from teachers which are then compared to the expected levels of development in key target areas based on the child's age. **Figures 4 and 5** indicates the number of children who were evaluated to be within the appropriate target range indicated as per their chronological age. Children were assessed in the fall, winter and spring with the expectation that the number of students performing in the specific skills domain would increase as a result of their preschool experiences. This indeed proved to

Figure 4: Teaching Strategies GOLD Data (2017-18)



	Social-Emotional	Physical	Language	Cognitive	Literacy	Math
Fall	28	46	36	28	29	18
Winter	74	83	66	70	81	60
Spring	89	93	79	85	90	86

Figure 5: Teaching Strategies GOLD Social-Emotional Data 2017-18



	Manages feelings	Follows expectations	Relationships with adults	Responds to emotional cues	Interacts with peers	Makes friends	Solves social problems	Takes care of own needs	Balances self & others
Fall	64	58	52	65	65	40	32	56	60
Spring	96	92	91	92	92	87	81	91	92

be the case, with all areas showing significant upward trends in skills. This is consistent with data demonstrated in prior reports.

Perceptual Data

Parent involvement is critical to the development of early learners and is a key component of the services in the Early Learners program. One way in which IU13 collects information on its families' satisfaction with these services is through a yearly survey of parents of children participating in its Head Start classes. Two-hundred and twenty-six parent surveys were returned (83% return rate), with the results as follows:

- I feel **welcomed and respected** by the Head Start staff.
  - Yes – 99.9%, No Response – 0.4%
- The teacher is **interested** in what I have to say.
  - Yes – 99.6%, No – 0.4%
- The teacher **keeps me informed** about how my child is doing.
  - Yes - 98%, No – 0.9%, No Response – 0.9%
- Do you feel **heard and valued** when you talk about your child with Head Start staff?
  - Yes – 98%, NA – 0.9%, No Response – 1.3%
- If your child has an IEP, were Head Start staff **helpful in getting your child evaluated**?
  - Yes – 53.9%, No – 0.9%, NA – 41.5%, No Response – 3.5%
- The teacher and I made **educational goals** for my child.
  - Yes – 98.2%, No – 0.4%, NA – 1.3%
- My child learned how to **share and take turns**.
  - Yes – 96.9%, No – 2.2%, No Response – 0.4%
- My child is better at **identifying his/her own emotions**.
  - Yes – 97.3%, No – 1.7%, NA – 0.4%, No Response – 0.4%
- My family service worker helped me to **set goals** and work toward achieving them.
  - Yes - 95%, No - 1%, NA - 4%
- The **home visit** with my family service worker was helpful.
  - Yes – 93.8%, No – 1.3%, NA - 5%
- Did you attend the **monthly parent meetings**?
  - Yes - 81%, No - 16%, NA – 2.2%, No Response – 0.9%
- Were the parent **meetings helpful**?
  - Yes – 76.1%, No - 4%, NA - 11%, No Response – 8%
- Head Start helped me to **prepare my child** for kindergarten.
  - Yes – 94.7%, No – 0.4%, NA - 4%, No Response, 0.4%
- My child and I had a **good experience** at Head Start.
  - Yes – 99.1%, No – 0.4%, No Response 0.4%

PARENT INVOLVEMENT HIGHLIGHTS

Head Start helped me to **prepare my child** for kindergarten.

- Yes – 94.7%

My child and I had a **good experience** at Head Start.

- Yes – 99.1%

The results of the survey suggest that the participating families feel positively about the program and that the program continues to meet its goal of creating strong connections with the students and their families.

Discussion

Based on a review and examination of the 2017-2018 student data, children receiving services from the Early Childhood program made significant gains across all of the domains of development. The program staff plans to continue its emphasis on a strong professional development plan that includes effective teaching practice modules and the implementation of practice-based coaching. Staff training will include an emphasis on developing nurturing, responsive and reciprocal relationships, high-quality teacher-child interactions and language development strategies.

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School-Age Programs

IU13 provides direct instruction and support to students with special needs who require individualized education plans (IEPs) in Lancaster and Lebanon counties in grades kindergarten through high school.

Classes include:

Emotional Support, Life Skills, Diagnostic Kindergarten, Autistic Support, Basic Occupational Skills (BOS), School-to-Work, Deaf/Hard of Hearing Support, and Multiple Disabilities

Supplemental services to students with IEPs include:

Physical, Occupational, Speech and Language Therapies; Job Training Services; Autism Itinerant Services; and Hearing Impaired/Visually Impaired Itinerant Services

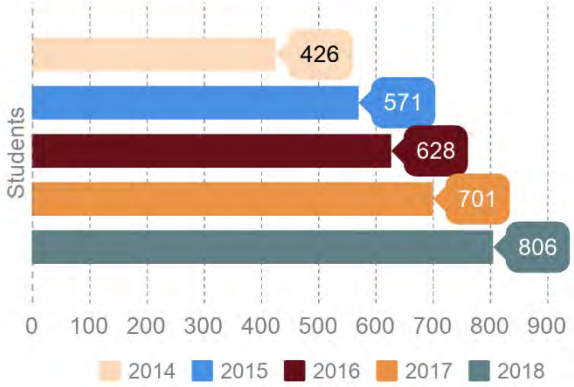
School-Age Students Served by IU13

In School-Age Itinerant Programs - 6,146

In School-Age IU13 Classes - 889

Extended School Year (ESY)

80% Increase in attendance over five years



95

Number of IU13-operated classrooms

Operated in support of area school districts

2,561

Receiving IU13 Job Training Services

Students with IEPs in IU or District Classes

Due Process Hearings

Zero Due Process Hearings occurred during the school year!

Data is reflective of the 2017-2018 school year.

School-Age Programs

Demographic Information

IU13 currently operates 95 classes in both Lancaster and Lebanon counties, including students in the following settings:

- Autistic Support
- Diagnostic Kindergarten
- Emotional Support
- Hearing Impaired Support
- Life Skills Support
- Multiple Disabilities Support
- School to Work/BOS

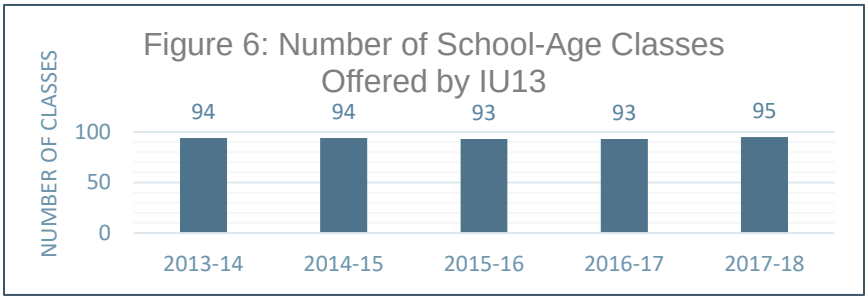


Figure 6 shows the number of classes operated by IU13 over the last five years, with the number of classrooms remaining relatively stable over the last four years.

The number of students in school-age IU13 classes has also remained fairly stable as shown in **Figure 7**, consistently measuring over 800 students.

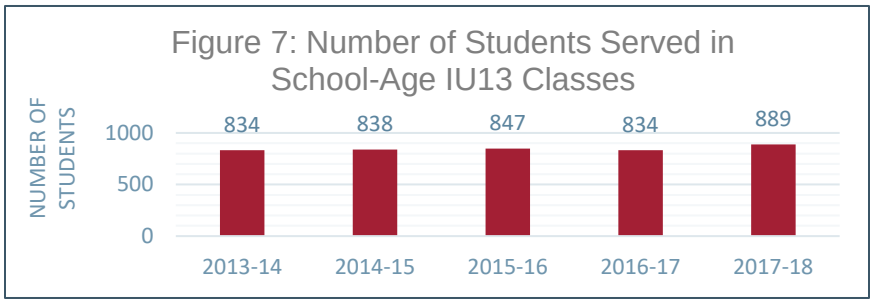
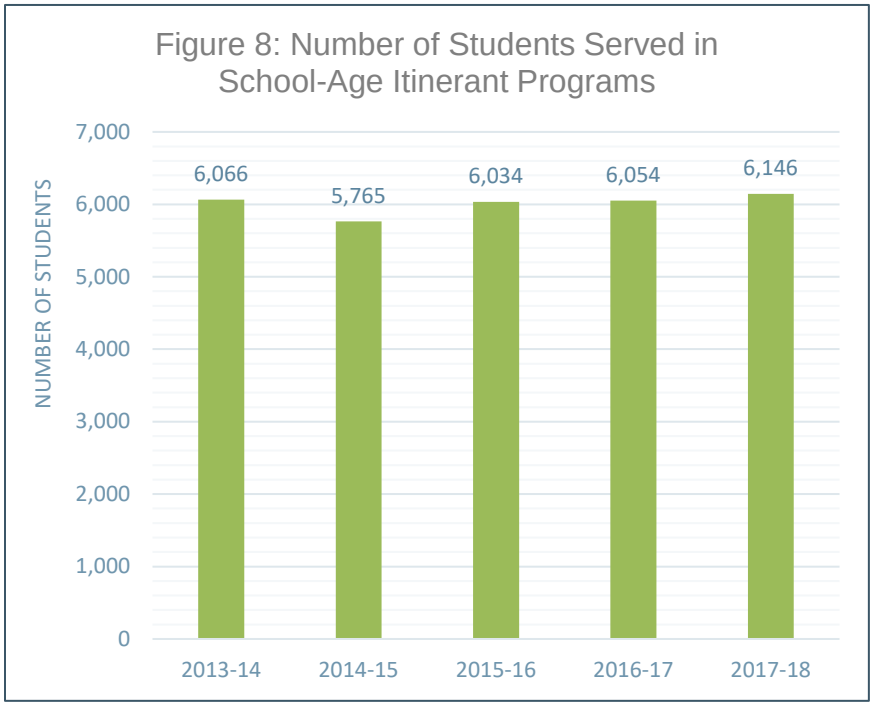


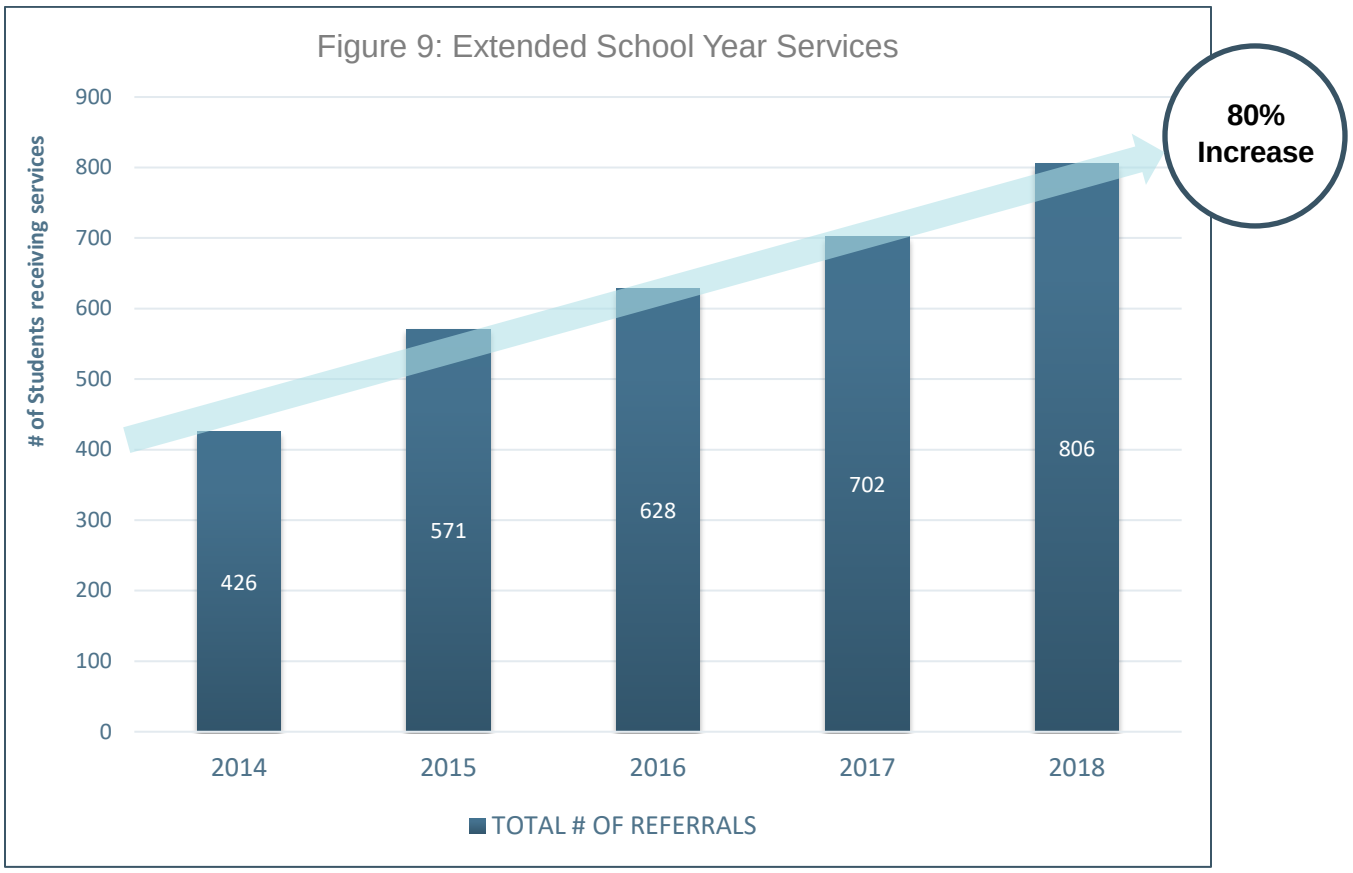
Figure 8 shows the demand for school-age itinerant services over the past 5 years. IU13 provides services to students in the following itinerant programs:

- Autistic Support
- Blind/Visually Impaired
- Deaf/Hard of Hearing Support
- Job Training
- Learning Support at Lancaster County CTC
- Occupational Therapy
- Physical Therapy
- Speech/Language Therapy



*Numbers represent total number of services provided. Students receiving more than one service are counted more than once.

Extended school year services (ESY) play an important part in the maintenance of the skills of a child with special needs. Because of this, IU13 provides extended school year services to students in local school districts to maximize the learning gains of eligible students. **Figure 9** shows the increasing demand for these services with the number of students participating in the program increasing by 80% over the last five years.



Due Process Hearings

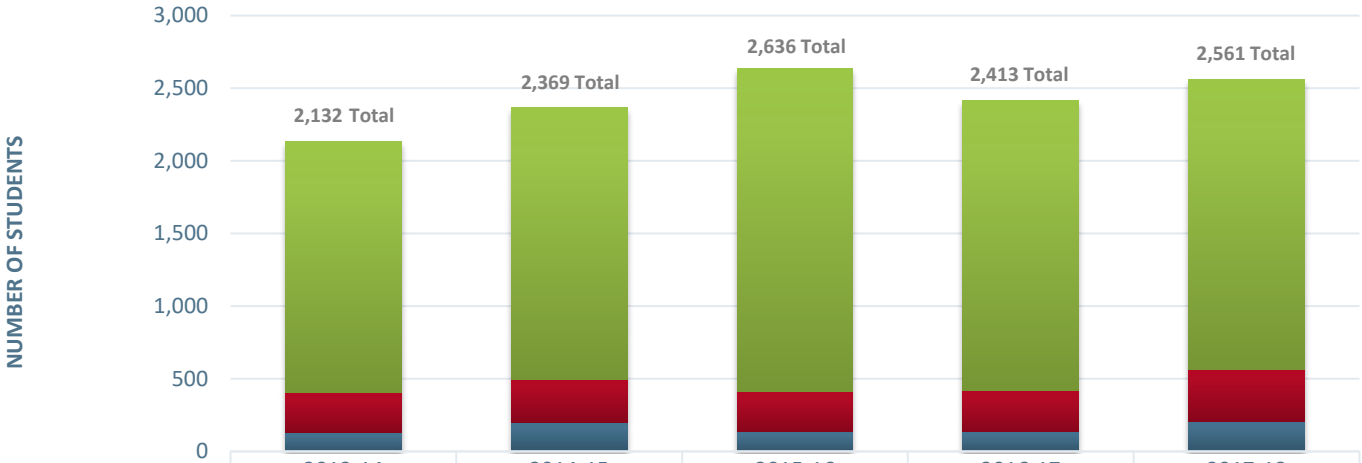
One of the important indicators of a quality special education program is the number of due process hearings that have occurred during the school year. Due process hearings take place when parents and school districts are unable to resolve differences over a student's individual education program. These events are expensive, time-intensive, and can erode the partnership between families and schools; therefore, tracking the number of due process hearings is an important indicator of how parent-school partnerships are proceeding. IU13 was involved in no due process hearings in 2017-18. The program achieved similar results in 2016-17. As a result, IU13 staff has been able to stay focused on positive relationships with parents and the program has avoided the costs associated with multiple hearings.

Job Placement of Students

IU13 provides transition services to students with disabilities in both district and IU-operated classes. Job trainers work closely with IEP teams and community partners to provide students with needed experiences and support as they apply classroom skills to the workplace environment through job placements, work readiness instruction, and internship experiences. IU13 runs several School-to-Work programs designed to provide students with intensive job preparation with sites at the Burle Business Park, Project SEARCH at Lancaster General Hospital and the Lebanon Veterans Administration Hospital, and Willow Valley Communities. The program also continues to grow in its initiatives with innovative services such as the Materials Handling and Logistics Transition program.

These transition services continue to be highly in demand as shown in **Figure 10**.

Figure 10: Job Training Services for Students with IEPs in District and IU13 Classes



	2013-14	2014-15	2015-16	2016-17	2017-18
Work Readiness	1,726	1,875	2,225	1,995	2,000
Job Placements	274	292	277	282	354
Unpaid Internships	132	202	134	136	207

Achievement/Student Learning

The instruction provided to students served in IU13 classes is determined by a team of educators, parents, and designated educational partners resulting in an individualized education plan (IEP). Each IEP includes achievement levels, progress monitoring targets and exit criteria. Because of the varied nature of IEPs, it is difficult to use an aggregate individual analysis as a method of broad program evaluation. State assessments are not tracked by IU13 classes and instead are reported to school districts. In addition, many of the students served by IU13 have IEP goals which include social and emotional, communication, and daily living skills goals. Because of this, IU13 special education program supervisors have established common data indicators that will be gathered on a yearly basis to track the quality and success rate of IU13 services. These identified indicators include:

- *Number of recommendations to have students return to a Less Restrictive Environment (LRE):* IU13's goal is to transition students back to their home district or to a LRE as they improve academically and behaviorally, as well as to prevent the need for students to require a more restrictive setting due to a decline in their IEP progress. Though yearly data may vary based on individual student needs, this information will continue to be tracked in future reports to allow for possible trend analysis.

- *Progress on designated assessments aligned to select program goals:* Assessments used include the **Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP),** the **NOCTI**, and the **Diagnostic Kindergarten Early Reading and Math Criterion Referenced Assessments.** (See *Appendix A* for further information on assessments.)

Indicators of Student Learning

Number of recommendations to return to a less restrictive environment (LRE):

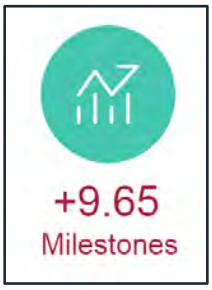
During 2017-18, 59 students were recommended by the IEP team to return to a less restrictive environment. IU13 consistently returns its students to a less restrictive environment each year, with over 12% returned during 2017-18. **Table 1** shows the data detailed by program assignments over the last three years:

Table 1: Number of Recommendations to Return to a Less Restrictive Environment

	2015-16		2016-17		2017-18	
	Total Students Served	Return To LRE	Total Students Served	Return To LRE	Total Students Served	Return To LRE
Community School Southeast/West	164	32	144	26	129	21
Diagnostic Kindergarten	20	3	12	11	8	0
Emotional Support (Lancaster Co.)	85	0	85	5	75	9
Life Skills (Lancaster Co.)	49	6	54	0	52	2
Catholic Charities	27	1	28	7	23	6
Deaf/Hard of Hearing	29	0	32	0	33	0
Valley Road Emotional Support	49	4	68	5	74	13
Valley Road Autistic Support	20	1	20	1	22	0
Fairland	51	3	52	2	53	3
Autistic Support (School Based)	132	18	117	9	138	5
Lebanon County Emotional Support, Life Skills Support, and Multiple Disabilities Support	92	1	100	0	88	0
Lancaster Multiple Disabilities Support	67	0	60	1	56	0
TOTAL	**785**	**69 (8.8%)**	**772**	**67 (8.8%)**	**751**	**59 (12.7%)**

VB-MAPP Achievement Data:

IU13 provides direct instruction to students with autism in partnership with the Lancaster and Lebanon school districts. Seventy-seven (77) students in 12 IU13 autistic support classes were assessed at the beginning and end of the year using the VB-MAPP. Students gained an average of 9.65 milestones during 2017-18 as a result of their instruction in IU13 classrooms.

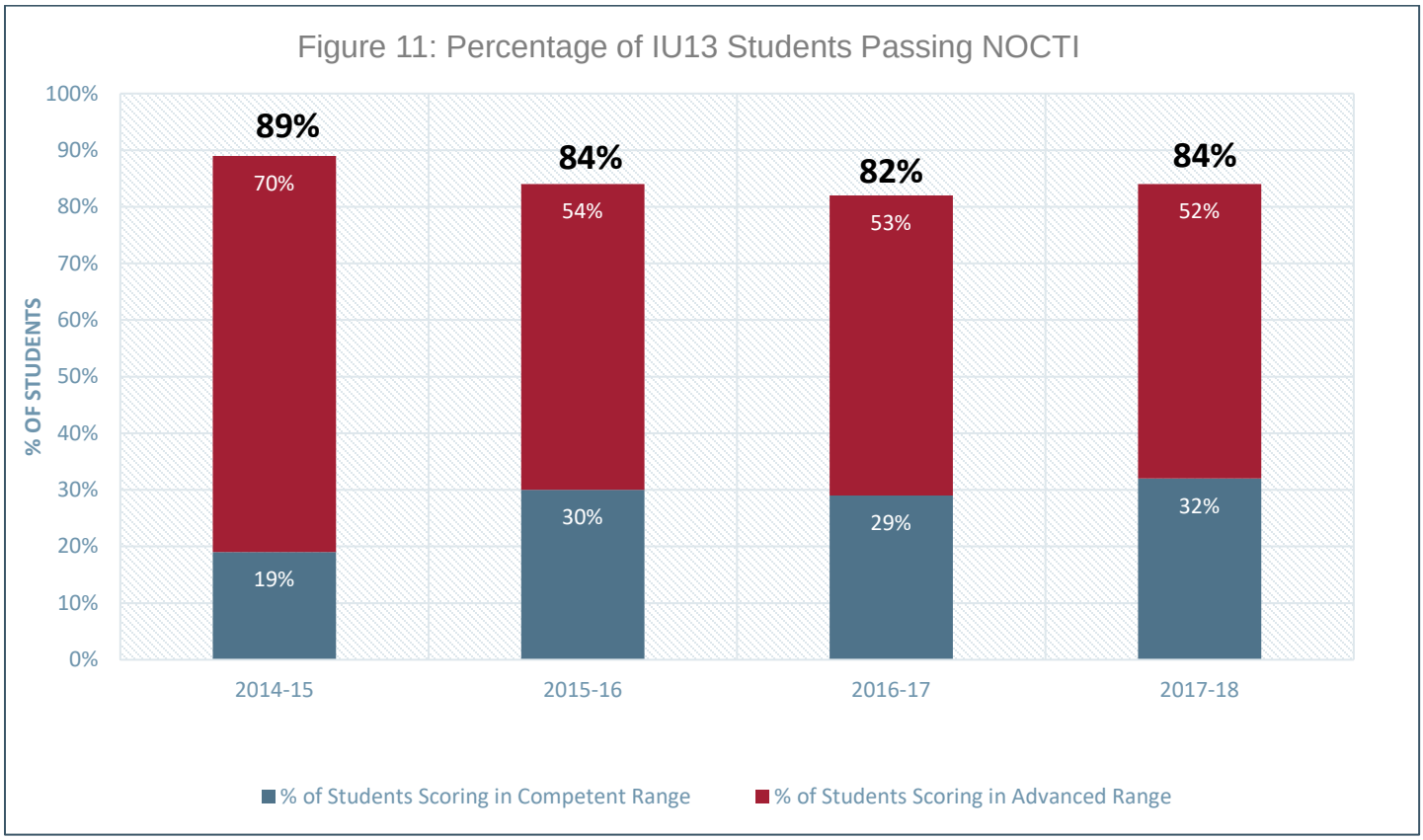


NOCTI Achievement Data:

IU13 provides direct instruction and support to students with IEPs enrolled in the Lancaster County Career and Technology

Center (LCCTC) programs. The service also includes ongoing consultation with the LCCTC educators and administrators. Students participating at the Lancaster County CTC were given the NOCTI at the completion of their program as a measure of their skill accumulation. The NOCTI assessments are designed to assess students' skills in comparison to real-life job-specific skill expectations.

Figure 11 shows the results for the most recent skill ratings of IU13 students in the program:



The percentage of students passing the NOCTI increased slightly in 2017-18, with IU13 students continuing to demonstrate a high success rate on the NOCTI exam. This data suggests that their accumulation of job-specific skills will serve them well in their selected occupation. Breakdown by the CTC sites is shown in **Table 2**:

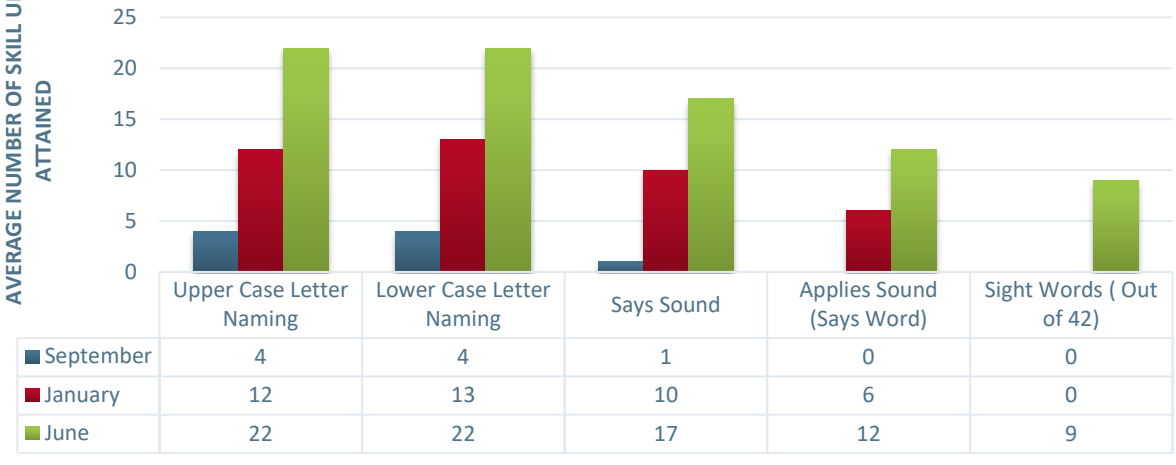
Table 2: NOCTI Scores for IU13 Students at the Lancaster County CTC 2017-18

Lancaster County CTC Campus	Total # Taking NOCTI	# Passing NOCTI	# Scoring in the Competent Range	# Scoring in the Advanced Range
Mount Joy	95	78 (82%)	34 (36%)	44 (46%)
Brownstown	68	65 (96%)	19 (28%)	46 (68%)
Willow Street	90	69 (77%)	24 (32%)	41 (45%)
All Students	**253**	**212 (84%)**	**81 (32%)**	**131 (52%)**

Early Reading and Math Achievement Data

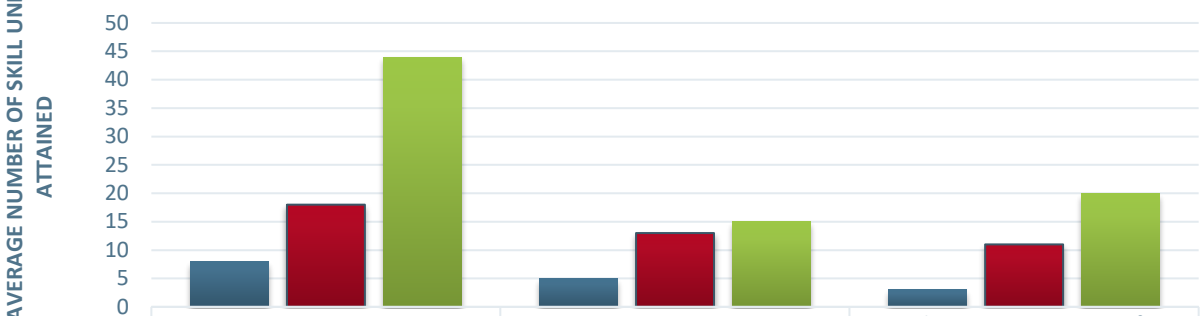
The Diagnostic Kindergarten program helps educators and parents determine the nature of a young child's learning disabilities. This program provides a developmentally appropriate environment that fosters intellectual, social, and emotional growth. The emphasis in the program is on concept formation, language development, and the development of auditory, visual, and motor skills. Students enrolled in the program were assessed in September 2017, January 2018, and May 2018, using criterion-referenced tests of early literacy and math skills developed by the program (**Figures 12 & 13**). These figures show the average number of skill units attained by students as measured by the Early Literacy and Early Math program assessments.

Figure 12:
Early Literacy Skills - Diagnostic Kindergarten (2017-18)



	Upper Case Letter Naming	Lower Case Letter Naming	Says Sound	Applies Sound (Says Word)	Sight Words (Out of 42)
September	4	4	1	0	0
January	12	13	10	6	0
June	22	22	17	12	9

Figure 13:
Early Math Skills - Diagnostic Kindergarten (2017-18)



	Rote Count	Count Sets Up to 18	Number Recognition out of 41
September	8	5	3
January	18	13	11
June	44	15	20

Throughout the course of the school year, the average number of skill units attained increased significantly, reflecting the accumulation of academic skills by students in the program.

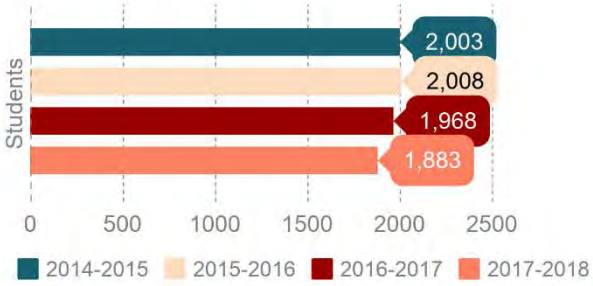
Community Education

IU13 offers High School Equivalency (HSE) and English as a Second Language Services (ESL) to adult learners in Lancaster and Lebanon counties. These classes provide adults with the necessary skills to pass the HSE examination and with the language and employability skills needed to prepare students to succeed in their community and the workplace.

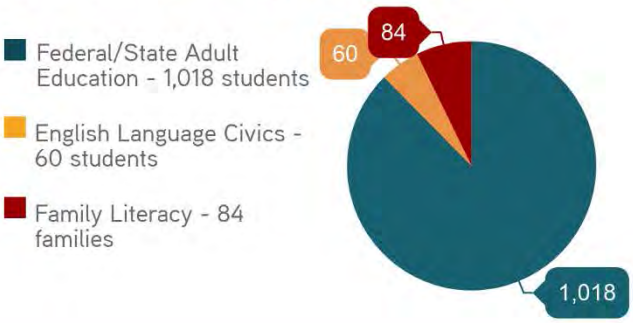
Parents can also participate in family literacy classes which are designed to benefit whole families.

Note: Adult education data is released to IU13 on a one-year delay to ensure data quality. Information included in this report reflects the most recent data available to the program (2016-17) and also represents data from IU13's partnering agency, the Literacy Council of Lancaster-Lebanon.

Adult Education Total Enrollment



Enrollment by Program



89%

"My teacher helps me meet my goals."

Student Satisfaction Survey

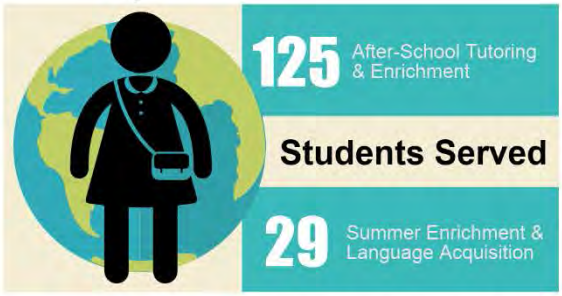
90%

"My teacher encourages me to learn."

Student Satisfaction Survey

Refugee Center & Community School

Opened in 2015 to provide educational, health, social, and emotional support services to families resettling in Lancaster County.



Data is reflective of the 2016-2018 time frame.

Community Education

In addition to services to early learners and K-12 students, IU13 offers High School Equivalency (HSE) and English as a Second Language services (ESL) to adult learners in Lancaster and Lebanon counties. These classes provide adults with the necessary skills to pass the HSE examination and with the language and employability skills needed to prepare students to succeed in their community and the workplace. Parents can also participate in family literacy classes which are designed to benefit whole families. Additionally, Community Education staff serve refugee families through the Refugee Center and Community School in Lancaster City.

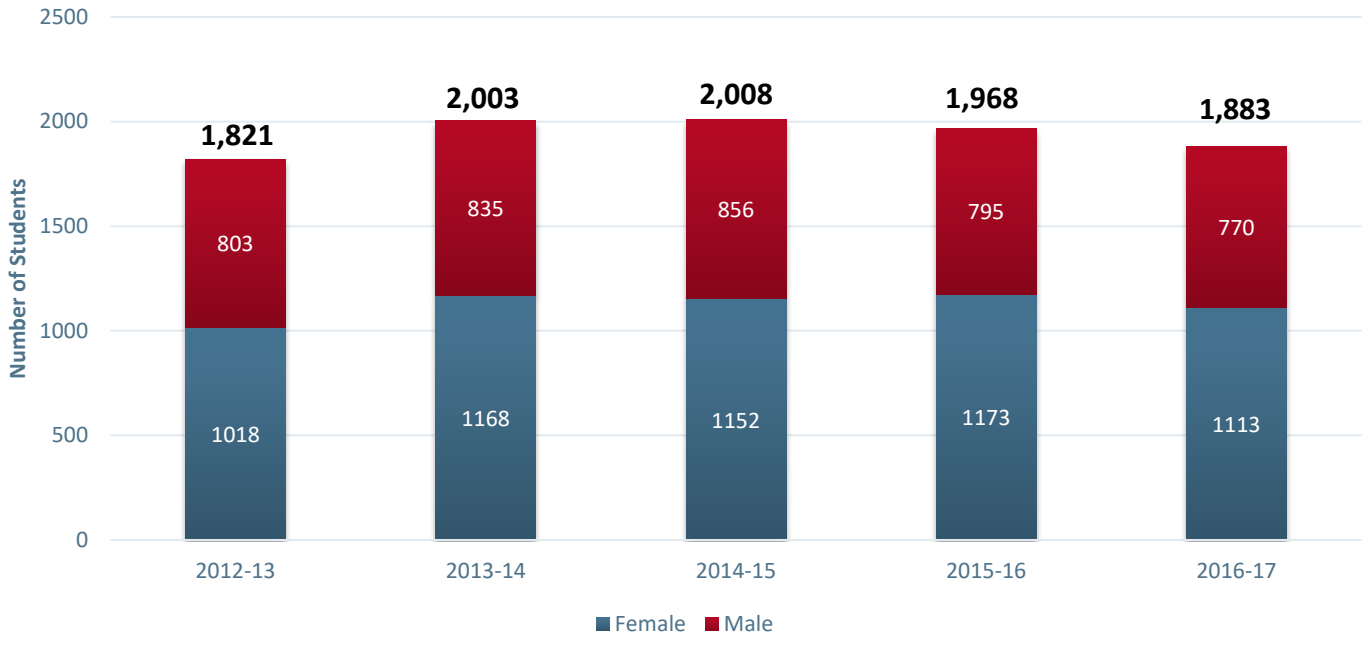
Adult education data is released to IU13 on a one-year delay to ensure data quality. Information included in this report reflects the most recent data available to the program (2016-17) and also represents data from IU13's partnering agency, the Literacy Council of Lancaster-Lebanon.

Demographic Information

Adult Education

IU13's Adult Education program consistently serves a large number of adult learners in Lancaster and Lebanon counties, with enrollment most directly impacted by the number of hours contracted by state and federal funding streams, student availability and costs per student.

Figure 14: Enrollment in Adult Education Programs



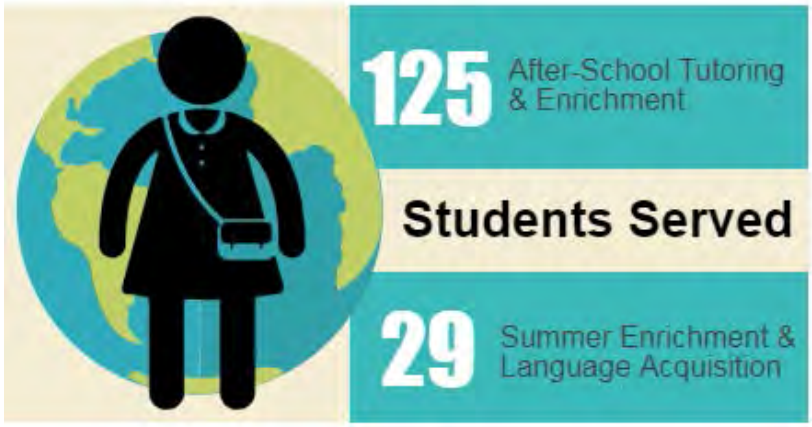
Each year, IU13 is contracted to serve a targeted number of students to meet the requirements of the designated state and federal funding streams. **Table 3** shows the number of students enrolled in each type of contract offered by Adult Education services as well as the percentage of students enrolled compared to contracted numbers. This is important information to track as funding is frequently tied to meeting contracted enrollment numbers.

Table 3: Adult Education Enrollment Data and Completion Rates

Contract Type	2014-15 Contract Goal	2014-15 Actual Enrollment	2014-15 % of Contracted Number	2015-16 Contract Goal	2015-16 Actual Enrollment	2015-16 % of Contracted Number	2016-17 Contract Goal	2016-17 Actual Enrollment	2016-17 % of Contracted Number
Federal/State Adult Education	1,082 Students	1,081 Students	100% of Goal	1,002 Students	1,071 Students	107% of Goal	1,082 Students	1,018 Students	94% Of Goal
English Language Civics	60 Students	40 Students	67% of Goal	47 Students	25 Students	53% of Goal	47 Students	60 Students	128% Of Goal
Family Literacy	87 Families	73 Families	84% of Goal	87 Families	79 Families	91% of Goal	87 Families	84 Families	97% Of Goal

Analysis of the data shows that in 2016-17, while numbers for English Language Civics classes exceeded the contract goal, the Federal/State Adult Education and Family Literacy programs did not serve the contracted number of students; students, however, are frequently shared between programs and since they may only be counted once, the numbers may not include all of the participants in each program. Generally, the state requires enrollment to fall between 95% and 105% of enrollment targets. Adult Education supervisors are continuing to monitor their enrollments to ensure that the programs fall within these guidelines.

Refugee Center & Community School at Reynolds Middle School



The Refugee Center and Community School at Reynolds Middle School (RCCSR) opened its doors at the School District of Lancaster (SDOL) in 2015, to provide educational, health, and social and emotional support services to Lancaster families. IU13 is the lead agency at the Center which represents a broad partnership among community agencies, leveraging resources to provide integrated services for the refugee and immigrant population in Lancaster City. As part of its mission, in addition to services such as meal provision, parent workshops and cultural navigation services, the Refugee Center provides support to students to accelerate their academic growth. In 2017-18, the RCCSR served 125 students with after school tutoring and enrichment activities and 29 students with summer enrichment and language acquisition activities.

Achievement/Student Learning

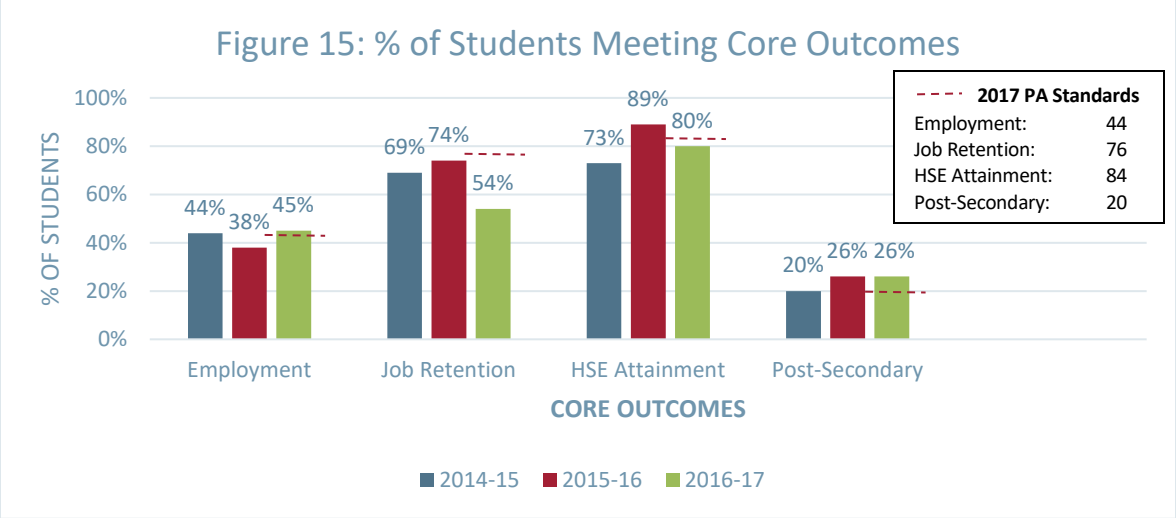
The Pennsylvania Division of Adult Education requires IU13 to track the progress of its students in multiple ways. These indicators include learning gains made by students, as well as employment, HSE attainment, job retention, and transition to post-secondary.

The most current data on IU13 programs is represented in **Table 4**. The educational functional levels (EFL) gains of IU13 students met the targets for learning gains with English Language Civics students, but did not meet the targets for learning gains with students counted in the Federal/State Adult Education and Family Literacy contracts.

Table 4: Adult Education Learning Gains 2016-17

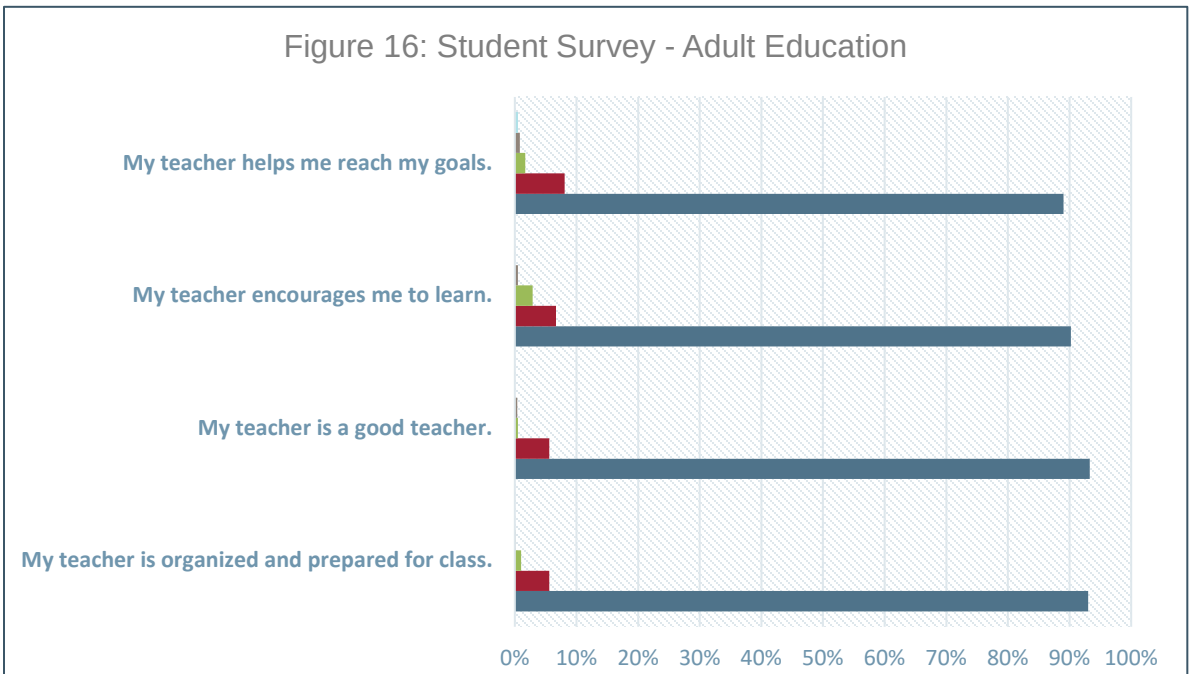
Contract	Learning Gains	Targets	2016-17 Comparison to Other State Agencies
Federal/State Adult Education	53%	44%	10th/53
English Language Civics	42%	47%	9th/16
Family Literacy	48%	56%	10th/20

Figure 15 represents the percentage of students meeting the core outcomes requirements for Pennsylvania Adult Education programs. IU13 exceeded the Pennsylvania (PA) standard for employment and post-secondary outcomes, but did not meet the PA Standards in job retention and HSE attainment.



Perceptual Data

The Community Education program annually asks students to complete surveys regarding their satisfaction with the services they received. Four hundred and fifty responses were analyzed. As shown in **Figure 16**, the students indicated a high level of satisfaction with their teachers.



	My teacher is organized and prepared for class.	My teacher is a good teacher.	My teacher encourages me to learn.	My teacher helps me reach my goals.
Never	0%	0%	0%	0%
Rarely	0%	0%	1%	1%
Sometimes	1%	1%	3%	2%
Usually	6%	6%	7%	8%
Always	93%	93%	90%	89%

*Percentages may not add up to 100% because of rounding.

Discussion

An analysis of this most recent data in Community Education revealed several trends in the indicators that are worth further discussion. Student surveys showed that participating students continue to value their instruction and believe that their teachers care about them. In addition, enrollment numbers remained strong for the various contracts which impacts future funding from the state.

The Community Education Program Improvement Team continues to look for ways to better improve the program's outcomes. Areas of focus include job retention and HSE attainment and learning gains in federal and state funded adult education classes and family literacy. Recommendations to improve practices include more detailed tracking of enrollment and learning gains data to improve accuracy, adjustments to class schedules for improved access, and ongoing alignment of curriculum and instruction with best practices.

Nonpublic School Services

IU13 provides remedial and support services to eligible Lancaster and Lebanon county students who attend nonpublic schools through the use of Act 89 state funds and Title I federal funds.

Title I

Title I services are provided on behalf of local school districts.

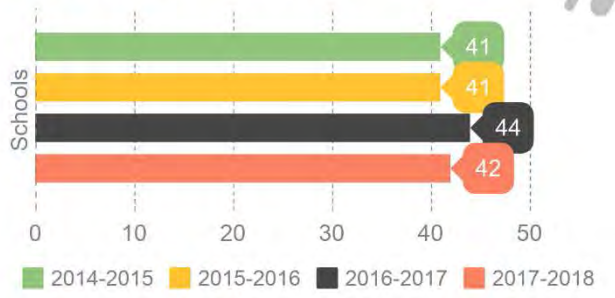
Act 89

Act 89 regulations require that intermediate units provide equitable services to students attending nonpublic schools.

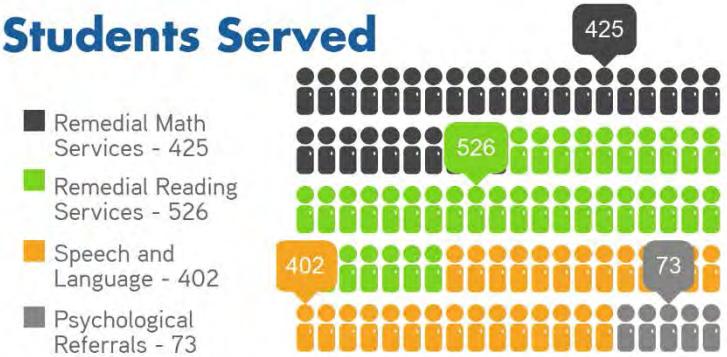
Additional Services

IU13 reading and math specialists, speech and language therapists, school counselors and psychologists work directly with identified students to improve their academic and social/emotional needs.

Act 89 Schools Served



Students Served



Some students receive multiple services.

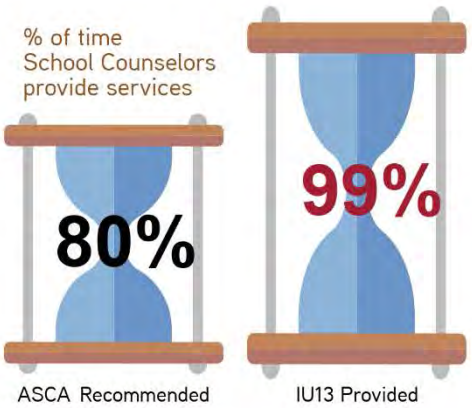
School Counseling Services

25

Number of Nonpublic Schools using IU13 School Counseling Services

5,589

Number of times students received services by the IU13 Nonpublic School Counselors

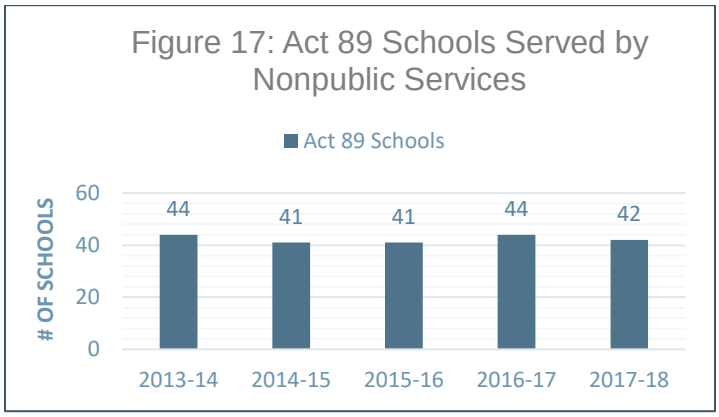


Data is reflective of the 2017-2018 school year.

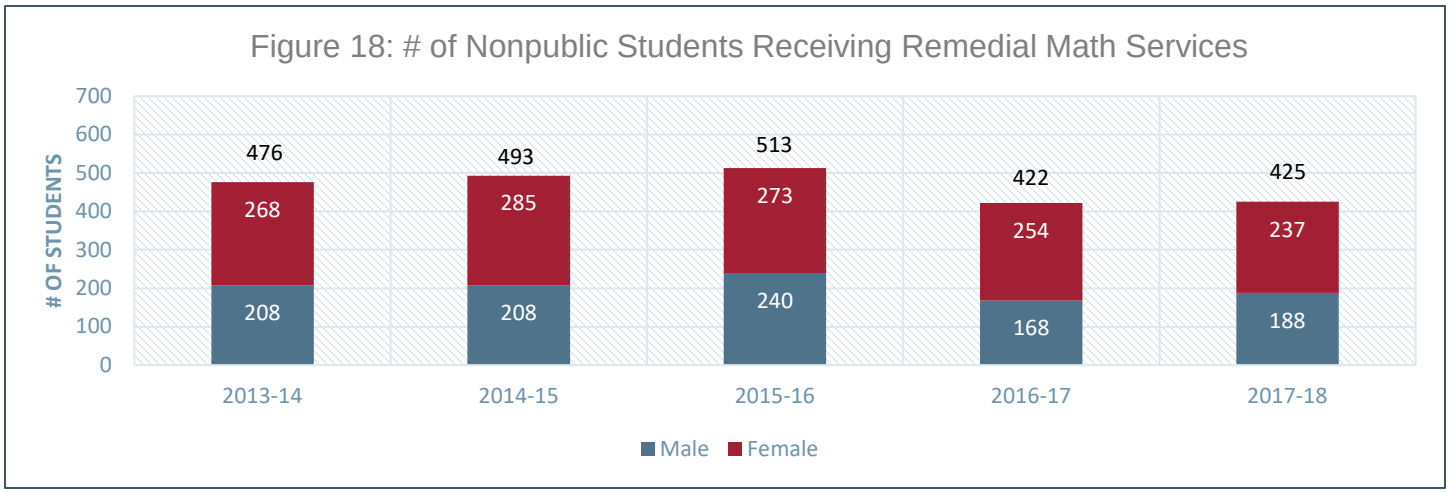
Nonpublic Services

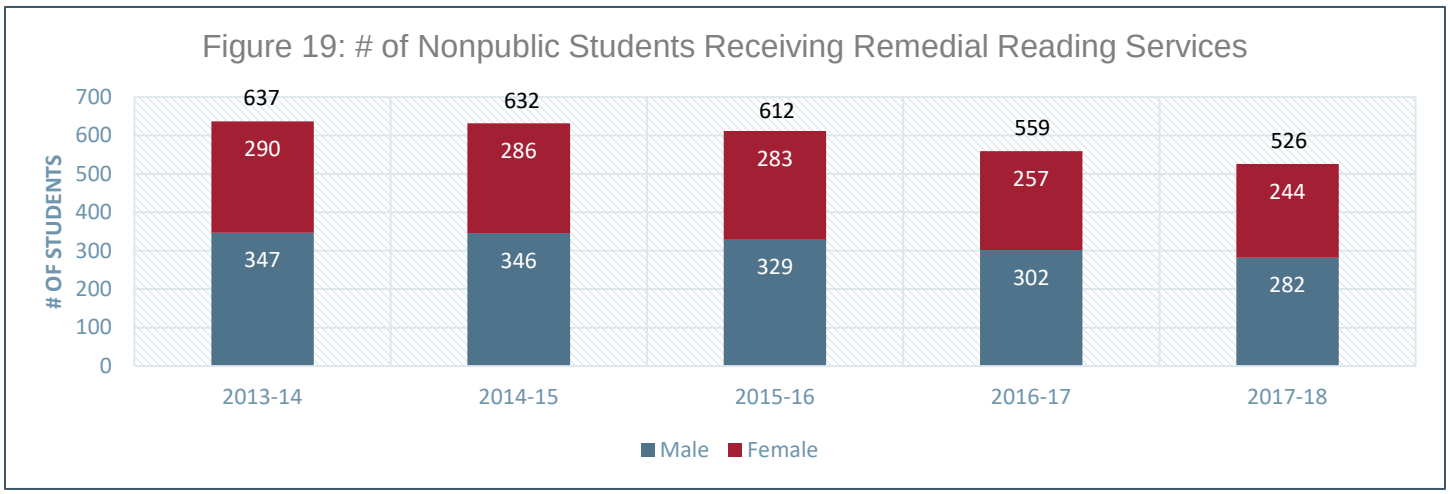
Demographic Information

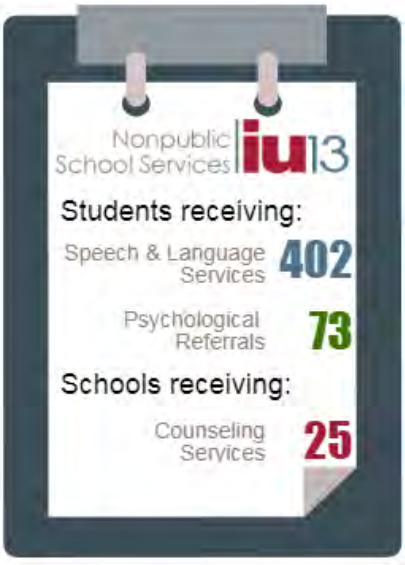
IU13 has consistently provided services to students in more than 40 nonpublic schools. **Figure 17** shows the trend in the number of schools served over the past five years.



A breakdown of the number of students receiving reading and math remedial services is detailed below in **Figure 18** (remedial math services) and **Figure 19** (remedial reading services):

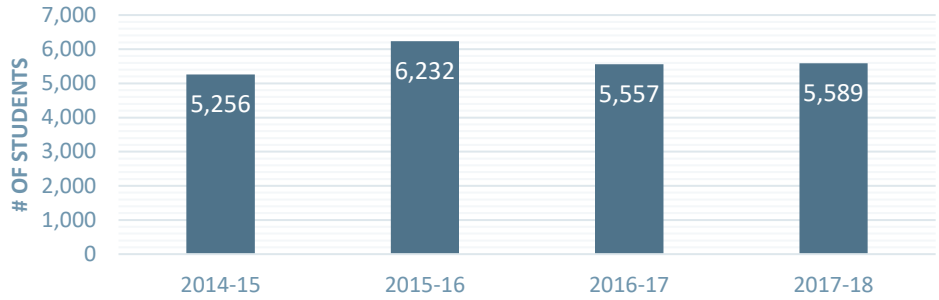






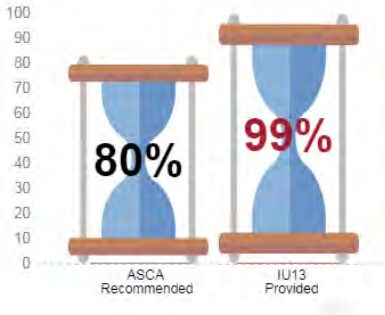
In addition, 402 students received speech and language services and 73 psychological referrals were conducted. IU13 also provides counseling services to students in 25 nonpublic schools in Lancaster and Lebanon counties. **Figure 20** shows the number of students served by IU13 counselors over the past four years:

Figure 20: # of Students Served by Nonpublic Counselors



The American School Counselor Association recommends that school counselors spend at least 80% of their time providing direct and indirect services to students. The nonpublic school counselors consistently exceeded these recommendations, with 99% of their time spent providing direct and indirect services to students in 2017-18. This number represents the strong commitment IU13 has made to maximize the availability of services to schools and students.

% of Time Counselors Provide Direct & Indirect Services



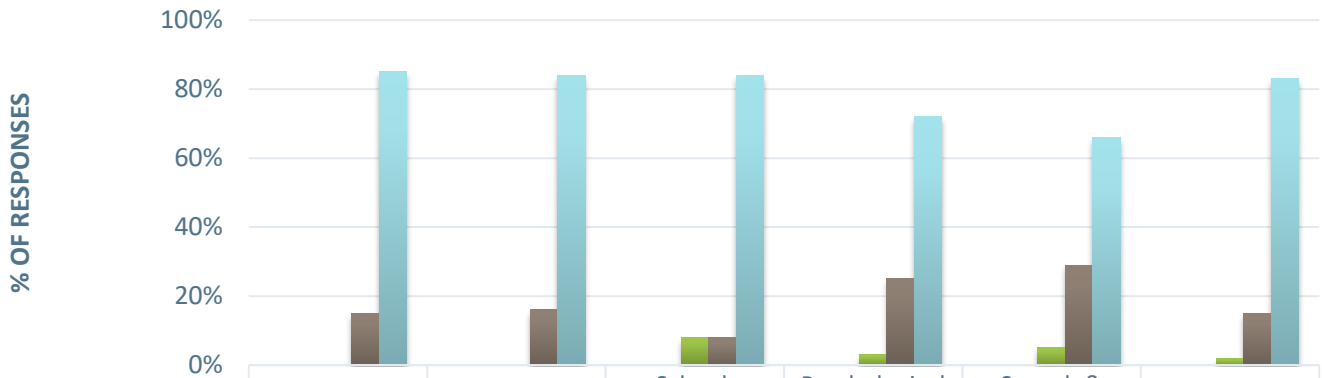
Achievement/Student Learning

Nonpublic reading and math specialists work directly with students who are identified as having below grade-level skills in reading and math. The services consist of pullout small group sessions designed to remediate key skills in these areas. As a result of these interventions, 35% of the identified students participating in the services were able to reach performance levels which placed them in the instructional range of their grade-level classroom, and therefore were exited from the IU's remedial services.

Perceptual Data

Nonpublic administrators were surveyed regarding their satisfaction with Nonpublic Act 89 and related services. The results of the survey are indicated below in **Figure 21**:

Figure 21: Satisfaction Ratings - Nonpublic Services



	Reading	Math	School Counseling	Psychological Services	Speech & Language	Office Staff
1 - Poor	0%	0%	0%	0%	0%	0%
2 - Below Average	0%	0%	0%	0%	0%	0%
3 - Average	0%	0%	8%	3%	5%	2%
4 - Above Average	15%	16%	8%	25%	29%	15%
5 - Excellent	85%	84%	84%	72%	66%	83%

*Percentages may not add up to 100% because of rounding.

Overall, results of the surveys completed by the nonpublic administrators indicate a consistent rating of satisfaction with services, suggesting that the staff is meeting the designated needs of the schools and their students. Any rating of a "3" or lower is followed up with a personal phone call to the nonpublic administrators to discuss ways to improve services.

Curriculum & Instruction Services

IU13 Curriculum & Instruction (C&I) services are designed primarily to improve the skills of district and IU13 teachers and administrators as they interact and instruct their students.

Content Areas:

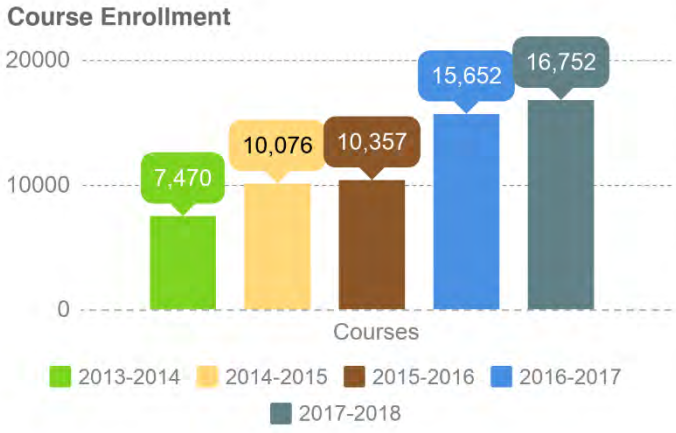
Literacy
STEM
Instructional Technology
Gifted Services

Services:

Workshops
Instructional coaching
Technical assistance
Curriculum, Instructional, and Assessment audits

Lancaster-Lebanon Virtual Solutions (LLVS)

LLVS provides districts and students with a high-quality, cost-effective online learning solution. LLVS currently serves students from 16 public and nonpublic school districts.



93% Completion

93% of students complete at least 90% of courses

Partnerships to Understand and Lead STEM Education (PULSE) 2.0

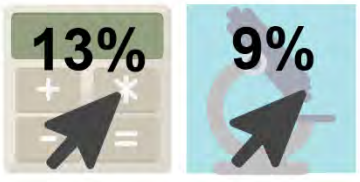
PULSE 2.0 is the second iteration of the IU13 Math Science Partnership grant. The program was an action-research study designed to measure the impact of targeted professional development for educators as it relates to student achievement in math and science.

In the first year

16 Schools
47 Teachers
1,400+ Students

Teacher Outcomes

Teacher Content Knowledge (TCK) increased an average of 13% in math and 9% in science



Data is reflective of the 2017-2018 school year.

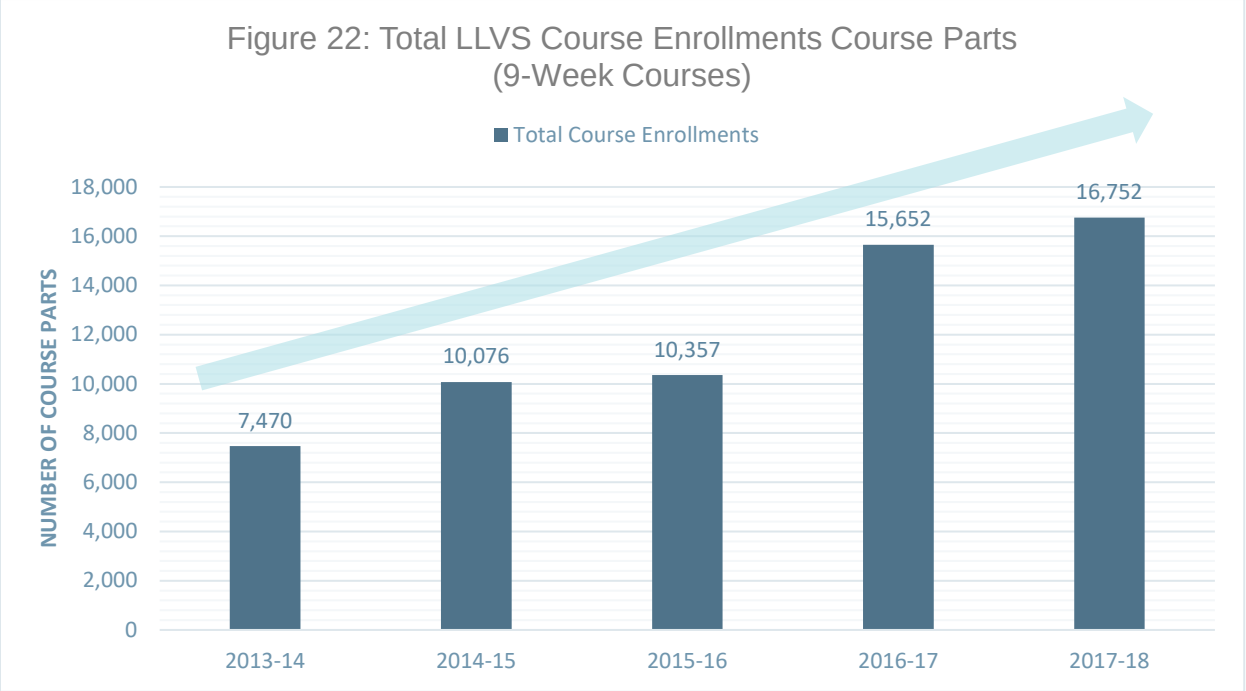
Curriculum and Instruction

Demographics

Over the past several years, the Curriculum and Instruction (C&I) staff has offered numerous marketplace services to IU13 districts. These services are available to schools on a fee-for-service basis; thus allowing educators to choose those offerings which best meet their particular needs. All 22 districts purchased services from the C&I program during the 2017-18 school year. School District of Lancaster was the largest purchaser of C&I services, with Manheim Central, Lampeter-Strasburg, Elizabethtown Area, and Solanco rounding out the list of top five purchasers.

The Curriculum and Instruction program also includes the cyber program, Lancaster-Lebanon Virtual Solutions (LLVS), which provides districts with access to an extensive portfolio of online courses, along with technical assistance and computer support. LLVS has maintained a consistent number of districts participating in the program over its seven-year history, with 16 public and nonpublic school districts participating during 2017-18. The number of actual course enrollments has steadily increased, showing the increasing popularity of online learning, as shown in **Figure 22**:

Figure 22: Total LLVS Course Enrollments Course Parts (9-Week Courses)

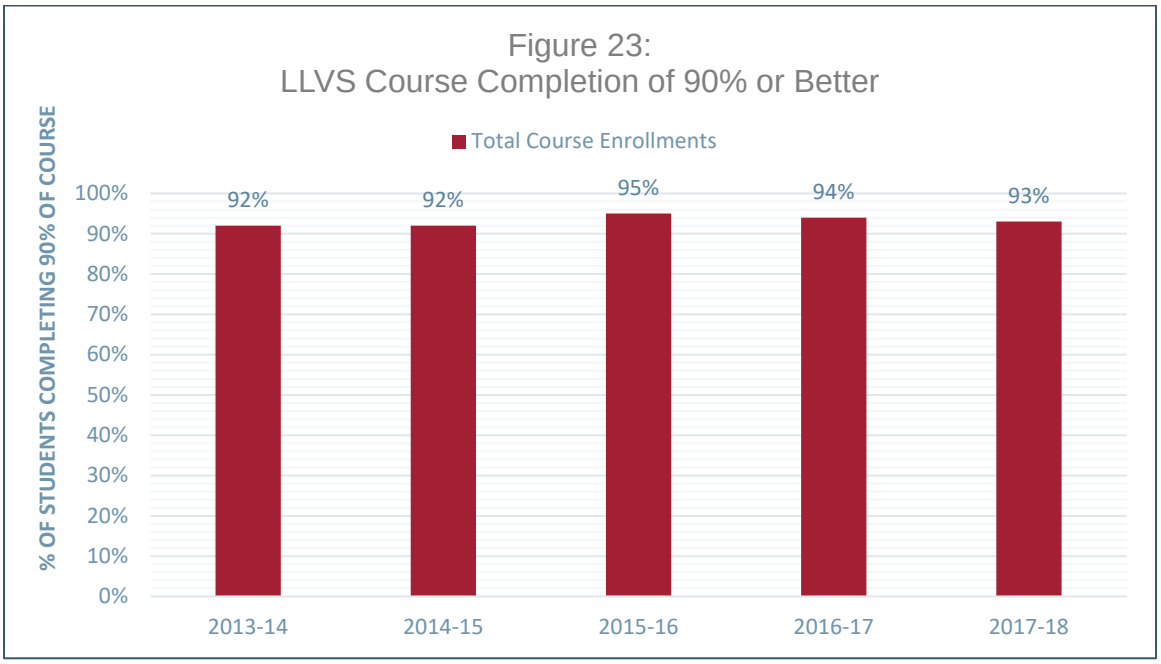


Achievement/Student Learning

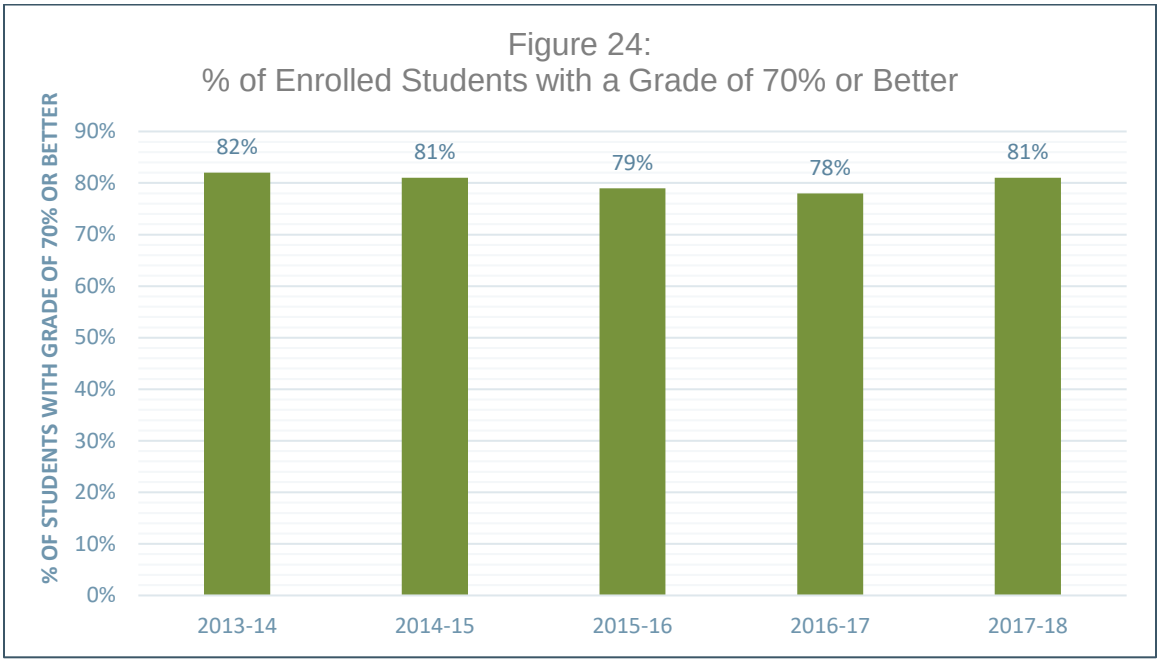
Lancaster-Lebanon Virtual Solutions (LLVS)

Students who participate in LLVS courses are provided instruction by teachers employed by the online content provider or the school district. LLVS, therefore, is not directly responsible for the learning gains of its enrolled students. Instead, LLVS provides districts and students with services that are designed to maximize learning opportunities. These services include, but are not limited to, support to district mentors who interact with students to make sure they are being successful in an online environment, help desk assistance to students should they encounter any technical difficulties, and a job-alike group designed to provide a forum for networking and professional development. It is believed that all of these services will result in better outcomes for students, both in the course completion rate and passing grades.

Data from LLVS supports this belief. Course completion is an important component of online learning. Without proper support, students can easily become frustrated with this more independent method of learning. LLVS students have maintained a high level of course completion over the years as shown in **Figure 23**:



Eighty-one percent (81%) of the students enrolled in LLVS classes received a 70% or better for their final grade, as shown in **Figure 24**:



Students utilizing LLVS consistently show high rates of course completion and achievement, both measures of the quality of the services provided via the program.

Professional Development and Consultation Services

IU13 consultants rarely provide direct instruction to students. Their task instead is to influence student achievement by training educators on best practices and assisting them in the implementation of these practices at the classroom, building,

and district level. As a result, the selection and analysis of the designated data have been designed to answer the second analysis question:

Is the professional development and training offered by IU13 of high quality and effectiveness, resulting in more highly trained educators who will in turn, impact student achievement?

The C&I team strives to provide expert services to increase their impact on IU13 teachers and students. One measure of this quality is demonstrated by the results of their Math Science Partnership (MSP) grant, the **Partnership to Understand and Lead STEM Education (PULSE) 2.0.** The IU13 MSP grant program is the second iteration of an action-research study designed to measure the impact of targeted professional development for educators on student achievement in math and science. By increasing the content knowledge and pedagogical skills of participating teachers, it is hypothesized that student achievement in the targeted concepts and standards should increase. Developed in partnership with local colleges, school districts, and community agencies, each MSP program is a two-year project, funded by the U.S. Department of Education and administered by the PA Department of Education. Elementary (grades 3-6) and middle school (grades 6-8) math, science and technology-education teachers participate in a summer 64-hour STEM Institute designed to deepen content knowledge and pedagogy and STEMathon, a STEM focused statewide conference (16 hours) held at IU13. During the subsequent school year, participating teachers work as building-based professional learning communities, receive instructional coaching from one of the IU13 STEM consultants, and participate in three days of professional development. Information shared in this data report is drawn from the data analysis done of years 1 through 2 of the grant, i.e. 2016-18.

Assessments used as part of the research design for the MSP grant include:

- **Reformed Teaching Observation Protocol (RTOP);**
- **Pennsylvania System of School Assessments (PSSAs);**
- **Pennsylvania Value-Added Assessment System (PVAAS)**;
- **Teacher Efficacy and Attitudes toward STEM (T-STEM) Survey;**
- **Teacher Content Knowledge (TCK) – Math and Science – Pretest and Posttest;** and the
- **Pedagogical Content Knowledge (PCK) – Math and Science – Pretest and Posttest.**

For a description of each assessment, see *Appendix A*.

Participants:

Forty-seven teachers from 16 public and nonpublic middle and high schools completed year 1 of the PULSE 2.0 grant. The primary audience of this initial year was elementary teachers, Grades 3-8 teachers, and middle school math, science and technology/engineering teachers (Grades 6-8). Collectively, the PULSE 2.0 participants taught over 1,400 students.

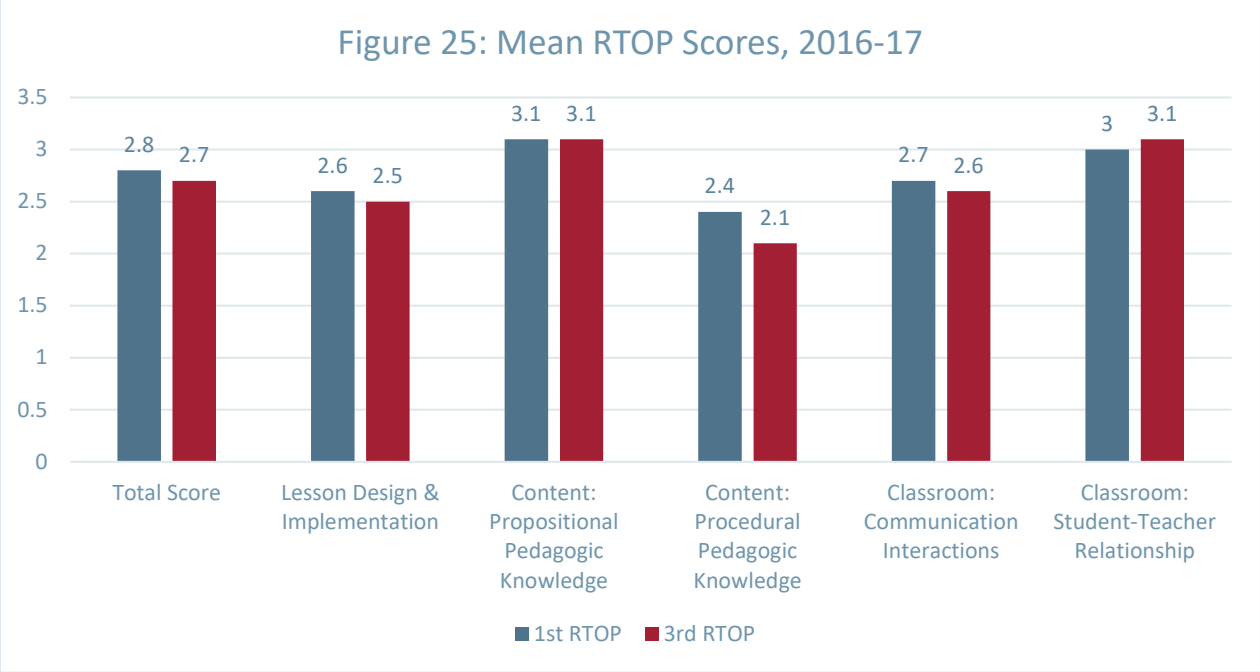
Teacher Outcomes:

As part of the PULSE Summer STEM Institute, all teachers took a pretest and posttest on either math or science topics, designed to measure gains in teacher content knowledge (TCK) resulting from their Institute participation. TCK was one of three grant-required measurements. Teachers also took a test designed to measure gains in their "STEM pedagogical content knowledge" (STEM PCK) – that is, their ability to apply STEM teaching techniques to encourage student innovation, systems thinking, and iterative design processes. The participants showed statistically significant gains in the Math and Science TCKs between the start and end of the Institute, with an average gain of 13 percentage points in math and 9 points in science. In addition, the participants showed an average gain of 6 percentage points on the STEM PCK.

Another group of teachers, the "control group," also took the TCK tests each year, although they did not participate in the summer STEM Institutes. The purpose of the control group (CG) was to help the PULSE 2.0 staff, faculty, and evaluators know that any TCK gains shown by the PULSE participants could be attributed to their attendance at the summer STEM institute, and not random chance. The control group's pretest scores were statistically equivalent to those of the teachers who attended the Institute and their Math TCK and STEM PCK scores actually decreased between pretest and posttest. This suggest that attending the Summer Institute and STEMathon had a measureable, positive impact on teachers' math knowledge and STEM pedagogy. However, the control group's Science TCK scores increased in a statistically similar amount to those of the teachers who participated in PULSE 2.0, suggesting that gains in science shown by the Institute attendees may have been due to "luck," guessing or other factors. Steps were taken therefore to better align the Science TCK test with the Institute held in 2017.

At the conclusion of the STEMathon conference, participating teachers took the Teacher Efficacy and Attitudes toward STEM (T-STEM) survey, in which they rated themselves on how well they believe they effectively teach science, math and STEM, have 21st Century learning and teacher leadership attitudes and are aware of STEM resources. Teachers ranked their responses to questions from 1 to 5, with 5 indicating greater agreement with each statement. Responses showed that participating teachers showed high agreement with the 21st century learning and teacher leadership attitudes and showed strong confidence in their teaching skills related to math (mean=4.1) and their awareness of STEM career resources (mean= 4.0). Teachers seemed to show slightly less confidence in their science teaching skills (mean=3.8). Teachers' beliefs that students' math and science learning are affected by effective teaching was rated somewhat lower (means of 3.6 and 3.4 respectively). Teachers also indicated that they used STEM instruction practices about half of the time (mean=3.2).

After the Summer Institute, teachers participated in three days of professional development, coaching and professional learning communities. Changes in instructional practices were then measured through classroom observations (three times during the school year) using the RTOP. Teachers also submitted a video recording of a lesson that was scored by an RTOP-trained observer. Results of the RTOP scoring are shown in **Figure 25:**



During 2016-17, teachers did not show significant gains across observations; however, technical difficulties with the submission of videos and inconsistencies in the type of lesson and subject matter submitted may have impacted the ability to accurately measure gains. As a result, in 2017-18, participating teachers were given additional instruction in how to select classes for recording and proper recording procedures.

Student data was not yet available for this report and will be analyzed in Year 2 of the grant. A more detailed analysis of all the results can be found in Appendix B which contains the comprehensive **Community Report for PULSE 2.0 Year 1**.

Perceptual Data

Feedback from PULSE 2.0 participants showed overall positive associations with the project. Specific teacher comments included:

- *"I learned that true STEM integration…is not meant to replace what we already do and teach something completely different – but rather it is a way to actively engage our students in material we are already covering." – 3rd grade teacher*
- *"With becoming a new STEM teacher, this course was a big eye opener and helpful to get me started about how to plan to engage students." – STEM & Technology teacher*
- *"It was very valuable to see how concepts taught in the different subjects can and need to be real world applicable." – 6th grade teacher*
- *"The process of having students as problem-solvers and teaching problem-solving will be a great thrust in my teaching this year." – 5th grade teacher*

Teacher feedback suggests that local educators see the value in the skills they gathered through their PULSE 2.0 training and are taking these skills back to their classroom.

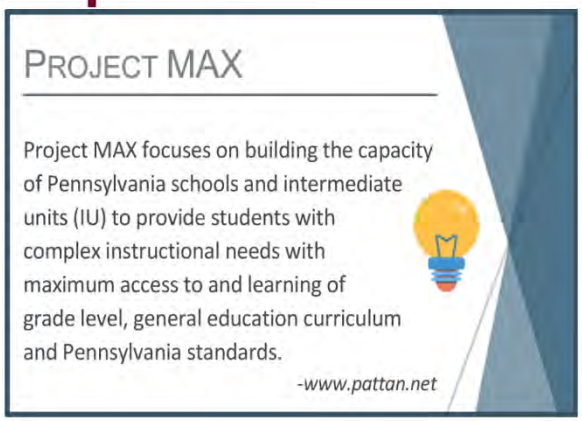
Promising Practices

IU13 is committed to delivering exemplary service to its community. As part of this commitment, IU13 staff are constantly seeking ways to build "promising practices" to increase student outcomes.

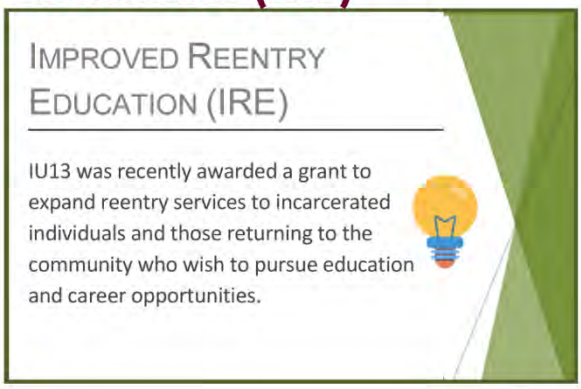
Promising Practices Exemplars:

- Project MAX (Maximizing Access and Learning)
- Improved Reentry Education (IRE)

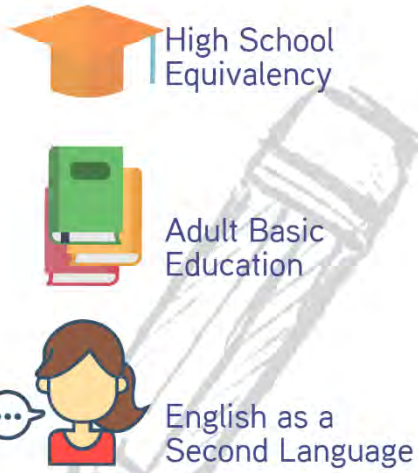
Project MAX



Improved Reentry Education (IRE)



170 Participants



Promising Practices

IU13 prides itself on its commitment to its students and delivering exemplary services to its community. As part of this commitment, IU13 staff is constantly seeking ways to build on emerging best practices to increase student outcomes. This is achieved through piloting new instructional practices or working with state, community and business partners. For the purposes of this report, the results of these initiatives will be examined in light of the following analysis question:

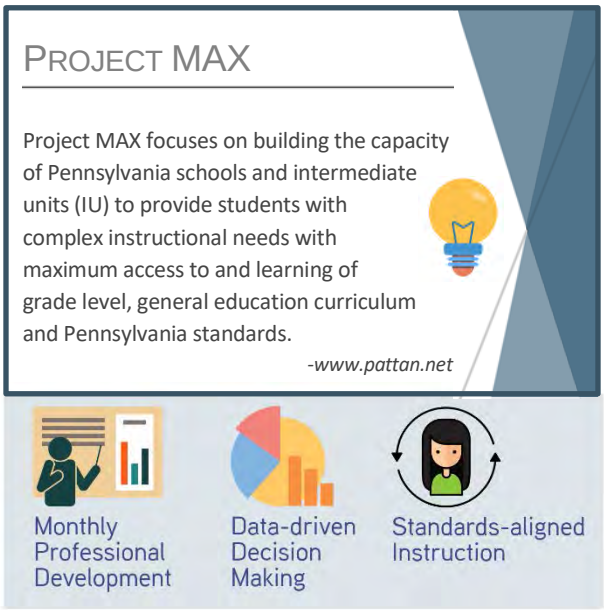
Has the implementation of IU13's promising practices resulted in improved student outcomes?

Two initiatives will be reviewed. They include:

- **Project MAX** (Maximizing Access and Learning)
- **Improved Reentry Education (IRE)**

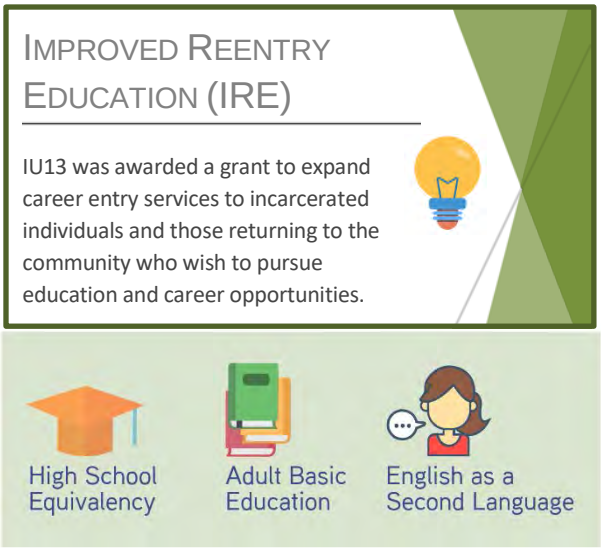
Project MAX

Project MAX focuses on building the capacity of Pennsylvania schools and intermediate units to provide students with instruction based on the Pennsylvania Standards. IU13 staff involved in Project MAX participated in formalized teaming processes designed to support systems change, including monthly professional development; coaching; data-driven decision making; and standards-aligned instruction. In 2017-18, based on a component of the Project MAX initiative trainings, classroom staff and speech therapists in Multiple Disabilities (MDS) classrooms focused on instructing students with significant communication disorders to increase their core vocabulary skills. Adults modeled the use of 36 identified vocabulary words, and students had access to core vocabulary boards throughout the school day. Students were evaluated three times during the school year on their mastery of the identified words. These evaluations consisted of direct observation of the number of utterances of students. The students averaged an increase of 4.83 words from baseline to the end of the school year.

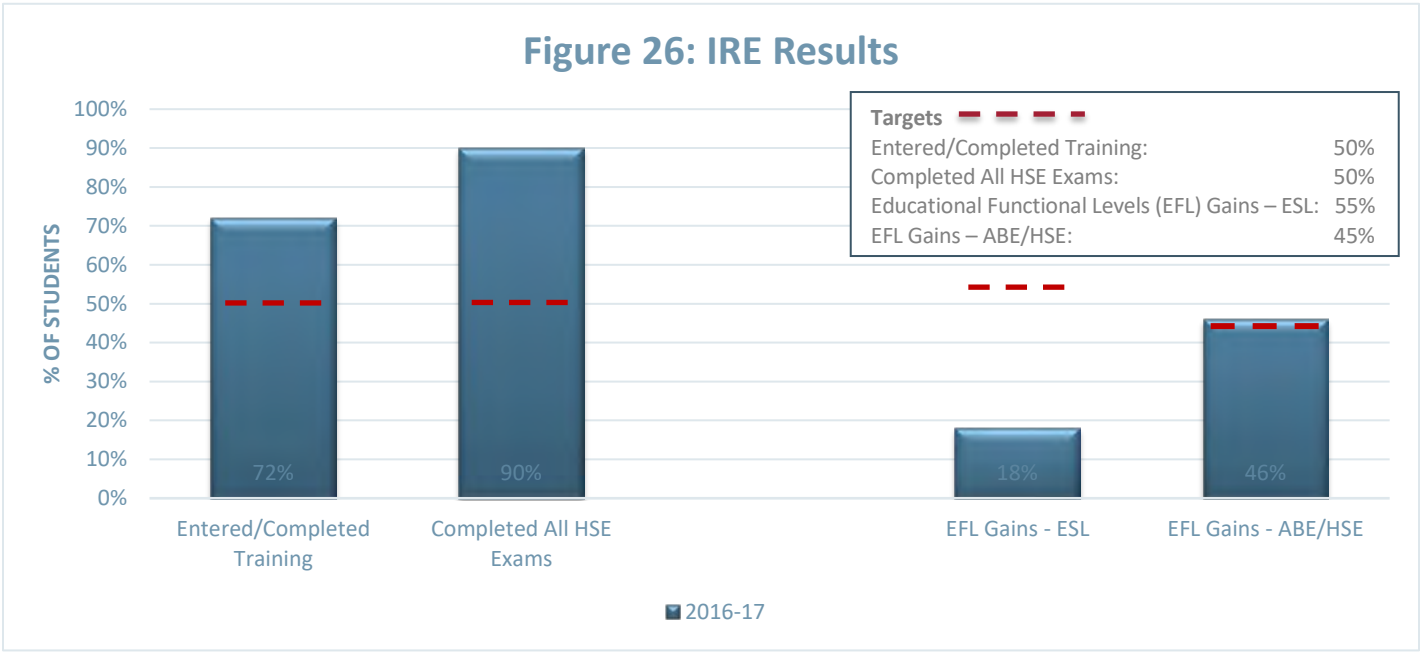


Improved Reentry Education (IRE)

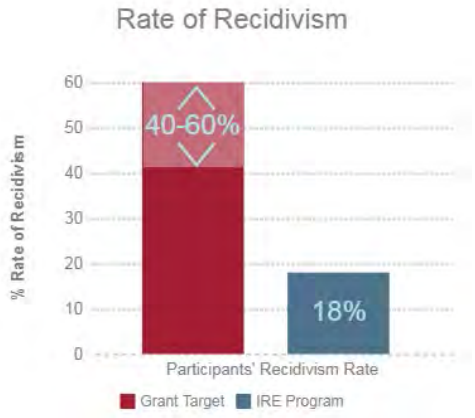
IU13 was recently awarded a grant to expand reentry services to incarcerated individuals and those returning to the community who wish to pursue education and career opportunities. Along with its partner agencies, IU13 provided academic assessment, career planning, Adult Basic Education (ABE) and high school equivalency preparation (HSE) classes, English as a Second Language (ESL) classes, job search and job skills training, post-secondary exploration, tutoring and other support services. The program exceeded the target enrollment (120 participants) by serving 170 participants in Lancaster and Lebanon prisons and the community.



The program's additional targets and outcomes are shown in **Figure 26:**



Additionally, the rate of recidivism for individuals in the program was only 18%, significantly below the 40-60% target of the grant. Given the positive outcomes of the program, it is strongly suggested that this initiative is having a positive impact on the participants and it should continue to be considered a promising practice.



SUMMARY AND CONCLUSIONS

The results gathered in this data report suggest that Lancaster-Lebanon IU13 services and supports have had a significant impact on the lives of learners in Lancaster and Lebanon counties. The evidence reported here demonstrates the numerous ways that IU13 has produced successful outcomes for students served directly by IU13 programs. In addition, data was shared that suggests that the professional development trainings offered to local teachers and administrators have resulted in more highly skilled educators who use their training to impact student achievement in their classrooms. Finally, IU13 continues to develop innovative programs that are having a positive impact on their participants.

IU13 will continue to implement its data collection system to gather and reflect upon the quality of services it offers. Through this ongoing analysis of critical indicators of program quality, IU13 believes it can more thoroughly fulfill its strategic priority to improve student achievement.

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APPENDIX A

Assessments

Reading, English Language Arts and Mathematics

Diagnostic Kindergarten Early Reading and Math Criterion Referenced Assessments – The Diagnostic Kindergarten program has developed a series of criterion referenced assessments to use with students in the program. These assessments are designed to measure the accumulation of key kindergarten skills in math and reading, and are used to monitor student progress in conjunction with other classroom assessments.

Pennsylvania Alternate System of Assessment (PASA) – The PASA is a statewide alternate assessment designed for students with the most significant cognitive disabilities. Specifically, it is intended for those who are unable to participate meaningfully in the Pennsylvania System of School Assessments (PSSA) even with accommodations. The PASA is an individually administered test given each spring to students by their teacher or another certified Test Administrator who knows the student well. Skills are measured in reading, mathematics, and science. More information on the PASA can be found at http://www.education.pa.gov/K-12/Assessment%20and%20Accountability/Pages/PASA.aspx#tab-1.

Pennsylvania System of School Assessments (PSSAs) – The Pennsylvania state assessments assess student proficiency levels in reading and math in Grades 3-8 and in science Grades 4 and 8. More information on the PSSA exams can be found at the PDE SAS portal at http://pdesas.org/.

Pennsylvania Value-Added Assessment System (PVAAS) – This analysis of achievement data measures student growth, in certain tested areas. More information on PVAAS can be found at https://pvaas.sas.com.

Student Outcomes

NOCTI – The NOCTI assessments are designed to measure technical skills at the occupation level (i.e., Accounting, Carpentry, and Pre-Engineering). The assessments measure aspects of occupational competence such as factual and theoretical knowledge and target students who have completed secondary and post-secondary programs. These assessments were used with students attending the Lancaster County Career and Technology Centers (CTCs).

Teaching Strategies GOLD – Teaching Strategies GOLD is an authentic assessment based on anecdotal notes, and student performance and evidence. This is a required assessment for the PA Pre-K Counts Grant managed by IU13. The assessment is based on 38 research-based objectives that include predictors of school success and are aligned with the Common Core State Standards, state early learning guidelines, and the Early Childhood Child Development and Early Learning Framework. The objectives are organized into 10 areas of development and learning including broad developmental areas, content areas, and English language acquisition. These assessment areas are Social-Emotional, Physical, Language, Cognitive, Literacy, Mathematics, Social Studies, Science and Technology, and the Arts.

The Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) – Based on B.F. Skinner's analysis of verbal behavior, established developmental milestones and research from the field of behavior analysis, the VB-MAPP assessment contains 170 measurable learning and language milestones that are sequenced and balanced across three developmental levels. The skills assessed include mand, tact, echoic, intradermal, listener, motor imitation, and independent play, social and social play, visual perceptual and matching-to-sample, linguistic structure, group and classroom skills, and early academics (Sundburg, 2008). This assessment was used in the Autistic Support program and is aligned to the desired outcomes of the program.

Instructional Practices

Pedagogical Content Knowledge (PCK) – The PCK is a locally developed assessment of a teacher's ability to apply STEM teacher techniques.

Reformed Teaching Observation Protocol (RTOP) – RTOP is an observation tool designed to measure changes in classroom instruction in math or science.

Teacher Content Knowledge (TCK) – The TCK is a locally developed curriculum-based assessment of a teacher's knowledge of math and science content, and technological design, presented as part of the PULSE 2.0 Summer Institute.

Teachers' Perceptions

Teacher Efficacy and Attitudes Toward STEM (T-STEM) – The T-STEM is a survey that allows teachers to rate themselves on how well they believe they effectively teach science, math and STEM, have 21st Century learning and teacher leadership attitudes and are aware of STEM resources.

APPENDIX B

PULSE 2.0

Partnership to Understand and Lead STEM Education

COMMUNITY REPORT

Year 1: 2016-17

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PULSE 2.0 is funded by a federal / U.S. Department of Education Math-Science Partnership grant. PULSE 2.0 provides high-quality professional development to elementary and middle-school science, math, and technology education teachers to deepen teachers' knowledge of STEM content and pedagogy in order to increase teacher effectiveness, which will ultimately increase student achievement in math and science.

WHAT IS PULSE 2.0?

The second iteration of the Partnership to Understand and Lead STEM Education (PULSE 2.0) brings together local elementary and middle schools in partnership with other agencies (*see page 2*). The collaborative work engages IU staff, university faculty, and agency and industry professionals in all aspects of the project. The project is governed by an advisory board comprised of representatives from all partners, which meets regularly throughout each year to plan, monitor, and refine the program. Collaboration among grant partners has enabled the development of professional learning experiences aimed at deepening content and pedagogical knowledge in alignment with the National Board for Professional Teaching Standards, Standards for Professional Learning developed by Learning Forward, the PA Core Standards for Math, the PA Standards for Science, Technology, and Engineering, and the College and Career Readiness Standards.

Prior to the start of PULSE 2.0, eligible schools were invited to participate in the project. If feasible, schools were encouraged to participate in both years (2016-17 and 2017-18), with a total of at least 50% of their eligible teachers in the building participating in Year 1 or 2. *(Each teacher participates for one year.)* Eligible teachers include elementary teachers of grades 3-6 and middle school math, science, and technology/engineering education teachers in grades 6-8 from public and nonpublic schools identified as eligible through a needs assessment. Demographically, participating schools range from the most economically disadvantaged to the wealthiest, from urban to rural, and include schools of cultural, ethnic, and linguistic diversity, all collaborating to improve science and math teaching, learning, and achievement.

The project design is based upon a comprehensive needs assessment, conducted between November 2015 and February 2016, which included data from PSSA, School Improvement, Title I, PVAAS, and a Professional Development Needs Assessment. Participating schools have a clear need to improve student achievement in math and science, with rates of proficiency below 75% and as low as 47%. The needs assessment indicates many teachers lack significant depth of understanding of math and science content that is integral to PA standards and assessments. Additionally, teachers lack adequate professional development in math, science, and STEM pedagogy that research indicates has a positive effect on student achievement. As a result, teachers lack the content knowledge (TCK) and pedagogical knowledge (PCK) to deeply engage students in complex math and science learning. Based on research and the needs of participants, several goals and objectives have been identified. *(These are listed on page 8.)*

Each year, the professional development program begins with a 64-hour summer institute held at IU13, and the STEMathon conference. During the school year, grant partners continue to support the learning of participating teachers through three days of professional development (PD), as well as coaching and school-based professional learning communities (PLCs). In a report prepared for the U.S. Department of Education on Math Science Partnerships, Abt Associates (2012) indicates four key features of effective PD including "substantial number of hours (~50), intensive follow-up experiences, facilitative of professional collaboration, and science or mathematics content focused with active learning opportunities to transfer into teaching practices and curriculum." PULSE is designed to incorporate these features.

The intended results of PULSE 2.0 are based upon the Theory of Action that PD increases teacher content knowledge (TCK) and pedagogical content knowledge (PCK), which increases teacher effectiveness through increased opportunities for student learning, ultimately increasing student achievement.

PULSE 2.0 YEAR 1 GRANT AWARD: $1,131,998 (Federal Fiscal Year 2015-16)

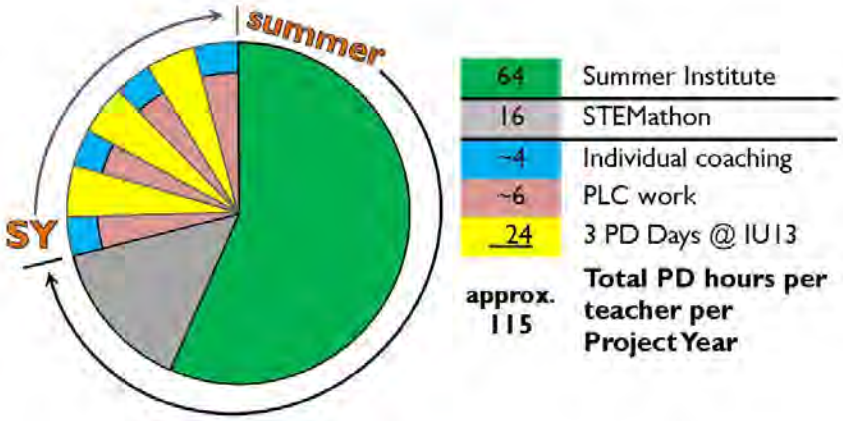
PULSE 2.0 FISCAL AGENT: Lancaster-Lebanon Intermediate Unit 13

OTHER PULSE 2.0 PARTNERS:

- Millersville University of Pennsylvania
- Lebanon Valley College
- Elizabethtown College
- Lancaster County Conservation District
- Chesapeake Bay Foundation
- Pennsylvania Farm Bureau
- Pennsylvania Department of Agriculture
- Capital Area Intermediate Unit
- Lancaster County Workforce Development Board
- By the Numbers: Data Analysis & Statistical Solutions

SUMMARY OF PULSE 2.0:

PULSE 2.0 provides high-quality professional development to elementary and middle school teachers to deepen teachers' knowledge of STEM content and pedagogy in order to increase teacher effectiveness, which will ultimately increase student achievement in math and science.



A PULSE 2.0 project year includes over 110 hours of professional development, including a 64-hour Summer STEM Institute, 16 hours of training at the STEMathon conference, three 8-hour "pull in days" during the subsequent school year, plus approximately 20 hours of work in a building-based Professional Learning Community (PLC) and additional, individual content and pedagogy coaching as requested.

PULSE 2.0 aligns with IU13's strategic goal of increasing student achievement in Lancaster and Lebanon Counties.

NUMBER OF FUNDED STAFF: 4.04 FTEs: STEM Consultants (2.64 FTE), Project Coordinator (0.25 FTE), Program Assistant (0.9 FTE), Project Director (0.25 FTE)

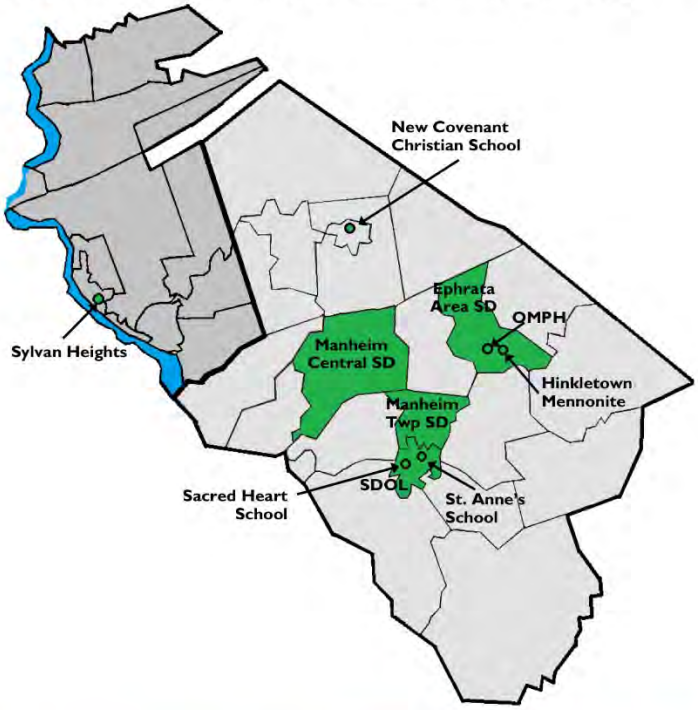
BREAKDOWN OF PARTICIPATION:

- Number of public schools/districts served: 5
- Number of nonpublic schools served: 5
- Number of adult educators served: 47
- Number of school-aged students served: approx. 1,400

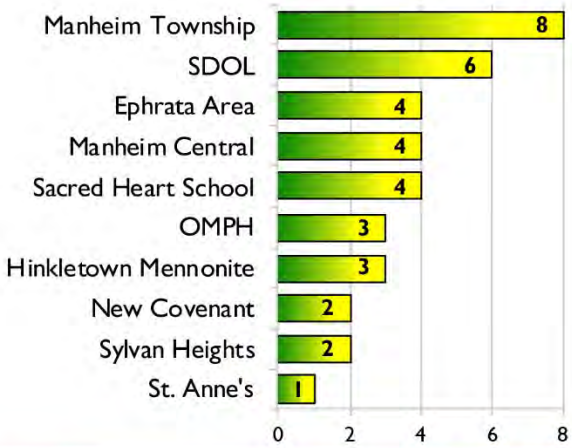
37 TEACHERS AND 10 ADMINISTRATORS PARTICIPATED IN PULSE 2.0 IN 2016-17.

PARTICIPATING DISTRICTS AND SCHOOLS INCLUDED:

Ephrata Area SD (*Highland Elementary and Akron Elementary*), Manheim Township SD (*Brecht Elementary, Reidenbaugh Elementary, Landis Run Intermediate, and MT Middle School*), Manheim Central SD (*H.C. Burgard Elementary, Doe Run Elementary, and Stiegel Elementary*), School District of Lancaster (*King Elementary*), Sylvan Heights Science Charter School, Hinkletown Mennonite School, New Covenant Christian School, Sacred Heart of Jesus Catholic School, St. Anne's Catholic School, and Our Mother of Perpetual Help Catholic School.



Number of Teachers, by District / School



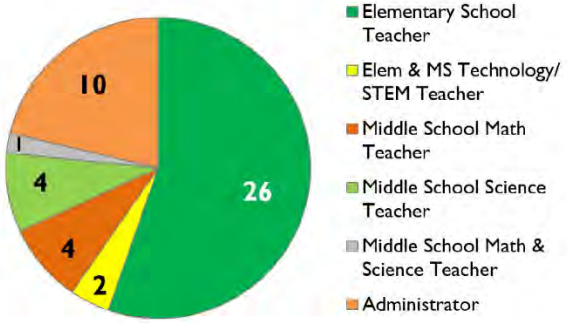
Collectively, the 2016-17 PULSE 2.0 participants taught almost

1400

students!

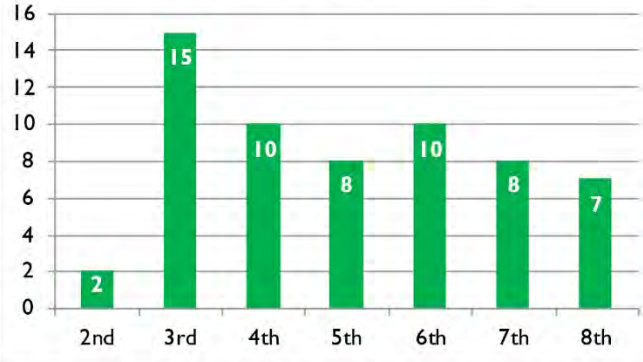
89.2% in elementary school, 10.8% in middle school

The primary audience for PULSE 2.0 is elementary and middle school math and science teachers, but administrators are also welcome to participate. Here is how the 2016-17 participants broke down by role:



In 2016-17, participants included elementary teachers of grades 3-6 and middle school math, science, and technology/engineering education teachers in grades 6-8 from public and nonpublic schools. In 2016-17, some participating teachers taught multiple grade levels. Here is the distribution of grade levels taught:

Grades Taught in 2016-17



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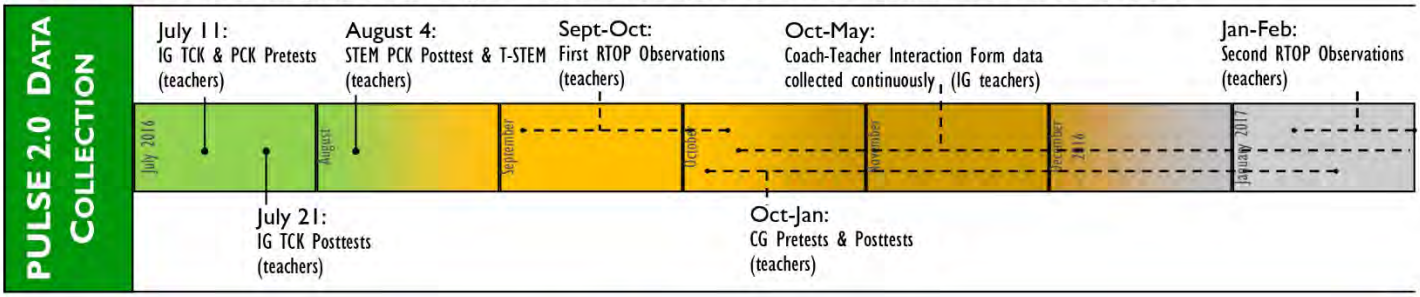
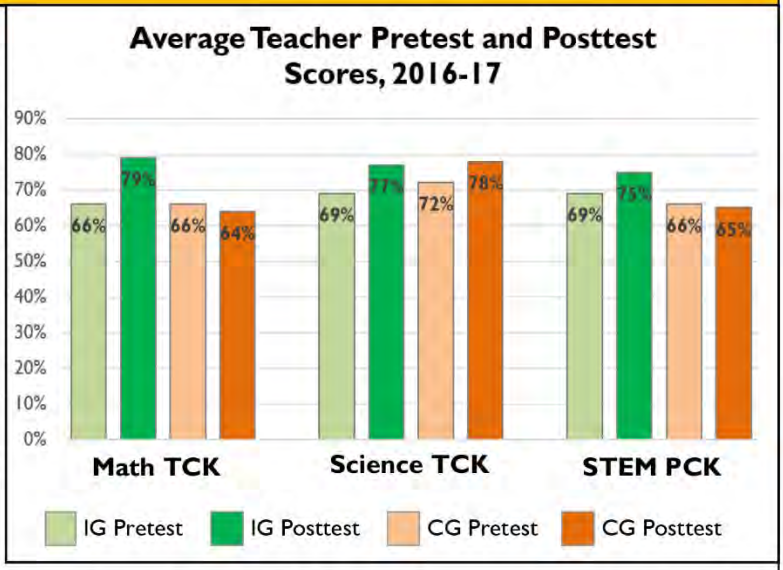
This timeline shows the various data points collected during the first year of PULSE 2.0, as well as whether the data measured teachers or students.



RESULTS: TEACHER CONTENT KNOWLEDGE AND PCK

As part of the PULSE 2.0 Summer STEM Institute, all teachers took pretests and posttests on math and science topics, designed to measure gains in teacher content knowledge (TCK) resulting from their Institute participation. (TCK is one of three grant-required measurements.) Teachers also took a test designed to measure gains in their "STEM pedagogical content knowledge" — that is, their ability to apply STEM teaching techniques to encourage student innovation, systems thinking, and iterative design processes. Teachers showed statistically significant gains in Math TCK, Science TCK, and STEM PCK between pretest and posttest.

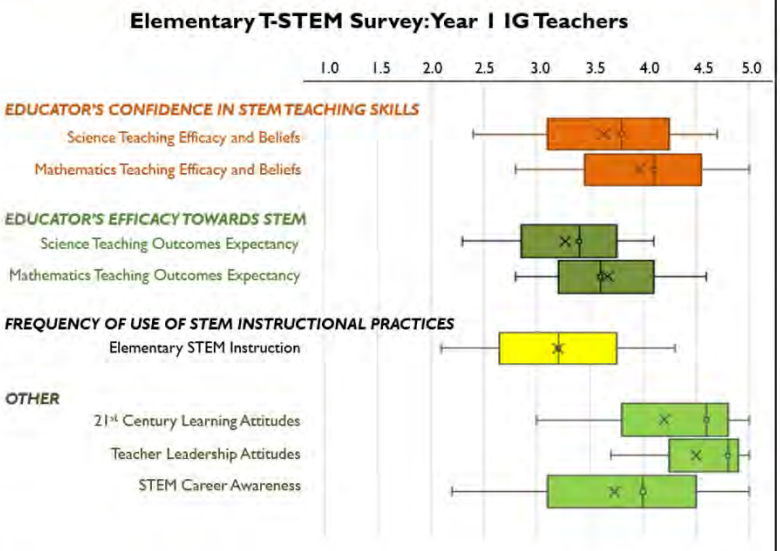


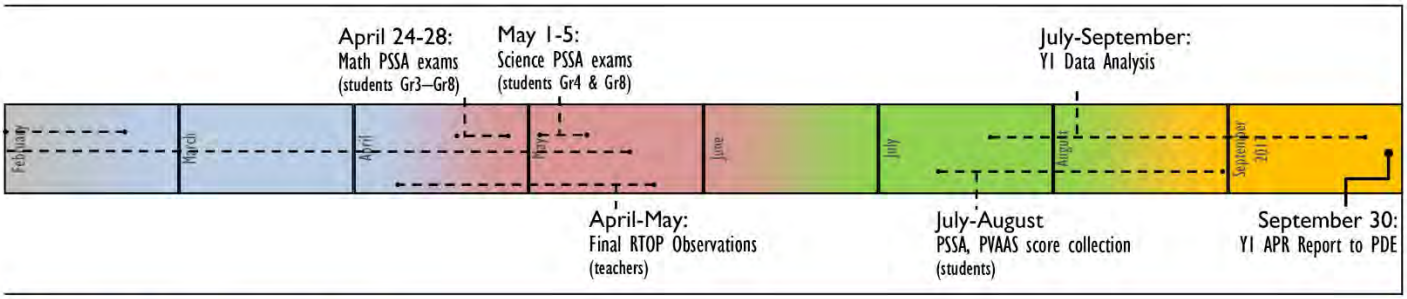
Another "control group" of teachers also took these tests, although they did not participate in the summer STEM Institute or attend STEMathon. The control group's *pretest* scores were statistically equivalent to those of the teachers who attended the Institute, and their Math TCK and STEM PCK scores actually decreased between pretest and posttest. This suggests that attending the Summer Institute and STEMathon did have a measurable, positive impact on teachers' math knowledge and STEM pedagogy. However, the control group's Science TCK scores *did* increase in a statistically similar amount to those of the teachers who participated in PULSE 2.0, suggesting that gains in science shown by the Institute attendees may have been due to "luck," guessing, or other factors. (Steps were therefore taken to better align the science TCK test with the Institute in 2017.)

RESULTS: ELEMENTARY T-STEM SURVEY

At the end of STEMathon, participating teachers took the Teacher Efficacy and Attitudes toward STEM (T-STEM) survey, in which they rated themselves on how well they believe they effectively teach science, math, and STEM, have 21st Century Learning and Teacher Leadership attitudes, and are aware of STEM resources. Responses to all questions are scored from 1 to 5, with 5 indicating greater agreement with each statement.

Overall, teachers indicated high agreement with 21st Century Learning Attitudes and Teacher Leadership Attitudes (mean scores of 4.6 and 4.8, respectively). Teachers also indicated strong confidence in their teaching skills related to math (mean=4.1), as well as their awareness of STEM career resources (mean=4.0). Teachers seemed to show slightly less confidence in their science teaching skills (mean=3.8). Teachers' beliefs that students' math and science learning are affected by effective teaching was rated somewhat lower (means of 3.6 and 3.4, respectively). Finally, teachers indicated that they used STEM instructional practices about half of the time (mean=3.2).

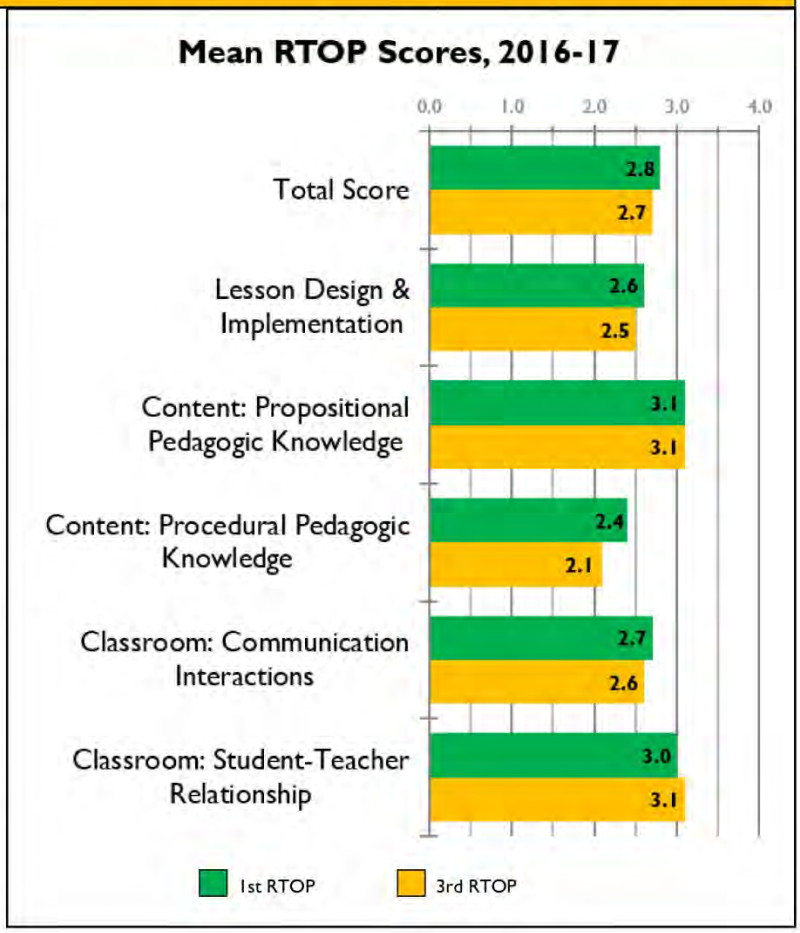




RESULTS: RTOP OBSERVATIONS

The RTOP (Reformed Teaching Observation Protocol) form is a measure of a teacher's classroom practice. Each PULSE 2.0 participant was observed three times using the RTOP form during the 2016-17 school year, to better understand when gains measured on by RTOP would occur (during the first half of the school year, the second half, or continuously throughout?). On average, 4.8 months (146 days) passed between a teacher's first and final observations. The RTOP contains statements that reflect different aspects of classroom practice; scores range from 0 to 4, with '0' indicating that the behavior described in the RTOP statement "never occurred" and '4' indicating that the RTOP statement was "very descriptive" of the teacher's behavior. Teachers made video recordings of their lessons during the year, and submitted them to be scored by an RTOP-trained observer.

During 2016-17, teachers generally did not show significant gains between their first and final (third) RTOP observation, on either the RTOP total average score or any of the five subscales. The average scores for the first and final RTOP observation are shown at right.



The lack of apparent gains may be due to several factors. In some cases, technical problems with the submitted videos made it hard to accurately score the lessons. Also, several teachers' first and final submitted lessons addressed different content areas (e.g. a math lesson for the first RTOP observation and a science lesson for the final observation), and in those cases it was challenging for the RTOP scorer to compare the lessons. *(To address these issues, in 2017-18, PULSE 2.0 staff provided participating teachers with additional training and support on how to select classes for recording and proper recording procedures.)*

The PULSE 2.0 evaluators did analyze individual RTOP questions to look for any gains, and found improvement related to the following questions/statements:

- "The instructional strategies and activities respected students' prior knowledge and the preconceptions inherent therein."
- "There was a climate of respect for what others had to say."
- "Active participation of students was encouraged and valued."
- "The teacher acted as a resource person, working to support and enhance teacher investigations."

STUDENT OUTCOMES

PULSE 2.0 uses a variety of assessments to measure the project's impact on students. The MSP grant requires analysis of student proficiency levels as measured by the Pennsylvania System of School Assessment (PSSA) exams, but because those exams are only given in certain grades and courses, typically scores are available for only a fraction of students taught by PULSE 2.0 teachers. Therefore, PULSE 2.0 supplements PSSA data with Pennsylvania Value-Added Assessment System (PVAAS) information. The combination of these metrics provides a more comprehensive picture of the project's impact on student achievement.

Despite using multiple metrics to measure impact on students, it is still the case that many students go "unanalyzed" in the project because the measurement tools available do not measure all math and science subjects in all grades.

What appears here are descriptive, observational data from Year 1 (2016-17), without any firm conclusions being drawn. A full analysis of PULSE 2.0's impact on student achievement will not be possible until Fall 2018, at the end of the project cycle, when multiple years' worth of data can be compiled for analysis.

RESULTS: STUDENT PROFICIENCY LEVELS

The Math PSSA is administered each spring to public-school students in grades 3 through 8. The Science PSSA is administered each spring to students in grades 4 and 8. Both types of exams return numeric scores, which fall into ranges labeled "Advanced," "Proficient," "Basic," and "Below Basic."

The number of math and science students with scores available are shown below, along with the combined totals of "Basic + Below Basic" and "Proficient + Advanced" for each group.

MATH	Approx. # of students taught math by PULSE 2.0 teachers	764
	# of students with 2017 math PSSA scores	380
	% of students scoring Basic or Below Basic	58%
	% of students scoring Proficient or Advanced	42%
SCIENCE	Approx. # of students taught science by PULSE 2.0 teachers	1000
	# of students with 2017 science PSSA scores	86
	% of students scoring Basic or Below Basic	49%
	% of students scoring Proficient or Advanced	51%

Note that some teachers taught both math and science to their students; figures in this table do double-count students. The number of individual students taught by PULSE 2.0 teachers in 2016-17 was approximately 1,400.

RESULTS: PVAAS DATA ANALYSIS

PVAAS data measures student growth in certain tested areas. PULSE 2.0 compared PVAAS projections of whether a student would score proficient or advanced on the 2017 PSSA with students' actual PSSA scores. If a student scored higher than projected, the teacher's participation in PULSE 2.0 could be a contributing factor.

Comparison of proficiency projections and actual scores are shown below, separated by Math and Science, and also by grade level. This analysis was not rigorous, and the sample sizes were small. Overall, actual proficiency levels met predicted levels in math, and did not meet predicted levels in science. These results could be due to several factors (random or non-random).

The PULSE 2.0 staff and evaluators will compare PVAAS projections and 2018 PSSA data in Year 2 of the project, to see if a pattern emerges and/or persists.

MATH			SCIENCE		
% Projected to be Proficient or Advanced	Actual % Proficient or Advanced		% Projected to be Proficient or Advanced	Actual % Proficient or Advanced	
39%	37%		63%	53%	
Grade level	% Proj	% Actual	Grade Level	% Proj	% Actual
4th Grade *(n=78)*	28%	26%	4th Grade *(n=78)*	63%	53%
5th Grade *(n=24)*	37%	33%			
6th Grade *(n=62)*	53%	53%			

TEACHER TESTIMONIALS

I learned that true STEM integration… is not meant to replace what we already do and teach something completely different—but rather it is a way to actively engage our students in material we are already covering.

— 3rd Grade teacher, Fulton & Highland Elementary Schools

Word problems without numbers was a great strategy that I'll certainly use when teaching problem solving. I also enjoyed the visual representation of the area of a circle (representing radius squared as an actual square helping drive home the meaning behind this part of the formula).

— 6th Grade Math Teacher, Landis Run Intermediate School

With becoming a new STEM teacher this course was a big eye opener and helpful to get me started about how I plan to engage students.

— STEM & Technology Teacher, St. Anne School

I am very weak in Math and Science. I taught on a team for the first 8 years of my teaching career as a Language Arts teacher, now I am a "self-contained" teacher teaching Science and Social Studies for the first time in my career. I am also trying to get my team of 3-5th grade teachers to work together on STEM oriented projects with multiple grade level kids. There were a multitude of ideas I can incorporate into my school/classroom. I will be presenting at our first week in-service in order to spread the "STEM" way of teaching to our school.

— 5th-6th Grade Teacher, New Covenant Christian School

I will be using the ideas taught in math and science in my classroom. I thought that the whole idea about having the students learn and take ownership of their learning through projects was great. The process of having students as problem solvers and teaching problem solving will be a great thrust in my teaching this year.

— 5th Grade Teacher, Hinkletown Mennonite

I have long thought of STEM as fun challenges and an extra activity to do with students. In actuality, it is a different pedagogical approach to teaching. It isn't an extra activity. STEM is integration of subjects and standards you're already teaching. The focus is more on problem solving.

— 4th Grade Teacher, Akron Elementary School

Everything was of GREAT benefit to me as a third grade teacher! I have now implemented a Science/STEM notebook with my students that we use just about daily. I also have declared Fridays as STEM Fridays where we are involved in STEM-related problem-solving activities.

— 3rd Grade Teacher, Doe Run Elementary School

I have learned many new ideas and ideas that are simple yet effective ways of teaching STEM in the classroom. I also appreciate knowing how much I can do with simple and inexpensive supplies since the budget at my school is very limited.

— MS Science Teacher, Sacred Heart School

It was very valuable to see how concepts taught in the different subject areas can and need to be real world applicable.

— 6th Grade Science/ELA Teacher, Landis Run Intermediate School

PULSE 2.0

Partnership to Understand and Lead STEM Education

PROJECT GOALS AND OBJECTIVES

Based upon extensive research and the PULSE 2.0 comprehensive needs assessment (conducted November 2015-February 2016), the following project goals and objectives were identified:

GOALS

1. Deepen teacher content knowledge (TCK) of math concepts aligned to math PSSA assessment anchors and PA Core math standards.
2. Deepen TCK of science concepts aligned to Science PSSA Assessment Anchors and PA Academic Standards for Science.
3. Expand teacher pedagogical content knowledge (PCK) of math and STEM instructional practices.
4. Expand teacher PCK of science and STEM instructional practices.
5. Build capacity of teachers capacity to apply math TCK and math and STEM PCK to classroom practice in math.
6. Build capacity of teachers to apply science TCK and science and STEM PCK to classroom practice in science.
7. Increase student achievement and growth on state math assessments.
8. Increase student achievement and growth on state science assessments.

OBJECTIVES

1. Deepen TCK of math concepts that are aligned to PA Core Math Standards and Math PSSA Assessment Anchors, specifically in the areas of geometry, measurement, and problem solving.
2. Deepen TCK of science concepts that are aligned to PA Academic Standards for Science and Science PSSA Assessment Anchors, specifically in the areas of systems, models, and earth science.
3. Expand teachers' PCK of the PA Core Math Practices.
4. Expand teachers' PCK of integrative STEM practices to support math learning and science learning.
5. Expand teachers' PCK of NGSS Science and Engineering Practices.
6. Build capacity of teachers to apply math TCK and STEM PCK to classroom practice in math through use of evidence-based strategies.
7. Build capacity of teachers to apply science TCK and STEM PCK to classroom practice in science through use of evidence-based strategies.
8. Increase student achievement and growth in math through prioritizing content aligned to the PA Core Math Standards and Math PSSA Assessment Anchors, specifically in the areas of geometry, measurement, and problem solving.
9. Increase student achievement and growth in science through prioritizing content aligned to the PA Academic Standards for Science and Science PSSA Assessment Anchors, specifically in the areas of systems, models, and earth science.
10. Reduce the number of teachers not adequately prepared to teach math.
11. Reduce the number of teachers not adequately prepared to teach science.

PULSE 2.0 will continue for two project years, concluding at the end of the 2017-18 school year. A new group of teachers will participate in each project year. An Annual Performance Report is submitted to the Pennsylvania Department of Education each September, and a final, cumulative analysis of the project will be submitted to PDE in September 2018.

The full PULSE 2.0 Annual Performance Report for 2016-17 was produced jointly by the IU13 STEM Team and By the Numbers: Data Analysis & Statistical Solutions, and was submitted to the Pennsylvania Department of Education on September 30, 2017. If you have questions or would like more information, including details on our statistical and reporting methods, please contact Amanda Paveglio, MSP Grant Coordinator, at 717-606-1666 or amanda_paveglio@iu13.org.

Lancaster-Lebanon Intermediate Unit 13 (IU13) is an education service agency dedicated to delivering irresistible services to school districts and communities across the state. IU13 is a leader in recognizing the needs of schools and implementing programs to meet those needs, with a core compelling purpose of improving student learning.

IU13 serves the 22 public school districts in Lancaster and Lebanon counties, as well as students in nonpublic schools, preschoolers, and adult learners throughout Pennsylvania.

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