THE UNIVERSITY OF UTAH
UTAH EDUCATION POLICY CENTER

STEMLINK AFTERSCHOOL GRANT PROGRAM EVALUATION: FOR GRANTEES

Year Two: 2015-2016

THE UNIVERSITY OF UTAH
UTAH EDUCATION POLICY CENTER

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Executive Summary of the Year 2 (2015-2016) STEMLink Program Evaluation

The STEMLink grant program was established in 2014 by the Department of Workforce Services Office of Child Care (DWS OCC) and was funded by Temporary Assistance for Needy Families (TANF). The grant provided three years of funding to 13 out-of-school-time (afterschool) programs selected through a competitive process. The purpose of the STEMLink grant is to increase students' STEM interest, STEM skills, and awareness and interest in STEM education and career opportunities.

Evaluation Overview

The Utah Education Policy Center (UEPC) at the University of Utah was asked to conduct an evaluation of the STEMLink program to assess both the implementation and outcomes associated with the program. This executive summary presents selected findings and recommendations from the second year (2015-16) of the three-year evaluation study. Data collection and analyses were guided by the following evaluation questions:

Implementation

1. To what extent were staff members prepared to implement STEM-related afterschool programs?
2. To what extent did staff members provide quality afterschool programming?
3. To what extent did STEMLink programs provide STEM-related learning opportunities for participants?
4. To what extent did the STEMLink programs provide prevention education learning opportunities for participants?

Outcomes

5. To what extent did students' interest in STEM change?
6. To what extent did students' STEM skills change?
7. To what extent did students' awareness of and interest in STEM-related post-secondary opportunities and career information change?
8. To what extent did students perceive change in social competencies, empathy and prosocial behaviors, academic behaviors, work habits, and misconduct?
9. What were the proficiency rates and chronic absence rates of STEMLink participants at baseline (2013-14) and the end of each implementation year?
10. What was the relationship between program participation and student achievement?
11. What was the relationship between program participation and chronic absence?

Table 1 shows the data sources used to answer the evaluation questions, number of respondents or participants (N), and the unit of analysis.

Table 1. STEMLink Data Sources

Data Source	N	Unit of Analysis
Posttest staff survey	115	Staff
Posttest & retrospective pretest student survey	446	Student
Program participation records	2,845	Student
Utah Afterschool Network (UAN) Quality Tool (QT)	11	Program
Participant education data (year one)	919	Student

Implementation Findings

To what extent were staff members prepared to implement STEM-related afterschool programs?

Key indicators of preparation included staff members' backgrounds, experience, and training. More than half (65%) of staff members had two or more years of experience working with youth, and the majority (63%) held at least a bachelor's degree. Seventy-two percent of staff members received professional development (PD) during year two, and among those who received PD, almost all found it useful.

- 28% of staff members did not receive PD. Among those who did not receive PD, 39% were classroom teachers
- 81% indicated that they received about the right amount of PD, an increase from 64% reported in year one

In many areas, staff members described themselves as prepared and agreed that they had the training they needed to do their job well.

- 96% reported implementing practices they learned through their program's PD
- 96% felt they could lead effective lessons for diverse students
- 92% felt prepared to manage student behavior

However, 29% indicated that they had unanswered questions about their jobs.

To what extent did staff members provide quality afterschool programming?

Three data sources informed this evaluation question: the UAN QT, staff surveys, and student surveys. On the QT, program sites reported they performed moderately well or better in key areas such as managing student behavior, developing meaningful relationships, learning new skills, and administrative practices. Specific areas in which sites reported performing very well or extremely well included:

- Staff and youth know, respect, and support each other
- Youth are actively engaged in learning activities that promote critical/creative thinking skills and build on individual interests/strengths
- The administration provides sound fiscal management of the program
- Program recruits, hires, and trains diverse and qualified staff members who value and nurture all participants

Potential areas for additional program development were fostering family involvement and aligning academic support to school-day curricula.

Staff survey responses described several positive program conditions.

- 96% enjoyed working at their program sites
- 96% reported they knew how to manage lessons and activities in such a way that supports positive student behaviors
- 93% indicated that they knew the goals of their programs
- 90% reported that they got the support they needed from their supervisors
- 88% reported that their programs developed learning activities based on students' needs

Students reported positive perceptions of adult program leaders, positive perceptions of their programs, and indicated that they developed positive relationships with peers.

- 91 % of students felt that adults in their program went out of their way to help kids
- 91% of students reported that they got along well with the kids in their program
- 94% of students felt included in activities
- 93% of students liked the activities and had fun at their afterschool programs
- 90% agreed that they had friends they could trust in the programs

To what extent did the STEMLink programs provide STEM-related learning opportunities for participants?

Similar to year one, overall program attendance rates were relatively low based on reported possible days of attendance. The programs collectively served 2,845 students in year two, an increase of 616 students from year one. About 72% of students attended for 29 days or fewer. Table 2 shows the percentage of students who received academic interventions by program year.

Table 2. Percentage of Students who Received Interventions

Interventions	Year 1	Year 2
Science	47%	69%
Technology	41%	70%
Engineering	40%	58%
Math	52%	69%

Based on staff survey responses, the most common STEM-related learning opportunities provided by staff members were projects that integrated multiple STEM topics. The least common STEM-related learning opportunities included making STEM learning resources available and providing students with information about STEM-related post-secondary opportunities.

- 97% reported that they provided effective learning environments
- 95% reported that they provided engaging lessons, facilitated group building or community developing activities, and helped students learn positive academic behaviors
- 93% reported that they provided opportunities to participate in projects that integrated multiple STEM topics
- 88% reported that they provided students with STEM-related lessons and opportunities to solve problems

To what extent did the STEMLink programs provide prevention education learning opportunities for participants?

Programs reported providing a variety of prevention education opportunities (including addiction prevention, civic engagement, education and career readiness, financial literacy, physical activity and nutrition, positive interpersonal relationships, self-concept and emotional intelligence, and violence and gang prevention activities), but not all students received those opportunities.

- 78% of students participated in prevention education activities at least once

Program Outcomes

To what extent did students' interest in STEM change?

Students reported increased interest in science, engineering, technology, and STEM (in general) between retrospective pretest and posttest results. This increased interest was small but statistically significant. Additionally, a separate set of items asked students to express their interest in STEM topics relative their participation in the afterschool programs.

- 80% reported increased interest in technology as a result of participating in the program
- 75% reported increased interest in engineering as a result of participating in the program
- 70% reported increased interest in science as a result of participating in the program
- 60% reported increased interest in math as a result of participating in the program

To what extent did students' STEM skills (critical thinking and perseverance) change?

Students reported an average increase in perseverance and critical thinking between retrospective pretest and posttest. The increase was small, but statistically significant.

To what extent did students' awareness of and interest in STEM-related post-secondary opportunities and career information change?

Students reported increased interest in STEM-related postsecondary or career opportunities and increased awareness of STEM careers between retrospective pretest and posttest results. These increases were small, but statistically significant. On average, students had greater interest than they had awareness for future opportunities in STEM fields.

To what extent did students perceive change in social competencies, empathy and prosocial behaviors, academic behaviors, work habits, and misconduct?

Students reported an increase in positive academic behaviors, work habits, social competency, and empathy and prosocial behaviors between retrospective pretest and posttest results. These increases were small, but statistically significant.

Academic and School Attendance Outcomes: Year One (2014-15)

What were the proficiency rates of STEMLink participants at baseline (2013-14) and year one (2014-15)?

STEMLink students' proficiency rates increased less than the statewide average from baseline to year one in math and English language arts. STEMLink student's proficiency rates did not improve from baseline to year one in science.

- Statewide, students' math proficiency rates improved by 10% STEMLink student's math proficiency rates improved by 5%
- Statewide, students' science proficiency rates improved by 5% STEMLink student's science proficiency rates declined by 1%
- Statewide, students' English language arts proficiency rates improved by 6%. STEMLink student's English language arts proficiency rates improved by 4%

What was the relationship between STEMLink program attendance and student achievement?

There was no statistical relationship between program attendance and science or ELA SAGE scores, there was a positive relationship between program attendance and math SAGE scores.

- For every 4 days of STEMLink afterschool attendance there was a one-point increase in year one math scores

What was the relationship between STEMLink program participation and chronic absence?

Rates of chronic absence for STEMLink students were generally higher than the state average, indicating that the program was serving students who needed additional support. Chronic absence rates for STEMLink students were similar from baseline (2013-14) to year one (2014-15), though there was a statistically significant relationship between program attendance and chronic absence.

- For every day of program attendance, the odds of chronic absence decreased by 1.6%

Considerations for Improvement

Based on the key findings, we offer the following state and program level considerations for STEMLink afterschool program improvement.

Staff preparation

State Level Considerations

- Increase state level support and coordination for PD that is aligned with where PD is most needed
- Collaborate with the UAN to use program and site level survey results to design and implement PD opportunities
- Continue to foster coordination with higher education partners to further develop the pools of highly qualified afterschool staff

Program Considerations

- Continue to hire educated, experienced, and capable staff members
- Use program and site level survey results to design and implement PD
- Ensure that staff members receive high quality PD that is aligned with program goals, such as achieving STEM-related goals and afterschool outcomes
- Differentiate PD for staff with varying roles and levels of experience, education, or professional background

Quality of Afterschool Programming

State Level Considerations

- Collaborate with UAN to provide opportunities for STEMLink programs to network and share promising strategies for improving program quality

Program Considerations

- Continue working to align daily program practices with afterschool program standards identified in the UAN Quality Tool
- Identify and implement strategies to increase family involvement
- Increase efforts to identify and implement strategies to align academic support with school day curriculum

- Ensure that all staff members who work with English language learners are prepared to do so
- Continue to create fun afterschool environments in which students have positive social interactions with staff members and peers and where students feel included

STEM-related Learning Opportunities

State Level Considerations

- Provide resources for implementing STEM-related learning opportunities
- Connect programs with partners that will provide resources to increase STEM-related learning opportunities
- Hold programs accountable to provide complete and accurate attendance and participation data
- Promote a 30-day attendance minimum as a standard of program dosage

Program Considerations

- Continue to provide STEM-related learning opportunities
- Train staff members to provide students with STEM learning resources and information about STEM-related post-secondary opportunities
- Continue to provide effective learning environments, engaging lessons, and help students learn positive academic behaviors.
- Work with school personnel, families, and students to increase program attendance rates
- Set attendance and participation goals; insure that students receive a minimum of 30 attendance days and a maximum number of STEM-related activities

Prevention Education Learning Opportunities

Program Considerations

- Make prevention activities available to all participants
- Set goals regarding student participation in prevention activities

STEM Outcomes

Program Considerations

- Continue to provide engaging activities that promote interest in STEM subjects
- Continue to provide opportunities and resources for students to engage in STEM-related activities
- Continue to promote interest in STEM-related post-secondary and career opportunities
- Increase efforts to make students aware of possibilities and paths for pursuing future careers in STEM

Afterschool Outcomes

Program Considerations

- Continue to offer programming that promotes positive afterschool outcomes

Academic and School Attendance Outcomes

State Level Considerations

- Provide support and technical assistance to help program administrators access and use student assessment data to plan intervention strategies

Program Considerations

- Facilitate studies of academic data with classroom teachers and afterschool staff to identify specific areas for targeted instructional support or interventions
- Use student assessment data to plan academic support interventions for participants
- Use student school day attendance data to plan interventions for specific students
- Work with school day personnel to plan attendance interventions

Introduction

The STEMLink grant program was established in 2014 by the Department of Workforce Services Office of Child Care (DWS OCC) and was funded by Temporary Assistance for Needy Families (TANF). Collaborators included the STEM Action Center, Utah Afterschool Network, and the Utah State Board of Education (USBE). The purpose of the STEMLink grant is to increase students' STEM interest, STEM skills, and awareness and interest in STEM education and career opportunities. Additional information about the grant program and its goals is available in the year one evaluation report (https://uepc.utah.edu/).

The STEMLink grant provided three years of funding to 13 out-of-school-time (afterschool) programs selected through a competitive process (see Table 3).

This evaluation report addresses the second year (2015-16) of STEMLink funded afterschool programming. The methods section provides descriptions of the data sources, explains how we used the data sources to answer evaluation questions, and shows response rates for surveys and sample sizes for matched data. In the findings, each section begins with an evaluation question and a brief summary of key findings. The purpose of the key findings summary is to answer the evaluation questions and provide an overview of the findings that seem most relevant or that appear as themes within the report. Throughout each section of the findings we present figures and tables and point out selected areas of success as well as opportunities for improvement. In some cases, we simply offer an explanation or summary of the figure or table. We encourage readers to review the findings carefully in each section and to consult the appendices for additional detail.

Table 3. STEMLink Programs' Operation Schedules in Year 2 (2015-16)

Program	Number of Sites	Academic Year Schedule	Summer Schedule
YMCA of Northern Utah	4	After school	None
University of Utah (CSME)	3	After school	None
Jordan School District	3	After school	Summer (1 week)
City Academy STEM Center	1	Before & after school; weekends	Summer (3.5 weeks)
Grand County School District (BEACON)	1	Before & after school	None
Salt Lake County Youth Services	3	Before & after school	Summer 6 (weeks)
Promise South Salt Lake	6	After school	Summer (7 weeks)
Salt Lake City Corporation	2	After school	Summer (10 weeks)
Spy Hop Productions	1	After school	Summer (12 weeks)
Thanksgiving Point Institute	1	After school; weekends	Summer (12 weeks)
Utah Valley University	1	Summer only	Summer (7 weeks)
Granite School District: Granite Technical Institute	1	Summer only	Summer (7 weeks)
Utah State University (4-H)	6	Three 10-week sessions	None

Evaluation Methods

The evaluation design focuses on program implementation, program quality, afterschool outcomes, and STEM outcomes. The evaluation questions were developed in accordance with STEMLink goals and quality standards of afterschool programming. Four implementation questions focus on staff preparedness, program quality, provision of STEM-related programming, and the provision of prevention education opportunities. Six outcomes questions address interest in STEM learning, STEM skills, awareness of STEM-related career information, STEM-related post-secondary and career interests, student behavioral outcomes, and the relationship of program participation, and academic outcomes. Data sources include student surveys, staff surveys, program participation data, the Utah Afterschool Network (UAN) Quality Tool Self-Assessment (QT), and student education data (attendance and academic achievement). Table 4 displays the evaluation questions and data sources, which are described in detail below.

Table 4. Evaluation Questions and Data Sources

Evaluation Questions	Data Sources
Implementation	
To what extent were staff members prepared to implement STEM-related afterschool programs?	Staff Survey
To what extent did staff members provide quality afterschool programming?	Staff Survey; Student Survey; UAN QT
To what extent did STEMLink programs provide STEM-related learning opportunities for participants?	Participation Records; Staff Survey
To what extent did the STEMLink programs provide prevention education learning opportunities for participants?	Participation records; Staff Survey
Outcomes	
To what extent did students' interest in STEM change?	Student Survey
To what extent did students' STEM skills (critical thinking and perseverance) change?	Student Survey
To what extent did students' awareness of and interest in STEM-related post-secondary opportunities and career information change?	Student Survey
To what extent did students perceive change in social competencies, empathy and prosocial behaviors, academic behaviors, work habits, and conduct?	Student Survey
Evaluation year 2: What were the proficiency rates and chronic absence rates of STEMLink participants at baseline (2013-14) and year one (2014-15)?	Participant education data
Evaluation years 2 and 3: What was the relationship between program participation and student achievement? Evaluation years 2 and 3: What was the relationship between program participation and chronic absence?	Participant education data; Program participation data

Student Surveys

The UEPC evaluation team designed a student survey to assess STEM outcomes, afterschool outcomes, and afterschool program quality. Within these three topics, the survey measured 15 constructs. All scales in the student survey were 4-point scales. Two open-ended survey questions provided respondents the opportunity to indicate what they liked most about the programs and what they wish were different. A third open-ended question asked students to identify the aspect of the program that changed their interest in, or awareness of, STEM. A summary of responses is presented in Appendix A. Details of the survey development process are available in the Year 1 evaluation report. Table 5 presents an overview of the topics and constructs.

During Year 2, the web-based student survey was administered as a pretest in October 2015 and as a posttest in May 2016. STEMLink program staff administered the student survey to their participants by accessing an electronic survey link provided by the UEPC. Programs that operated during the summer received reports of their results for program improvement purposes, but survey data from the summer administration are not included in this evaluation report.

Retrospective Student Survey

The posttest student survey included retrospective pretest items, which were used for comparisons in this report. After completing the posttest, survey instructions directed students to remember their interest in STEM before they participated in the program. For the retrospective pretest, students responded to the same items as those in the posttest, but based on their interests in STEM prior to participating. For example, one retrospective item read, "Before I participated in this program I got excited about science. Including retrospective pretest items as part of the posttest survey allowed us to compare 1) pretest to posttest responses and 2) retrospective pretest responses to posttest responses. A summary of retrospective pretest and posttest analyses is available in Appendix B.

Table 5. STEMLink Student Survey Constructs

Implementation and Outcomes Topics	**Measured Constructs**
STEM Outcomes	
Increased interest in STEM learning	General Science Interest
	Enjoyment of STEM
	Participation in STEM-related Activities
Increased STEM skills	Critical Thinking
	Perseverance
Increased awareness of STEM Careers	Career Information
Increased interest in STEM Education	Career and Post-secondary Interest
Afterschool Outcomes	
	Social Competencies
	Empathy & Prosocial Behavior
	Academic Behaviors
	Work Habits
	Misconduct
Program Quality	
	Relationships with Adults in the Program
	Relationships with Peers in the Program
	Positive Learning Environment

Staff Survey

The STEMLink staff survey was designed to analyze program quality and implementation from the perspective of staff members who worked directly with participants. Main components of the staff survey included staff members' education and experience, usefulness of professional development (PD), program implementation, knowledge of practice, self-efficacy for teaching STEM, and barriers and supports. All scales in the staff survey were 4-point scales except for the self-efficacy items, which were 6-point scales. Four open-ended questions provided the opportunity for respondents to express additional PD topics of interest, needs for additional support, successes they have experienced, and recommendations for program improvement. More information about the development of the staff survey is available in the Year 1 evaluation report. The staff survey was administered in October 2015 (fall) and May 2016 (spring). We also administered a staff survey to programs operating during the summer 2016. Results of the summer staff survey were provided to grantees and are not included in this evaluation report. With a few exceptions, this evaluation report includes results from the spring 2016 survey.

Attendance and Participation Data

Administrators provided program participation records that included total days of attendance, days of possible attendance, days of STEM interventions, and days of enrichment activities. We used these data to document program attendance and activity participation. We also matched program participation data with participant education data.

UAN Quality Tool

The Utah Afterschool Program Quality Assessment and Improvement Tool (QT) is an internal evaluation tool afterschool providers can use to review and document program quality and improvement efforts. It served as a key data source for understanding STEMLink program quality in four areas: program safety, developing meaningful relationships, learning new skills, and program administration.

The QT is administered once per academic year by the UAN and was made available to STEMLink grantees during February and March 2016. The administration procedures require that program administrators meet with program staff teams and stakeholders to complete the QT through a group process. Once completed, the group can print their responses as a report that can be used for ongoing program improvement, to document current program practices, and to secure future funding. The QT responses of STEMLink grantees were included in this evaluation report as an indicator of program quality.

Participant Education Data

Participant education data were made available through a data sharing agreement with Utah State Board of Education.[1] These data included demographics, academic performance, and school attendance. Since data were not yet available for academic year

[1] This report uses data made available through a data sharing agreement between the Utah State Board of Education (USBE) and the Utah Education Policy Center (UEPC). The views expressed are those of the authors and are not necessarily the USBE's or endorsed by the USBE.

2015-16, we used data from 2013-14 (baseline) and 2014-15 (year 1) to describe academic outcomes of STEMLink participants.

Sample and Response Rates

The sample consisted of all staff members and student participants of STEMLink programs. STEMLink programs reported 2,845 student participants in year two. The results section provides detailed tables of participation for each program and activity.

Table 6. Staff Survey Fall 2015 and Spring 2016 Responses by Program

Program	Staff Fall 2015	Staff Spring 2016*
City Academy STEM Center	7	7
Promise South Salt Lake	27	26
University of Utah (CSME)	20	22
BEACON	4	6
Jordan School District	16	8
Salt Lake City Corporation	6	4
Salt Lake County Youth Services	11	12
Thanksgiving Point	6	3
Utah State University (4-H)	16	8
YMCA of Northern Utah	17	14
Spy Hop Productions	5	5
Total	**135**	**115**

*Staff pretest and posttests were not matched because pretest responses were anonymous.

Table 7. Spring 2016 Staff Survey Responses by Role

Role in the Afterschool Program	Frequency	Percent
Program Staff	62	54%
Director, Site Coordinator, or Site Manager	22	19%
Classroom Teacher	21	18%
Volunteer	6	5%
Other	3	3%
Social worker or counselor	1	1%
Principal or Assistant Principal	0	0%
Total	**115**	**100%**

Source: Staff survey posttest

*Table 8. Student Survey Responses by Program**

Program	Student Survey Pretest	Student Survey Posttest	Matched Pretest-Posttest^	Matched Retrospective Pretest-Posttest
City Academy STEM Center	7	2	0	2
Promise South Salt Lake	63	63	7	63
University of Utah (CSME)	55	46	16	46
BEACON	15	40	9	40
Jordan School District	218	101	60	101
Salt Lake City Corporation	22	26	14	26
Salt Lake County Youth Services	74	51	8	51
Thanksgiving Point	47	1	7	1
Utah State University (4-H)	0	0	0	0
YMCA of Northern Utah	90	89	23	89
Spy Hop Productions	37	27	10	27
Total	**628**	**446**	**154**	**446**

Sources: Student survey pretest and posttest. *Responses in this table represent cleaned and prepared survey data. ^These data were not used in this report.

Table 9. Year One Reported Participation Data and Education Data Match Rate

Program	Number of Year 1 Participants (2014-15)	Number of Year 1 (2014-15) Participants Matched with Year 1 Education Data	Match Rate
City Academy STEM Center	187	166	89%
Promise South Salt Lake	657	79	12%
University of Utah (CSME)	76	25	33%
BEACON	30	15	50%
Jordan School District	46	38	83%
SLC Corporation	50	32	64%
Salt Lake Co. Youth Services	292	65	22%
Utah State University (4-H)	481	262	54%
YMCA of Northern Utah	410	229	56%
Thanksgiving Point	Not Reported	Not Matched	-
Spy-Hop Productions	Not Reported	Not Matched	-
Total	**2,229**	**911**	**41%**

In evaluation year one (2014-15), we merged year one participation data with 2013-14 participant education data to establish baseline academic performance. In this evaluation report, we present comparisons of the baseline academic performance with year one academic performance. In order to do so, we used participation data from 2014-15 to match with participant education data from 2014-15 (see Table 9). Participant education form 2015-16 were not available at the time of reporting.

Data Analyses

Descriptive statistics (e.g., means, standard deviations, and/or frequencies) were calculated from all data sources. Since staff survey responses were anonymous and could not be matched, we present only the posttest results. However, an exception to this was the STEM teacher self-efficacy items for which we conducted an independent samples t-test. To simplify comparison, we present the means rather than percentages for these items. All data sources are identified beneath figures in the findings section.

For the student survey, we also used paired sample t tests to compare the difference in means between retrospective and posttest scores. The decision to report the comparison of the retrospective data to posttest data instead of traditional pretest data to posttest data was partially influenced by the opportunity to represent more students (446 rather than 154). A second reason was the belief that a response shift bias may have occurred from the time of traditional pretest to the posttest administration. Response shift bias occurs when participants' internal frame of reference change between pretest and posttest as a result of exposure to the program (Howard and Dailey 1979, Howard 1980, Goedhart & Hoogstraten 1992, Lam & Bengo 2002, Shadish et al. 2002). These internal changes can lead to a shift in understanding of the outcomes. Administering the retrospective pretest at the time of posttest administration provides a way to control for response shift bias.

To test the relationships of STEMLink program attendance and academic outcomes, the evaluation team ran four predictive models. These analyses address year one (2014-15) outcomes because year 2 data were not yet available.

Additional Evaluation Activities

The goal of the evaluation was to provide information to both the DWS OCC and the STEMLink grantees for program improvement and to inform implementation and practice. To that end, the evaluation design called for formative and summative reporting. The UEPC provided grantees and the DWS OCC with student and staff survey results from all survey administrations.

Evaluation Findings

STEMLink Afterschool Participants: Who the Program Served

We used matched participant education data from Year 1 (2014-15) to examine the demographic characteristics of STEMLink participants.

Table 10. Program Participant Characteristics

Participant Race/Ethnicity	%	N	Participant Characteristics	%	N
Hispanic or Latino/a	26%	233	Mobile	18%	162
White	60%	544	Low Income	57%	523
Asian	4%	40	Special Education	14%	127
Black	5%	48	ELL	8%	74
Native Hawaiian or Pacific Islander	1%	11	Female	43%	393
American Indian or Alaskan Native	1%	10			
Multiethnic	3%	25			
Total	**100%**	**911**			

- 60% of students were White
- 57% of students were low income

Program Implementation

To what extent were staff members prepared to implement STEM-related afterschool programs?

Key Findings:

- Most staff respondents had completed a degree in higher education or were currently working to obtain a degree.
- Over half of the staff respondents had more than two years' experience working with youth.
- Almost one third of staff respondents reported they received no training or professional development through the afterschool program. Most staff members who received no PD worked 10 or fewer hours a week in their programs.
- Almost one third of staff respondents had unanswered questions about their jobs.
- Almost all staff respondents who received PD found it useful and reported they implemented practices learned.
- Most staff respondents were satisfied with the amount of PD they received.
- Almost all staff respondents felt prepared to lead effective lessons for diverse students and manage student behavior. However, some also indicated that they could benefit from additional PD about managing student behavior.
- Staff respondents reported high self-efficacy for STEM-related teaching.

Staff Demographics, Education, and Experience

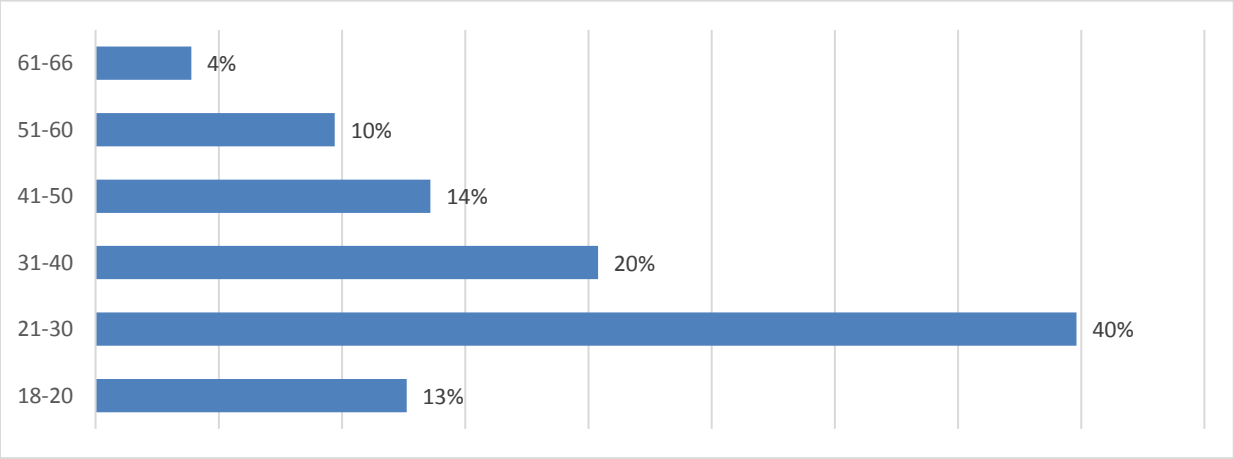
Table 11. Staff Member Race/Ethnicity

Staff Member Race/Ethnicity	
White	68%
Hispanic or Latino/a	17%
Asian	11%
Black or African American	8%
American Indian or Alaskan Native	3%
Native Hawaiian or Pacific Islander	1%

Source: Staff survey posttest

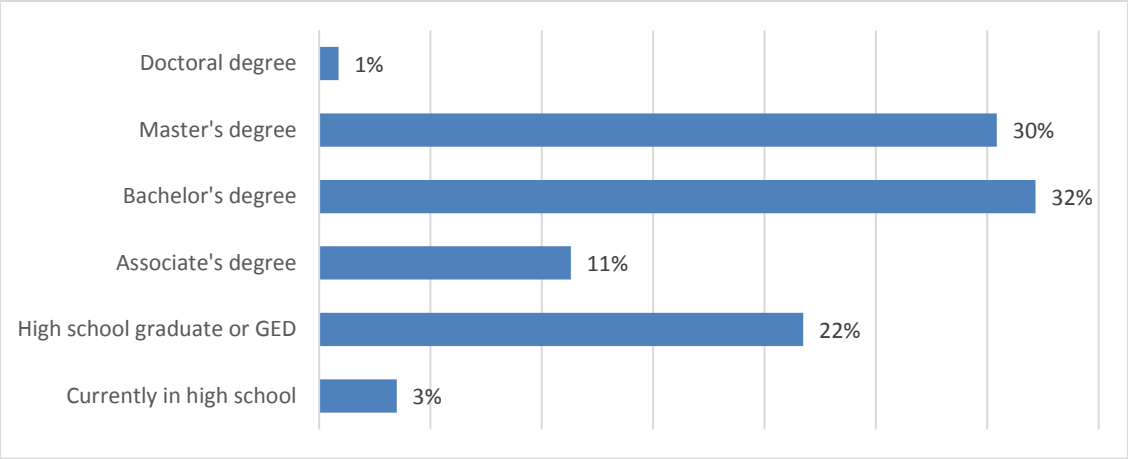
- 68% of staff members were White
- 50% of staff members were female, 49% were male, and 1% of chose not to respond or identified as other gender (table not shown)
- Staff member ages ranged from 18-66, with an average age of 33 years old

Figure 1. Age of Staff Members



Source: Staff survey posttest

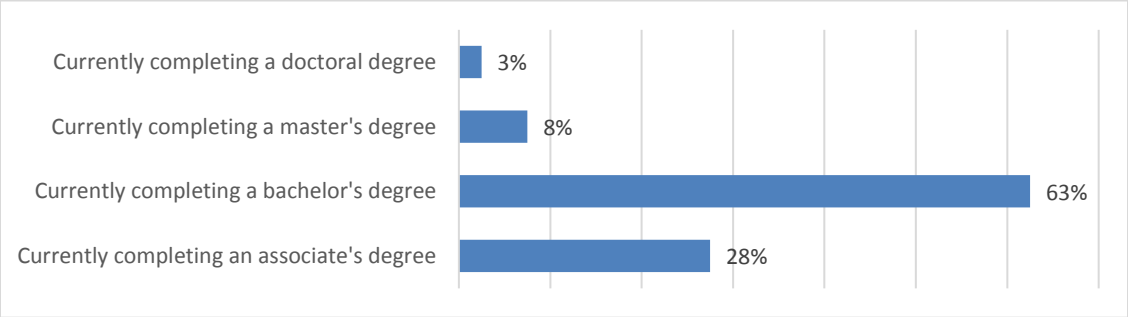
Figure 2. Educational Attainment of Staff Members



Source: Staff survey posttest

- 63% of staff members held a bachelor's degree or higher

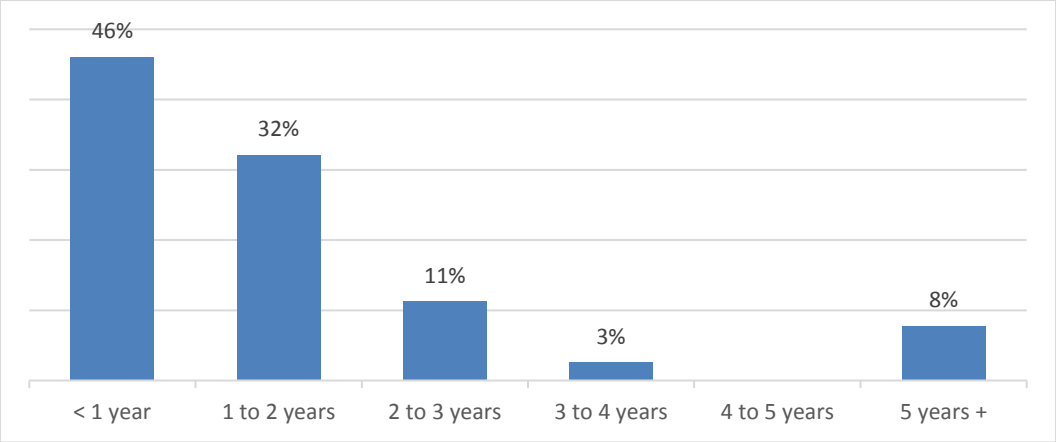
Figure 3. Staff Currently Enrolled at a College or University



Source: Staff survey posttest

- 63% of staff members who were currently enrolled at a college or university were completing a bachelor's degree

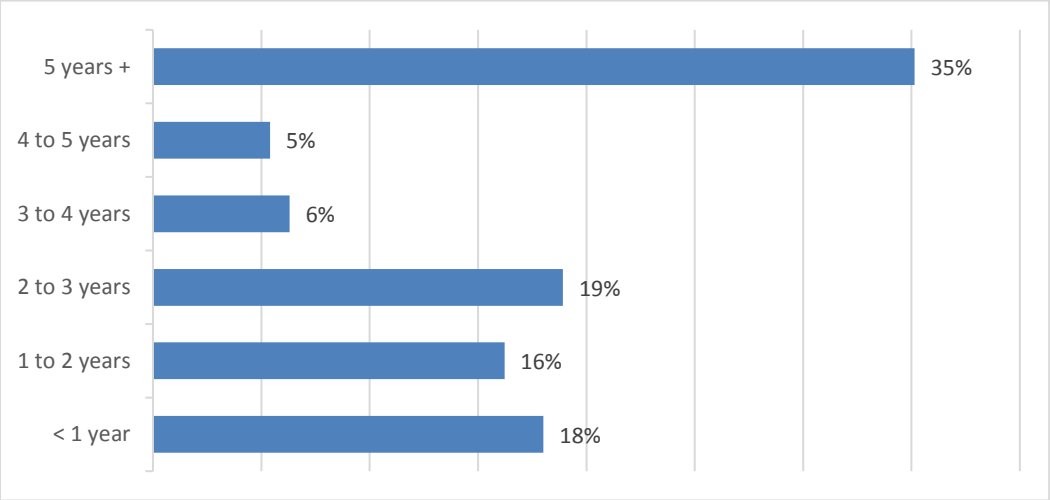
Figure 4. Years Working in Afterschool Program



Source: Staff survey posttest

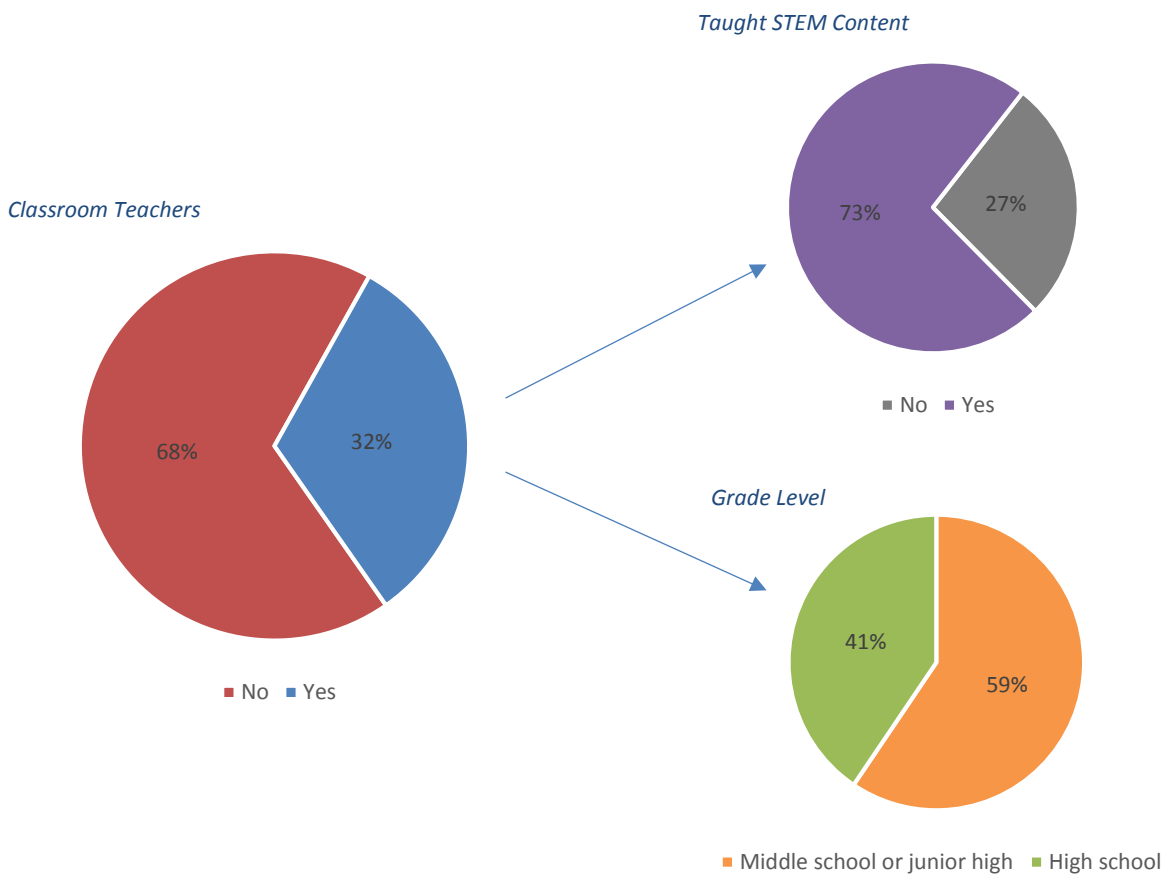
- 46% of staff members had one year or less experience working for their afterschool program

Figure 5. Years of Experience Working with Youth



- 46% had 3 or more years of experience working with youth

Figure 6. Percentage of Program Staff who were also Classroom Teachers and who Taught STEM Content



- Of the 32% of staff members who were classroom teachers, 73% taught STEM content
- Staff members who were also classroom teachers taught either middle school/junior high (41%) or high school (59%)

Source: Staff survey posttest

Professional Development

Seventy-two percent of staff members reported that they participated in a training or professional development session during the 2015-16 academic year. Among the 28% of staff members who did not receive training or PD, 81% reported that they worked fewer than 10 hours per week, 39% were classroom teachers, and 42% were program staff.

Figure 7. Percentage of STEMLink Staff Members who Received PD

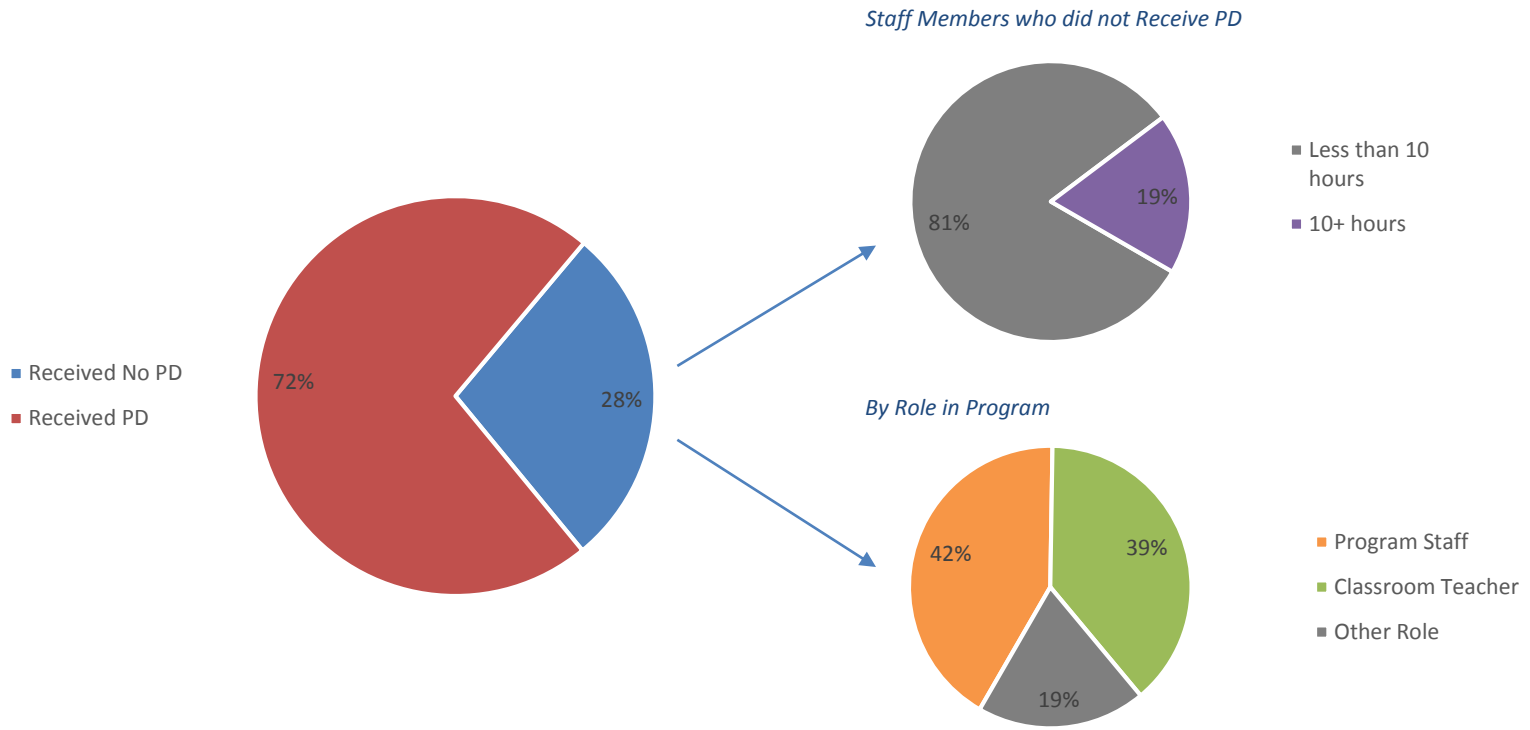
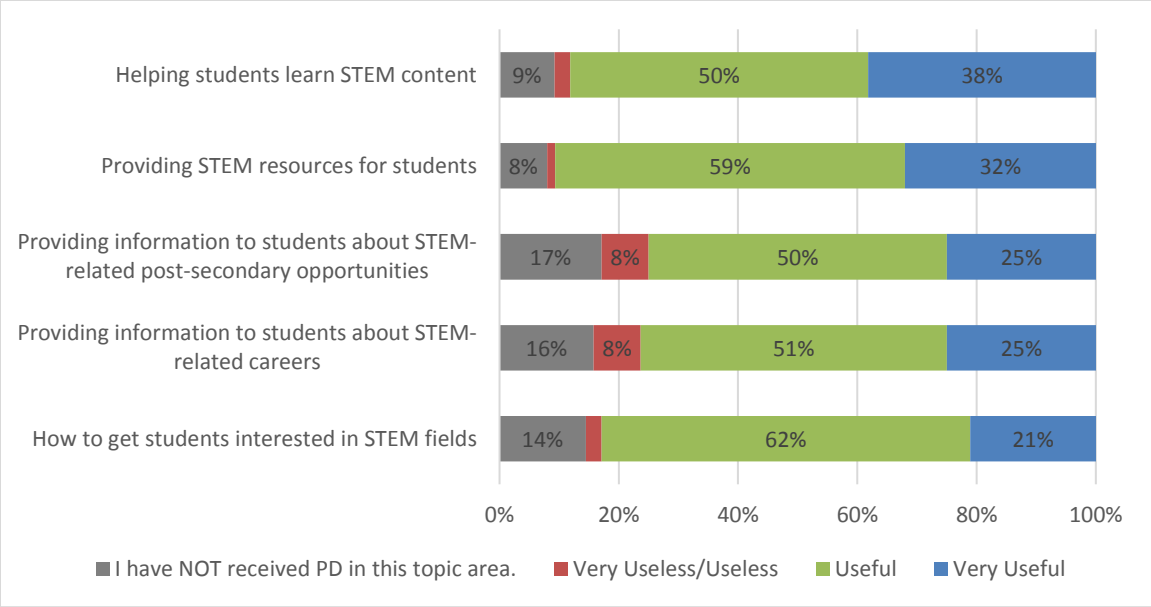


Figure 8. STEM-related Professional Development



Source: Staff survey posttest

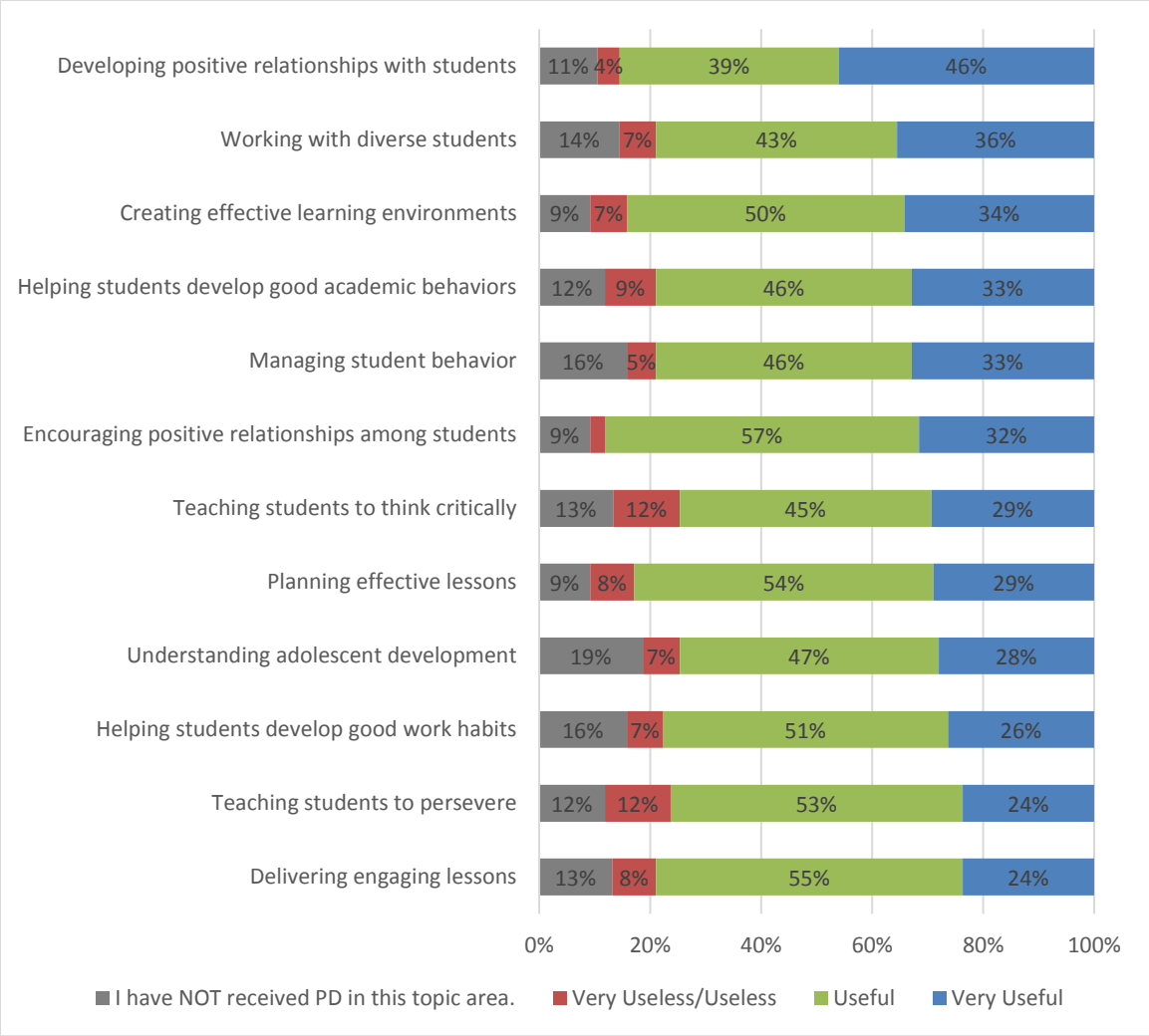
Areas of Success

- ✓ Most staff members found the STEM-related PD they received to be useful or very useful

Opportunities for Improvement

- ➢ Some staff members did not receive PD in topic areas including providing information to students about STEM-related post-secondary opportunities and careers

Figure 9. Usefulness of Afterschool Professional Development received by Staff Members



Source: Staff survey posttest

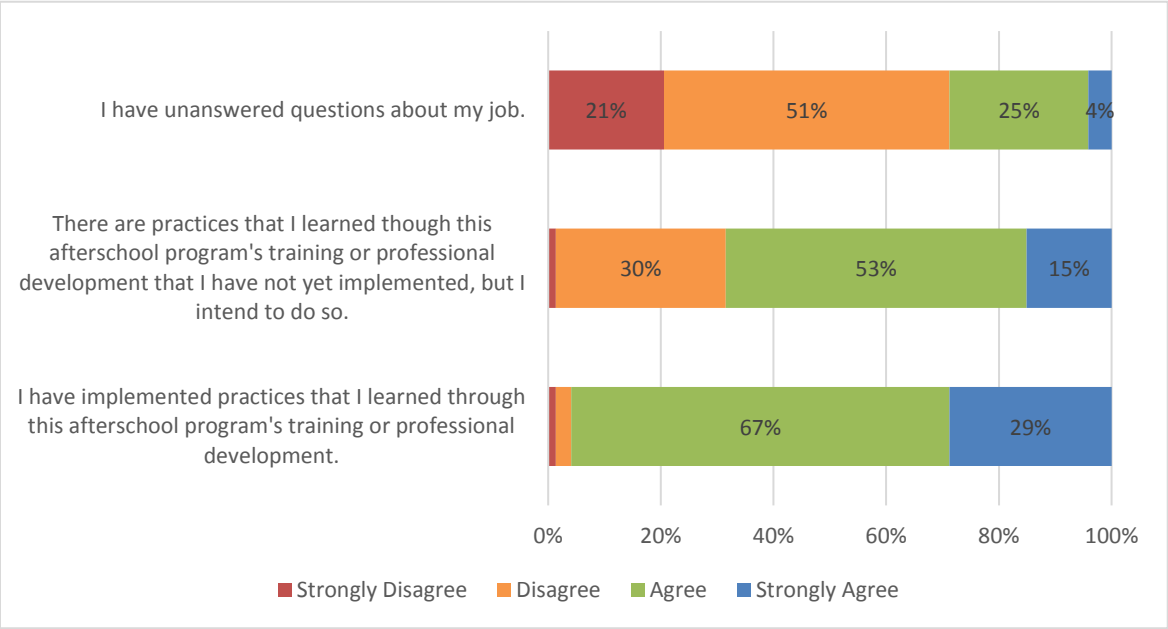
Areas of Success

- ✓ 85% of staff found the PD they received to be useful or very useful for developing positive relationships with students
- ✓ 84% of staff found the PD they received to be useful or very useful for creating effective learning environments
- ✓ 83% of staff found the PD they received to be useful or very useful for planning effective lessons

Opportunities for Improvement

- ➢ 12% did not find the PD useful for teaching students to think critically
- ➢ 12% of did not find the PD useful for teaching students to persevere
- ➢ 26% either did not receive PD or did not find the PD useful for understanding adolescent development

Figure 10. Application of Professional Development



Source: Staff survey posttest

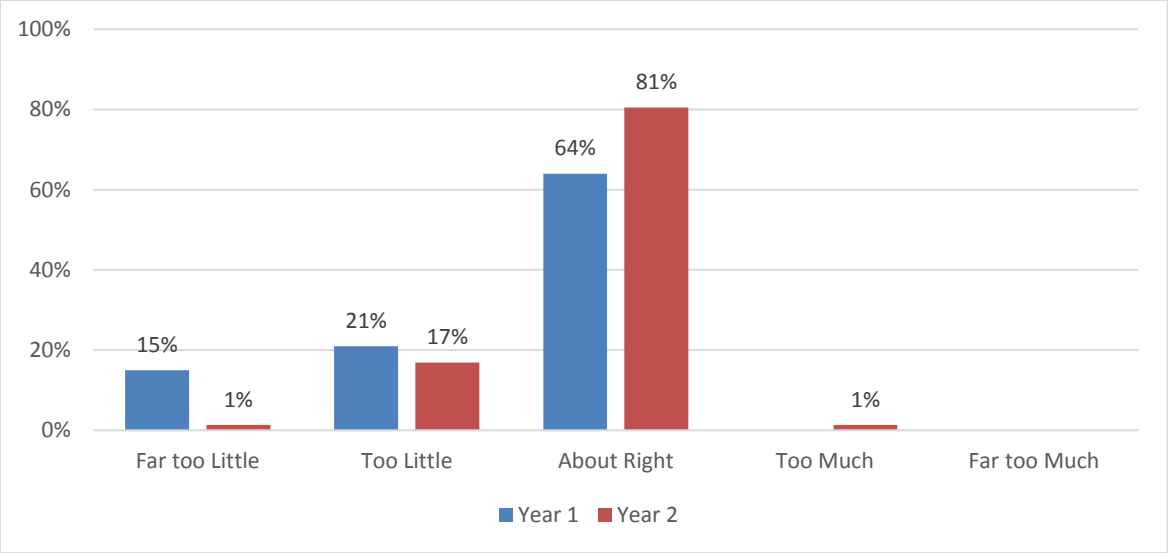
Areas of Success

- ✓ 96% of staff members had implemented practices they learned through their afterschool program's PD
- ✓ 68% intend to implement practices they learned through their afterschool program's PD

Opportunities for Improvement

- ➢ 29% of had unanswered questions about their job

Figure 11. Staff Attitudes about the Amount of Professional Development they Received



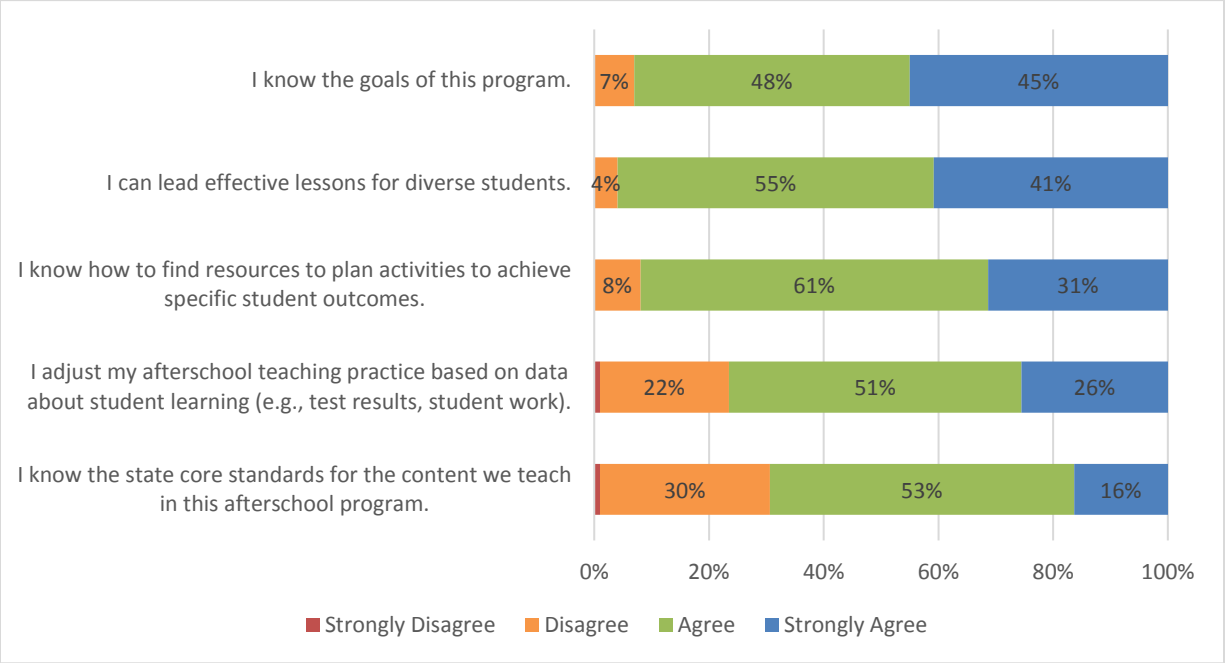
Source: Staff survey posttest

- 81% of staff members were satisfied with the amount of professional development they received

An open-ended survey question asked respondents to identify what topics they would like to learn more about through future professional development opportunities. The most common responses related to academic PD were more information about college and career readiness and STEM teaching strategies. The most common responses related to working with students were classroom behavior and management, differentiating for and working with diverse students, and engaging and motivating students in STEM. See Appendix A for a summary of responses.

Staff Preparedness

Figure 12. Staff Preparedness



Source: Staff survey posttest

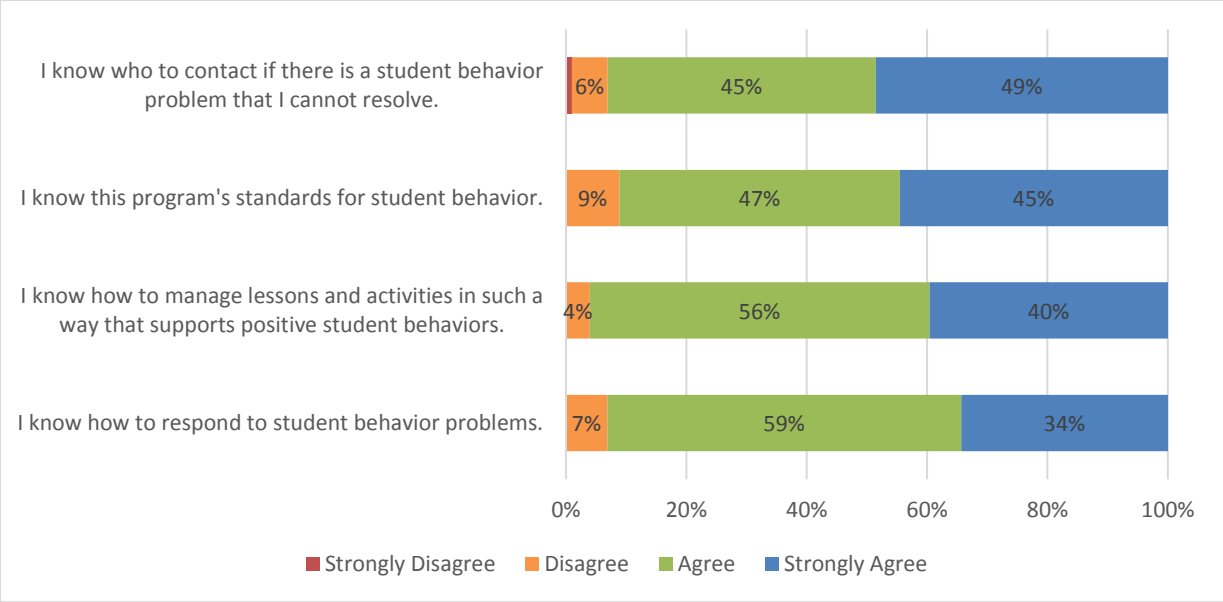
Areas of Success

- ✓ 96% of staff members believed they could lead effective lessons for diverse students

Opportunities for Improvement

- ➢ 31% did not know state core standards for the content they teach in their afterschool program

Figure 13. Staff Members Preparedness to Manage Student Behavior

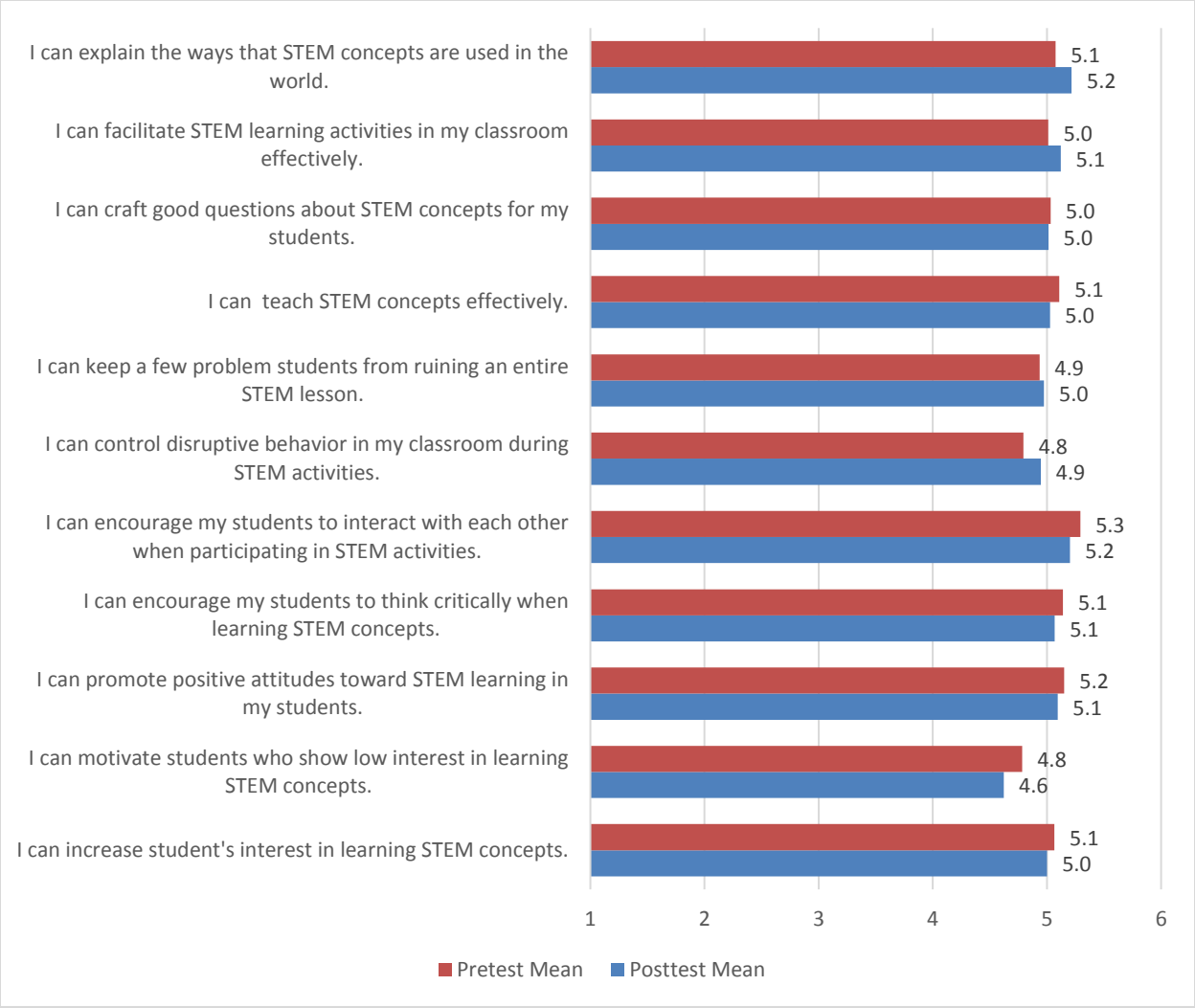


Source: Staff survey posttest

Areas of Success

- ✓ Most staff members (92% or higher) felt prepared to manage student behavior

Figure 14. Staff Members' STEM Teaching Self-Efficacy



Source: Staff survey pretest and posttest

Areas of Success

- ✓ Staff members reported high self-efficacy for STEM-related teaching

Opportunities for Improvement

- ➢ Staff members could continue to increase their self-efficacy for STEM-relating teaching

To what extent did staff members provide quality afterschool programming?

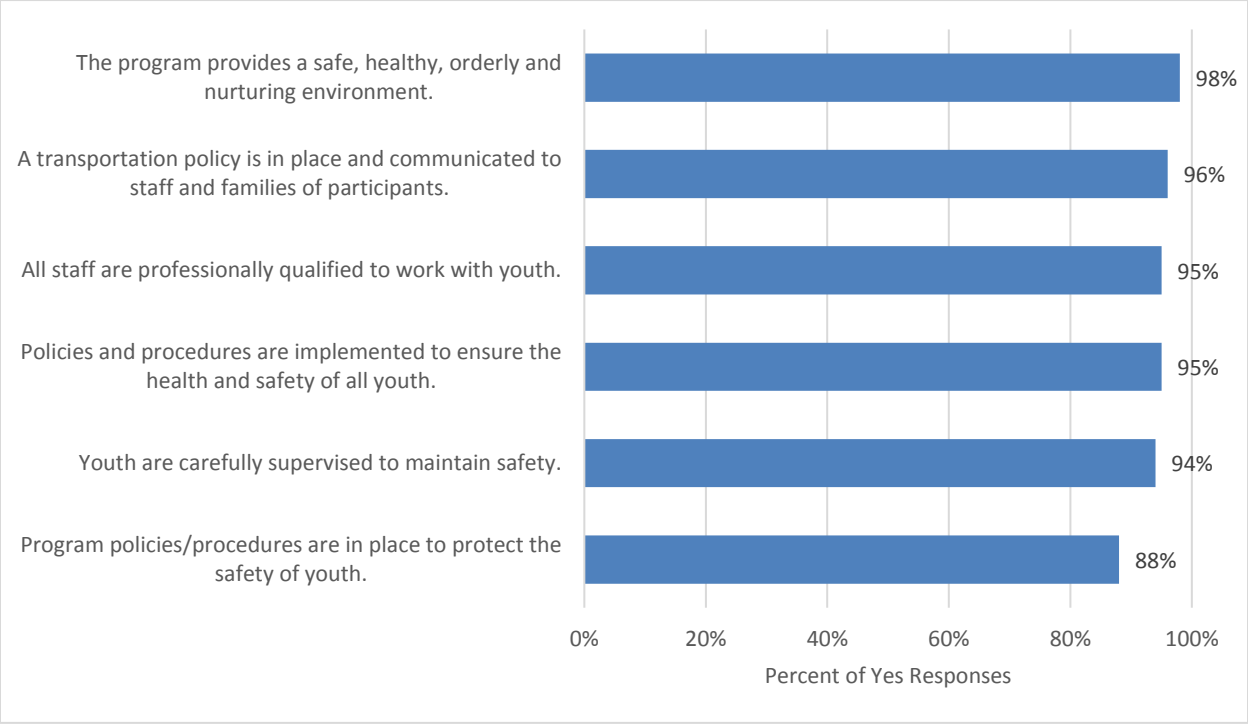
Key Findings:

- Most programs reported meeting quality standards in areas of safety, administrative practices, developing meaningful relationships, and helping students learn new skills. Areas for potential improvement include fostering family involvement and aligning academic support to school-day curricula.
- One third of staff respondents reported trouble communicating with students who did not speak English.
- Almost all student respondents felt that adults in the program went out of their way to help students.
- Almost all student respondents reported that they got along with other students in their programs.
- Almost all student respondents felt included in activities, liked the activities, and had fun at their programs.

Quality Tool Data

Safety

Figure 15. Quality Standards for Afterschool Program Safety



Source: UAN Quality Assessment Tool

Areas of Success

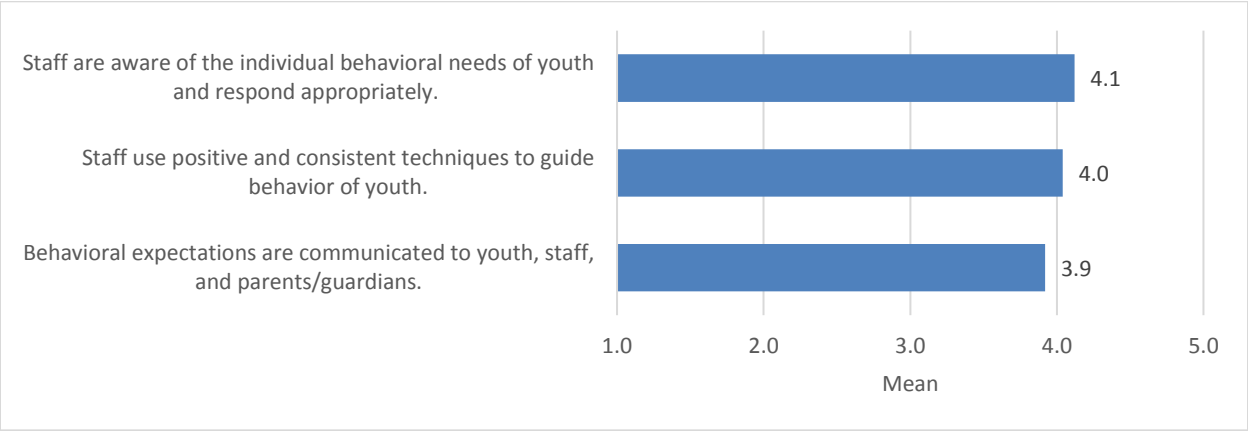
- ✓ Most programs reported that they met quality standards for afterschool program safety

Opportunities for Improvement

- ➢ Some program sites could further develop policies or procedures to protect the safety of youth

Note: See Appendix C for more detail about the Quality Tool data.

Figure 16. Quality Standards for Behavioral Expectations

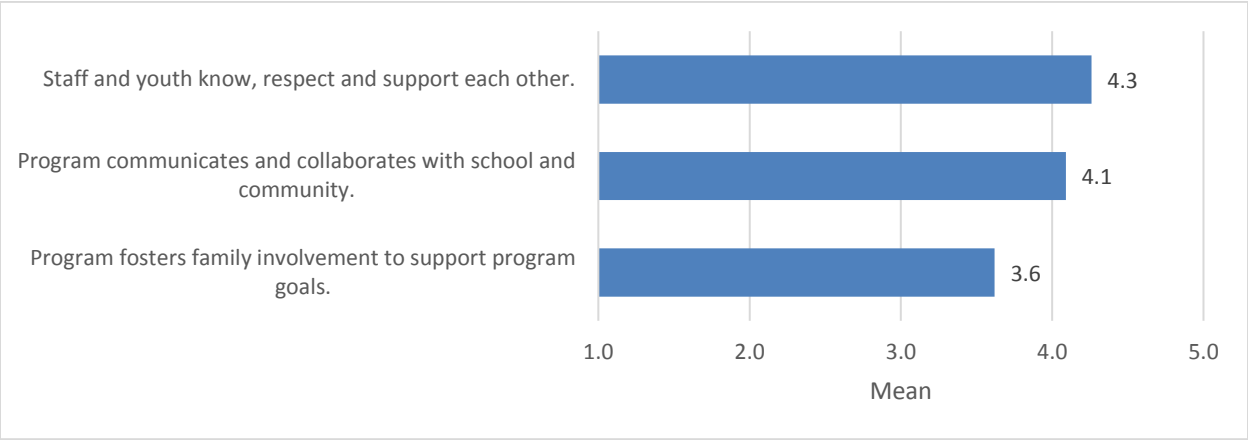


Scale: 1 = Not at all, 2 = Slightly well, 3 = Moderately well, 4 = Very well, 5= Extremely well
Source: UAN Quality Assessment Tool

- Programs reported that they performed very well in their behavior management practices

Developing Meaningful Relationships

Figure 17. Quality Standards for Developing Meaningful Relationships



Scale: 1 = Not at all, 2 = Slightly well, 3 = Moderately well, 4 = Very well, 5= Extremely well
Source: UAN Quality Assessment Tool

Areas of Success

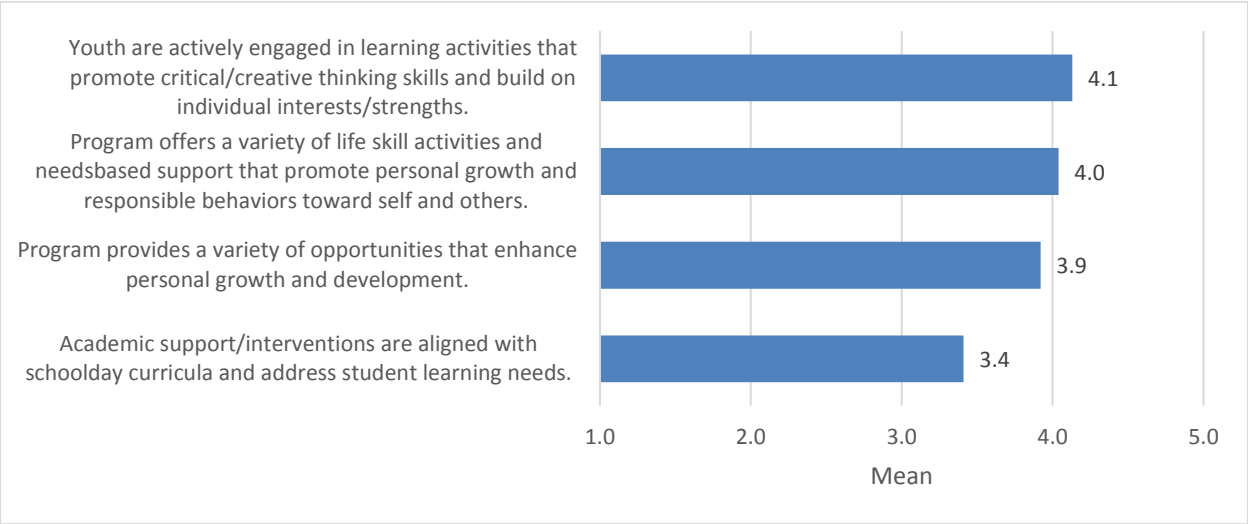
- ✓ On average, programs performed very well in developing meaningful relationships

Opportunities for Improvement

- ➢ Some programs can increase fostering family involvement to support program goals

Learning New Skills

Figure 18. Quality Standards for Learning New Skills



Scale: 1 = Not at all, 2 = Slightly well, 3 = Moderately well, 4 = Very well, 5= Extremely well
Source: UAN Quality Assessment Tool

Areas of Success

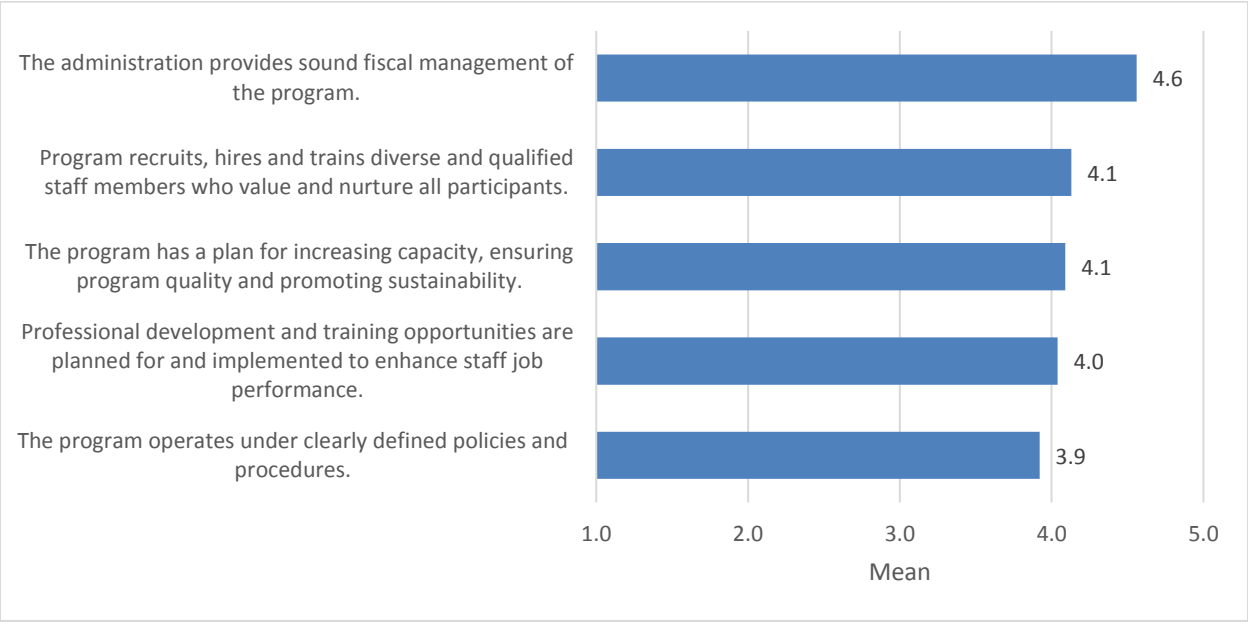
- ✓ On average, programs performed very well in helping students learn new skills

Opportunities for Improvement

- ➢ Some programs can increase their alignment of academic support with school day curricula

Administration

Figure 19. Administrative Program Quality Standards



Scale: 1 = Not at all, 2 = Slightly well, 3 = Moderately well, 4 = Very well, 5= Extremely well
Source: UAN Quality Assessment Tool

Areas of Success

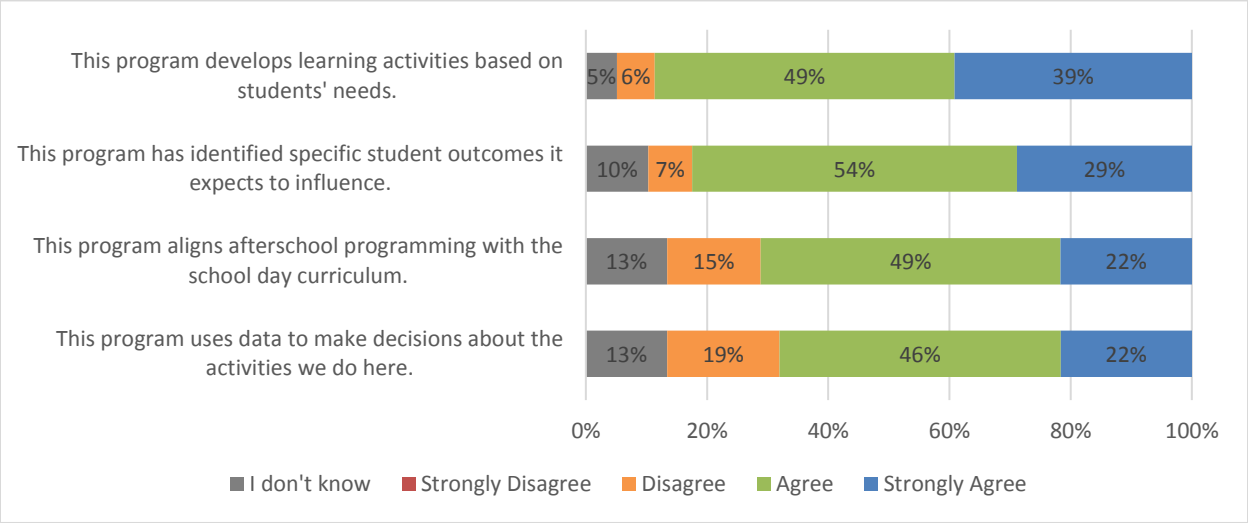
- ✓ Programs performed very well in their administrative practices

Opportunities for Improvement

- ➢ Some programs can improve their use of policies and procedures

Implementation Practices

Figure 20. Goal Oriented and Data-driven Programming



Source: Staff survey posttest

An open-ended survey question provided an opportunity for staff members to comment on their greatest successes working in their respective programs. Staff members felt that their greatest academic successes were helping to improve student academic performance, developing engaging and interactive STEM activities, and fostering student development and learning. They also noted that built meaningful relationships with students. See Appendix A for a summary of responses.

The staff survey also asked staff members to identify ways to improve the quality of programming and better meet students' needs. Sixty-one staff members responded with suggestions about the need for highly qualified and certified staff, more or better resources and improved communication and better organization within the program. See Appendix A for a summary of responses.

Areas of Success

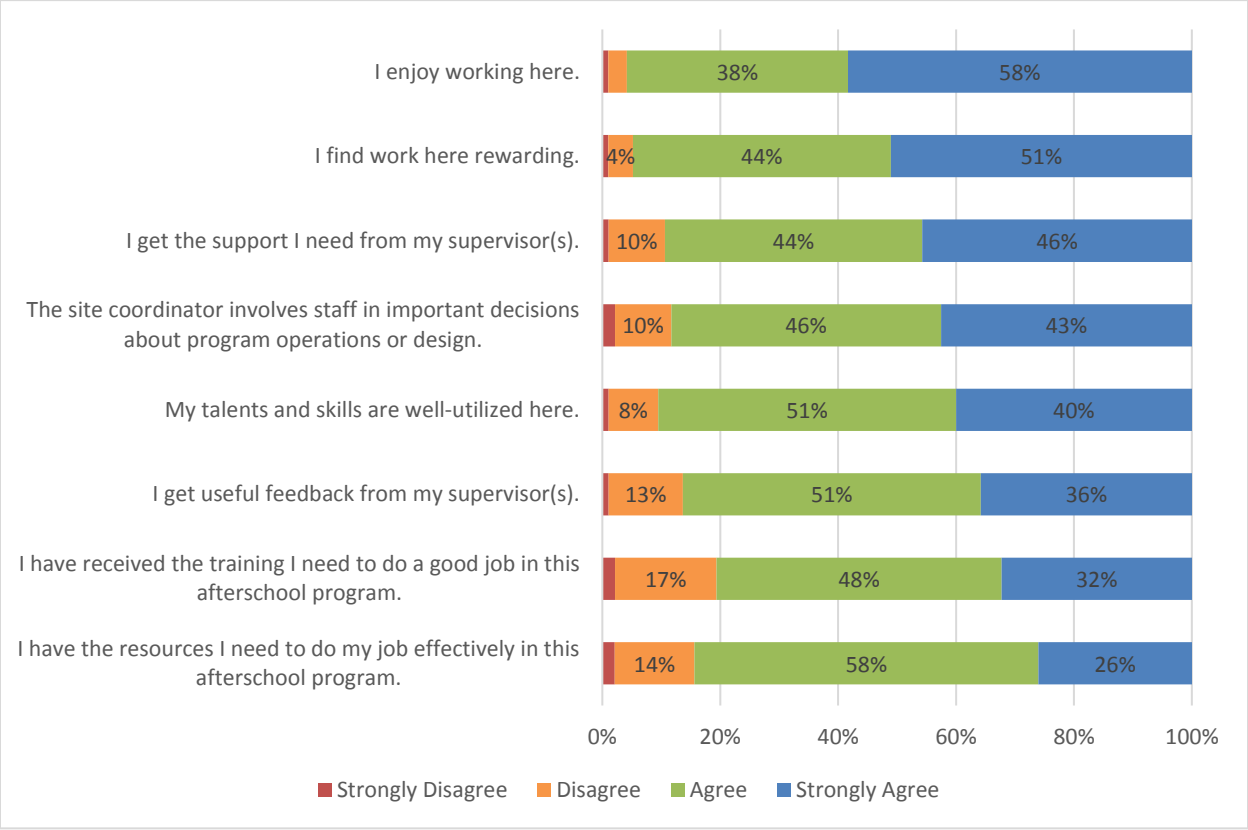
- ✓ 88% of staff members reported that their programs developed learning activities based on students' needs
- ✓ 83% reported that their programs had identified specific student outcomes they expected to influence

Opportunities for Improvement

- ➢ 19% disagreed that their programs used data to make decisions about doing activities

Supports and Barriers

Figure 21. Staff Perceptions of Support



Source: Staff survey posttest

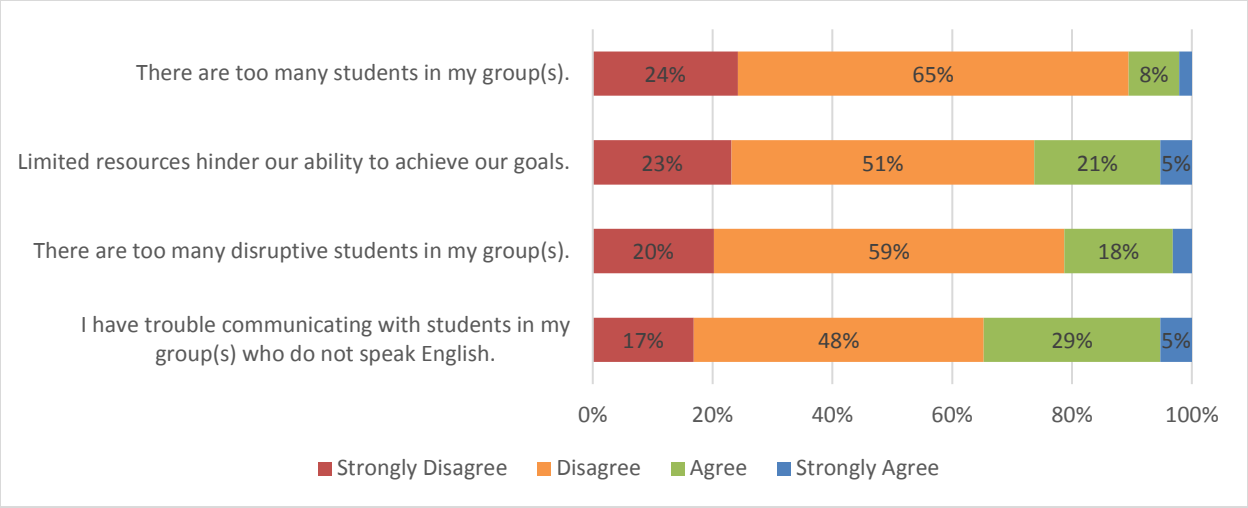
Areas of Success

- ✓ 96% of staff members reported that they enjoyed working at their programs
- ✓ 95% reported that they found their work rewarding

Opportunities for Improvement

- ➢ 19% reported that they had not received the training they needed to do a good job
- ➢ 16% did not have the resources they needed to do their job effectively

Figure 22. Staff Perceptions of Barriers



Source: Staff survey posttest

Sixty-four staff members responded to an open-ended survey question that asked them to identify the additional support(s) they needed to be most effective in their current roles. The most requested supports included more or improved STEM resources, more funding, and additional training for managing student behavior or classroom management. See Appendix A for a summary of responses.

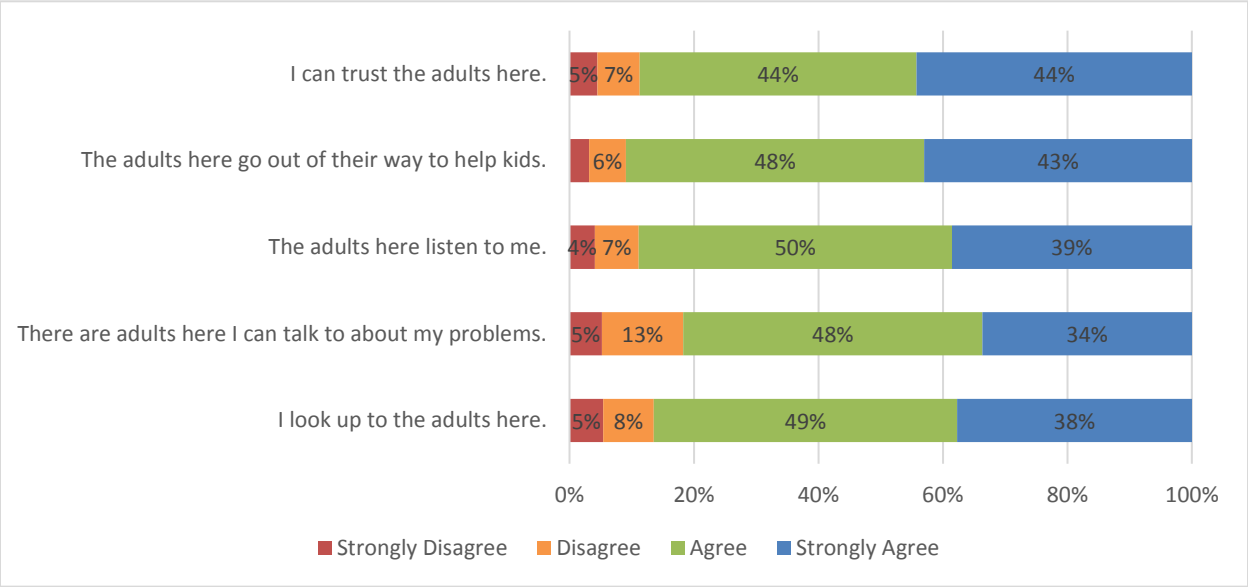
Areas of Success

- ✓ 84% of staff members disagreed that there were too many students in their group
- ✓ 79% disagreed that there were too many disruptive students in their groups

Opportunities for Improvement

- ➢ 34% expressed that they had trouble communicating with students in their groups who do not speak English

Figure 23. Student Perceptions of Adults in their Afterschool Program



Source: Student survey posttest

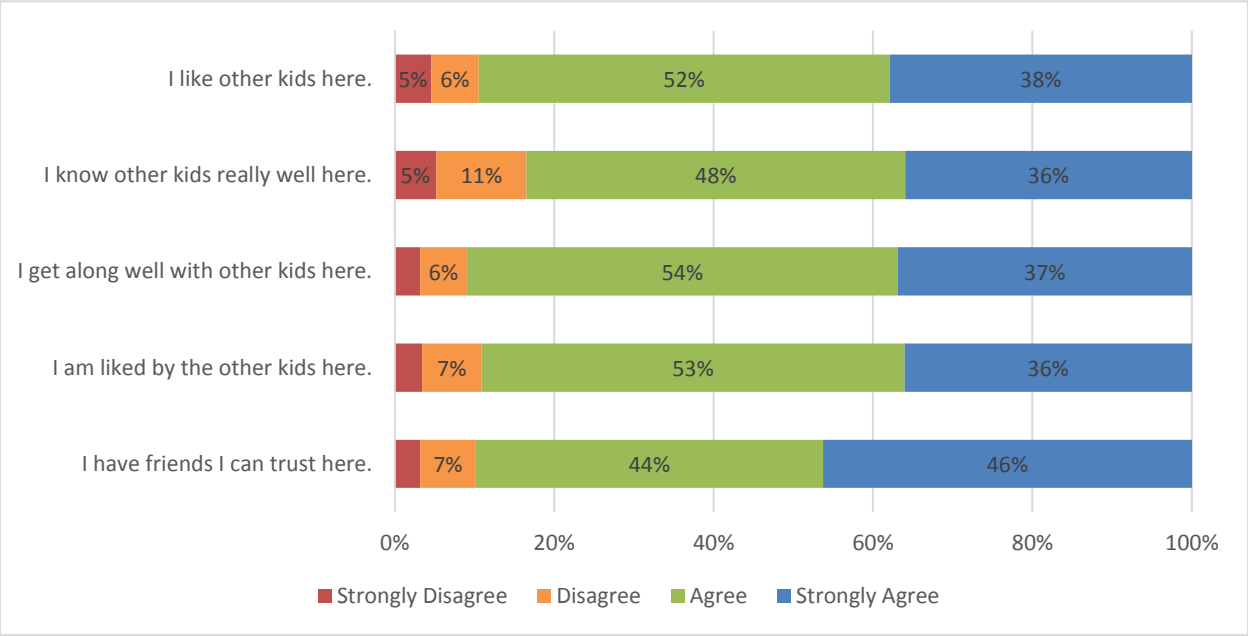
Areas of Success

- ✓ 91% of students felt that the adults in their program went out of their way to help kids

Opportunities for Improvement

- ➢ 18% did not have adults in the programs they could talk to about their problems

Figure 24. Student Perceptions of Peers in their Afterschool Program



Source: Student survey posttest

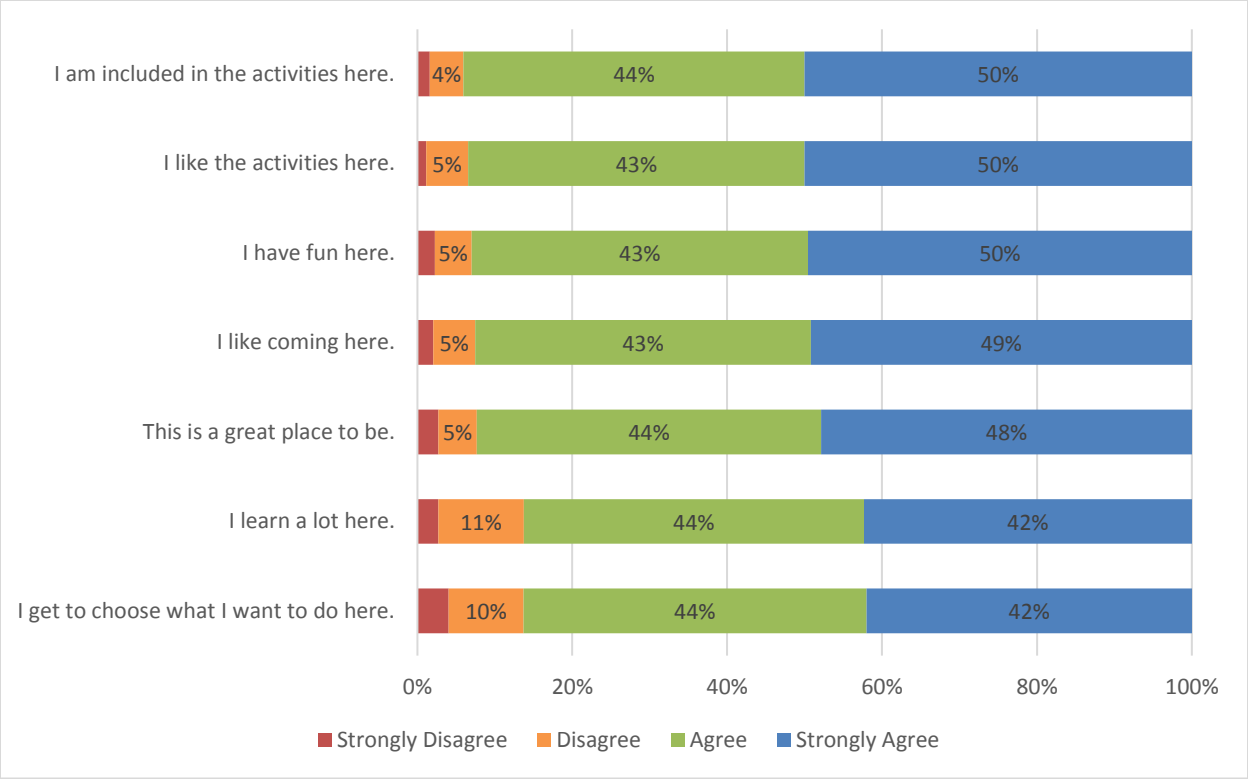
Areas of Success

- ✓ 91% of students reported that they got along well with the kids in their program

Opportunities for Improvement

- ➢ 16% did not know other kids in their program well

Figure 25. Posttest Responses for Positive Program Experiences



Source: Student survey posttest

Areas of Success

- ✓ 94% of students felt included in program activities
- ✓ 93% liked the activities and had fun at their afterschool programs

Opportunities for Improvement

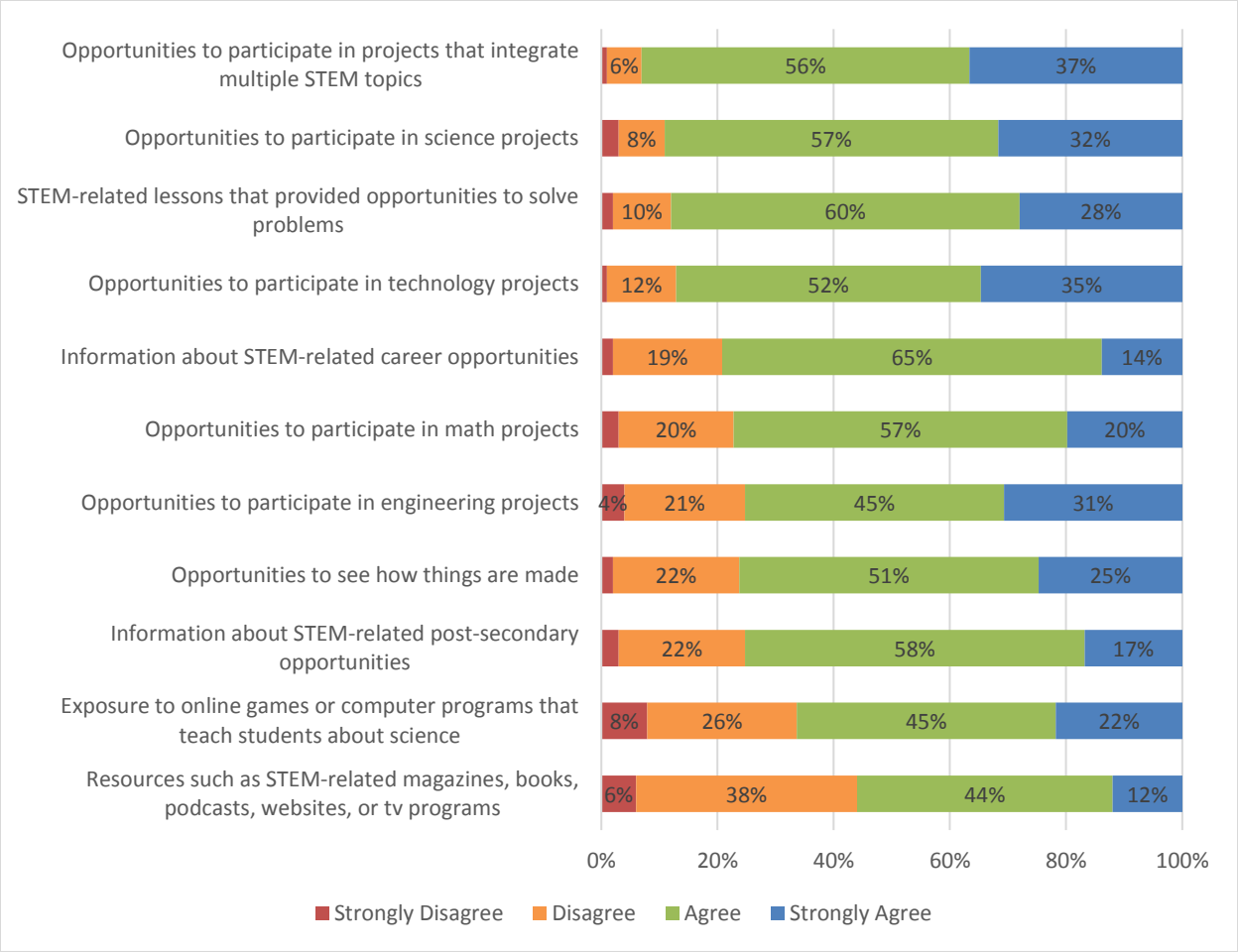
- ➢ 14% felt that they did not get to choose what they wanted to do in their programs

To what extent did the STEMLink programs provide STEM-related learning opportunities and prevention learning opportunities for participants?

Key Findings:

- The most common STEM-related opportunities that staff respondents provided were projects that integrated multiple STEM topics.
- The least common STEM-related learning opportunities included making STEM learning resources available and providing students with information about STEM-related post-secondary opportunities.
- Staff respondents reported that they provided effective learning environments, engaging lessons, and helped students learn positive academic behaviors.
- Reported average program attendance was lower than expected, with about 28% of students attending fewer than 30 days.
- Reported average participation in STEM interventions was lower than expected, with about one-third of students receiving no science interventions.
- Many STEMLink students received at least one day of prevention activities.
- The average number of days students participated in prevention activities was relatively low.

Figure 26. Staff Reported STEM Opportunities Provided to Students



Source: Staff survey posttest

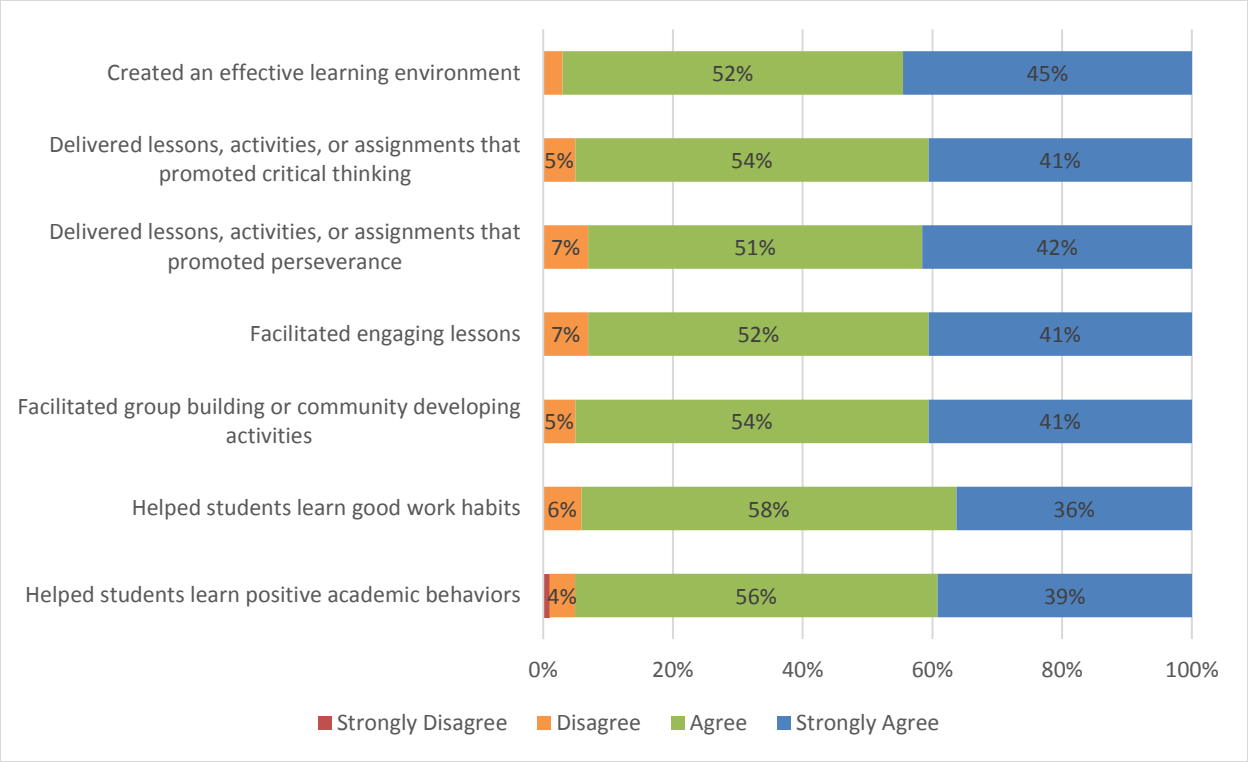
Areas of Success

- ✓ 93% of staff members reported that they provided opportunities to participate in projects that integrated multiple STEM topics
- ✓ 88% provided students with STEM-related lessons and opportunities to solve problems

Opportunities for Improvement

- ➢ 44% disagreed that they provided students with resources such as STEM-related magazines, books, and other media
- ➢ 25% disagreed that they provided information about STEM-related post-secondary opportunities

Figure 27. Afterschool Opportunities Provided for Students



Source: Staff survey posttest

Areas of Success

- ✓ 97% of staff members reported that they provided effective learning environments
- ✓ 95% provided engaging lessons, facilitated group building or community developing activities, and helped students learn positive academic behaviors

Program Attendance and Participation

Each STEMLink afterschool program reported the number of days students attended their programs and the number of possible days of attendance for each student. Evaluators asked program administrators to provide further detail by reporting the number of STEM and prevention education activities in which students participated.

Programs reported Programs serving 2,845 students, who attended a total of 71,467 days. The average number of days attended was 25.1 (SD = 28.24). Most students (72%) attended for 29 days or less, 17% attended 30 – 59 days, 7% attended 60 -89 days, and 5% attended 90 or more days. The overall average attendance rate across programs was 29% (days of attendance / days of possible attendance). The average attendance rate ranged from 4% to 88% across programs.

Table 12. Participation Summary

Intervention	Number of Students	Percent of Students
Science	1,970	69%
Technology	2,001	70%
Engineering	1,661	58%
Math	1,965	69%
Prevention	2,205	78%

Source: Participation data submitted by STEMLink programs

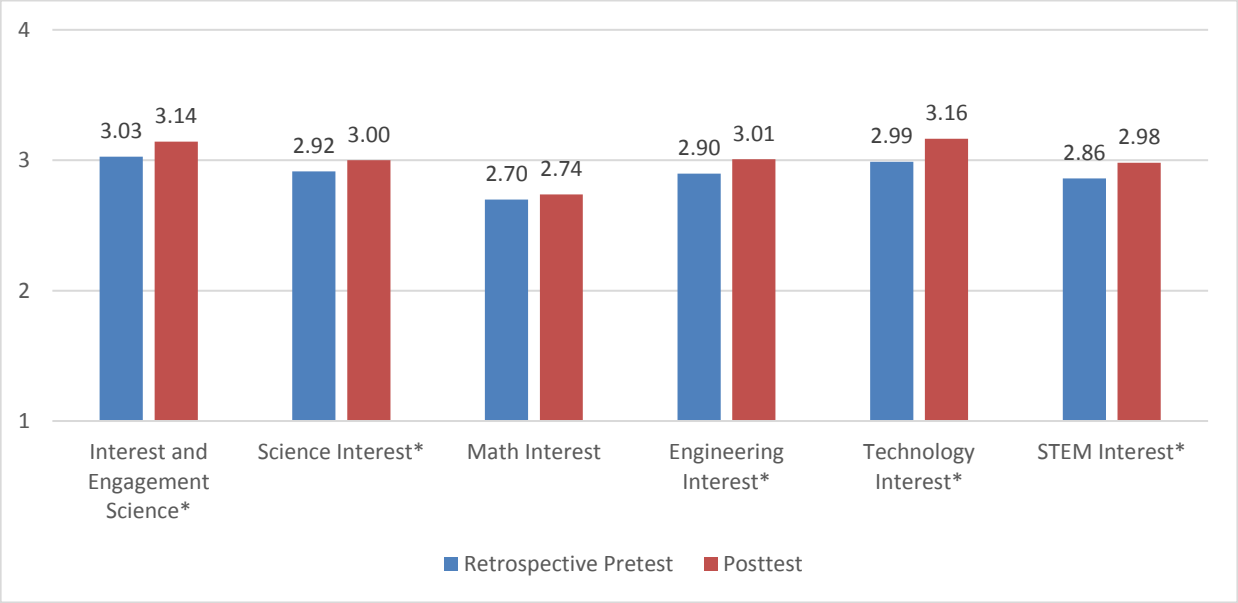
Program Outcomes: Year Two (2015-16)

To what extent did students' interest in STEM change?

Key Findings:

- On average, students reported increased interest in science, engineering, and technology.
- On average, students reported increased frequency of doing STEM activities.

Figure 28. Retrospective Pretest and Posttest Mean Scores for Student Interest in STEM



- Students reported increased interest in STEM

Source: Student survey retrospective pretest and posttest; *Statistically significant difference between retrospective pretest and posttest

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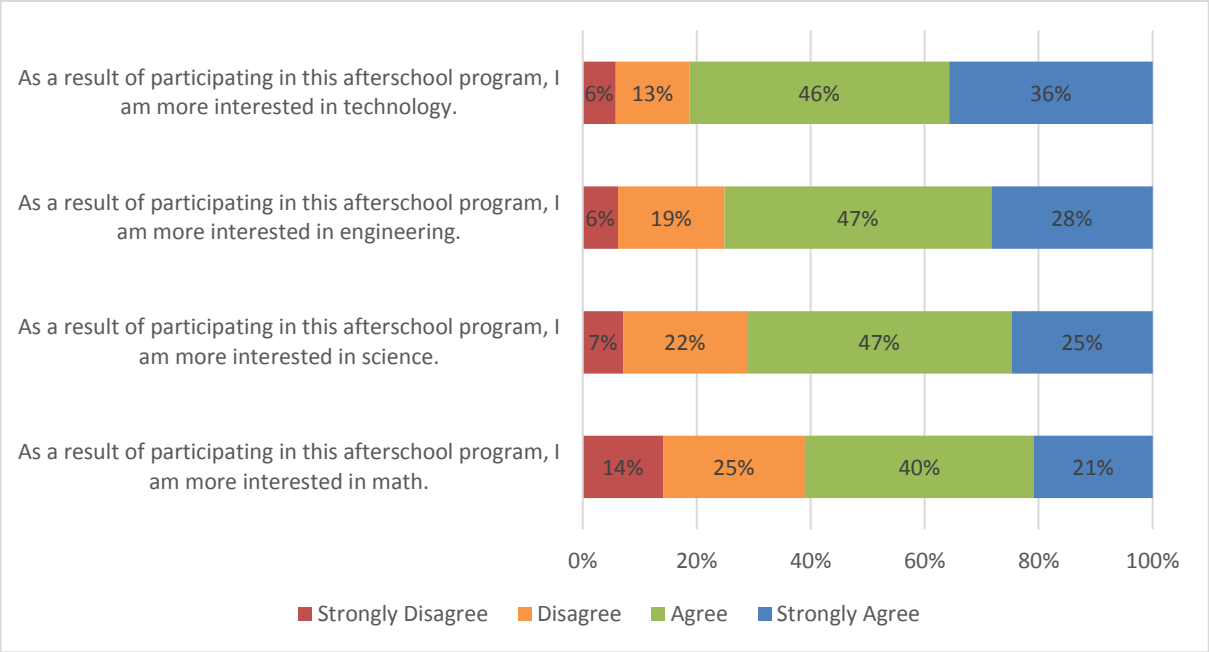
THE UNIVERSITY OF UTAH

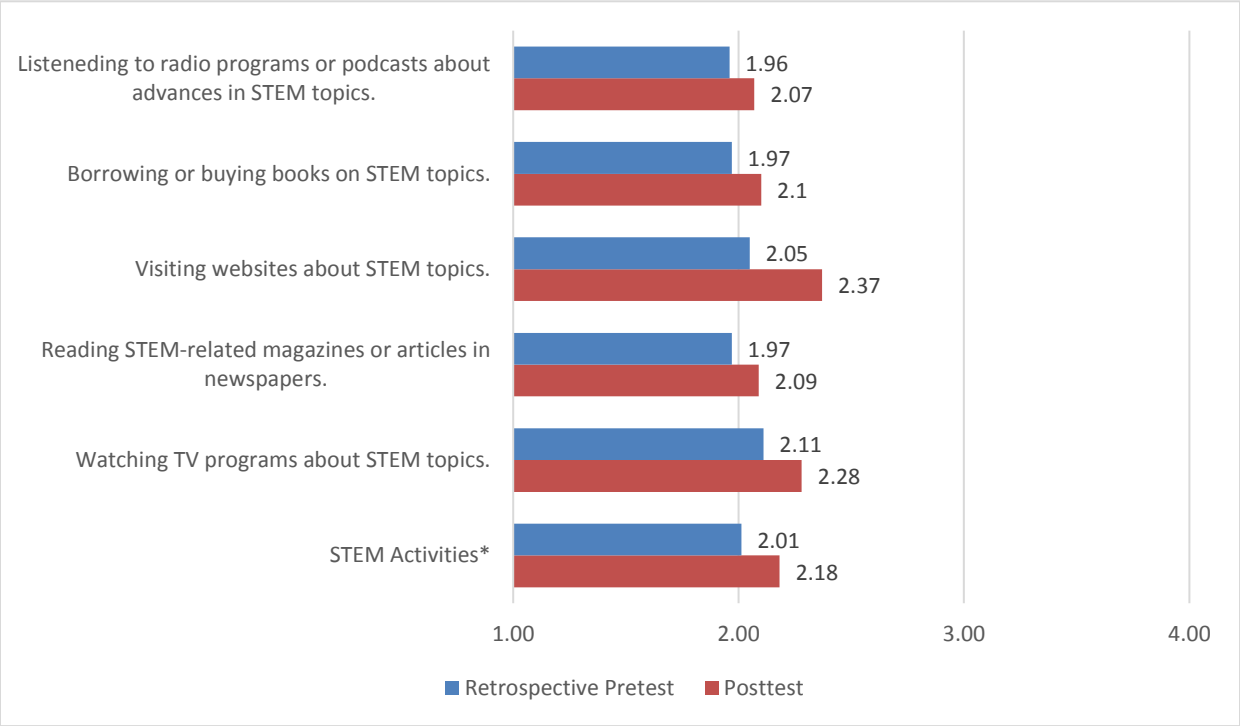
Figure 29. Posttest Responses for Interest in STEM Subjects



Source: Student survey posttest

- 80% of students reported increased interest in technology as a result of participating in the program
- 75% of students reported increased interest in engineering as a result of participating in the program
- 70% of students reported increased interest in science as a result of participating in the program
- 60% of students reported increased interest in math as a result of participating in the program

Figure 30. Frequency of Engaging in STEM Activities



Source: Student survey retrospective pretest and posttest; *Statistically significant difference between retrospective pretest and posttest for engaging in STEM activities

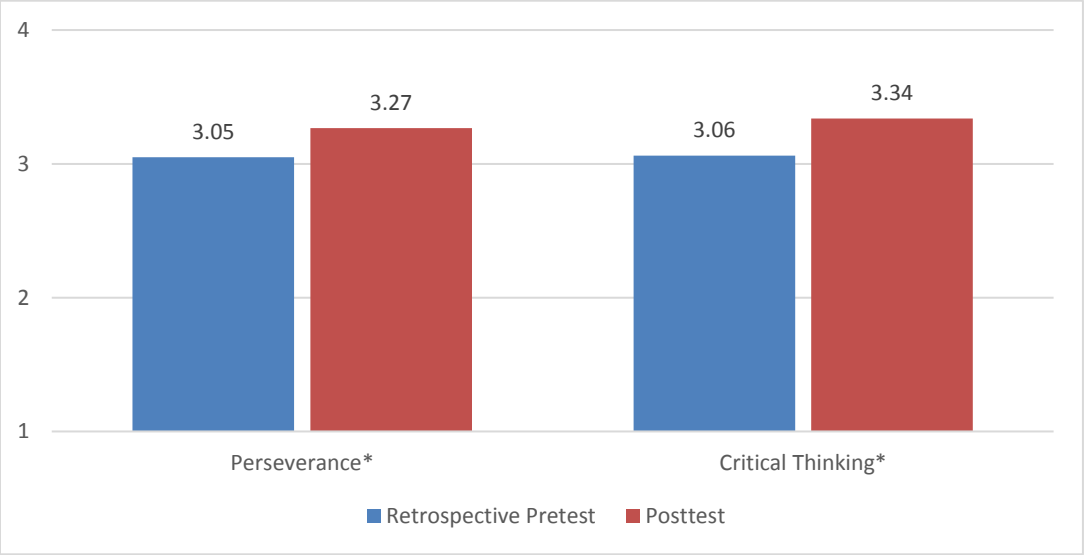
- Students reported increased frequencies of engaging in STEM activities

To what extent did students' STEM skills (critical thinking and perseverance) change?

Key Findings:

- On average, students reported increased perseverance and critical thinking.

Figure 31. STEM Skills Pretest and Posttest Mean Scores



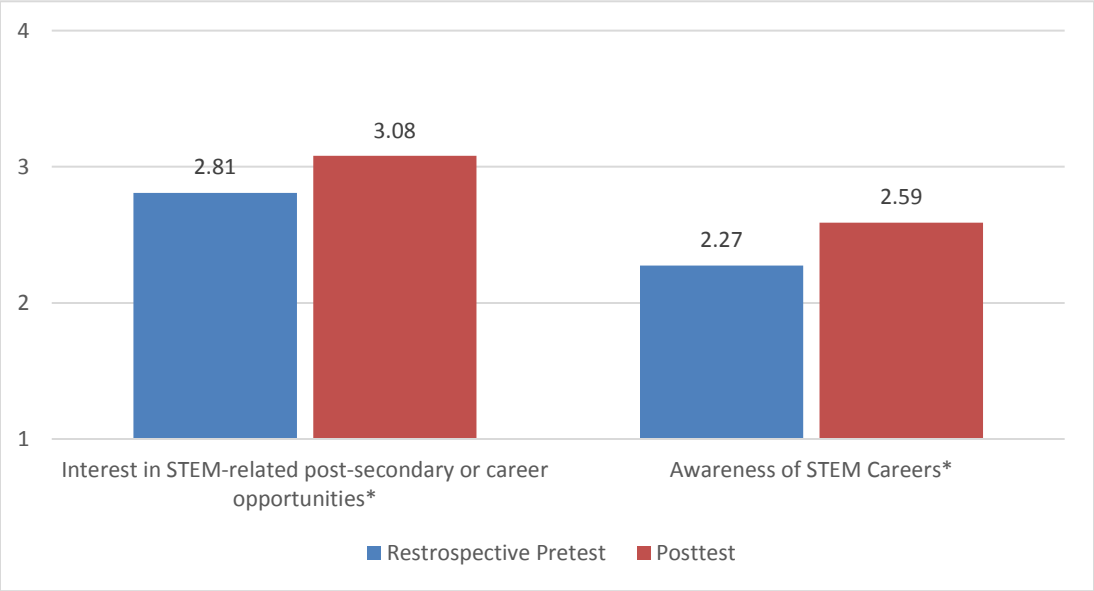
Source: Student survey retrospective pretest and posttest;
*Statistically significant difference between retrospective pretest and posttest

To what extent did students' awareness of and interest in STEM-related post-secondary opportunities and career information change?

Key Findings:

- On average, students reported increased interest in STEM-related postsecondary or career opportunities and increased awareness of STEM careers.
- On average, students had greater interest than they had awareness for future opportunities in STEM fields.

Figure 32. Retrospective Pretest and Posttest Mean Scores for Interest in and Awareness of Future in STEM Fields



Source: Student survey retrospective pretest and posttest (n = 446); *Statistically significant difference between retrospective pretest and posttest

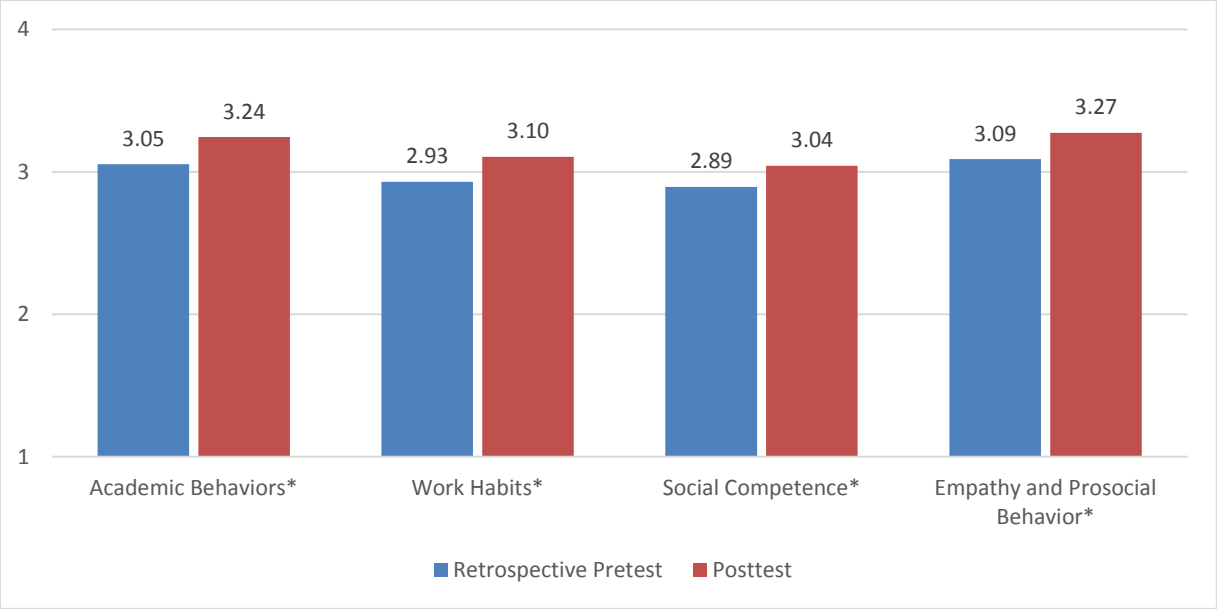
Students also responded to an open-ended survey question that asked them to identify the aspects of the program that changed their interest in, or awareness of, STEM. The most frequently cited responses included increased learning, participating in activities, and greater awareness of future STEM-related opportunities. See Appendix A for a summary of responses.

To what extent did students perceive change in social competencies, empathy and prosocial behaviors, academic behaviors, work habits, and misconduct?

Key Findings:

- On average, students perceived significant increases in academic behaviors, work habits, social competency, and empathy and prosocial behaviors.

Figure 33. Pretest and Posttest Mean Scores for Afterschool Outcomes



Source: Student survey retrospective pretest and posttest (n = 446);
*Statistically significant difference between retrospectivepretest and posttest

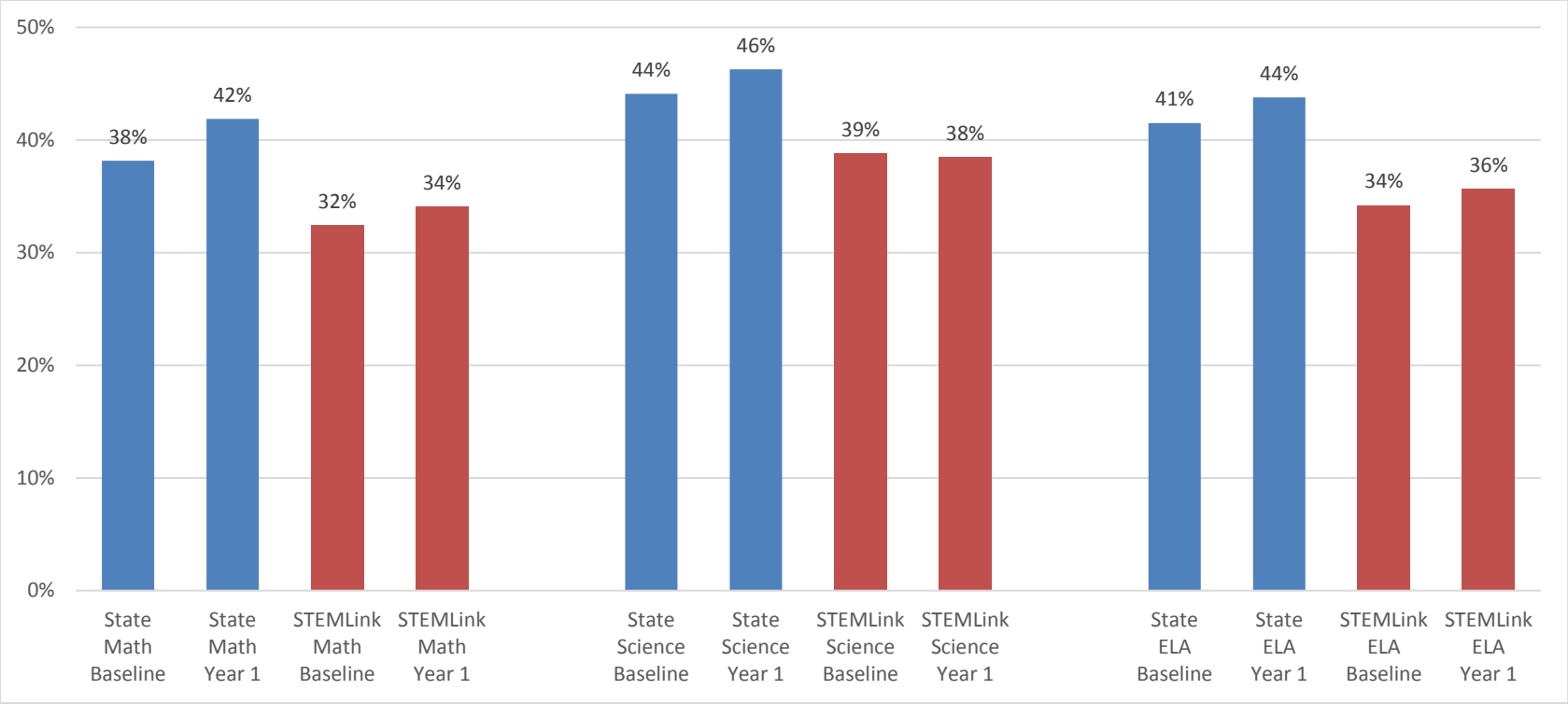
Academic and School Attendance Outcomes: Year One (2014-15)

What were the proficiency rates of STEMLink participants at baseline (2013-14) and year one (2014-15)?

Key Findings:

- STEMLink students' proficiency rates increased less than the statewide average from baseline to year one in math and English language arts.
- STEMLink students' proficiency rates did not improve from baseline to year one in science.

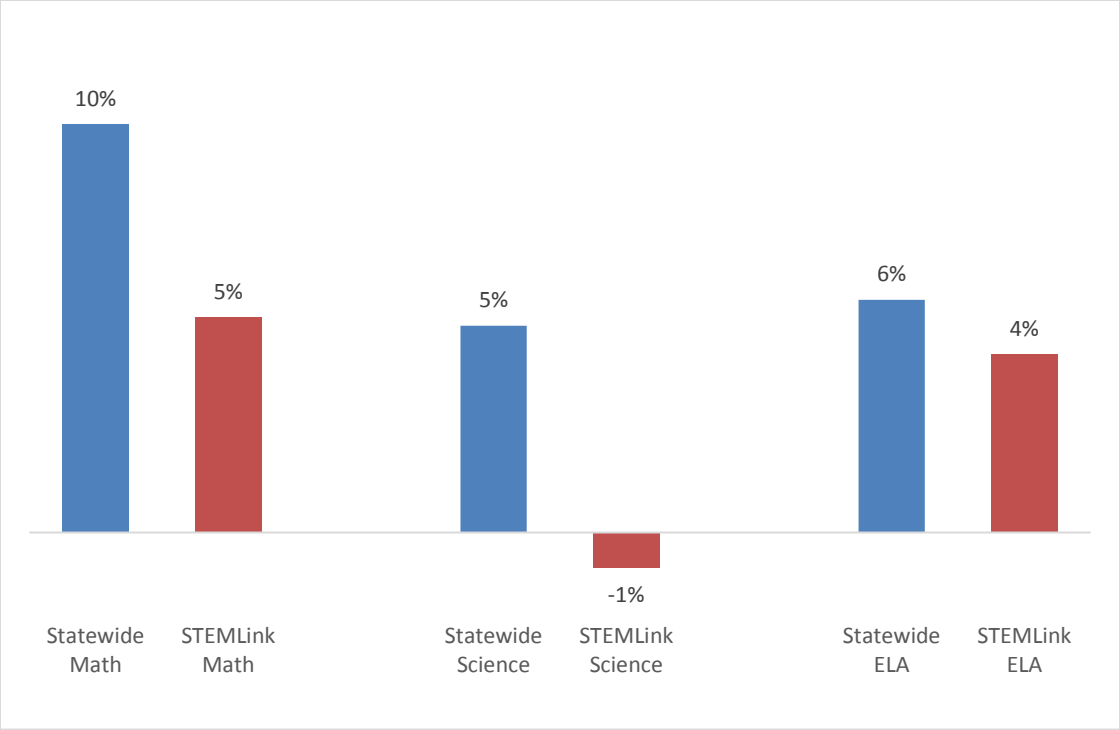
Figure 34. Percent Point Difference of Student Proficiencies by Tested Subject from Baseline (2013-14) to Year One (2014-15)



Source: Participant education data (2013-14 and 2014-15)
Note: See Appendix D for grade levels included in these proficiency ratings.

- Average math proficiency rates increased 4 percentage points statewide and increased 2 percentage points for STEMLink students
- Average science proficiency rates increased 2 percentage points statewide and decreased 1 percentage point for STEMLink students
- Average English language arts proficiency rates increased 3 percentage points statewide and increased 2 percentage points for STEMLink students

Figure 35. Percent Change in Student Proficiency Rates from Baseline (2013-2014) to Year One (2014-15)



Source: Participant education data (2013-14 and 2014-15)
Note: See Appendix D for grade levels included in these proficiency ratings.

- Statewide, students' math proficiency rates improved by 10%. STEMLink student's math proficiency rates improved by 5%.
- Statewide, students' science proficiency rates improved by 5%. STEMLink student's science proficiency rates declined by 1%.
- Statewide, students' English language arts proficiency rates improved by 6%. STEMLink student's English language arts proficiency rates improved by 4%.

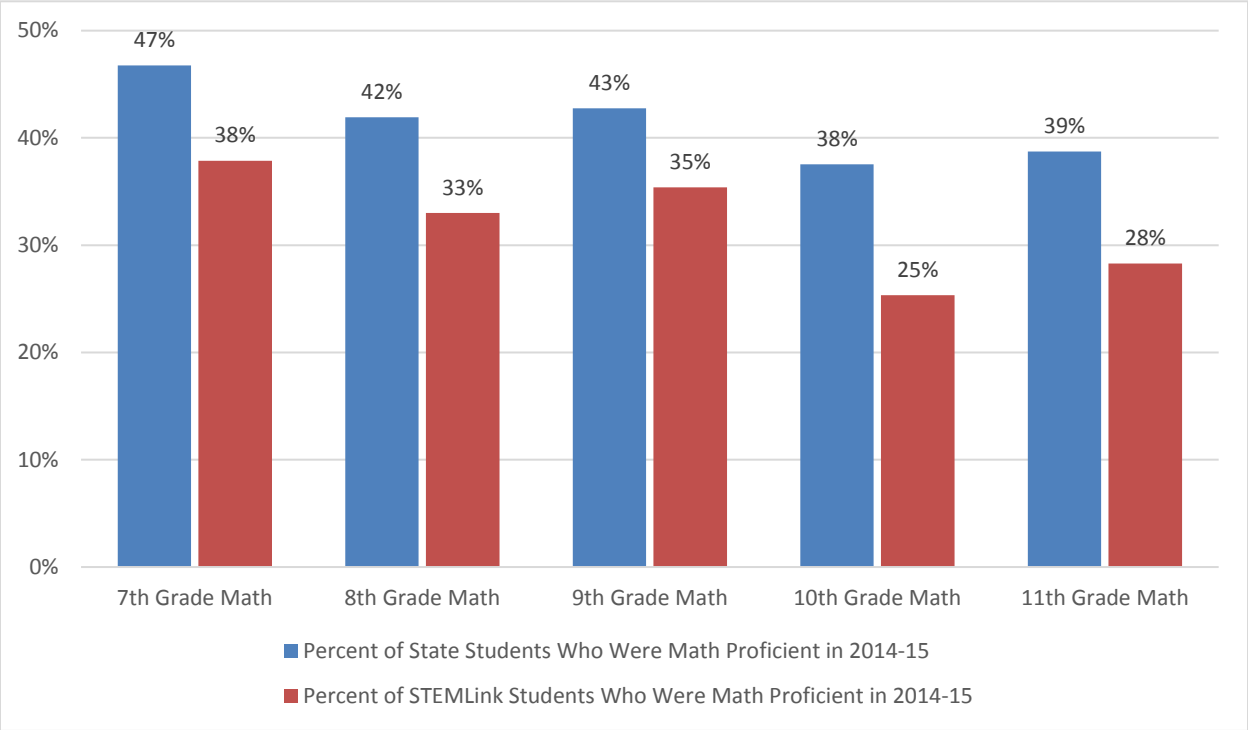
What was the relationship between STEMLink program attendance and student achievement?

In this section we provide descriptive figures of academic outcomes (see Appendix D) and key findings from the results of predictive models. We used three multiple linear regression models to answer this evaluation question. The models used participants' days of STEMLink program attendance, student characteristics, and test scores from the baseline year (2013-14) to predict academic achievement in all three tested subjects. We used Utah's standardized Student Assessment of Growth and Excellence (SAGE) test scores for mathematics, science, and English language arts (ELA). Further details about these three models, including tables of results, are available in Appendix E.

Key Findings:

- STEMLink student proficiency rates in math, science, and English language arts were lower than statewide averages, indicating that the program was serving students who could benefit from additional academic support.
- There was a positive relationship between program attendance and **math** SAGE scores. For every four days students attended a STEMLink program there was a one-point increase in year one math scores.
- We found no statistical relationship between program attendance and **science** or **ELA** SAGE scores.
- Low-income students and English language learners had significantly lower test scores in math, science, and ELA than other students. Hispanic students had significantly lower test scores than white students.

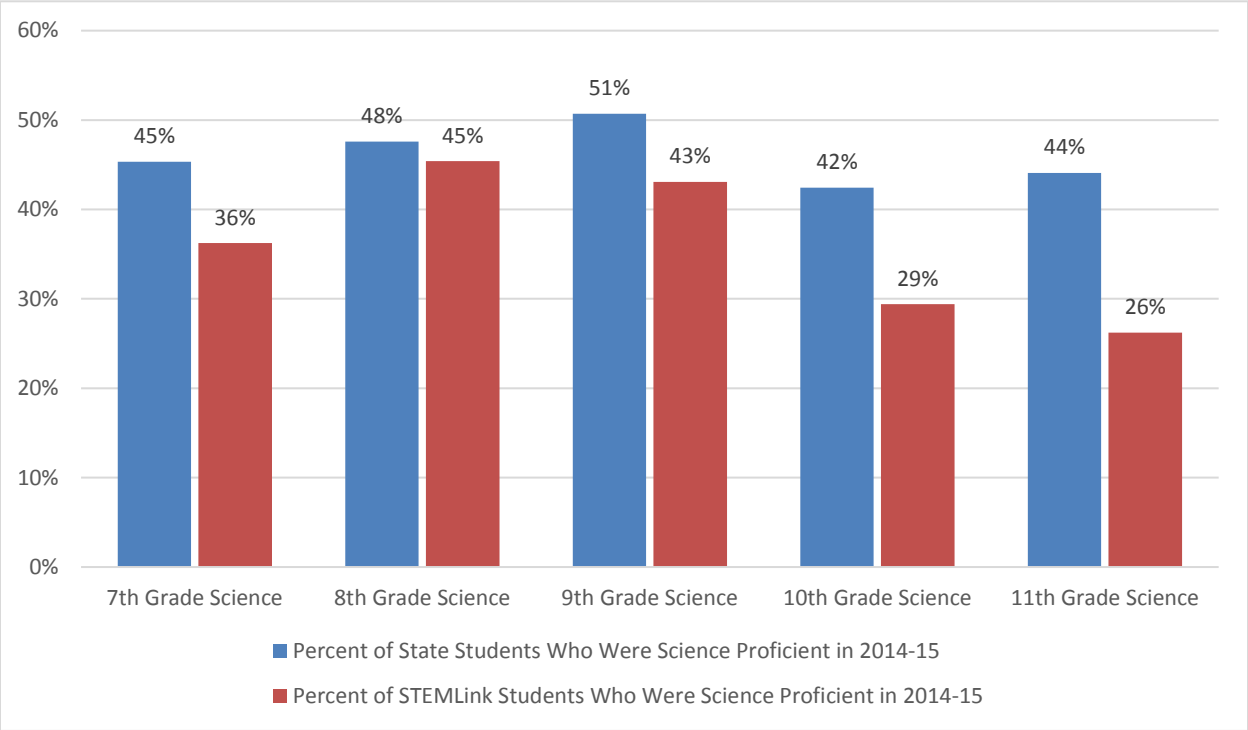
Figure 36. Percent of Math Proficient Students in Year One (2014-15)



Source: Participant education data (2014-15)

- STEMLink students' math proficiency ratings were lower than the statewide average in year one

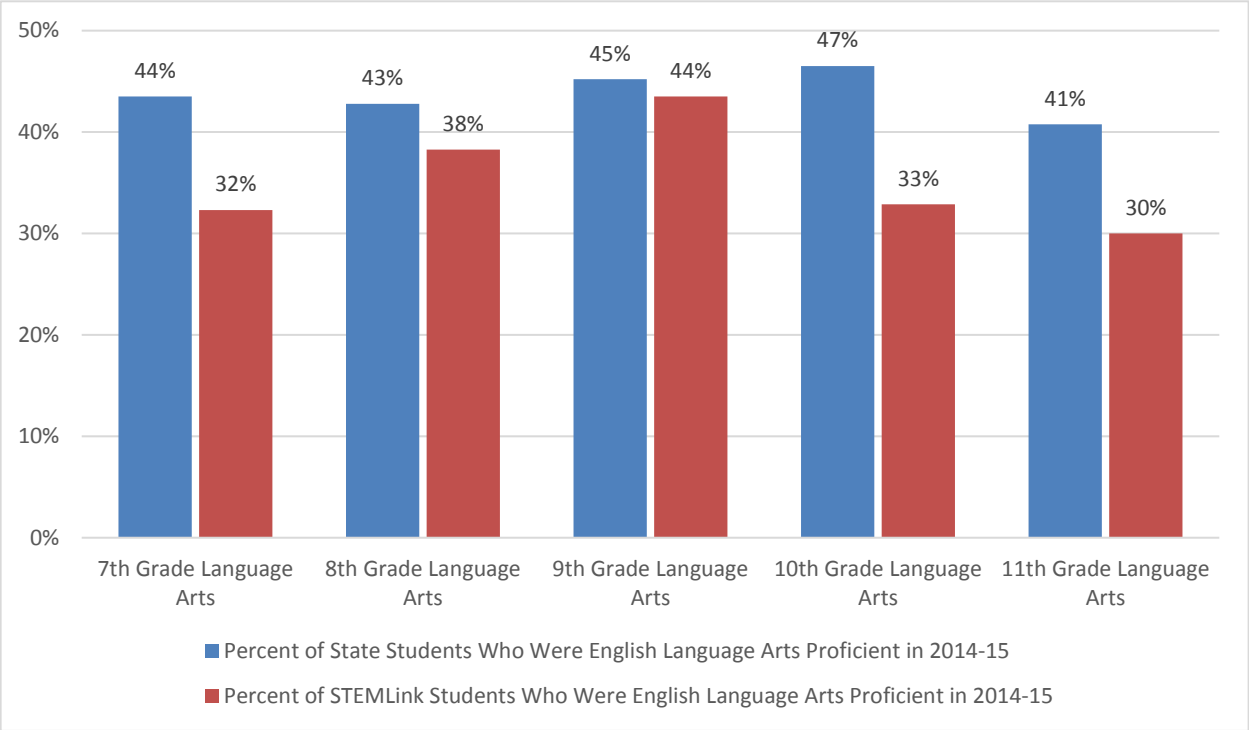
Figure 37. Percent of Science Proficient Students in Year One (2014-15)



Source: Participant education data (2014-15)

- STEMLink students' science proficiency ratings were lower than the statewide average in year one

Figure 38. Percent of English Language Arts Proficient Students in Year One (2014-15)



Source: Participant education data (2014-15)

- STEMLink students' English language arts proficiency ratings were lower than the statewide average in year one

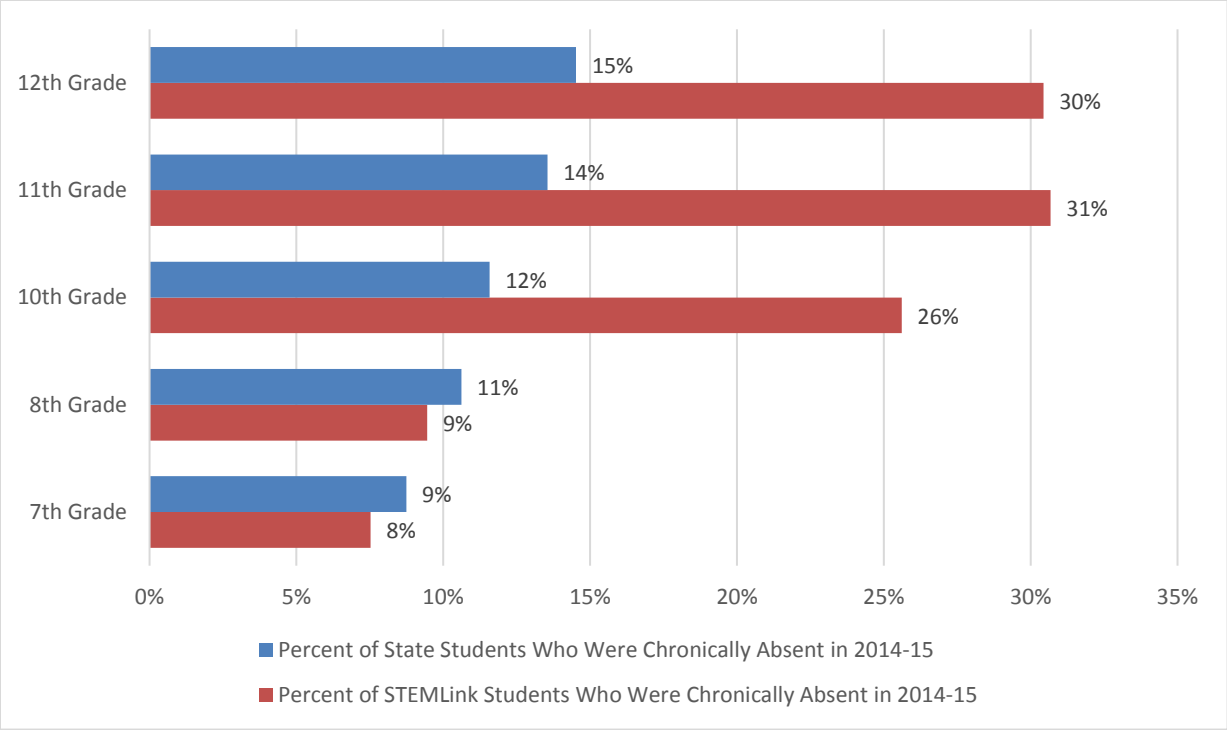
What was the relationship between STEMLink program participation and chronic absence?

Here we provide descriptive figures (see Appendix D) and key findings from the results of a logistic regression model. We used the model to determine the odds of being chronically absent in relationship to program attendance. Similar to the other models, we statistically controlled for student characteristics. Further details about the model, including a table of results, are available in Appendix E.

Key Findings:

- Rates of chronic absence for STEMLink students were generally higher than the state average, indicating that the program was serving students who needed additional support.
- Rates of chronic absence for STEMLink students from baseline to year one were relatively similar.
- There was a statistically significant relationship between program attendance and chronic absence. For every day a student attended a STEMLink program, the odds of the student being chronically absent decreased by 1.6%.
- Asian students were less likely to be chronically absent than white students and Hispanic students were about twice as likely as white students to be chronically absent. Students who were mobile, and those who received free or reduced lunch, were more likely to be chronically absent than other students.

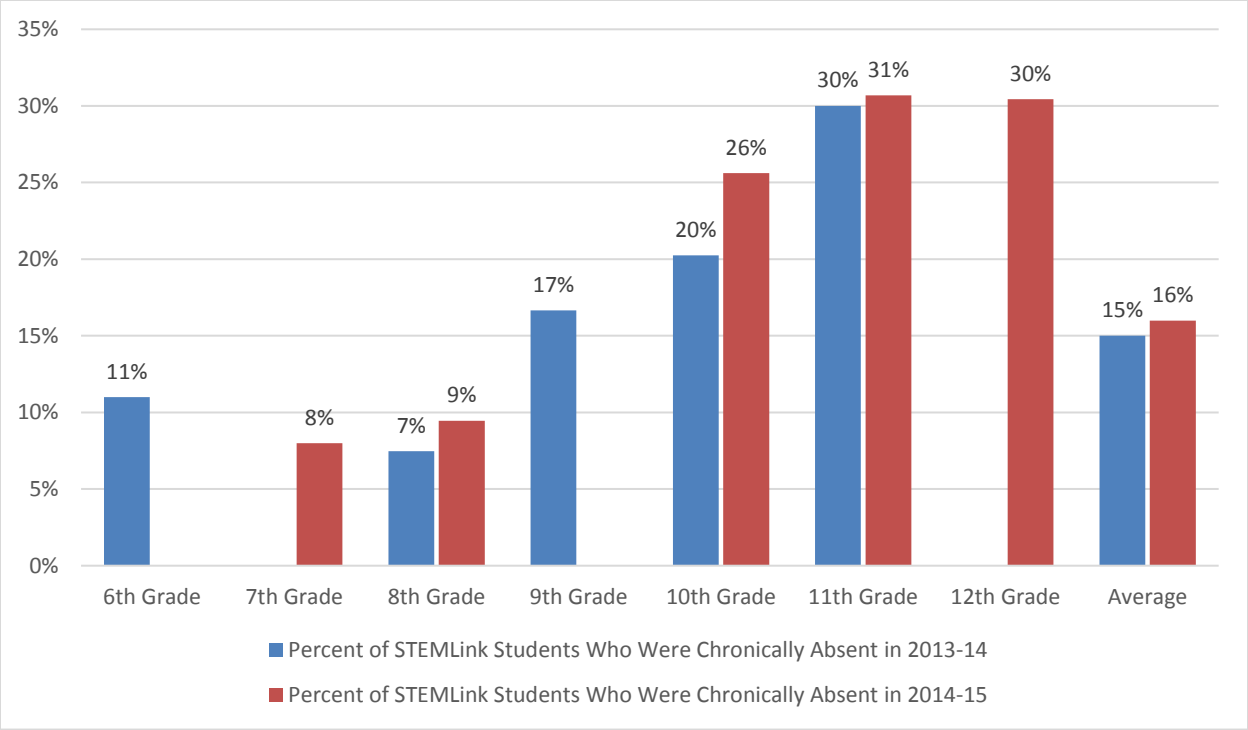
Figure 39. Rates of Chronic Absence in School for Year One (2014-15)



Source: Participant education data (2014-15)
Note: 9th grade excluded (N < 10)

- STEMLink students had lower rates of chronic absence than students statewide in grades seven and eight, but higher rates in grades ten, eleven, and twelve
- On average, STEMLink participants had higher rates of chronic absence than students statewide

Figure 40. Percent of STEMLink Students who were Chronically Absent during Year One and Year Two



Source: Participant education data (2013-14 and 2014-15) Note: 7th and 12th grade 2013-14 excluded for low N size (N<10); 6th and 9th grade 2014-15 excluded from low N size (N<10)

- Average rates of chronic absence increased from baseline to year one for STEMLink students in grades eight, ten, and eleven

Programmatic Considerations

Evaluation Questions	Findings	Considerations for Improvement
To what extent were staff members prepared to implement STEM-related afterschool programs?	• Most staff respondents had completed a degree in higher education or were currently working to obtain a degree. • Over half of the staff respondents had more than two years' experience working with youth. • Almost one third of staff respondents reported they received no training or professional development through the afterschool program. Most staff members who received no PD worked 10 or fewer hours a week in their programs. • Almost one third of staff respondents had unanswered questions about their jobs. • Almost all staff respondents who received PD found it useful and reported they implemented practices learned. • Most staff respondents were satisfied with the amount of PD they received. • Almost all staff respondents felt prepared to lead effective lessons for diverse students and manage student behavior. However, some also indicated that they could benefit from additional PD about managing student behavior. • Staff respondents reported high self-efficacy for STEM-related teaching.	State Level Considerations • Increase state level support and coordination for PD aligned with areas of greatest need. • Collaborate with the UAN to use program and site level survey results to design and implement PD opportunities. • Continue to foster coordination with higher education partners to develop the pool of highly qualified afterschool staff. Program Considerations • Continue to hire educated, experienced, and capable staff members. • Use program and site level survey results to design and implement PD. • Ensure that all staff members receive high quality PD that is aligned with program goals, such as achieving STEM and afterschool outcomes. • Differentiate PD for staff with varying roles and levels of experience, education, or professional background.
To what extent did staff members provide quality afterschool programming?	• Most programs reported meeting quality standards in areas of safety, administrative practices, developing meaningful relationships, and helping students learn new skills. Areas for potential improvement include fostering family involvement and aligning academic support to school-day curricula. • One third of staff respondents reported trouble communicating with students who did not speak English. • Almost all student respondents felt that adults in the program went out of their way to help students. • Almost all student respondents reported that they got along with other students in their programs.	State Level Considerations • Collaborate with UAN to provide opportunities for STEMLink programs to network and share promising strategies to improve program quality. Program Considerations • Continue working to align daily program practices with afterschool program standards identified in the UAN Quality Tool. • Identify and implement strategies to increase family involvement.

	• Almost all student respondents felt included in activities, liked the activities, and had fun at their programs.	• Increase efforts to identify and implement strategies to align academic support with school day curriculum. • Ensure that all staff members who work with English language learners are prepared to do so. • Continue to create fun afterschool environments in which students have positive social interactions with staff members and peers and where students feel included.
To what extent did STEMLink programs provide STEM-related learning opportunities for participants?	• The most common STEM-related opportunities that staff respondents provided were projects that integrated multiple STEM topics. • The least common STEM-related learning opportunities included making STEM learning resources available and providing students with information about STEM-related post-secondary opportunities. • Staff respondents reported that they provided effective learning environments, engaging lessons, and helped students learn positive academic behaviors. • Reported average program attendance was lower than expected, with about 28% of students attending fewer than 30 days. • Reported average participation in STEM interventions was lower than expected, with about one-third of students receiving no science interventions.	State Level Considerations • Provide resources for implementing STEM-related learning opportunities. • Connect programs with partners that will provide resources to increase STEM-related learning opportunities. • Hold programs accountable to provide complete and accurate attendance and participation data. • Promote a 30-day attendance minimum as a standard of program dosage. Program Considerations • Continue to provide STEM-related learning opportunities and integrate multiple STEM topics into afterschool activities. • Train staff members to provide students with STEM learning resources and information about STEM-related post-secondary opportunities. • Continue to provide effective learning environments, engaging lessons, and help students learn positive academic behaviors. • Work with school personnel, families, and students to increase program attendance rates. • Set attendance and participation goals; insure that students receive a minimum of 30 attendance days and a maximum number of STEM-related activities.

To what extent did the STEMLink programs provide prevention education learning opportunities for participants?	• Many STEMLink students received at least one day of prevention activities. • The average number of days students participated in prevention activities was relatively low.	Program Considerations • Make prevention activities available to all participants. • Set goals regarding student participation in prevention activities.
To what extent did students' interest in STEM change?	• On average, students reported increased interest in science, engineering, and technology. • On average, Students reported increased frequency of pursuing their interests in STEM by accessing related resources.	Program Considerations • Continue to provide engaging activities that promote interest in STEM subjects. • Continue to provide opportunities and resources for students to engage in STEM-related activities.
To what extent did students' STEM skills?	• On average, students reported increased perseverance and critical thinking.	Program Considerations • Continue to offer opportunities for students to develop perseverance and critical thinking.
To what extent did students' awareness of and interest in STEM-related post-secondary opportunities and career information change?	• On average, students reported increased interest in STEM-related postsecondary or career opportunities and increased awareness of STEM careers. • Students had greater interest than awareness for future opportunities in STEM fields.	Program Considerations • Continue to promote interest in STEM-related post-secondary and career opportunities. • Increase efforts to make students aware of possibilities and paths for pursuing future careers in STEM.
To what extent did students perceive change in social competencies, empathy and prosocial behaviors, academic behaviors, and work habits?	• On average, students reported significant increases in academic behaviors, work habits, social competency, and empathy and prosocial behaviors.	Program Considerations • Continue to offer programming that promotes positive afterschool outcomes.

What were the proficiency rates and chronic absence rates of STEMLink participants at baseline (2013-14) and year one (2014-15)? **What was the relationship between program participation and student achievement?**	• STEMLink student proficiency rates in math, science, and English language arts were lower than statewide averages, indicating that the program was serving students who could benefit from additional academic support. • STEMLink students' proficiency rates increased less than the statewide average from baseline to year one in math and English language arts. • STEMLink students' proficiency rates did not improve from baseline to year one in science. • There was a positive relationship between program attendance and math SAGE scores. For every four days students attended a STEMLink program there was a one-point increase in year one math scores. • We found no statistical relationship between program attendance and science or ELA SAGE scores. • Low-income students and English language learners had significantly lower test scores in math, science, and ELA than other students. Hispanic students had significantly lower test scores than white students.	State Level Considerations • Provide support and technical assistance to help program administrators access and use student assessment data to plan intervention strategies. Program Considerations • Facilitate studies of academic data with classroom teachers and afterschool staff to identify specific areas for targeted instructional support or interventions. • Use student assessment data to plan academic support interventions for participants.
What was the relationship between program participation and chronic absence?	• Rates of chronic absence for STEMLink students were generally higher than the state average, indicating that the program was serving students who needed additional support. • Rates of chronic absence for STEMLink students increased from baseline to year one. • There was a relationship between program attendance and chronic absence. For every day a student attended a STEMLink program, the odds of the student being chronically absent decreased by 1.6%. • Asian students were less likely to be chronically absent than white students and Hispanic students were about twice as likely as white students to be chronically absent. Students who were mobile, and those who received free or reduced lunch, were more likely to be chronically absent than other students.	Program Considerations • Use student school day attendance data to plan interventions for specific students. • Work with school day personnel to plan attendance interventions.

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Appendix A: Staff Survey and Student Survey Posttest Open-ended Items Response Summary

Staff Survey Open-ended Responses

What topics would you like to learn more about through future professional development opportunities?

There were 66 responses to this question.

Categories and Themes	Frequency
Academic	
More College and Career Readiness Information	9
STEM Teaching Strategies	7
Increasing Knowledge on Specific STEM Fields	4
Improving STEM Activities & Exploration	3
Integrating 21st Century Skills into STEM	3
More Information on Science Competitions	3
Cross-Curricular Incorporation of STEM	2
Curriculum Design & Resources for STEM topics	2
Increasing Art in STEM	1
Tutoring Skills	1
Programmatic	
Increased Technology Training	4
Organizational Improvements	2
Inter-Program Collaboration	1
Motivating Staff	1
Promoting Equity in STEM	1
Recruitment of Qualified Staff	1
Varying and Improving Athletic Activities	1

Working with Students	
Classroom Behavior & Management	15
Differentiating for & Working with Diverse Students	10
Engaging and Motivating students in STEM	9
Addressing Emotional & Mental Needs of Students	4
Age-Based Student Development	2
Recruitment and Commitment of Students	2
Identifying Community Resources	1
Other	
None Required	4
Improving Current Professional Development	1

What additional support(s) do you need to be most effective in your current role working for this program?

There were 64 responses to this question.

Categories and Themes	Frequency
Academic	
College and Career Readiness Supports or Information	2
Access to Students' Academic Grades	1
Linguistic Support Through Technology	1
More Field Trips	1
Varying the Classes Offered	1
Programmatic	
More or Better STEM Resources	6
More Funding	5

Additional Technology	4
More Developed STEM Trainings for Staff	4
More or Better Qualified STEM Staff	4
Better Organization	3
More Parent Interactions	3
Access to Community STEM Experts and Partners	2
Better Access to Facilities	2
Clarified Program Goals & Expectations	2
Collaboration with Other STEM Programs	2
Collaboration within the School	2
Improved Program Scheduling	2
More Support from Administration	2
Efficiency & Organization of Purchasing Supplies	1
Increased Program Time	1
Increased Salary	1
Marketing the STEM Program	1
Other Student Resources Outside of the Program	1
Working with Students	
Behavioral and Classroom Management Support	9
Addressing Students' Emotional and Developmental Needs	4
Engaging Consistent Student Enrollment	2
More Effective Disciplinary Measures	1
Other	
None Required	14

What has been your greatest success working in this program this year?

There were 73 responses to this question.

Categories and Themes	Frequency
Academic	
Helping to Improve Student Academic Performance	13
Developing Interactive and Engaging STEM Activities	12
Fostering Student Development and Learning	10
Preparing Students for Future Endeavors	8
Facilitating Student Competitions	5
Providing Unique STEM Opportunities	5
Differentiating Instruction for Student Needs	1
Programmatic	
Improve Program Structure	3
Promoting the Value of STEM	2
Working Successfully with Parents	2
Developing Community Relationships	1
Obtaining Resources	1
Working with Students	
Building Meaningful Relationships with Students	14
Engaging Students	12
Supporting Students in Personal Growth and Challenges	6
Fostering Quality Social Interactions	3
Exposing Students to Off-Site Experiences	2
Fostering a Safe and Positive Environment	2
Working with Diverse Student Populations	2
Improving Student Behavior	1
Learning from Students	1

Validating & Celebrating Students	1

What could be done here to improve the quality of programming and better meet students' needs?

There were 61 responses to this question.

Categories and Themes	Frequency
Academic	
Additional STEM-specific Trainings	3
More 21st Century-Oriented Programs	2
More Engaging STEM Activities	1
More Extracurricular Activities	1
Outcome-Based Curriculum	1
Programmatic	
Highly Qualified and Certified Staff	8
More or Better Resources	6
Improved Communication between Staff, School, and Administration	5
Improved Organization	5
Better Facilities	4
Clarified Mission, Goals, & Expectations	3
Increased Pay	3
More Collaboration between Schools and Other Programs	3
More Parent Involvement	3
Targeted Language Instruction	3
Better Access to Technology	2

More Field Trips of Interest	2
Alignment of Classroom & Programmatic Goals	1
Better Program Marketing	1
Cultural and Academic Diversification of Staff	1
High and Consistent Standards for Staff	1
Increased Feedback	1
Less Stringent STEM Focus	1
More College and Career Readiness Resources	1
More Funding	1
More Paid Preparation and Learning Time	1
One-to-One Lessons or Tutoring	1
Provide Effective Reading Tutoring	1
Variety in Healthy Snacks	1
Working with Students	
Increased Student Engagement and/or Involvement	4
Improved Disciplinary Measures	3
Better Understanding of Student Needs	2
Fostering a Welcoming Environment	2
Well-Defined Student Expectations	2
Gathering Student Input	1
Strategic Student Grouping	1
Other	
None Required	5
Improving Current Professional Development	1

Student Survey Open-ended Responses

Below are summarized themes from two open-ended posttest student survey items. Themes are further summarized beneath broad, bolded categories and following each theme is the number of times the theme appeared.

What do you wish was different about this afterschool program?

There were 423 responses to this question.

Categories and Themes	Frequency
Activities	
More Variety in Activities	21
More Time Dedicated to Activities and Classes of Student Interest	13
More Emphasis on STEM	9
More Sports	8
Less Homework Time	8
More Time Outdoors	6
More In-Depth Opportunities for Learning	6
More or More Time for Particular Clubs	6
Less or No Homework	5
Better Activity or Class Design	4
More Integrated Art	3
More Homework Time	3
More Pokemon	2
More College & Career Readiness Preparation	2
More Opportunities for Teamwork	2
More Homework Help	2
More Games	2
Less Supervision	2

More Computer Programming	2
More Technology	2
More Activities & Classes of Student Interest	2
Incorporating Gymnastics	1
More Tasks During Class	1
Less Group Work	1
Less Academic Pressure	1
Access to More or Better Resources	1
More Competitions	1
Staff	
More or More Qualified Staff	10
More or Better Instructional Guidance	5
More Understanding Staff	4
Better Teaching Techniques	3
More Help from Staff	3
Staff in General	1
Program Characteristics	
More or Better Food	35
Longer or Extend Program Hours	22
Program Offered More Often	12
More Choice and Freedom	9
Program Should be Shortened	7
Continued Programming in the Future	6
Better Facilities	6
More Fun Incorporated	6
More Field Trips of Interest	6
Less or Different Regulations	5

Better Location	5
More Free Time	4
Better Behavioral Regulations	4
Access to Computers	3
Address Scheduling Challenges	2
Program Offered During School Breaks	2
More Overall Funding	2
More Organization	2
Allow for Background Music	1
Incorporating Breaks	1
No Forced Participation	1
Program Offered Less Frequently	1
Address Transportation Issues	1
Allow for Usage of Mobile Phones	1
Usage of Windows Program in Lieu of Mac	1
Bring in Guest Speakers from the Field	1
Social	
More Dedicated Student Participants	11
More Peer Participants from School	11
Better Program Environment	5
More Diverse Student Participants	4
Better Quality of Social Interactions	2
Variety of Specialized STEM Staff	2
Better Program Equity	1
More Socializing with Peers	1
Other	
No Change Needed	119

Everything	3
Experienced Difficulty with STEM	1

What is the best thing about attending this afterschool program?

There were 429 responses to this question.

Categories and Themes	Frequency
Academic Activities	
General Participation in Activities	42
Homework Time Provided	36
Computer Programming and Coding	16
Technology	12
Specific STEM Activities	11
Robotics	10
Games	7
College and Career Awareness	6
Building or Making Things	6
Legos	4
Music	4
Science	3
Competitions	3
Cooking	2
Engineering	2
Plays	1
Making Apps	1
Service Learning	1
Opportunities for Creativity	1

Physical Activities	
Sports	10
Soccer	9
Being Active	5
Hiking	1
Martial Arts	1
Learning	
Opportunities to Learn New Things	28
General Academic Development	21
Greater Understanding of STEM	11
Software Programs	9
Academic Improvement	7
Academic Advancement	3
Increased Learning Compared to Regular Classes	1
Life Skills	
Collaboration	11
Growth of General Work Ethic Skills	5
Improvement in Future Planning	3
STEM Career Experience	2
Program Characteristics	
Fun	51
Food	30
Help Provided in Program	27
Homework Help Provided	21
Positive Program Environment	20
Safe Program Environment	15
General Enjoyment of the Program	8

Having Choice	5
Field Trips	4
Provided Transportation	2
Access to Resources	1
Receiving Rewards	1
Social	
Time with Friends	40
Quality Interactions with Staff	30
General Quality Social Interactions	28
Making Friends	23
Meeting New People	15
Social Inclusiveness	11
Collaboration	3
Socializing with Peers	3
Other	
Everything	8
Did Not Have a Positive STEM Experience	4
It's Something To Do	3
Nothing	2
Time Away From Home	1

What aspect of this program has changed your interest in or awareness of science, technology, engineering, or math (STEM)?

There were 357 responses to this question.

Categories and Themes	Frequency
Academic	
Specific STEM Activities	22

General Increase in Learning STEM Subjects	21
General Academic Improvement	11
Hands-On Activities	11
Engagement in Technology	9
Learning Computer Programming and Coding	8
Learning 21st Century Skills	5
Increased Interest in Learning	5
Increased Creativity	3
Clear and Meaningful Instruction	2
More In-Depth Learning	2
Great Interest in Music	1
Participation in Clubs	1
Programmatic	
Greater Awareness of Future Career Path	26
Better Understanding of Possible STEM Careers	18
Enjoyment of the Program and Subjects	9
Fun	8
General Program Participation	6
Access to Resources	2
Sports	1
Field Trips	1
Events Related to STEM	1
General Environment of the STEM Program	1
Life Skills	
Greater Appreciation of STEM	22
Given Students a New Perspective about STEM	18

Understanding the Importance of STEM	7
Understanding the Interrelatedness of STEM	6
Helping and Collaborating in the Program	6
High Expectations for Students	2
Greater Curiosity in STEM	2
Feeling Successful in STEM	1
Personnel	
Community of People in the Program	17
Other	
None	28
Everything	17
Did Not Enjoy STEM	6
Interest Due to Pre-existing Factors	6
Unaware of STEM	1

Appendix B: Summary of Retrospective Pretest and Posttest Student Survey Analysis

Five hundred one students completed the retrospective pretest and posttest survey at the end of the academic year (2015-16). This does not include 22 students who neither reported their names nor answered any questions in the survey. Also excluded were 33 duplicate responses. After cleaning the data, the final sample for the retrospective pretest and posttest included 446 students.

We used paired sample t tests to compare differences retrospective pretest and posttest mean scores. We chose the retrospective pretest and posttest means comparison for two reasons. First, the retrospective pretest sample was larger (155 versus 446 responses) than the pretest sample. Opportunities to match the traditional pretest and posttest survey responses were limited by inconsistency in the ways that students entered their names on the two surveys. Further, some students who took the pretest did take the posttest and vis-a-versa. Secondly, we chose the retrospective pretest to account for response shift bias, which occurs when an individual's internal frame of reference changes between pretest and posttest (Howard and Dailey 1979, Howard 1980, Goedhart & Hoogstraten 1992, Lam & Bengo 2002, Shadish et al. 2002). In this evaluation, change would occur as a result of a student being exposed to the program between the pretest and posttest surveys. Table 13 displays retrospective pretest and posttest mean scores and results of the paired samples t tests for each tested construct in the student survey.

Table 13. Retrospective Pretest and Posttest Mean Scores and Paired Samples t Test Results

Student Survey Outcomes	Retro-Pre Mean	Post Mean	Mean Difference	SD	*t*	df	*p*
Interest and Engagement in Science	3.028	3.144	0.115	0.610	3.78	398	0.000
Science Interest	2.915	2.999	0.084	0.563	2.96	391	0.003
Technology Interest	2.988	3.164	0.175	0.589	5.89	390	0.000
Engineering Interest	2.898	3.008	0.110	0.608	3.58	389	0.000
Math Interest	2.699	2.736	0.037	0.655	1.14	402	0.255
Awareness of STEM Fields	2.274	2.589	0.315	0.880	7.18	401	0.000
Interest in a future in STEM Fields	2.809	3.080	0.271	0.691	7.78	303	0.000
STEM Activities	2.003	2.178	0.175	0.722	4.82	393	0.000
Perseverance	3.049	3.267	0.218	0.615	7.13	404	0.000
Critical Thinking	3.061	3.338	0.276	0.690	8.00	398	0.000
Work Habits	2.930	3.105	0.175	0.689	5.06	397	0.000
Academic Behaviors	3.055	3.244	0.190	0.641	5.87	393	0.000
Social Competence	2.895	3.043	0.148	0.615	4.73	384	0.000
Empathy & Prosocial Behavior	3.090	3.274	0.184	0.608	5.95	386	0.000

Appendix C: Quality Tool

This appendix presents tables of the items used as indicators for each of the four Quality Tool domains (Safety, Developing Meaningful Relationships, Learning New Skills, and Administration). The titles of each figure are the domain descriptions that appear in figures in the findings section. The items reported in percentages were calculated based on yes or no responses. The items reported as means were calculated from a five-point scale that included 1 = not at all, 2 = slightly well, 3 = moderately well, 4 = very well, 5 = extremely well.

Quality Tool Items for Safety

All staff are professionally qualified to work with youth	**Percentage in compliance**
All staff meet minimum age requirements and position qualifications.	100%
Criminal background checks are conducted on all staff and volunteers who work alone with youth.	100%
All staff are required to read and sign an organization's "Code of Conduct" and adhere to confidentiality requirements.	88%
All staff will read and document their understanding of program's policies and procedures.	92%
A minimum of 20 hours of in-service training is made available to all staff annually.	100%
At least one staff member certified in CPR/First Aid is with youth at all times.	96%
Staff have knowledge of child abuse and neglect reporting requirements and procedures.	100%
Food handler permits are required for staff responsible for preparing and serving food that is not pre-packaged.	81%
Averaged percentage	**95%**

Policies and procedures are implemented to ensure the health and safety of all youth.	**Percentage in compliance**
Program implements a regular schedule that is communicated to all staff, parents and participants.	100%
Participant registration information is accessible and includes emergency contact/release numbers, allergies, medications and other needs.	96%
Special health needs of participants are documented and staff is informed, as appropriate.	92%
Emergency medical treatment release consent is on file for each participant.	85%
Procedures/policies are in place to address the administration of medication to youth.	88%
Youth with communicable diseases are not permitted in the program and participant parents/guardians are notified in writing of any possibility of exposure.	96%

Program implements a written computer use and internet safety policy.	100%
Parents/guardians are notified regarding urgent issues that could impact the health and safety of participants.	100%
Healthy practices and hand washing procedures are implemented especially after using the toilet or before handling food.	96%
Nutritious snacks are provided, as appropriate, in accordance with USDA nutrition guidelines and drinking water is always available.	100%
Averaged percentage	**95%**

Youth are carefully supervised to maintain safety.	**Percentage in compliance**
Staff supervise youth according to youths' ages and abilities.	100%
Staff increase supervision according to level of need and or risk involved in an activity.	100%
Staff record when youth arrive, when they leave, and if picked up, with whom they leave.	88%
A written policy/procedure is in place to prevent unauthorized people from taking youth from the program.	92%
Program ensures safe arrival of all youth to the program site. (Elementary only.)	78%
A participant release policy/process is in place to ensure safe departure for all youth.	100%
A minimum of two staff are on site at all times.	100%
A written policy/process is in place to address injuries, accidents, and incidents.	92%
Averaged percentage	**94%**

A transportation policy is in place and communicated to staff and families of participants.	**Percentage in compliance**
The program complies with all legal requirements for vehicles and drivers.	100%
The program provides written policies and procedures to transport youth safely to and from off-site activities.	100%
Averaged percentage	**100%**

The program provides a safe, healthy, orderly, and nurturing environment.	**Percentage in compliance**
Policy/procedures are in place regarding facility use, liability, maintenance, and repairs.	100%
Indoor/outdoor space meets state and local health, safety and cleanliness requirements.	100%
Program utilizes both indoor and outdoor spaces to implement developmentally appropriate programs and activities.	92%

Space provided is appropriate and suitable for activities being conducted.	100%
Staff protect youth from potential health and safety hazards.	100%
Averaged percentage	**98%**

Program policies/procedures are in place to protect the safety of youth.	**Percentage in compliance**
An emergency and disaster preparedness plan is maintained on site and accessible.	100%
Emergency drills (fire, earthquake, lockdown, power outages, etc.) are conducted quarterly.	54%
Staff have access to first aid supplies and bodily fluid clean up kits.	100%
A phone is available at all times for communication between staff and parents/guardians.	100%
Averaged percentage	**88%**

Quality Tool Items for Developing Meaningful Relationships

Staff and youth know, respect, and support each other.	**Mean**
Staff promote a respectful and welcoming environment for all youth.	4.38
Staff facilitate and participate in all program activities with youth.	4.27
Staff promote and demonstrate respect for all cultural backgrounds and ability levels.	4.42
Staff respect, listen, and appropriately respond to the needs and feelings of youth.	4.27
Staff model and facilitate positive interactions to promote healthy relationships.	4.19
Staff communicate with each other during program hours about youth and program needs as they arise.	4.31
Staff encourage and guide youth to resolve their own conflicts.	4
Grand Mean	**4.26**

Program communicates and collaborates with school and community.	**Mean**
Program engages in school and community collaborations to plan and implement intentionally designed programs based on youth needs and interests.	4.08
Program builds relationships with arts, cultural, service learning and other organizations to expand and enhance program offerings.	3.96

Program develops and maintains positive working relationships with hosting and collaborating organizations.	4.24
Grand Mean	**4.09**

Program fosters family involvement to support program goals.	**Mean**
Program encourages family involvement and maintains ongoing outreach efforts with parents/guardian.	3.46
Program makes community resource information available to families.	3.46
Staff interact with parents/guardians on matters concerning the well-being of their youth.	3.92
Grand Mean	**3.62**

Quality Tool Items for Learning New Skills

Youth are actively engaged in learning activities that promote critical/creative thinking skills and build on individual interests/strengths.	**Mean**
Program offers a balance of intentionally designed academic and enrichment activities that are age and skill level appropriate	4.04
Program offers enrichment activities that allow youth to explore new ideas, build skills and demonstrate their knowledge in a variety of learning environments	4.23
Grand Mean	**4.13**

Academic support/interventions are aligned with school-day curricula and address student learning needs.	**Mean**
Program offers needs-based academic support, including tutoring and/or homework help.	3.77
Program establishes communication with school day administration and staff regarding academic and behavioral progress of participants	3.23
Program coordinates with day school to align academic components and activities to Common Core State Standards	3.23
Grand Mean	**3.41**

Program offers a variety of life skill activities and needs-based support that promote personal growth and responsible behaviors toward self and others.	**Mean**
Program provides opportunities for youth to develop the skills needed to make positive choices and promote self-responsibility	4.04
Program provides opportunities for youth to develop the skills needed to interact appropriately with others.	4.23

Program offers evidence-based prevention/intervention education to build skills and knowledge that promote social success of youth.	4
Program addresses needs of youth requiring individualized attention and support.	4
Program provides activities that promote health and wellness.	3.92
Grand Mean	**4.04**

Program provides a variety of opportunities that enhance personal growth and development.	**Mean**
Program involves youth in planning, implementation and evaluation.	3.69
Program provides varied opportunities for the development of personal responsibility, self-direction and leadership skills	3.81
Program provides opportunities to build 21st century skills that prepare youth to be responsible citizens, effective communicators	4.12
Program incorporates interest-based and age-appropriate career exploration and college readiness experiences.	4.08
Grand Mean	**3.92**

Quality Tool Items for Administration

The program has a plan for increasing capacity, ensuring program quality, and promoting sustainability.	**Mean**
Program has developed a clear mission statement and goals that promote youth success.	4.38
Program involves key stakeholders (staff, families, youth, community organizations, etc.) in long-term planning, decision-making, and evaluation.	3.85
Program engages in intentional school/community / collaborations and partnerships that support its mission and goals and promote program quality.	4.08
Program fosters relationships with community leaders/stakeholders to build advocacy and program support	3.85
Program utilizes multiple funding and in-kind resources to promote sustainability.	4.19
Program administration participates in annual program evaluation, assessment and ongoing improvement.	4.58
Program utilizes multiple data sources for program design, enhancement, and evaluation.	4.08
Program reports progress, impacts, and achievements to the community at large (families, local businesses, school, etc.) and community partners/boards.	3.92
Program develops and implements a marketing plan to increase awareness, involvement and support and revises strategies as needed.	3.88
Grand Mean	**4.09**

The program operates under clearly defined policies and procedures.	Mean
Program makes written organizational policies and procedures accessible to staff, family and the community for review	3.96
Program utilizes an employee handbook outlining staff expectations and policies and procedures.	3.88
Program provides a parent handbook that includes information about program policies, procedures and expectations for youth, family, and staff.	3.5
Program administration maintains staff files.	4.19
Program provides for a written youth and parent/guardian grievance process.	3.85
Program has a clearly defined participant attendance policy.	4.12
Grand Mean	**3.92**

The administration provides sound fiscal management of the program.	Mean
Program is aware of and complies with federal, state and local laws and regulations.	4.54
Program expenditures are aligned with the program budget and reflect the mission and goals.	4.54
Program administration implements financial procedures in accordance with the organization's financial policies and generally accepted accounting practices.	4.73
Program meets reporting requirements.	4.42
Grand Mean	**4.56**

Program recruits, hires, and trains diverse and qualified staff members who value and nurture all participants	Mean
Program implements a standard hiring process that ensures all staff have the personal attributes, ability to learn needed skills, and professional qualifications appropriate for their position.	4.42
Program recruits, hires and develops staff who reflect the diversity, languages and cultures of the community served.	3.96
Program provides an orientation for all staff (including volunteers).	4.04
Staff participate in regularly scheduled program meetings.	4.31
Program administration sets aside time for staff communication and planning around youth and program needs	4.16
Responsibilities and duties are shared among staff so that activities are effectively implemented and potential problems are handled smoothly.	4.19
Program staff receive regular supervision and support, as needed and at least one annual formal performance review	3.85

Grand Mean	**4.13**

Professional development and training opportunities are planned for and implemented to enhance staff job performance.	**Mean**
Program assesses staff training needs and provides relevant training and support (developmentally appropriate activities, culturally responsive, positive behavior management, etc.).	4.19
Program promotes and encourages career development pathways for all staff.	3.81
Program implements a professional development plan that promotes best practices working with youth, families, and community.	4.12
Grand Mean	**4.04**

Appendix D: Student Proficiency and Chronic Absence Rates

The evaluation team used participant education data to calculate rates of proficiency and chronic absence. We used the following procedures and data cleaning rules.

- In rare cases in which students had multiple records in the same year with conflicting data, we applied the following rules:
  - Student race and grade level were reported as missing if records were in conflict for those variables.
  - If students had multiple test scores recorded for a single test, the student record with highest score was used.
  - If students had multiple membership day totals recorded, we reported the record with the highest total membership days.
- The statewide totals include STEMLink participants.
- We identified students as chronically absent if they missed school at least 10% of their total membership days and had at least 60 total membership days.
- The tables in this appendix provide additional detail about the number of students represented in Figure 34 through Figure 40 in the report. This is important to consider when interpreting the findings because in some cases several grades were withheld due to low N size of STEMLink students in some grade levels.

Table 14. Math Proficiency Rates for STEMLink Students and Statewide Students in Year One (2014-15)

	STEMLink			Statewide		
Grade Level	**N**	**Proficient (N)**	**Proficient (%)**	**N**	**Proficient (N)**	**Proficient (%)**
7th Grade Math	264	100	37.88%	45,112	21,086	46.74%
8th Grade Math	194	64	32.99%	44,254	18,556	41.93%
9th Grade Math	130	46	35.38%	42,283	18,080	42.76%
10th Grade Math	75	19	25.33%	39,237	14,732	37.55%
11th Grade Math	53	15	28.30%	29,142	11,290	38.74%
Total	**716**	**244**	**34.08%**	**200,028**	**83,744**	**41.87%**

Table 15. Science Proficiency Rates for STEMLink Students and Statewide Students in Year One (2014-15)

	STEMLink			Statewide		
Grade Level	**N**	**Proficient (N)**	**Proficient (%)**	**N**	**Proficient (N)**	**Proficient (%)**
7th Grade Science	265	96	36.23%	45,216	20,500	45.34%
8th Grade Science	196	89	45.41%	44,434	21,141	47.58%
9th Grade Science	130	56	43.08%	41,995	21,291	50.70%
10th Grade Science	68	20	29.41%	38,367	16,278	42.43%
11th Grade Science	61	16	26.23%	23,668	10,434	44.08%
Total	**720**	**277**	**38.47%**	**193,680**	**89,644**	**46.28%**

Table 16. English Language Arts Proficiency Rates for STEMLink Students and Statewide Students in Year One (2014-15)

	STEMLink			Statewide		
Grade Level	**N**	**Proficient (N)**	**Proficient (%)**	**N**	**Proficient (N)**	**Proficient (%)**
7th Grade English Language Arts	263	85	32.32%	44,782	19,487	43.52%
8th Grade English Language Arts	196	75	38.27%	43,993	18,816	42.77%
9th Grade English Language Arts	131	57	43.51%	42,712	19,311	45.21%
10th Grade English Language Arts	73	24	32.88%	40,766	18,963	46.52%
11th Grade English Language Arts	80	24	30.00%	37,441	15,259	40.75%
Total	**743**	**265**	**35.67%**	**209,694**	**91,836**	**43.80%**

Table 17. Student Proficiency by Subject at Baseline (2013-14) and Year One (2014-15)

	N	Proficient (N)	Proficient (%)	Grade Levels Included
Statewide Math Baseline	175,643	67,009	38.15%	6th through 9th grades
Statewide Math Year 1	200,028	83,744	41.87%	7th through 11th grades
STEMLink Math Baseline	654	212	32.42%	6th through 9th grades
STEMLink Math Year 1	716	244	34.08%	7th through 11th grades
Statewide Science Baseline	278,851	122,999	44.11%	5th through 11th grades
Statewide Science Year 1	193,680	89,644	46.28%	7th through 11th grades
STEMLink Science Baseline	781	303	38.80%	5th through 11th grades
STEMLink Science Year 1	720	277	38.47%	7th through 11th grades
Statewide ELA Baseline	251,106	104,189	41.49%	6th through 11th grades
Statewide ELA Year 1	209,694	91,836	43.80%	7th through 11th grades
STEMLink ELA Baseline	795	272	34.21%	6th through 11th grades
STEMLink ELA Year 1	743	265	35.67%	7th through 11th grades

*Table 18. Percent Change from Baseline to Year One by Tested Subject**

Tested Subject	Baseline % Proficient	Year 1 % Proficient	% Point Difference	% Change
Statewide Math	38.15%	41.87%	3.72%	9.74%
STEMLink Math	32.42%	34.08%	1.66%	5.13%
Statewide Science	44.11%	46.28%	2.18%	4.93%
STEMLink Science	38.80%	38.47%	-0.32%	-0.84%
Statewide ELA	41.49%	43.80%	2.30%	5.55%
STEMLink ELA	34.21%	35.67%	1.45%	4.25%

*To better understand the change in proficiency rates from the baseline year to year one for both statewide students and STEMLink participants, we calculated the percent of change. Percent of change was calculated by dividing the percent point difference by baseline proficiency rates.

Table 19. Chronic Absence Rates of STEMLink Students and Statewide Students in Year One (2014-15)

	Statewide			STEMLink		
Grade Level	**N**	**Chronic Absence (N)**	**Chronic Absence (%)**	**N**	**Chronic Absence (N)**	**Chronic Absence (%)**
7th Grade	47,801	4,180	8.74%	279	21	7.53%
8th Grade	47,281	5,021	10.62%	201	19	9.45%
10th Grade	46,154	5,344	11.58%	82	21	25.61%
11th Grade	44,099	5,974	13.55%	88	27	30.68%
12th Grade	41,876	6,082	14.52%	92	28	30.43%
Total	**227,211**	**26,601**	11.71%	**742**	**116**	15.63%

9th grade excluded due to low N size (N<10) of STEMLink students who were chronically absent

Table 20. Chronic Absence Rates of STEMLink Students at Baseline (2013-14) and Year One (2014-15)

	STEMLink 2013-14			STEMLink 2014-15		
Grade Level	**N**	**Chronic Absence (N)**	**Chronic Absence (%)**	**N**	**Chronic Absence (N)**	**Chronic Absence (%)**
6th Grade	265	28	11.00%	*	N<10	N<10
7th Grade	*	N<10	*	279	21	8.00%
8th Grade	134	10	7.46%	201	19	9.45%
9th Grade	78	13	16.67%	*	N<10	N<10
10th Grade	79	16	20.25%	82	21	25.61%
11th Grade	90	27	30.00%	88	27	30.68%
12th Grade	*	N<10	*	92	28	30.43%
Total	**646**	**94**	**15.00%**	**742**	**116**	**16.00%**

*7th and 12th grade 2013-14 excluded from low N size (N<10) of chronically absent STEMLink students; 6th and 9th grade 2014-15 excluded from low N size (N<10) of chronically absent STEMLink students

Appendix E: Analyses of Program Participation and Outcomes

To understand relationships between program participation and student test scores, we ran three multiple linear regression (MLR) models. These models examined whether or not students' participation in STEMLink programs could predict their math, science, and English language arts (ELA) scores on statewide standardized tests (SAGE) in 2014-15, while statistically controlling for student characteristics and their scores on the same tests in 2013-14. In a fourth model, we used logistic regression to determine whether student participation in STEMLink programs was related to the likelihood of being chronically absent. Similar to the other models, we statistically controlled for student characteristics. In order to control for the varied influence of programs on student performance, all four models accounted for clustered standard errors in the programs.

Student demographic variables included race, gender, school level (elementary, middle, high school), mobile, low income, special education, English language learner (ELL). For race, due to the small number of students identified as American Indian, multiracial, Alaska Native, or Pacific Islander, we consolidated these groups into one group identified as 'other' in these models. For ELL status, according to USOE data clearinghouse documentation, student statuses with Y (student is ELL) or O (Refused services offered through NCLB Title III) are counted as ELL.

The modelling results are displayed in Tables 23 - 26. The three MLR models had an R squared value larger than 60%, which accounted for more than half of the total variance in the dependent variable in each model. In the MLR models, student test scores in the year 2013-14 significantly predicted the student test scores in math, science, and language arts in the year 2014-15, respectively, holding all the student demographics constant. These test scores in the previous year accounted for some unobserved student characteristics as well, which increased the variance explained in the models by about 35% compared with those models without student test scores in the year 2013-14.

Table 21. Program Attendance and Participation Summary

Program Attendance and Participation	Number of Year 1 (2014-15) Participants Matched with Year 1 Education Data	Mean Days of Year 1 (2014-15) Participation	Standard Deviation
Days of Program Attendance	911	21.7	23.77
Days of Science Intervention	532	10.8	14.84
Days of Technology Intervention	526	7.4	14.35
Days of Engineering Intervention	502	5.8	8.07
Days of Math Intervention	616	6.6	9.48

Table 22. Student characteristics used in the statistical analysis

Student Characteristics	Description
Race	Categories were whether or not the student was White, Black, Asian, Hispanic, or Other
Gender	Whether the student was female or male
High school	Whether the student is high school or middle school/junior high
Mobile	Whether or not the student changed schools during the academic year
Low income	Whether or not the student received free or reduced lunch
Special education	Whether or not the student was designated as receiving special education instruction
ELL	Whether or not the student was an English language learner
Program attendance	The number of days that each student attended the program
Scores in the baseline year (2013-14)	Student scores in the year prior to participating in a STEMLink afterschool program

Table 23. The Relationship Between STEMLink Participation and Math SAGE Scores in 2014-15

Math Scores (2014-15)	Coefficient	Robust Std. Error	*t*	*p*	95% Confidence Interval	
Black	15.148	9.014	1.68	0.131	-5.639	35.935
Asian	-18.665	9.967	-1.87	0.098	-41.650	4.320
Hispanic	-15.398	3.408	-4.52	0.002	-23.256	-7.539
Other race	-6.974	10.039	-0.69	0.507	-30.123	16.175
Female	-4.578	5.362	-0.85	0.418	-16.944	7.787
Days attended	0.258	0.057	4.57	0.002	0.128	0.389
High school	14.846	5.488	2.71	0.027	2.192	27.501
Mobile	-0.647	6.580	-0.1	0.924	-15.821	14.527
Low income	-11.913	3.524	-3.38	0.01	-20.039	-3.788
Special Ed.	-6.496	7.993	-0.81	0.44	-24.928	11.935
ELL	-17.152	6.790	-2.53	0.035	-32.810	-1.493
Math scores 2013-14	0.869	0.041	21.02	0	0.774	0.964
Intercept	99.457	19.842	5.01	0.001	53.701	145.213

Table 24. The Relationship Between STEMLink Participation and Science SAGE Scores in 2014-15

Science Scores (2014-15)	Coefficient	Robust Std. Err.	*t*	*p*	95% Confidence Interval	
Black	-1.898	3.899	-0.49	0.639	-10.889	7.093
Asian	5.161	2.503	2.06	0.073	-0.612	10.934
Hispanic	-2.993	1.939	-1.54	0.161	-7.464	1.479
Other race	-0.198	3.349	-0.06	0.954	-7.922	7.526
Female	-0.081	1.546	-0.05	0.959	-3.645	3.483
Days attended	0.002	0.042	0.05	0.960	-0.095	0.100
High school	-2.712	3.261	-0.83	0.430	-10.232	4.809
Mobile	0.601	4.388	0.14	0.894	-9.517	10.720
Low income	-4.021	1.264	-3.18	0.013	-6.937	-1.106
Special Ed.	-2.025	2.999	-0.68	0.519	-8.940	4.890
ELL	-7.674	2.245	-3.42	0.009	-12.850	-2.497
Science Scores 2013-14	0.690	0.034	20.54	0.000	0.612	0.767
Intercept	261.585	29.021	9.01	0.000	194.662	328.507

Table 25. The Relationship Between STEMLink Participation and English and Language Arts SAGE Scores in 2014-15

English Language Arts (2014-15)	Coefficient	Robust Std. Err.	*t*	*p*	95% Confidence Interval	
Black	8.719	10.122	0.86	0.414	-14.622	32.060
Asian	9.596	12.685	0.76	0.471	-19.656	38.848
Hispanic	2.235	7.619	0.29	0.777	-15.334	19.804
Other race	-12.396	5.079	-2.44	0.041	-24.108	-0.685
Female	0.730	2.890	0.25	0.807	-5.935	7.396
Days attended	0.045	0.077	0.59	0.574	-0.133	0.223
High school	7.679	4.532	1.69	0.129	-2.771	18.130
Mobile	-6.374	7.017	-0.91	0.390	-22.555	9.806
Low income	-10.031	4.041	-2.48	0.038	-19.350	-0.711
Special Ed.	-15.203	7.060	-2.15	0.063	-31.483	1.076
ELL	-32.092	13.082	-2.45	0.040	-62.260	-1.924
English & Language Arts Scores 2013-14	0.756	0.026	28.71	0.000	0.695	0.817
Intercept	123.976	11.632	10.66	0.000	97.152	150.800

Table 26. The Relationship Between STEMLink Participation and Chronic Absence in 2014-15

Chronic Absence (2014-15)	Odds Ratio	Robust Std. Err.	*z*	*p*	95% Confidence Interval	
Black	0.584	0.323	-0.97	0.330	0.198	1.724
Asian	0.103	0.116	-2.03	0.043	0.012	0.927
Hispanic	2.370	0.565	3.62	0.000	1.485	3.782
Other race	1.111	0.827	0.14	0.888	0.258	4.782
Female	1.130	0.242	0.57	0.569	0.742	1.720
Days attended	0.984	0.006	-2.93	0.003	0.973	0.995
High school	3.078	0.962	3.60	0.000	1.669	5.678
Mobile	2.407	0.460	4.60	0.000	1.655	3.500
Low income	1.559	0.191	3.61	0.000	1.225	1.983
Special Ed.	0.813	0.105	-1.60	0.109	0.632	1.047
ELL	1.471	0.393	1.45	0.148	0.872	2.482
Intercept	0.057	0.012	-13.72	0.000	0.038	0.086