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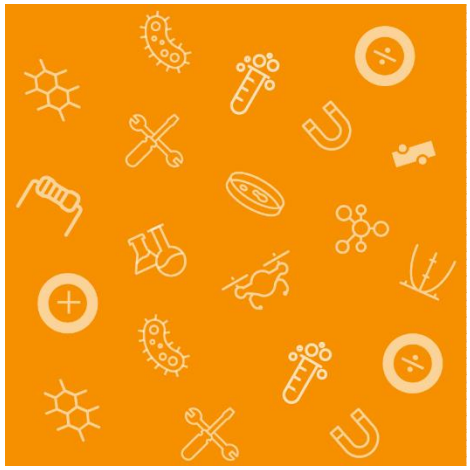

ARMY EDUCATIONAL OUTREACH PROGRAM

FY23 Unite Evaluation Report
Summative Findings

June 2024

aeop
ARMY EDUCATIONAL OUTREACH PROGRAM

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Contents

Executive Summary

The Army Educational Outreach Program (AEOP) offers students and teachers science, technology, engineering and mathematics (STEM) programming that is designed to attract, develop, and teacher the next generation of the nation's diverse talent through United States (U.S.) Army educational outreach programs. Unite directly supports the AEOP mission by offering STEM courses for students to promote self-discovery and empower students to recognize the real-life applications of STEM and get familiar with STEM careers and professionals in the field.

Education Development Center, Inc. (EDC), the external evaluation partner for AEOP, conducted a summative evaluation of the 2022-2023 program year. The FY23 evaluation sought to document and assess the benefits of participation, program strengths and challenges, and overall effectiveness in meeting AEOP and program objectives. The primary tools for data collection were student and teacher/instructor post-surveys. We also conducted a site visit during the national competition, during which we gathered data and information via focus groups with participants. It is important to recognize that these results only reflect those individuals who participate in evaluation activities and may not be generalizable for the Unite program.

Key findings from the evaluation are presented below.

Overview of Participants

In FY23, Unite served 595 participants, 73% (436) of whom were students, and the remaining 27% (159) were teachers or instructors. All Unite participants are expected to meet the AEOP criteria for being underserved.

Participant Experience and Outcomes

Development of STEM Knowledge and Skills

Students increased their STEM knowledge and skills. Participants learned how to use various tools and methodologies to conduct research. They were encouraged to think about real-world issues and come up with questions to solve them. Between 84% and 96% of students self-reported gains in specific STEM skills involved in planning, conducting, and sharing research (and the vast majority of teachers also reported that students made gains in these areas).

Development of 21st Century Skills

Students gained several 21st Century skills, including communication and collaboration; critical thinking and problem solving; and creativity and innovation. Their improvement came through their communication and collaboration with peers and teachers. The majority of students (between 88% and 97%) indicated increased competencies in these areas, while virtually all teachers reported that students made gains in each 21st Century skill.

Interest in STEM and STEM Careers

Students' interest in STEM and STEM careers increased. About two thirds of the students reported that they were more likely to engage in STEM activities after their participation in Unite (ranging between 63% and 71%). The majority of students (77%) reported that the program had influenced their interest in pursuing a STEM degree, and that they were more interested in pursuing a STEM career (80%).

Perceptions of DoD

Students gained a greater appreciation of and interest in Army/DoD STEM research and careers through their participation in Unite. A substantial portion of students reported that they had a greater appreciation of DoD STEM research (73%) and just over half (52%) were more interested in pursuing a STEM career with the DoD.

Impact of S&E Teachers/Instructors

Unite teachers/instructors used a variety of strategies to engage with students. Most students reported that teachers used strategies to support the students' needs. Across an array of items, student responses fell between 81% and 95%. The highest percentages (90% or above), were reported in three key areas: allowed work on a team project, provided extra support when needed, and helped participants to practice a variety of STEM skills. Teachers agreed that they employed many strategies to meet the diverse needs of students, including asking students about their education and career goals (96%), giving students real-life problems to solve (95%), and having students listen with an open mind (90%). Teachers were relatively less likely to report using strategies related to learning specifics about the students they were mentoring, including becoming familiar with students' backgrounds and interests or understanding their learning styles (51% and 47%, respectively).

Overall Experience

Students who participated in the Unite program generally expressed high levels of satisfaction with their activities and experiences during the program. They enjoyed the hands-on experiences in their STEM classes and appreciated the learning experience that allowed them to develop an interest in STEM. Many students appreciated the program's unique blend of formal learning and hands-on work.

Unite teachers/instructors were also satisfied with their work with Unite. They appreciated that the program offered opportunities for students from diverse backgrounds, especially students from marginalized or underrepresented communities.

Students were interested in participating in AEOP and other STEM programs, but there is room for greater awareness of these opportunities. Approximately one-third to one-half of students indicated they were not familiar with specific programs.

Recommendations

Although the data do not necessarily represent all participants in the program, we believe that the results allow us to make the following recommendations:

Programmatic Considerations

Keep engaging students with practical applications of STEM skills that are relevant to their communities and social issues. By providing hands-on experiences in teamwork to solve real-world problems, students feel a sense of accomplishment.

Provide more opportunities for students to bond and have "free" time. Students want more opportunities to know and bond with peers outside the program activities**.**

Keep integrating STEM professional students meet during the program. Students feel inspired to take a STEM career path when they encounter people who have gone through the experience and are current professionals in STEM.

Consider changing the approach to academic writing skills learning to make it more attractive to the students so they can understand the communication of science is valuable. Students would like to have less academic writing.

Explore ways to improve awareness of various AEOP resources, including printed materials, the website, and other social media. There is room to increase students' awareness of other AEOP opportunities.

Evaluation Considerations

Continue to examine ways to increase survey response rates. Address the challenge of moderate response rates in student and teacher surveys to ensure data representativeness and reliability. Some strategies could include building time near the end of the program to administer the surveys.

1 Introduction

1.1 AEOP Priorities & Goals

The Army Educational Outreach Program (AEOP) mission provides an accessible pathway of science, technology, engineering, and mathematics (STEM) opportunities to attract, develop, and teacher the next generation of our nation's diverse talent through the United States (U.S.) Army educational outreach programs.

AEOP has three priorities:

1. **STEM Literate Citizenry**. Broaden, deepen, and diversify the pool of STEM talent in support of our Defense Industry Base (DIB).
2. **STEM Savvy Educators.** Support and empower educators with unique Army research and technology resources.
3. **Sustainable Infrastructure.** Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army.

Unite directly supports the AEOP mission by offering STEM courses for students to promote self-discovery and empower students to recognize the real-life applications of STEM and get familiar with STEM careers and professionals in the field.

1.2 Overview of Participants

In FY23, Unite served 595 participants, 73% (436) of whom were students, and the remaining 27% (159) were teachers/instructors.[1]

AEOP has a focus on reaching participants who have more limited access to STEM learning opportunities and/or who are from groups that are underserved in STEM education and careers. AEOP defines underserved participants as those who possess at least two of the following characteristics: attend a rural, urban, or frontier/tribal school; identify as female; identify as racial/ethnic minority in STEM (i.e., Alaska Native, Native American, Black or African American, Hispanic, Native Hawaiian and other Pacific Islander, other); receive free or reduced meals price at school; speak English as a second language (ELL); first generation college student; students with disabilities; or a dependent of a military service member or veteran (referred to hereafter as Underserved).

All students who participants in Unite are expected to meet one or more of the AEOP criteria for being underserved.[2]

[1] Throughout this report, we refer to teachers and instructors interchangeably.
[2] Unite only provided aggregate counts; because we do not have data at the participant level, we cannot accurately determine how many criteria were met by each participant. We can only report the highest number for all categories and say that at least 350 participants (59%) met one criteria.

2 Evaluation Approach

Education Development Center, Inc. (EDC) is AEOP's external evaluation partner. The primary methods for data collection were post-surveys for students[3] and teachers, which were designed to evaluate the benefits of participation, program strengths and challenges, and overall effectiveness in meeting AEOP and program objectives. Unite program personnel facilitated the distribution of these online surveys to students and their teachers upon completion of the program activities.

In addition to administering student surveys, the evaluation team conducted a site visit to a Unite program in July 2023. The main purpose of the site visit was to learn first-hand about the range of participant experiences. EDC sought to gain understanding of program facilitation and structures through direct observation, and we spoke to six participants to gather their input on how program influenced their interest in STEM as well as their perspectives on program strengths and areas of improvement. Furthermore, focus groups added depth to data collected through the surveys.

In general, we sought to address the overarching research questions listed in Table 1.

Table 1. Research Questions Addressed in This Report

AEOP Priority	Research Questions Regarding Participants
STEM Literate Citizenry: Broaden, deepen, and diversify the pool of STEM talent in support of our defense industry base.	*Participant Research Question #1* - To what extent do participants report growth in interest and engagement in STEM?
	Research Question #2a - To what extent do participants report increased STEM competencies, 21st Century/STEM skills, STEM knowledge, STEM abilities, and STEM confidence?
	Research Question #2b – To what extent do participants demonstrate use of and growth in 21st Century skills?
	Participant Research Question #3 - To what extent do participants and teachers report increased participant interest in STEM research and careers?
	Participant Research Question #4 - To what extent do participants and teachers report increased awareness of and interest in Army/DoD STEM research and careers?
	Research Question #5 - To what extent do participants report increased enrollment, achievement, and completion of STEM degree programs?
STEM Savvy Educators: Support and empower educators with unique Army research and technology resources.	*Research Question #6* - What is the impact of scientist and engineer (S&E) teachers on AEOP participants?
	Research Question #7 - To what extent do teacher participants report increased use of new approaches to teaching research concepts within STEM practices, and infusion of careers?
Sustainable Infrastructure: Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army.	*Research Question #8* - To what extent do participants report growth in awareness of and/or interest in AEOP opportunities?

[3] Throughout this report, we refer to students and participants interchangeably.

2.1 Survey Respondents and Site Visit Participants

This report includes results from student and teacher surveys (310 student surveys and 74 teacher surveys; see Table 2), and the site visit to a Unite program.

Table 2. Participant and Teacher Survey Response Rates

	Participant Surveys		Team Advisor Surveys	
Program	Count	Response Rate	Count	Response Rate
Unite	310	71%	74	47%

2.2 Limitations

It is important to recognize that survey results only reflect those individuals who completed surveys. The modest response rates for participants (71%) and teachers (47%) mean that these responses may not accurately represent the broader population involved in the program. In addition, the site visit results shared in this report only reflect a subset of individuals whom we spoke with at one Unite program and cannot be generalized across the entire program.

2.3 Report Organization

The evaluation team focused on presenting aggregated results for AEOP overall. Evaluation findings presented below are guided by the research questions and organized thematically by topic. Sections include the following:

- Development of STEM Knowledge and Skills
- Development of 21st Century Skills
- Interest in STEM and STEM Careers
- Perceptions of DoD
- Impact of Teachers on AEOP participants
- Overall Experience
- Recommendations

3 Development of STEM Knowledge and Skills

Students demonstrated notable improvement in STEM knowledge and skills through their engagement in Unite. Students learned skills needed to tackle real-world problems. From understanding the methods have limitations, to collecting and showcasing their work, Unite participants learned to support their arguments in STEM. In addition to developing research skills, students also gained knowledge on specific STEM topics.

Survey findings indicate that the majority of Unite students increased their knowledge of STEM and various aspects of STEM research. In the survey, students were asked to rate their learning in specific topics ranging from "did not learn anything new" to "learned a lot." As shown in Table 3, there is a consistent pattern of reported increases. Students and teachers alike reported enhancement for students in several key areas, including understanding of how scientists and engineers solve real-world problems, in-depth knowledge of STEM topics, knowledge of research processes in STEM, and insights into the daily work in STEM research.

Table 3. Students Increased Their STEM Knowledge

Response		I/they didn't learn anything new	I/they learned a little	I/they learned more than a little	I/they learned a lot	Overall learning
Knowledge of how scientists and engineers work on real problems in STEM	Participant	3%	18%	29%	50%	96%
	Teacher	0%	6%	27%	67%	100%
In depth knowledge of a STEM topic(s)	Participant	1%	13%	28%	59%	95%
	Teacher	0%	3%	20%	77%	100%
Knowledge of research processes used in STEM	Participant	3%	22%	29%	47%	95%
	Teacher	1%	7%	16%	75%	99%
Knowledge of what everyday research work is like in STEM	Participant	2%	24%	29%	45%	94%
	Teacher	0%	12%	17%	71%	100%

Participant Survey (n = 306)
Teacher Survey (n = 74)

Participants and teachers reported enhancements for students in various STEM skills needed in different stages of the research (see Table 4). For example, at least 95% of students and teachers reported students learned "at least a little" about identifying the limitations of the methods and tools used to collect data, as well as how to make a model to show how something works. Students and teachers also reported that students learned how to carry out experiments, record data accurately, and present an argument using data from an experiment.

Table 4. Students Increased Their Skills in STEM and Various Aspects of STEM Research

Response		I/they didn't learn anything new	I/they learned a little	I/they learned more than a little	I/they learned a lot	Overall Learning
How to identify the limitations of the methods and tools used for collecting data	Participant	5%	22%	30%	43%	95%
	Teacher	0%	8%	30%	62%	100%
How to make a model to show how something works	Participant	5%	18%	31%	46%	95%
	Teacher	5%	15%	15%	66%	96%
How to carry out an experiment	Participant	7%	20%	26%	47%	94%
	Teacher	0%	8%	20%	72%	100%
How to record data accurately	Participant	10%	21%	25%	44%	90%
	Teacher	0%	8%	27%	65%	100%
How to support an explanation with my STEM knowledge or data from experiments	Participant	10%	19%	40%	31%	90%
	Teacher	0%	7%	30%	62%	99%
How to present an argument that uses data and/or findings from an experiment	Participant	10%	22%	28%	40%	90%
	Teacher	2%	13%	21%	64%	98%
How to create charts or graphs to display data and find patterns	Participant	16%	26%	18%	40%	84%
	Teacher	3%	8%	21%	67%	96%

Participant Survey (n = 299)
Teacher Survey (n = 69)

"*During this program, when virtually constructing the parts which we would later combine, I faced some error and needed to come up with a way around the issue(s). Once the issue was resolved it allowed me to learn more about problem solving individually.* -Unite Student

"*We focused a lot on making a stoplight out of a board which was really cool and taught me how to code.* -Unite Student

"*We have done projects with each other during biology engineering, including making a hydrologic arm and a cardboard prosthetic arm.* -Unite Student

"*We learned how to carry out, write about, and clean up experiments* -Unite Student

4 Development of 21st Century Skills

Students made substantial gains in 21st Century Skills, including their problem-solving, collaboration skills, and communication skills. Both students and teachers reported increases in nearly all areas of 21st Century Skills, suggesting that Unite helped students gain skills that could prepare themselves for future collaborative endeavors in a STEM field.

The surveys asked about 21st Century skills across three main domains, shown in Table 5. Results from each domain are below.

Table 5. 21st Century Skills Assessed through the Evaluation

21st Century Areas	Description
Problem solving and collaboration	• Solving problems individually or with a team • Involving others in decision making • Working collaboratively with others • Leading and guiding others in a team
Communicating and interacting with others	• Communicate clearly with others orally • Communicate clearly with others in writing • Interacting with others in a respectful and professional
Community and real-world connections	• Thinking about how their work impacts the larger community

4.1 Problem Solving and Collaboration

Participants and teachers reported significant improvement in students' problem-solving and collaboration abilities. They gained skills solving problems individually or with a team (97% of students and 100% of teachers reported at least a "small increase"), working collaboratively with others (97% of students and 100% of teachers), and involving others in decision-making (94% of students and 98% of teachers). Students were somewhat less likely to report growth in leading or guiding others in a group (92%). See Table 4 below for the full range of responses to these items.

Students' comments underscore how they learned specific research skills through Unite. For example, one student shared that *"solving problems with a partner"* was a skill they gained during the program.

Table 6. Students Improved their Problem-Solving and Collaboration Skills

Response		No increase	Small increase	Medium increase	Large increase	Overall Learning
Solving problems individually or with a team	Participant	3%	13%	38%	46%	**97%**
	Teacher	0%	4%	23%	73%	**100%**
Working collaboratively with others	Participant	3%	16%	43%	39%	**97%**
	Teacher	0%	5%	32%	62%	**100%**
Involving others in decision making	Participant	6%	16%	37%	41%	**94%**
	Teacher	1%	10%	29%	59%	**98%**
Leading and guiding others in a team or group	Participant	8%	21%	33%	38%	**92%**
	Teacher	3%	10%	27%	61%	**97%**

Participant Survey (n = 303)
Teacher Survey (n = 74)

> *I worked in a team to build and test drones. This helped me not only gain knowledge in how to develop a drone, but it also allowed me better learn about communicating with a team.* -Unite Student

> *Collaboratively, we brainstormed ideas that we could use and then democratically selected whichever idea seemed the best.* -Unite Student

> *I noted that I increased in solving a problem by myself or with a group* -Unite Student

> *An example of solving problems individually and in groups would be when we had to figure out how to stack books onto cards 6 inches tall without it falling and we all had ideas, we tried them, some worked and some didn't work.* - Unite Student

> *I learned about solving problems with a partner. When building a robot there was some difficulties in putting pieces together. We had to find another way of connecting them without messing up the final product.* -Unite Student

> *When building our robots we worked in teams, and we had to make sure we weren't taking all the work and that we were sharing ideas.* -Unite Student

4.2 Communicating and Interacting with Others

Students improved their communication skills. The majority of both students and teachers reported AEOP contributed to gains in students' ability to communicate clearly with others orally (88% of students and 100% of teachers reported at least a "small increase") and in writing (88% of students and 100% of teachers). Students also improved their skills in interacting with others

in a respectful and professional manner (95% of students and 97% of teachers reported at least a “small increase”). See Table 5 below for the full range of responses to these items.

Table 7. Students Improved Various Communication Skills

Response		No increase	Small increase	Medium increase	Large increase	Overall Learning
Interacting with others in a respectful and professional manner	Participant	5%	15%	28%	52%	**95%**
	Teacher	3%	3%	37%	58%	**97%**
Communicating clearly with others orally	Participant	5%	18%	31%	45%	**88%**
	Teacher	0%	1%	30%	69%	**100%**
Communicating clearly with others in writing	Participant	12%	27%	29%	33%	**88%**
	Teacher	0%	16%	30%	55%	**100%**

Participant Survey (n = 303)
Teacher Survey (n = 74)

> *I have begun talking to new individuals and have worked on my understanding of others’ writing.* -Unite Student

> *I improved on a lot of communication skills that will better me in the future.* - Unite Student

> *I have learned how to clearly communicate with others orally and express my ideas and opinions. Also, I have acknowledged the importance of teamwork by working on the assignment with them.* -Unite Student

> *When we were working in groups, I learned to solve problems with a team and communicate both in writing and orally, which improved my social and team-building skills.* - Unite Student

> *I could accurately communicate what the data meant in the area down below so I wouldn’t have to be there to explain.* -Unite Student

4.3 Community and Real-world Connections

Unite offered many students hands-on opportunities to understand how STEM can address real-world problems that impact the larger community. As Table 6 shows, 92% of students reported gains in thinking about how their work has the potential to impact broader communities.

Table 6. Students Improved Their Perspectives about How their Work Impacts the Larger Community

Response		No increase	Small increase	Medium increase	Large increase	Overall Learning
Thinking about how your work could impact the larger community	Participant	8%	17%	33%	42%	**92%**
	Teacher	0%	10%	24%	66%	**100%**

Participant Survey (n = 303)
Teacher Survey (n = 74)

5 Interest in STEM and STEM Careers

The evaluation results highlight that participating in Unite positively influences students' STEM confidence, interest in STEM-related activities, and aspirations for STEM education and careers.

5.1 STEM Confidence

Most students and teachers indicated that AEOP increased students' STEM confidence. Both groups were asked to rate their agreement with a statement about confidence in STEM knowledge, skills, and abilities. As Table 7 shows, they agreed that students were more confident in these areas as a result of their participation in AEOP (89% of students and 97% of teachers).

Table 7. Most Students and Teachers Indicated that AEOP Increased Students' STEM Confidence

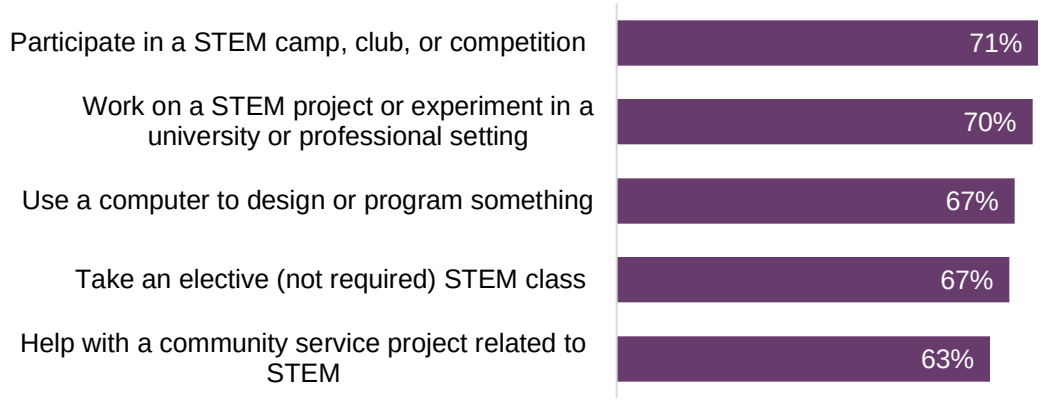
Response		Strongly disagree	Disagree	Agree	Strongly Agree	Agree overall
I am/They are more confident in STEM knowledge, skills, and abilities	Participant	1%	7%	55%	36%	**91%**
	Teacher	1%	1%	36%	61%	**97%**

Participant Survey (n = 306)
Teacher Survey (n = 72)

5.2 Interest in STEM-related Activities

Overall, students in the program indicated that they are more interested in participating in STEM-related activities. Students were more interested in participating in STEM camps, clubs, or competitions (71%), working on STEM projects or experiments in a university or professional setting (70%), and using a computer to design or program something (67%). They indicated an increase in interest in taking elective classes in STEM (67%). Additionally, their STEM projects were focused on helping the community (63%) (see Figure 1). One student who engaged in a case competition as part of their Unite program shared that the experience made them think of *"how you can make an insurance company to help any business in many different ways."*

Figure 1. Student Had Higher Likelihood of Continued Engagement in STEM Activities Post-AEOP Experience

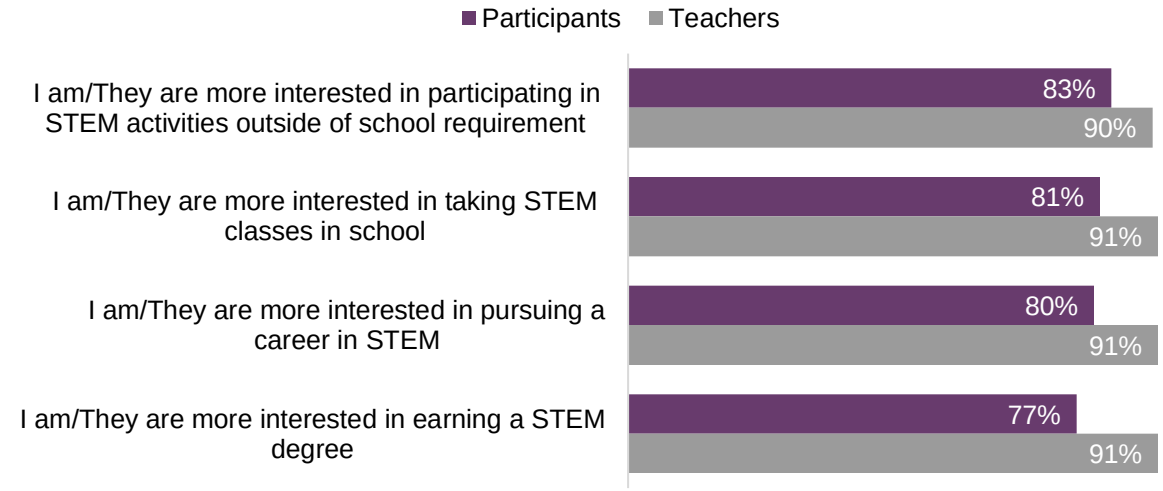


Participant Survey (n = 308)
Responses include those who reported "more likely" and "much more likely."

5.3 Interest in Pursuing STEM Education and Careers

Overall, students were more interested in taking STEM classes and earning a STEM degree. 83% of the program participants expressed that they are more interested in participating in STEM activities outside of school requirements. The students also said they are more interested in taking STEM classes in school (81%) and in pursuing a career in STEM (80%). One student shared that the program "has allowed [them] to understand more about STEM and want to pursue a degree in STEM." 77% of the students showed greater interest in earning a degree in STEM after participating in the program.

Figure 2. Unite Had a Positive Effect on Students' Interest in STEM Education and Careers



Participant Survey (n = 306)
Teacher Survey (n = 72)
Participant and Teacher responses include those who reported Agree or Strongly Agree.

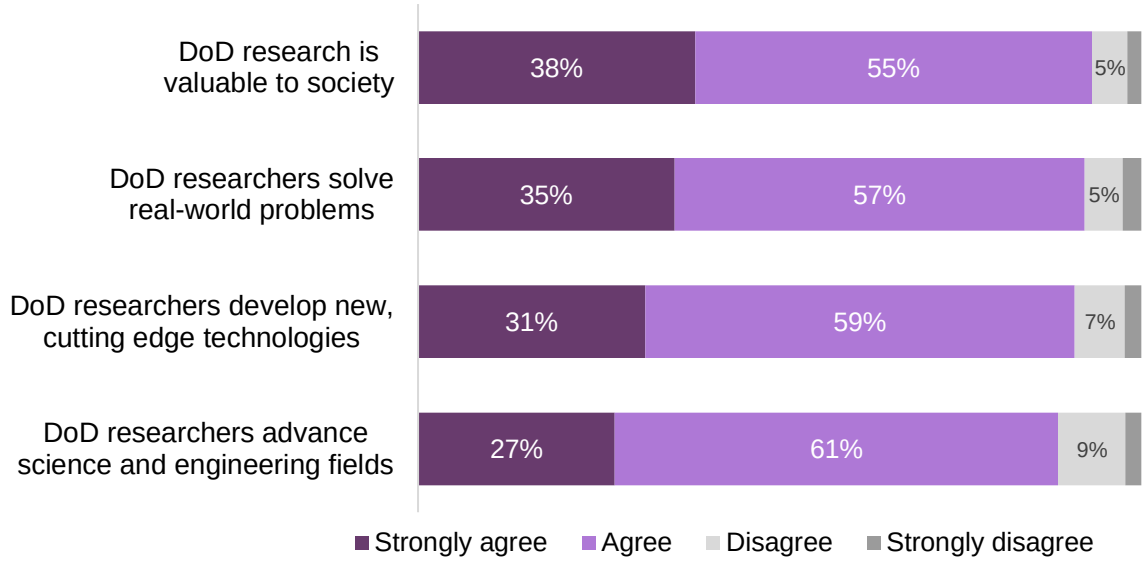
6 Perceptions of DoD

Unite helped students learn about the significance of Department of Defense (DoD) research in addressing real-world issues. According to evaluation results, the vast majority of students recognize the value of DoD research, acknowledging its role in advancing science and engineering, developing innovative technologies, and solving practical problems.

6.1 Understanding of DoD Research

Unite gives students an understanding of the value of DoD research, including for solving real-world problems. On the survey, students were asked how much they agree or disagree with statements about DoD researchers and research. Approximately 90% or more of students "agreed" or "strongly agreed" that DoD research is valuable to society; that DoD researchers solve real-world problems; that DoD researchers develop new, cutting-edge technologies; and that DoD researchers advance science and engineering fields (Figure 3).

Figure 3. Students Understand that DoD Research is Important

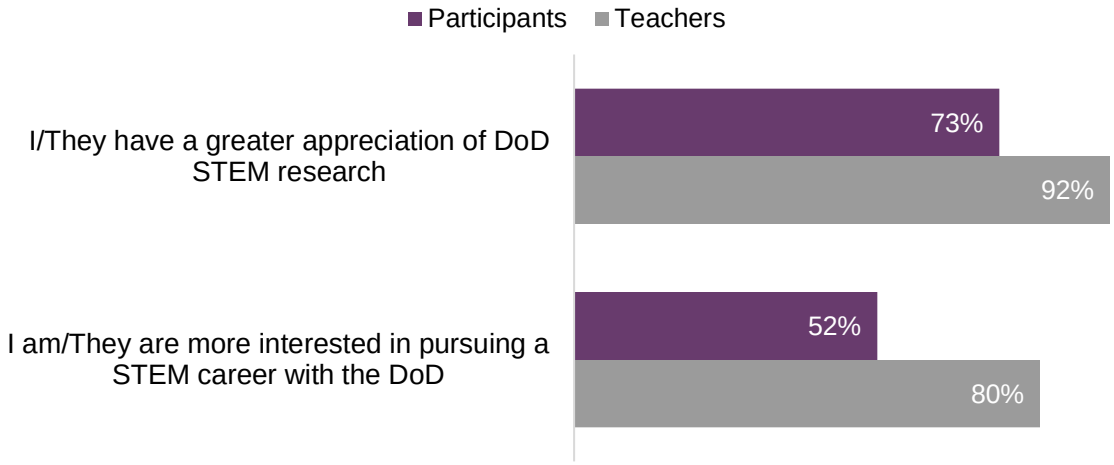


Participant Survey (n = 286)
For each category, 2% of respondents chose "Strongly disagree."

6.2 Interest in Army/DoD STEM Research and Careers

Participating in Unite cultivated students' appreciation for and interest in DoD STEM research and careers. As Figure 4 shows, both teachers and students reported that students had a greater appreciation of DoD STEM research (92% of teachers and 73% of students, respectively) and were more interested in pursuing a STEM career with the DoD (80% and 52%, respectively). In general, the students have a greater appreciation of the DOD research and are interested in pursuing a career with the DoD.

Figure 4. Unite contributed to increasing students' interest in Army/DoD STEM Careers



Participant Survey; All AEOP Programs combined (n = 289)
Teacher Survey (n = 72)
Participant and Teacher responses include those who reported Agree or Strongly Agree.

7 Impact of Teachers/Instructors on AEOP Participants

Overall, students and teachers reported that Unite teachers used strategies to help develop skills and learning with participating students. For example, 95% of students reported (and 96% of teachers) reported that students worked on a team project or activity. In addition, high percentages of students reported using strategies related to the particular work or activity within their AEOP experience. About nine out of ten students reported that teachersgave them extra support when they needed it (93%), helped them learn or practice STEM skills (90%), and used a variety of strategies to help them learn (87%).

Teachers had the important role of helping students better understand STEM and the role it plays in their lives. About nine out of ten teachers reported helping students become aware of STEM in their everyday lives (88%) and helped them understand how they can use STEM to improve their community (90%). At least 85% of both students and teachers reported encouragement in sharing ideas with others of different backgrounds.

Respondents were asked if teachers provided information about the education needed for a STEM career. Teachers were more likely to suggest they provided this information (89%) than students were to indicate that they received it (81%).

Table 8. Participants and Teachers Reported Common Strategies Used Across AEOP

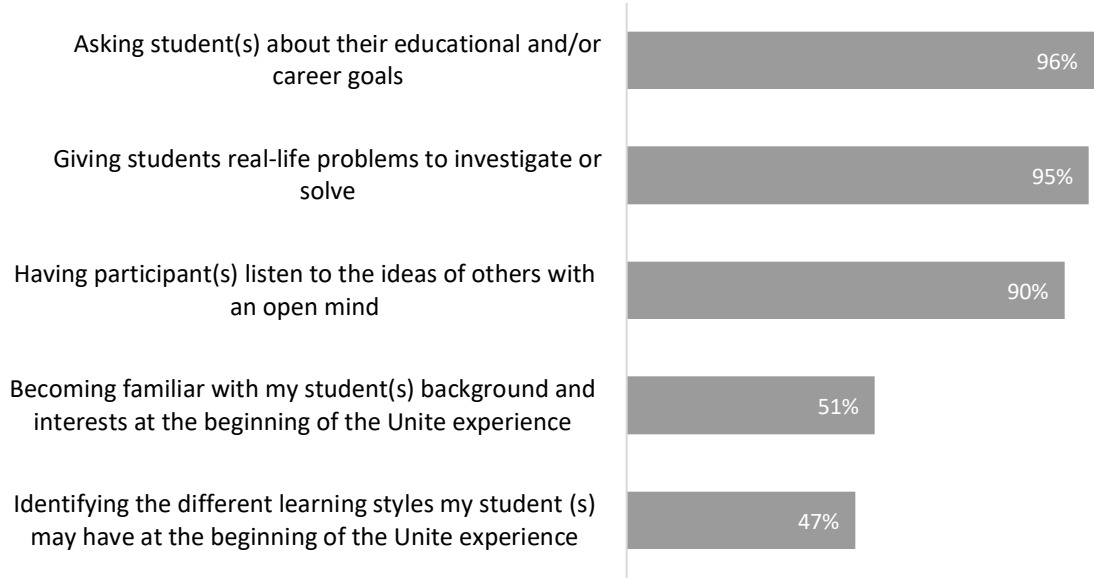
Response		
Allowed me to work on a team project or activity	Participant	95%
Allowing students to work on a team project or activity	Teacher	96%
Gave me extra support when I needed it	Participant	93%
Providing additional support to students as needed	Teacher	96%
Helped me learn or practice a variety of STEM skills	Participant	90%
Providing guidance to help students practice a variety of STEM skills	Teacher	96%
Used a variety of strategies to help me learn	Participant	87%
Using a variety of teaching and/or mentoring activities to meet the needs of all students	Teacher	97%
Helped me become aware of STEM in my everyday life	Participant	86%
Helping students become aware of the role(s) that STEM plays in their everyday lives	Teacher	88%
Encouraged me to share ideas with others who have different backgrounds or viewpoints than I do	Participant	85%
Having student(s) exchange ideas with others whose backgrounds or viewpoints are different from their own	Teacher	88%
Helped me understand how I can use STEM to improve my community	Participant	83%
Helping students understand how STEM can help them improve their own community	Teacher	90%
Talked to me about the education I need for a STEM career	Participant	81%
Talking to students about the education they need for STEM careers	Teacher	89%

Participant survey (n=310)
Teacher survey (n=73)

Teachers employed many strategies to meet the diverse needs of students (see Figure 5). In addition to the areas above, the teacher survey asked them to indicate other ways that they

supported their students. Teachers were most likely to report asking students about their education and career goals (96%), giving students real-life problems to solve (95%), and having students listen with an open mind (90%). Teachers were relatively less likely to report using strategies related to learning specifics about the students they were mentoring, including becoming familiar with students' backgrounds and interests or understanding their learning styles (51% and 47%, respectively). The latter two areas could indicate an opportunity for professional development or peer learning among instructors.

Figure 5. Teachers Used Multiple Strategies to Meet Students' Diverse Needs



Teacher Survey (n=73)

8 Overall Experience

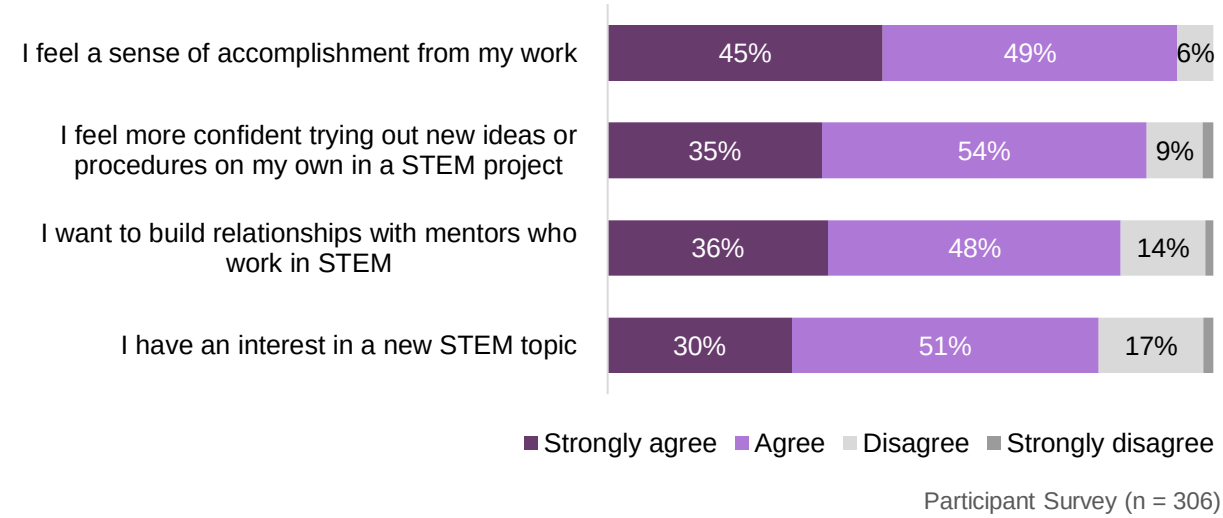
The evaluation results reflect positive experiences for students in Unite. The students participating in Unite commented that they enjoyed the program. Although some students suggested improvements, overall they said that the program was a good learning and bonding experience. One student said they were *"super glad that [they] get this opportunity to be around such awesome people and do awesome things like this."*

8.1 Overall Impressions

Students had positive overall experiences with Unite. As noted in the above sections, students developed their STEM skills and knowledge while gaining valuable real-world experience. Figure 6 shows that overall, at least four out of five students "agreed" or "strongly agreed" that they have an interest in a new STEM topic (81%), want to build relationships with teachers who work in STEM (84%), feel more confident trying out new ideas or procedures (89%), and feel a sense of accomplishment from their work in AEOP (94%).

One student shared that they *"hope to come back next year to meet new people, learn new things, and expand [my] knowledge of STEM, U.S. military advancements, and simply the changing industries around us."*

Figure 6. Students Had Positive Overall Experiences Overall



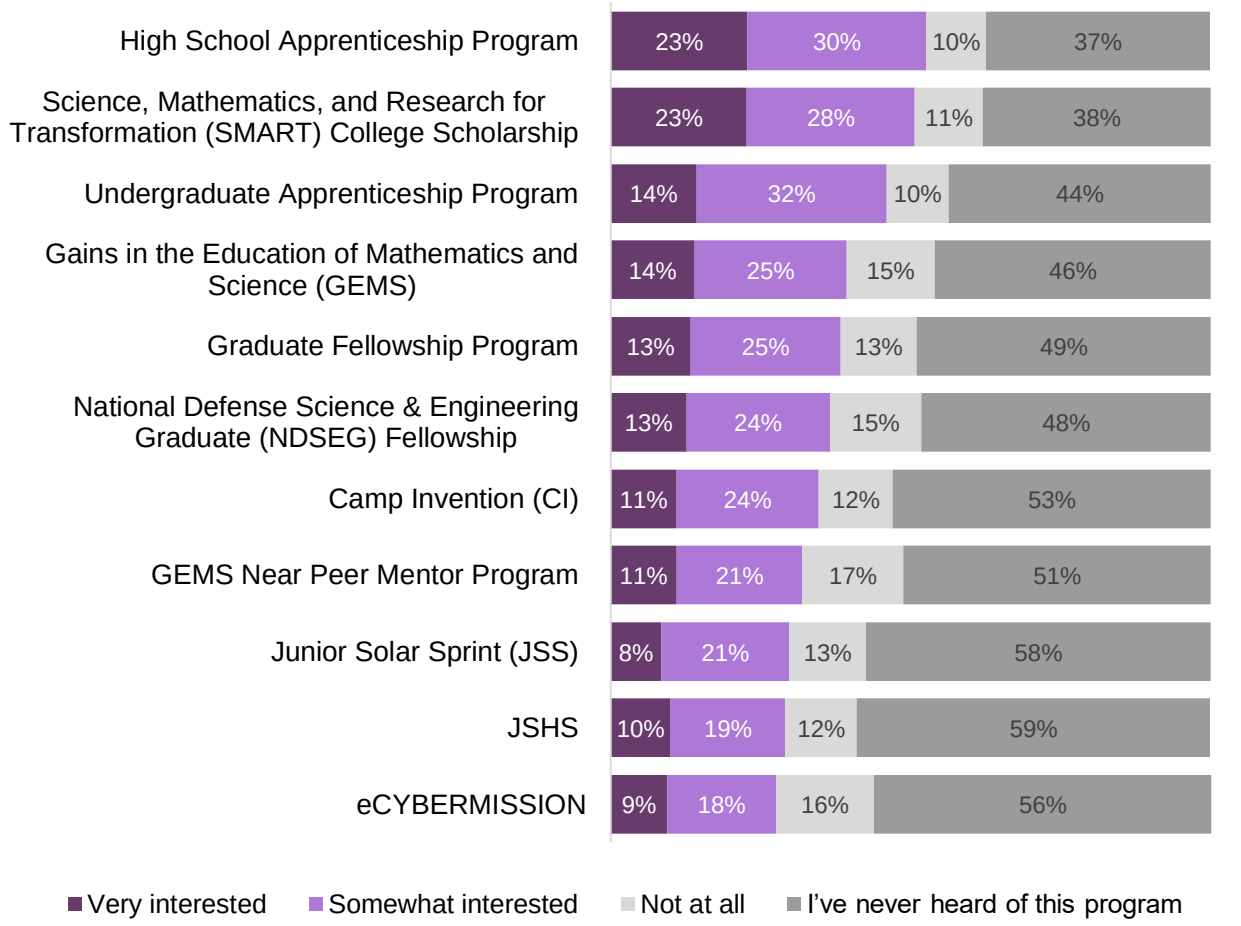
Participant Survey (n = 306)

8.2 Future Interest in AEOP and Other STEM Programs

Students were interested in participating in AEOP and other STEM programs, but there is room for greater awareness of these opportunities. Between 27% to 53% of students indicated they were somewhat or very interested in participating in another program within AEOP or a similar STEM-focused initiative in the future (see Figure 7). This enthusiasm serves as a strong foundation for expanding participation within AEOP or other STEM-focused programs. While the current level of interest is high, there is a potential to increase student familiarity with the breadth of programs available. Approximately one-third to one-half of

students indicated they were not familiar with specific programs, highlighting an opportunity for enhanced outreach. This indicates a pathway for Unite to amplify its efforts in disseminating information about its diverse and enriching opportunities, ensuring that students can take full advantage of the programs that foster their growth in STEM fields.

Figure 2. Student Expressed Interest in AEOP and Other STEM Programs with Opportunities for Increased Awareness



Participant Survey (n = 306)

8.3 Program Satisfaction

The survey asked students open-ended questions about the perceived benefits of Unite and any additional comments about their Unite experience.

Students who participated in the Unite program generally expressed high levels of satisfaction with their activities and experiences during the program. They enjoyed the hands-on experiences in their STEM classes and appreciated the learning experience that allowed them to develop an interest in STEM. Many students appreciated the program's unique blend of formal learning and hands-on work. Many students said they enjoyed learning about STEM, especially the topics that interested them. They enjoyed taking STEM-related courses and getting hands-on experience. Additionally, they appreciated the opportunity to prepare for

college by taking preparatory classes. After the program, many said their interest in STEM grew and they saw a path toward a STEM career.

Students also enjoyed the various field trips and social activities that the program offered, which served as “stress relievers” and allowed them to bond with their peers. Students built strong relationships with teachers and appreciated having someone who listened to their ideas and gave them feedback.

Students consistently remarked positively on their experiences in Unite.

“ *My overall experience was awesome. I loved getting to work with a new project every year.* -Unite Student

“ *I really enjoyed spending time at Unite. It has allowed me to understand more about STEM and want to pursue a degree in STEM.* - Unite Student

“ *I met a lot of new people, made a lot of new friends, and I definitely look forward to doing it again next year.* -Unite Student

“ *This was an amazing program. Regardless of the level of STEM background students had, everyone was challenged and walked away with new information each day.* -Unite Student

Overall, teachers were also satisfied with their work with Unite. They appreciated that the program offered opportunities for students from diverse backgrounds, especially students from marginalized or underrepresented communities. They also were satisfied with the program’s focus on teaching students about career paths in STEM and activities to preview college life.

Mentors cited a number of reasons they thought Unite was a valuable program.

“ *Having students with varied backgrounds, from different schools, work together and learn about STEM in a safe environment.* -Unite Teacher

“ *Gives students access to college-level research and a preview of the college experience, something they may never otherwise have had.* -Unite Teacher

“ *Catching them young, networking and giving them an opportunity to make informed career choices.* -Unite Teacher

“ *Providing marginalized and underrepresented students hands on opportunities in STEM.* -Unite Teacher

“ *Hands-on activities – building circuits, using microcontrollers and sensors, robotics programming, and 3D Printing.* -Unite Teacher

8.4 Suggestions for Improvement

8.4.1 Participants’ Suggestions for Improvement

The participant surveys included a question which asked, “What are two ways [this program] could be improved?”

Students participating in the Unite program generally expressed high levels of satisfaction with the program, especially the mix of formal learning and fun. However, **Unite students offered some suggestions for improvements, including more direct STEM-related activities, more opportunities for collaboration and group interaction, less writing and more hands-on activities, and more fun activities outside of the program. They also recommended improvements to accommodations, more staff, and breaks to build connections with peers.** These recommendations are enumerated below.

Students identified ways to improve the program’s technical and programmatic components. The students suggested more direct STEM-related activities, improved judging and real-world applications/real-world learning. They also proposed more collaboration, group interaction, and in-person activities to foster meaningful connections with their peers.

The students also wanted less writing and more hands-on activities, with timely feedback to help them improve their skills. They suggested that the program provide topics or experiment ideas to help them explore their interests. One student shared that the program *“should include more investigations and broaden the amount of topics covered.”*

The students also recommended more fun activities and year-round outside of program/camp days. They suggested improvements to accommodations, such as space and more student choice in the program requirements and guidelines.

Although they understood Unite provides students a diversity of courses to prepare them for college, some participants reported they took the same class twice and wanted more diversity in both STEM and non-STEM courses.

Students also reported that scheduling was a challenge because of conflicting times between activities. Other recommendations included more field trips, more staff (teachers, teachers, and/or near-peer mentors), and more breaks and time to build connections with peers. The students also requested more food and drink options.

Lastly, some participants who participated in Unite sites that were residential saw a need to change disciplinary policies because they felt their privileges were being taken away when they were not involved in a disciplinary matter. One participant shared, “It’s like a couple of people do something. Everybody on that floor will be punished.”

8.4.2 Teachers’ Suggestions for Improvement

The teacher surveys included a question which asked, “What are two ways [this program] could be improved?”

In their responses, a number of teachers offered praise, saying that Unite provides students with hands-on and flexible exposure and access to STEM and technology. Nevertheless, some teachers offered some suggestions. They expressed the need for more explicit expectations and guidelines for them and additional funding for student stipends. They also suggested more field trips and longer, more engaging activities that allow students to solve real-life problems. Some teachers recommended that the basic material be scaffolded through online material. More support for technical writing and presentations, increased teacher assistance, and additional time with students were requested. Teachers wanted the program to be aware of transportation problems for rural students and that the need for laptops was affecting the experience of some students. They also requested more opportunities for high school teachers and faculty without a PhD to be instructors. More contact between students and military personnel was also requested.

9 Recommendations

Although the data do not necessarily represent all participants in the program, we believe that the results allow us to make the following recommendations:

Programmatic Considerations

Keep engaging students with practical applications of STEM skills that are relevant to their communities and social issues. By providing hands-on experiences in teamwork to solve real-world problems, students feel a sense of accomplishment.

Provide more opportunities for students to bond and have "free" time. Students want more opportunities to know and bond with peers outside the program activities**.**

Keep integrating STEM professional students meet during the program. Students feel inspired to take a STEM career path when they encounter people who have gone through the experience and are current professionals in STEM.

Consider changing the approach to academic writing skills learning to make it more attractive to the students so they can understand the communication of science is valuable. Students would like to have less academic writing.

Explore ways to improve awareness of various AEOP resources, including printed materials, the website, and other social media. There is room to increase students' awareness of other AEOP opportunities.

Evaluation Considerations

Continue to examine ways to increase survey response rates. Address the challenge of moderate response rates in student and teacher surveys to ensure data representativeness and reliability. Some strategies could include building time near the end of the program to administer the surveys.