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ARMY EDUCATIONAL OUTREACH PROGRAM

FY23 JSS Program 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 s science, technology, engineering and mathematics (STEM) programming that is designed to attract, develop, and mentor the next generation of the nation's diverse talent through United States (U.S.) Army educational outreach programs. The Technology Student Association manages the AEOP grant for Junior Solar Sprint (JSS). Through the JSS competition, teachers, mentors, and other community members are empowered to work with middle and high school students in designing, building, and racing model solar cars. Students develop teamwork and problem-solving abilities, investigate environmental issues, and gain hands-on STEM skills.

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/advisor post-surveys. The team 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 JSS program.

Key findings from the evaluation are presented below.

Overview of Participants

In FY23, JSS served a total of 886 participants – 80% (706) were students and 20% (180) were educators, advisors, mentors, Science & Engineering (S&E) volunteers, or other adults.

JSS focuses on providing STEM career and education exploration to underrepresented groups in STEM. Of the student participants in JSS, 75% met two or more of the AEOP criteria for being underserved, while an additional 20% met one AEOP criterion for underserved status. Underrepresentation is determined by the students' social characteristics, such as living in rural, urban, or frontier/trivial schools or identifying as females of a racial/ethnic minority (i.e., Alaska Native, Native American, Black or African American, Hispanic, Native Hawaiian and other Pacific Islander, other). Other characteristics include speaking English as a second language or receiving free meals at school.

Participant Experience and Outcomes

Development of STEM Knowledge and Skills

As a result of their participation in JSS, students felt accomplished, confident, and interested in STEM. Ninety percent of students agreed or strongly agreed that they felt a sense of accomplishment from their work in JSS. They also shared that they felt more confident during

the program (81%), and many students indicated that they have an interest in a new STEM topic (72%).

Development of 21st Century Skills

Students improved their 21st Century Skills. Their improvement came in communication with peers and teachers/advisors and collaboration with peers in their projects. Students gained skills in thinking about real-world issues and developing questions to solve them (90%). Students learned how to work collaboratively with others (96%) and lead a group (94%). They also developed communication skills (93%) and involved others in decision-making (92%).

Interest in STEM and STEM Careers

Participation in JSS heightened students' interest in various aspects of STEM. Many students were particularly engaged with the program activities and their STEM projects, leading to a growing desire to further their knowledge by taking additional STEM classes (46%) and participation in STEM activities (e.g., camp, club, or competition) outside of school (53%).

Perceptions of DoD

JSS students had a favorable view of Department of Defense (DoD) research, recognizing its contributions to solving real-world problems (84%) and developing new, cutting-edge technologies (87%). They acknowledged the value of DoD research in advancing science (88%) and engineering and its broader societal benefits (84%).

Impact of Teachers/Advisors

Teachers/advisors enjoyed working with students from diverse backgrounds and giving opportunities to all to aspire to be STEM professionals. They saw JSS as an opportunity for students to build confidence and skills and have hands-on experiences in STEM. The teachers/advisors also enjoyed presenting students with real-world problems to solve.

Future Interest AEOP and Other STEM Programs

Students were generally interested in participating in AEOP and other STEM programs, but there is room for greater awareness of these opportunities. Between 29% and 48% of students indicated that they were somewhat or very interested in participating in another program within AEOP or a similar STEM-focused initiative in the future. While there is evident interest in future participation, awareness of other programs needs improvement. Approximately one-fourth or more of students were not aware of other AEOP programs or STEM-focused initiatives, highlighting an opportunity to enhance communication and outreach efforts to better inform students about the range of educational opportunities available to them.

Recommendations

In this report, we condensed the data from students and teachers/advisors through surveys and focus groups to answer AEOP's overarching research questions. Although the data does not represent all participants in the program, we believe that the results allow us to make the following recommendations.

Programmatic Considerations

Continue the integration of STEM professionals in programming: Maintain the involvement of STEM professionals in the program, as students reported that their presence inspires students to pursue STEM careers by providing real-world insights and role models.

Enhance targeted marketing and outreach: Continue to use targeted marketing and outreach campaigns to raise awareness about AEOP programs and their benefits among students, educators, and parents. Utilize diverse communication channels such as social media, school partnerships, and community events to ensure broad reach and engagement.

Adjust program structure and supply management: Consider frontloading tasks to distribute workload evenly throughout the program. In addition, consider providing teachers/advisors with a supply list to facilitate requesting essential materials, enhancing teaching support and student learning experiences.

Evaluation Considerations

Increase survey response rates: Address the challenge of low response rates in student and teacher/advisor surveys to ensure data representativeness and reliability. Consider ways to tailor outreach strategies by utilizing personalized communications and targeted reminders.

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 mentor the next generation of our nation's diverse talent through 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.

The Technology Student Association manages the AEOP grant for Junior Solar Sprint (JSS). Through the JSS competition, teachers, mentors, and other community members are empowered to work with middle and high school students in designing, building, and racing model solar cars. Students develop teamwork and problem-solving abilities, investigate environmental issues, and gain hands-on STEM skills.

1.2 Overview of Participants

In FY23, JSS served 886 participants – 706 (80%) were students, and 180 (20%) were teachers/advisors.

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).

Of the student participants in JSS, 75% met two or more of the AEOP criteria for being underserved, while an additional 20% met one AEOP criterion for underserved status.

2 Evaluation Approach

Education Development Center, Inc. (EDC) is AEOP's external evaluation partner. The primary data collection method was post-surveys for students and teachers/advisors[1], which were designed to evaluate the benefits of participation, program strengths and challenges, and overall effectiveness in meeting AEOP and program objectives. In addition to the surveys, we conducted site visits for JSS and a selection of other programs to understand further and document the implementation, experience, and impact of the individual programs. 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 mentors report increased participant interest in STEM research and careers?
	Participant Research Question #4 - To what extent do participants and mentors 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) mentors 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?

[1] Depending on the program, surveys were administered to either mentors or teachers/team advisors.

2.1 Survey Respondents

This report describes participant data and results from student and teacher/advisor surveys (see Table 2).

Table 2. Participant and Teacher/Advisor Survey Response Rates

	Participant Surveys		Teacher/Advisor Surveys	
Program	Count	Response Rate	Count	Response Rate
JSS	256	36%	54	30%

2.2 Focus Group Respondents

The EDC team conducted focus groups, each lasting 45 minutes, during the 2023 national JSS competition. Forty-two JSS students participated in four separate focus groups. Students discussed the reasons and benefits of participating at JSS as well as improvements to the program. They also discussed their exploration of STEM careers and the knowledge they gained about the Army and the Department of Defense (DoD).

2.3 Limitations

It is important to recognize that survey results only reflect those individuals who completed surveys. These responses may not generalize well to the populations involved in the program. In addition, as noted above, the site visit results shared in this report only reflect a subset of individuals and cannot be generalized across the entire program. The focus group topics focused on a few areas of interest and were meant to supplement data gathered through surveys. As a result, while these findings offer some insights into the JSS program, this report does not provide a complete or representative account of outcomes from the program.

2.4 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 Mentors on AEOP Participants[2]
- Overall Experience
- Recommendations

[2] Across AEOP, the role, function, and even title of “mentors” varies. In JSS, they are generally teachers/advisors and we have used this term throughout this report. These adult participants play a crucial role in guiding students through STEM learning experiences, offering support, expertise, and inspiration to foster their interest and development in STEM fields.

3 Development of STEM Knowledge and Skills

The JSS program appears to have fostered gains in students' STEM knowledge and skills. Students gained a comprehensive understanding of the research process, including the limitations of different methodologies. They learned how to effectively collect data, present their findings, and build strong arguments in support of their ideas within the STEM field. Additionally, their involvement deepened their knowledge of both STEM research practices and specific STEM topics.

During the JSS program, students developed STEM skills. In the surveys, students and teachers/advisors were asked to rate students' learning in specific areas 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/advisors both reported learning gains for students in numerous areas, including in-depth knowledge of STEM topics, understanding of how scientists and engineers solve real-world problems, and insights into the daily work in STEM research. In general, teachers/advisors were slightly more likely to report larger gains than students.

Table 3. Students Developed Knowledge of STEM

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
In depth knowledge of a STEM topic(s)	Participant	6%	16%	35%	43%	**94%**
	Teacher/advisor	2%	8%	29%	61%	**98%**
Knowledge of how scientists and engineers work on real problems in STEM	Participant	6%	28%	27%	39%	**94%**
	Teacher/advisor	0%	10%	25%	65%	**100%**
Knowledge of what everyday research work is like in STEM	Participant	10%	24%	32%	33%	**90%**
	Teacher/advisor	0%	8%	37%	55%	**100%**

Due to rounding, totals may vary.
Participant Survey (n = 232)
Teacher/Advisor Survey (n = 51)

Students learned skills needed to tackle real-world problems that research in STEM can solve. From recording data accurately to making a model to show how something works, students gained skills in conducting STEM research. As Table 4 shows, students and teachers/advisors reported improvements in these areas.

Table 4. Students Increased their Skills in 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 record data accurately	Participant	7%	23%	34%	37%	94%
	Teacher/advisor	2%	10%	37%	51%	98%
How to make a model to show how something works	Participant	5%	15%	29%	51%	95%
	Teacher/advisor	0%	6%	14%	80%	100%

Due to rounding, totals may vary.
Participant Survey (n = 231)
Teacher/Advisor Survey (n = 51)

> *"I noticed how things work with technology and build things. Also, working in teams and attempting competitions.* -JSS Student

> *"I helped a lot with the design of the car, and it turned out very well and fast. -* JSS Student

> *"When we did JSS, I learned a lot I learned how to make a JSS car and how to do many other things.* - JSS Student

4 Development of 21st Century Skills

Students in JSS reported substantial gains in 21st Century Skills such as problem-solving, decision-making, working collaboratively, and leading others in the team. They also indicated that they gained skills in communicating more clearly with others and considering real-world connections of their projects. Teacher/advisors' assessments of students' improvements in these areas were consistent with what students reported.

The surveys asked about 21st Century skills across three main domains, shown in Table 5. Results from each of these domains are described in the following sections.

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 • Interacting with others in a respectful and professional manner
Community and real-world connections	• Thinking about how their work impacts the larger community

4.1 Problem Solving and Collaboration

Students reported improving various problem-solving and collaboration skills. Students and teachers/advisors reported gains in students' skills related to solving problems individually or on a team, involving others in decision-making, working collaboratively with others, and leading and guiding others in a team or group (see Table 6).

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

		No increase	Small increase	Medium increase	Large increase	Overall Increase
Solving problems individually or with a team	Participant	5%	11%	40%	45%	**96%**
	Teacher/Advisor	0%	0%	34%	66%	**100%**
Involving others in decision making	Participant	8%	15%	28%	49%	**92%**
	Teacher/Advisor	2%	6%	34%	59%	**98%**
Working collaboratively with others	Participant	4%	15%	36%	45%	**96%**
	Teacher/Advisor	0%	8%	21%	71%	**100%**
Leading and guiding others in a team or group	Participant	6%	20%	34%	41%	**94%**
	Teacher/Advisor	0%	4%	42%	54%	**100%**

Due to rounding, totals may vary.
Participant Survey (n = 247)
Teacher/Advisor Survey (n = 53)

4.2 Communicating and Interacting with Others

Students improved various communication skills. The majority of both students and teachers/advisors reported gains in communicating clearly orally with others as well as interacting respectfully and professionally with others. One student said, “I was too shy at first when talking to people, but now I know how to.”

Table 7. Students Improved Various Communication Skills

		No increase	Small increase	Medium increase	Large increase	Overall Increase
Communicating clearly with others orally	Participant	7%	16%	37%	40%	**93%**
	Teacher/Advisor	0%	8%	31%	62%	**100%**
Interacting with others in a respectful and professional manner	Participant	8%	13%	32%	48%	**92%**
	Teacher/Advisor	0%	2%	35%	64%	**100%**

Due to rounding, totals may vary.
Participant Survey (n = 247)
Teacher/Advisor Survey (n = 53)

4.3 Community and Real-World Connections

Students increased their ability to think about how their work could impact the larger community. As Table 8 shows, the majority of both students and teachers/advisors reported students experienced a large gain in thinking about how their work could impact the larger community.

Table 8. Students Increased their Ability to Think about Their Community Impact

		No increase	Small increase	Medium increase	Large increase	Overall Increase
Thinking about how your work could impact the larger community	Participant	10%	20%	33%	38%	**90%**
	Teacher/Advisor	4%	20%	36%	40%	**96%**

Due to rounding, totals may vary.
Participant Survey (n = 247)
Teacher/Advisor Survey (n = 53)

Students and teachers/advisors offered several examples of how participants gained skills in problem-solving and collaboration, communicating and working with others, and understanding community and real-word connections.

“ *Me and my friends ran into a problem, but we solved it together.* - JSS Student

“ *My team is all about working together. We tell each other what we are going to be doing, and we don't keep things from each other.* -JSS Student

“ *My tire was not going on right, so I had to fix it and explain to my partners what was going on* - JSS Student

“ *I thought about how things like using too much fossil fuels impact the earth.* -JSS Student

“ [Students learned about] *problem solving, understanding consequences of design choices.* -JSS Teacher/Advisor

“ [Students learned about] *thinking through the steps of the design build process.* -JSS Teacher/Advisor

5 Interest in STEM and STEM Careers

Students increased their interest in different aspects of the JSS program and their STEM projects. Many were interested in the activities during the program, while others focused on their STEM projects or experiments. They also increased their interest in furthering their knowledge in STEM by taking classes in STEM and participating in STEM activities outside of school.

5.1 STEM Confidence

Most students indicated that JSS increased their STEM confidence. As Table 9 shows, more than two-fifths of students reported that they are more confident in their STEM knowledge, skills, and abilities as a result of their participation in JSS (81% agreed or strongly agreed).

Table 9. Most Students Indicated that JSS increased their STEM Confidence

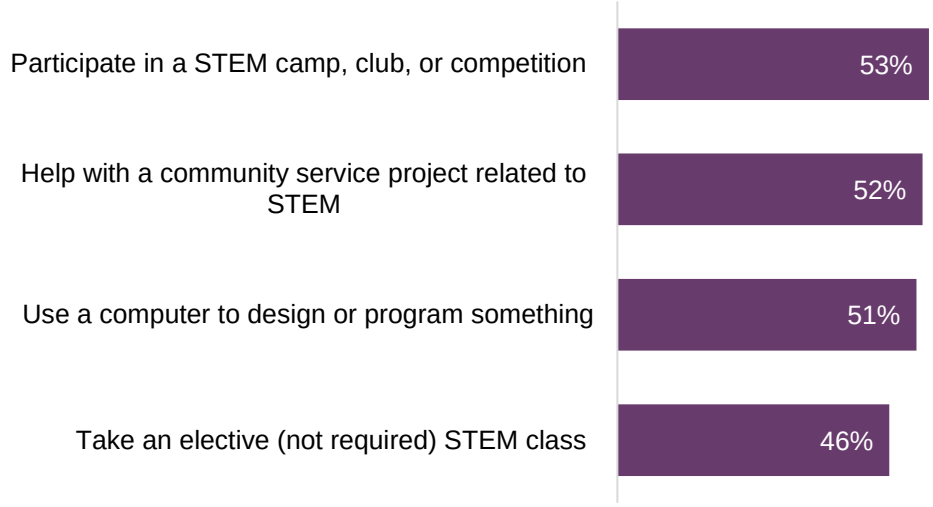
Response		Strongly Disagree	Disagree	Agree	Strongly Agree	Agree overall
I am/They are more confident in STEM knowledge, skills, and abilities	Participant	4%	15%	46%	35%	81%

Participant Survey (n = 349)
*This item was inadvertently omitted from the Teacher/Advisor survey.

5.2 Interest in STEM-related Activities

Many students indicated they are more interested in participating in STEM-related activities. At least one-half of surveyed students were more interested in participating in STEM camps, clubs, or competitions (53%), helping with a community service project focused on STEM (52%), and using a computer to design or program something (51%). They also indicated an increase in interest in taking elective classes in STEM (46%).

Figure 1. Most Students Reported Becoming More Interested in Participating in Other STEM-related activities



Participant Survey (n = 224)
Responses include those who reported "more likely" and "much more likely."

> "*JSS has helped me by improving my knowledge about technology. -* JSS Student
>
> "*JSS has helped me with my leadership skills. At first, I didn't have as much as I do now, and I feel more confident when it comes to [it].* - JSS Student
>
> "*It helped me learn how to model something, test it out, tear it down and do it again until I got it right.* -JSS Student

5.3 Interest in Pursuing STEM Education and Careers

Overall, students are more interested in taking STEM classes and pursuing STEM activities outside of school. As Table 10 illustrates, more than two-thirds of students expressed that they are more interested in participating in STEM activities outside of school requirements and are interested in taking more STEM classes in school (79% of students agreed with each of these). Teachers/advisors also reported that students are more interested in STEM activities in and out of school (94% of Teachers/advisors agreed overall).

Table 10. Most students are interested in classes and participation in STEM activities

		Strongly Agree	Agree	Disagree	Strongly Disagree	Agree Overall
I am/They are more interested in participating in STEM activities outside of school requirements	Participant	21%	50%	21%	8%	**79%**
	Teacher/Advisor	40%	54%	4%	2%	**94%**
I am/They are more interested in taking STEM classes in school	Participant	27%	44%	21%	7%	**71%**
	Teacher/Advisor	43%	51%	4%	2%	**94%**

Participant Survey (n = 349)
Teacher/Advisor Survey (n =52)

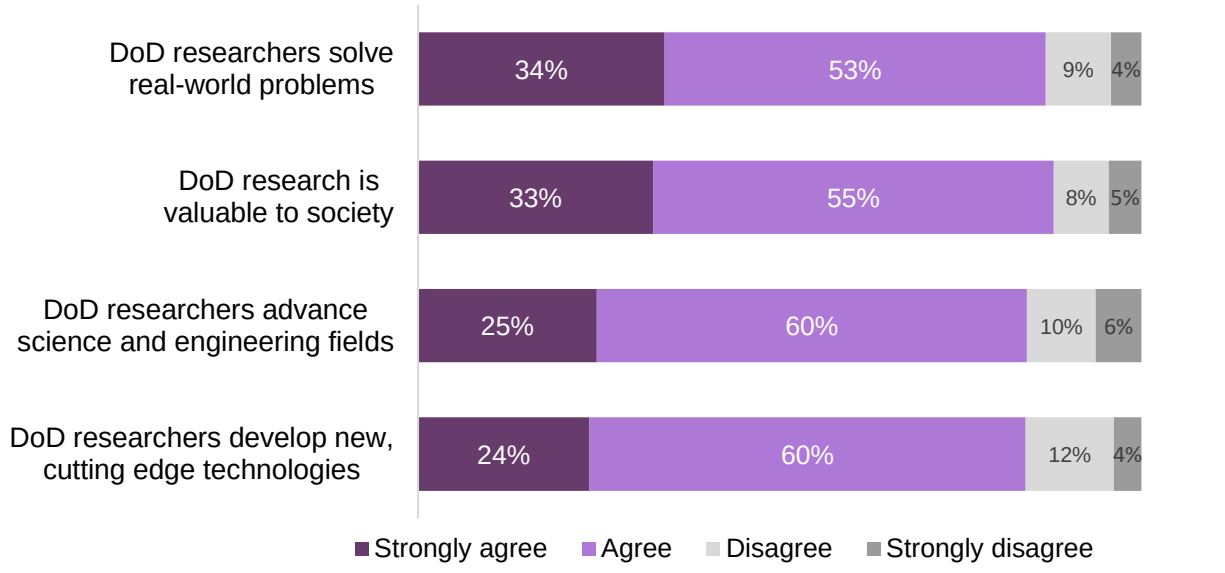
6 Perceptions of DoD

JSS students had a positive perception of DoD research and its contributions to society. The students agreed that the DoD helps solve real-world problems and develop new technologies. They also agreed that DoD research is of value to society and helps advance science and engineering.

6.1 Understanding of DoD Research

Students understand that DoD research is valuable. In general, students agreed or strongly agree or agreed that DoD research is valuable and advances science and technology in science and engineering. As Figure 4 shows, roughly 85% or more of students agree or strongly agree that DoD researchers solve real-world problems (84% agree overall), DoD research is valuable to society (84%), DoD researchers advance science and engineering fields (88%), and DoD researchers develop new, cutting-edge technologies (87%).

Figure 2. Students Understand that DOD Research is Valuable



Participant Survey (n = 167)

7 Impact of Mentors on AEOP Participants[3]

Both students and teachers/advisors consistently reported the implementation of common instructional, coaching, and mentorship approaches within the JSS program. These approaches involved providing students with extra support when needed, helping students understand the relevance of STEM in their everyday lives and communities. In addition, teachers/advisors reported using various student-centered strategies to meet the program's learning objectives. The strategies likely allowed for customization to enhance student engagement and achievement in JSS.

Overall, the teachers/advisors and the students used common strategies to develop skills and learning across AEOP. The majority of students and teachers/advisors indicated that teachers/advisors gave them extra support when needed (89% of students and 90% of teachers/advisors). Participants also reported that teachers/advisors used multiple strategies to become aware of STEM in everyday life (76% of students and 87% of teachers/advisors). They also reported that teachers/advisors helped students understand how to use STEM to improve their community (68% of students and 71% of teachers/advisors).

Table 11. Participants and Teachers/Advisors Reported Common Strategies to Engage Students

Response		
Gave me extra support when I needed it	Participant	89%
Provided additional support to students as needed	Teacher/Advisor	90%
Helped me become aware of STEM in my everyday life	Participant	76%
Helped students become aware of the role(s) that STEM plays in their everyday lives	Teacher/Advisor	87%
Helped me understand how I can use STEM to improve my community	Participant	68%
Helped students understand how STEM can help them improve their own community	Teacher/Advisor	71%

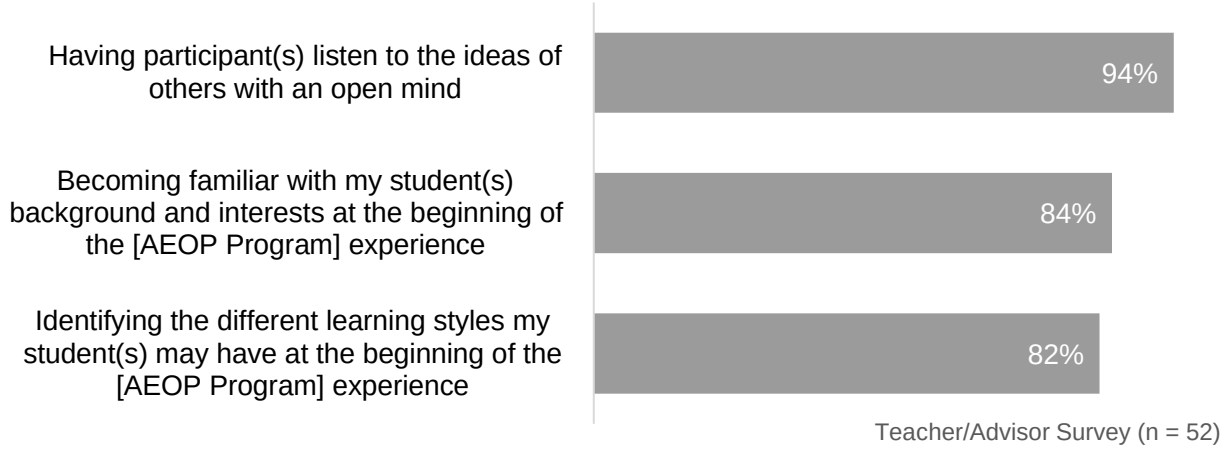
Participant Survey (n = 178)
Teacher/Advisor Survey (n = 52)

Teachers/advisors expressed using multiple strategies to meet students' needs, such as asking them about their career goals or becoming familiar with the students' backgrounds and interests to determine how best to serve them during their time in the program. Teachers/advisors encouraged participants to listen to the ideas of others with an open mind

[3] Across AEOP, the role, function, and even title of "mentors" varies. In JSS, they are generally teachers/advisors and we have used this term throughout this report. These adult participants play a crucial role in guiding students through STEM learning experiences, offering support, expertise, and inspiration to foster their interest and development in STEM fields.

(94%) and to become familiar with their background and interests (84%). Teachers/advisors also reported that they worked to identify the students' different learning styles at the beginning of the program to serve their educational needs better (82%).

Figure 3. Teachers/Advisors Used Multiple Strategies to Meet Students' Needs



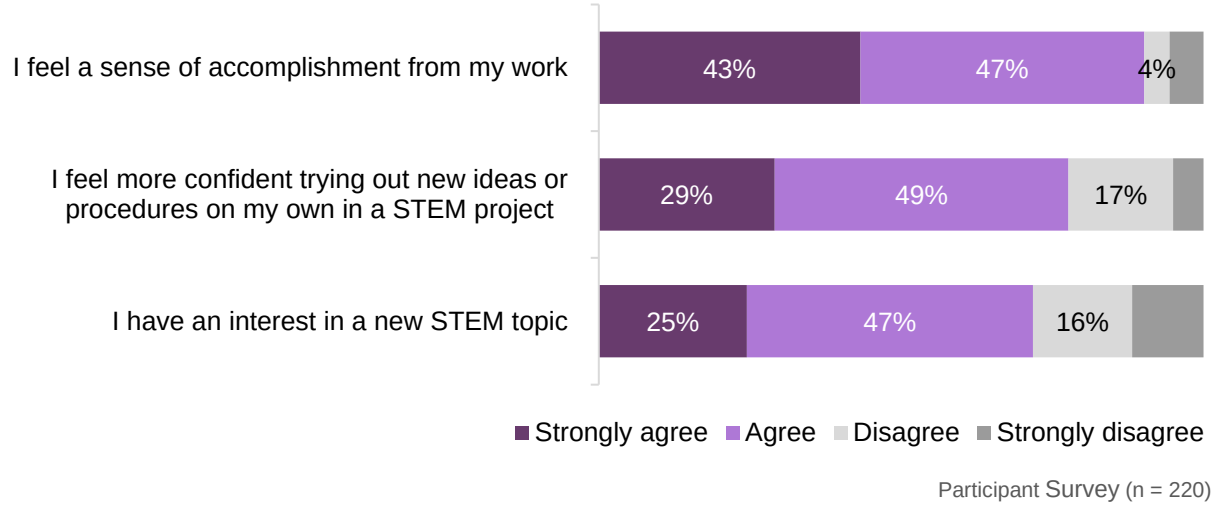
8 Overall experience

Students participating in the JSS program felt accomplished from their work during the program. They felt more confident trying new ideas and procedures during their project and were interested in a new topic in STEM. During the JSS focus groups, students expressed that the program had many benefits. For example, they had the opportunity to design, build, and test their cars while collaborating with peers and adults. They also remarked on their experiences engaging in different aspects of the project where teamwork was needed to implement their car design.

8.1 Overall Impressions

Students had positive overall experiences with AEOP. Although some students felt the JSS program needed improvements, the majority of students reported that the program was a good learning and bonding experience for most students. Students generally agreed and strongly agreed that they felt accomplished in their work during the program (90% agreed overall). They also reported that they felt more confident exploring new ideas in their projects (78% agreed overall) and that they were interested in new STEM topics (72% agreed overall).

Figure 4. Students had Positive Overall Experiences with JSS



Participant Survey (n = 220)

Students consistently remarked positively on their experiences in JSS.

“ *This is an amazing program, and you are able to learn many new skills and meet new people while participating in the program.* -JSS Student

“ *The experience was amazing, and I loved the people who I worked with I am very anticipated for nationals.* - JSS Student

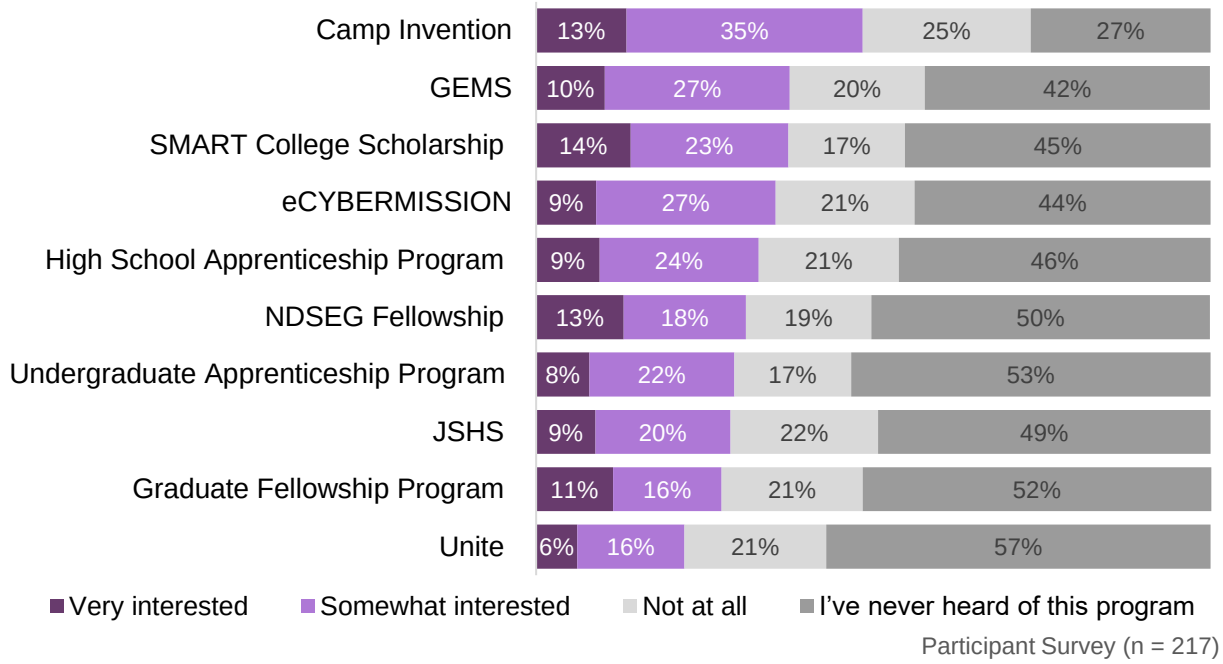
“ *I am very happy even though I did not win and if I can do it in 7th grade that would be amazing too.* -JSS Student

“ *JSS has helped me so much this year, by teaching me the importance of teamwork, leadership, and really improving my communication skills. It has also increased my knowledge about technology by a whole lot!* -JSS Student

8.2 Future Interest in AEOP and Other STEM Programs

Students were generally interested in participating in AEOP and other STEM programs, but there is room for greater awareness of these opportunities. Between 29% and 48% of students indicated that 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). While there is evident interest in future participation, awareness of other programs needs improvement. Approximately one-fourth or more of students were not aware of other AEOP programs or STEM-focused initiatives, highlighting an opportunity to enhance communication and outreach efforts to better inform students about the range of educational opportunities available to them.

Figure 5. Students were Interested in AEOP and other STEM Programs, but there is Room for Greater Awareness



Participant Survey (n = 217)

8.3 Program Satisfaction

To assess overall satisfaction, the surveys asked both students and teachers/advisors an open-response question, *please tell us about your overall satisfaction with your JSS experience*. Students in the program were satisfied with different aspects of 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.

8.3.1 Student Program Satisfaction

Students who participated in the JSS program often expressed high levels of satisfaction with their activities and experiences during the program. Many students appreciated the program's unique blend of formal learning and hands-on work. Many students said they enjoyed learning new skills, especially those that interest them. They mentioned that working with peers in the solar car requires communication with peers. Learning new skills while learning together with peers. They enjoyed "every bit" of the solar car project. Students mentioned "fun" as part of their descriptions of the JSS programs.

8.3.2 Teacher/Advisor Program Satisfaction

Teachers/advisors consistently expressed positive experiences with the JSS program. For example, one teacher/advisor highlighted the mutual learning experience, noting it was their first time overseeing all aspects of JSS and emphasized the lifelong skills students gained.

Another teacher/advisor praised the project for building students' confidence and their ability to successfully complete the solar car. A different teacher/advisor shared that the program provided the students a deeper understanding of the engineering design process, as they continually improved their car's performance and found alternative materials. Overall, teachers/advisors appreciated the program's impact on both their teaching and the students' practical skill development.

8.4 Suggestions for Improvement

In addition to asking about their overall satisfaction, the surveys included the open-ended question: *What are two ways JSS could be improved?* Below is a summary of themes from student and teacher/advisor comments.

Implement policies to limit parental intervention: A number of teachers/advisors suggested that the program should develop and enforce guidelines to prevent parental involvement in the creation of solar cars. This will ensure that the work remains student-driven and maintains the integrity of the competition.

Standardize resource availability: A few teacher/advisors noted that the program should ensure that all students have equitable access to materials by limiting the solar car construction resources to those that are easily accessible. While the program currently supports this, this may be an area to clarify with teachers/advisors.

Adjust program structure and supply management: Consider frontloading some tasks to balance the workload throughout the program. Additionally, provide a supply list for teacher/advisors, allowing them to request necessary materials to better support their teaching and the students' learning experiences.[4]

[4] The Army points of contact receive a supply list once they have confirmed they will be hosting an event, but teachers/advisors may not be aware of this.

9 Recommendations

In this report, we condensed the data from students and teachers/advisors through surveys and focus groups to answer AEOP's overarching research questions. Although the data does not represent all participants in the program, we believe that the results allow us to make the following recommendations.

Programmatic Considerations

Continue the integration of STEM professionals in programming: Maintain the involvement of STEM professionals in the program, as students reported that their presence inspires students to pursue STEM careers by providing real-world insights and role models.

Enhance targeted marketing and outreach: Continue to use targeted marketing and outreach campaigns to raise awareness about AEOP programs and their benefits among students, educators, and parents. Utilize diverse communication channels such as social media, school partnerships, and community events to ensure broad reach and engagement.

Adjust program structure and supply management: Consider frontloading tasks to distribute workload evenly throughout the program. In addition, consider providing teachers/advisors with a supply list to facilitate requesting essential materials, enhancing teaching support and student learning experiences.

Evaluation Considerations

Increase survey response rates: Address the challenge of low response rates in student and teacher/advisor surveys to ensure data representativeness and reliability. Consider ways to tailor outreach strategies by utilizing personalized communications and targeted reminders.