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ARMY EDUCATIONAL OUTREACH PROGRAM

2022 JSHS Evaluation Report
Summative Findings

July 2023

aeop
ARMY EDUCATIONAL OUTREACH PROGRAM

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This report has been prepared for the AEOP Cooperative Agreement and the U.S. Army by Education Development Center, Inc. on behalf of Battelle Memorial Institute (Lead Organization) under award W911 SR-15-2-0001.

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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 mentor the next generation of the nation's diverse talent through United States (U.S.) Army educational outreach programs. The JSHS is a DoD-sponsored STEM program (U.S. Secretary of the Defense and the U.S. Departments of the Army, Navy, and Air Force) which promotes original research and experimentation in STEM at the high school level and publicly recognizes students for outstanding achievement.

Education Development Center, Inc. (EDC), the external evaluation partner for AEOP, conducted an evaluation of the Junior Science and Humanities Symposium (JSHS) during the 2021-2022 program year. The JSHS 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 post-surveys. It is important to recognize that survey results only reflect those individuals who completed surveys and may not be generalizable within a specific program.

Key findings from the evaluation are presented below.

Overview of Participants

In FY22, JSHS served a total of 2,755 student participants.

AEOP has a particular focus on reaching participants who have more limited access to STEM learning opportunities and/or who are from groups that are underrepresented in STEM education and careers. AEOP defines underserved and underrepresented participants as those who possess one or more 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. AEOP has identified a particular interest in reaching students who meet two or more of the underserved and underrepresented criteria described above (referred to hereafter as Underserved). **In FY22, 1,178 (77%) of all JSHS participants met two or more of the Underserved criteria. An additional 22% of student participants met one of the AEOP Underserved criteria.**[1]

Participant Experience and Outcomes

AEOP exposed students to an array of STEM experiences. According to survey results from students, the majority of students had experiences such as conducting research, solving real-

[1] JSHS uses a slightly different definition of underserved than AEOP. The numbers included in this report represent the AEOP definition of underserved. Future years' reports will document calculations using the JSHS definition for underserved.

world problems, and interacting with STEM researchers; at least 78% of students reported that they had these opportunities. A relatively smaller majority of students gained experience working with and presenting their research to industry and military professionals; between 55% and 76% of students reported some level of interaction with STEM professionals.

Students reported improved STEM skills such as: knowledge of STEM topics and STEM research; planning and carrying out an experiment; analyzing and interpreting data. Overall, between 87% and 91% of students reported improvements in a range of STEM skills.

Students noted gains in 21st Century skills such as: communication and collaboration; critical thinking and problem solving; and creativity and innovation. The majority of students (between 69% and 94%) indicated increased competencies in these areas. Students were less likely to report improvements in their skills related to media and technological literacy. Between 63% and 89% reported gains in this area.

Students' interest in STEM and STEM careers increased, including Army/DoD careers. Most students reported that they were more likely to engage in STEM activities after their participation in JSHS (ranging between 89% and 96%). At least 96% of students indicated that JSHS had a positive influence on their interest in earning a STEM degree. Additionally, 74% of students credited their participation in JSHS as the reason for their increased appreciation for Army/DoD research (roughly 90% on multiple items).

Mentors used a variety of strategies to engage with students. Most students reported that mentors used strategies to support the diverse needs of students, establish relevant learning activities, support students' development of collaboration and interpersonal skills, and support students' educational pathways. Across an array of items, student responses fell between 55% and 86%.

Students reported generally positive experiences with AEOP. Students enjoyed learning new STEM skills, working on real-life community problems, and engaging in hands-on research.

Most suggestions for improvement pointed to a need for improved communication. Some also noted a desire for aligning judges with presentations in their content area(s).

Recommendations

This report distills findings across the student participant surveys as they align with AEOP's overarching research questions. As stated in the limitations, data collected for this evaluation are not necessarily representative of the entire program; however, based on the results presented above, we offer the following recommendations:

Programmatic Considerations

- **Continue to offer hands-on, authentic, relevant research experiences.** Research shows these kinds of experiences are important to developing and sustaining students' interest in STEM education and career pathways.

- **Align judges and projects by content area.** Student surveys indicated that lack of alignment between students' research area and judges' expertise was sometimes an issue which detracted from their overall satisfaction with the program.
- **Consider increasing communication with participants.** The student surveys indicated a desire for more communication before the program start date and during the program. Students advocated for activity schedules and other logistical information to be shared ahead of time. During the program, students felt they would benefit from some type of peer review during the program or more feedback from judges.

Evaluation Considerations

- **Continue to examine ways to increase response rates.** As noted above, the variable response rates across programs make it difficult to generalize the findings across AEOP. The EDC evaluation team is working with IPAs to troubleshoot these issues and develop strategies to improve response rates.

1 Introduction

1.1 AEOP Priorities & Goals

The Army Educational Outreach Program (AEOP) mission is to provide 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 JSHS is a DoD-sponsored STEM program (U.S. Secretary of the Defense and the U.S. Departments of the Army, Navy, and Air Force) which promotes original research and experimentation in STEM at the high school level and publicly recognizes students for outstanding achievement.

1.2 Overview of Participants

In FY22, JSHS served a total of 2,755 student participants.

AEOP has a particular focus on reaching participants who have more limited access to STEM learning opportunities and/or who are from groups that are underrepresented in STEM education and careers. AEOP defines underserved and underrepresented participants as those who possess one or more of the following characteristics: attend a rural, urban, or frontier/tribal school; identify as female[1]; 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. AEOP has identified a particular interest in reaching students who meet two or more of the underserved and underrepresented criteria described above (referred to hereafter as Underserved). In FY22, 1,178 (77%) of all JSHS participants met two or more of the Underserved criteria. An additional 22% of student participants met one of the AEOP Underserved criteria.[2]

[2] JSHS uses a slightly different definition of underserved than AEOP. The numbers included in this report represent the AEOP definition of underserved. Future years' reports will document calculations using the JSHS definition for underserved.

2 Evaluation Approach

Education Development Center, Inc. (EDC) became the AEOP's external evaluation partner in fall 2021. The primary tools for data collection were student and mentor post-surveys, which were designed to evaluate the benefits of participation, program strengths and challenges, and overall effectiveness in meeting AEOP and program objectives. In most cases, AEOP program staff were responsible for distributing the online survey links to their student participants and mentors at the conclusion of program activities.

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?

2.1 Survey Respondents

This report describes participant data and results from student surveys (Table 2).

Table 2. Participant Survey Response Rates

	Participant Surveys		Mentor Surveys	
Program	Count	Response Rate	Count	Response Rate
JSHS	414	15%	NA	NA

2.2 Limitations

It is important to recognize that survey results only reflect those individuals who completed surveys and may not be generalizable within JSHS. Due to the relatively low response rate (15%), it is possible that these responses do not generalize well to the population of students that were involved in these programs.

It is also important to consider the characteristics of survey respondents. For example, the majority of respondents had not yet completed high school at the time of the survey. In this instance, it is important to note that we cannot reasonably expect respondents to report postsecondary outcomes that are long-term goals of the AEOP program.

2.3 Report Organization

Evaluation findings presented below are guided by the research questions and organized thematically by topic. Sections include the following:

- Overall Experience
- Program Activities
- Development of STEM Skills
- Development of 21st Century Skills
- Interest in STEM and STEM Careers
- Impact of S&E Mentors on Participants
- Recommendations

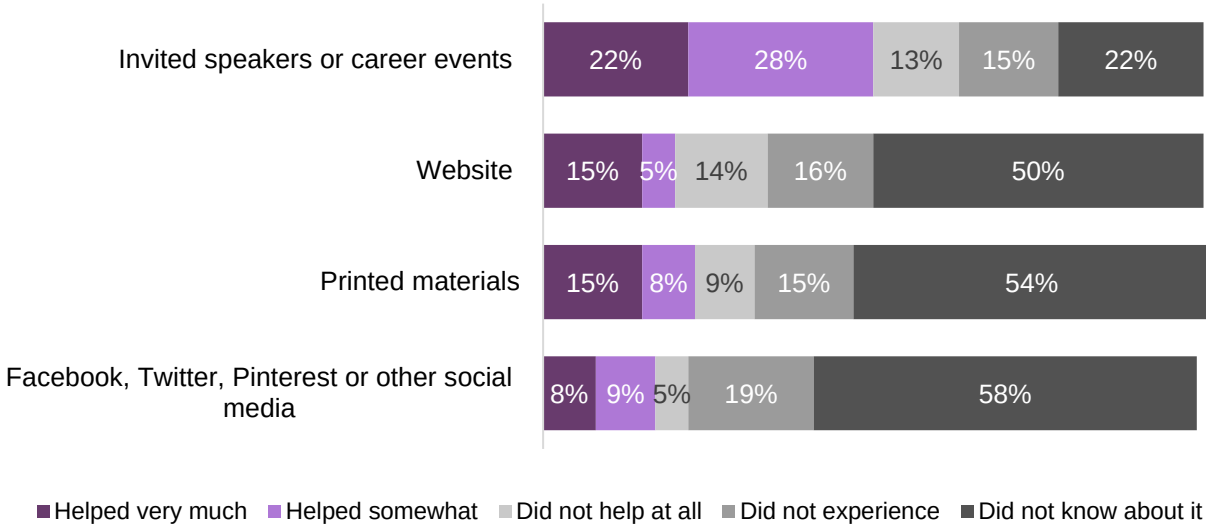
3 Overall Experience

In general, students reported positive experiences with JSHS. Students found the invited speakers and career events helpful. In addition, students indicated that they largely were satisfied with the program.

3.1 Perceived Value of Program Resources

Overall, students said that invited speakers and career events were by far the most helpful resources to them, while printed and online media were considered less helpful. Students rated the program website, printed materials, and social media as relatively less useful than more personal methods such as invited speakers or career events (Figure 1). More than one-half of students said they did not use or were not aware of print or online media AEOP resources, whereas 78% of students reported experiencing invited speakers or career events (and 50% of students said the invited speakers/career events were helpful).

Figure 1. Students reported invited speakers and career events were the most helpful JSHS resources, while social media was the least effective resource



Participant Survey (n = 189)

3.2 Program Satisfaction

To assess overall satisfaction, the surveys asked students two open-ended questions about the perceived benefits of JSHS and their overall satisfaction with their JSHS experience.

3.2.1 Student Program Satisfaction

Just over half of the 113 respondents to this question mentioned that learning new technical and research skills were beneficial aspects of participating in the program. Several participants stated that they improved their presentation skills and have more confidence in public speaking. Others mentioned that JSHS provided the opportunity to gain experience in conducting research and increased their interest in engaging in conducting research in the future. About half of respondents stated that they developed their interest and knowledge in STEM or STEM-related careers. Another third of participants stated that the program increased their social emotional skills and gave them the opportunity to network and meet more people, especially more scientists and researchers.

Table 3. Reasons students gave for their satisfaction with JSHS

Theme	Quote
Gained confidence and learned skills	*JSHS helped me gain more confidence in my science abilities. Now I feel like I am a STEM kid. People used to tell me that before, but I always felt like that comment was baseless, because just getting good grades in math and science class doesn't make you a STEM kid. But, winning at JSHS Puerto Rico made me really happy and I felt like finally, I was actually a STEM kid.*

Theme	Quote
Had the opportunity to work on real-life community problems	*[JSHS showed]* me how cutting-edge STEM at *A*rmed *F*orces is, showing me that people in armed forces are approachable and nice (I can fit in) and showing me that they want to help the community outside wars.
Gained knowledge of STEM careers	*JSHS broadened my view of what it means to have a career in the Armed Forces. (…) JSHS was a major factor in deepening my interest in a research career for STEM by showing me how fun and valuable discovery is.*
Engaged in hands-on, STEM research	*[I] s*aw limitless opportunities of science, inspiring me to go beyond what I see others at my school doing to meet only minimum requirements; try my best to solve problems in the world.
Overall positive experience	*I was very satisfied, although I didn't win any awards, it was a wonderful experience on the college campus, and I met so many new people and learned about so many different topics.*

3.3 Suggestions for Improvement

In addition to asking students about their overall satisfaction, the survey also asked them to identify areas for improvement. Students were asked, *What are the three ways JSHS should be improved for future participants?* A high-level summary of key themes is included below.

3.3.1 Students' Suggestions for Improvements

One hundred-fifteen respondents offered suggestions for various ways that the JSHS program could be improved. About a quarter of respondents wanted the judging process to be improved; one of the ways suggested was to have judges from specific subject areas judge those respective projects. Participants sometimes felt that the judges didn't have enough background information on the projects or subject area to which they were assigned. One participant shared, *"We need better judges, quality judges—at least few judges in the related field. Some judges did not understand the basic chemistry and asked vague questions."* Additionally, participants wanted more feedback and more specific feedback from judges.

About 15% wanted clearer communication about program activities; this included presentation schedules and notifications about last-minute changes to room assignments. An example from a student participant noted that, *"Activity schedules are not shared with students or parents and in our case the chaperone could not make it and a NSTA chaperone was added last minute, who did not provide any details on the activities 3 weeks before the event."* A handful of participants wanted more peer-to-peer social networking opportunities; they were particularly interested in learning from others with similar interests. Lastly, participants expressed a preference for in-person activities instead of virtual or online competitions.

4 Program Activities

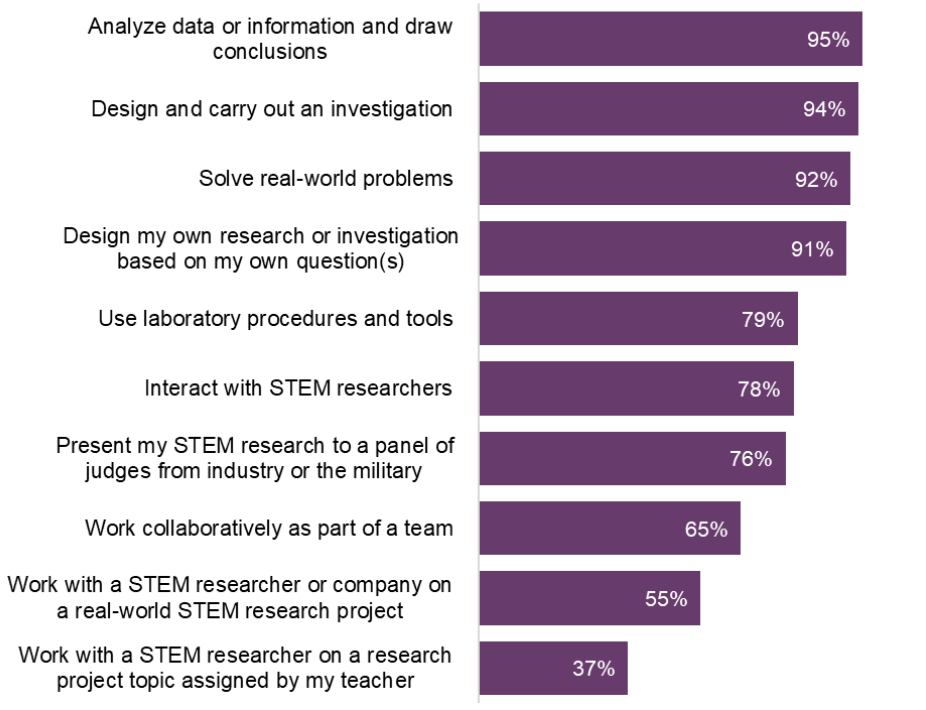
JSHS gave students the opportunity to engage in various STEM-related activities. According to survey results from participants, most students had experiences analyzing data and information, designing and carrying out investigations, solving real-world problems, and designing research based on their own questions. At least 91% of participants reported that they had these opportunities. A smaller portion of participants gained experience working with STEM researchers (between 37% and 78% of participants).

4.1 STEM Practices

JSHS participants had opportunities to engage in a variety of STEM activities. Most participants reported analyzing data and information (95%), designing and carrying out an investigation (94%), and frequently solving real-world problems (92%) (Figure 2).

By comparison, fewer participants reported working directly with STEM researchers. Nearly four-fifths of participants (78%) reported that they interacted with STEM researchers. Smaller proportions of participants noted that they worked with a STEM researcher or company on a real-world STEM project (55%) or worked with a STEM researcher on a topic assigned by their teacher (37%).

Figure 2. JSHS participants had opportunities to engage in a variety of STEM activities



Participant Survey (n = 354)
Participant responses include those who reported, "at least once," "every day," and "most days."

5 Development of STEM Skills

Participants reported gains in a number of STEM research skills as a result of their participation in JSHS. Students improved their knowledge of STEM topics, gained experience in ethical, everyday research processes, and increased their knowledge of how scientists and engineers work on real problems within the STEM field.

5.1 STEM Skills

Survey results indicate that the majority of students increased their knowledge of STEM and various aspects of STEM research. Students were asked about an array of STEM- and research-related skills. Students were asked to report to what extent they learned about a specific topic (from "did not learn" to "learned a lot"). As Table 4 shows, students consistently reported increases in all areas.

Table 4. Students increased their knowledge of STEM and various aspects of STEM research

Response	Did not learn	Learned just a little	Learned more than a little	Learned a lot	Overall Learning or Gain
In-depth knowledge of a STEM topic(s)	9%	20%	24%	47%	**91%**
Knowledge of research processes, ethics, and rules for conduct in STEM	9%	18%	32%	41%	**91%**
Knowledge of how scientists and engineers work on real problems in STEM	10%	20%	31%	38%	**89%**
Knowledge of what everyday research work is like in STEM	13%	23%	26%	38%	**87%**

Participant Survey (n = 343)

5.2 Planning and Carrying out Experiments

Survey results indicate that the majority of students increased their knowledge of STEM and various aspects of STEM research. Like the items above, students were asked to report to what extent students learned or experienced gains in a number of areas related to conducting experiments; percentages were generally high across all areas (see Table 5).

Table 5. Students improved skills related to planning and carrying out investigations

Response	Did not learn	Learned just a little	Learned more than a little	Learned a lot	Overall Learning or Gain
Designing procedures or steps for an experiment or designing a solution that works	9%	16%	36%	38%	**90%**
Creating a hypothesis or explanation that can be tested in an experiment/problem	13%	20%	33%	34%	**87%**
Carrying out an experiment and recording data accurately	11%	13%	38%	38%	**89%**
Defining a problem that can be solved by developing a new or improved product or process	11%	21%	35%	33%	**89%**
Presenting an argument that uses data and/or findings from an experiment or investigation	7%	12%	34%	47%	**93%**

Participant Survey (n = 267)

5.3 Analyzing and Interpreting Data

Students developed skills in data analysis and interpretation. Students were also asked about to what degree they learned or gained experience with analyzing and interpreting data. Table 6 shows the full list of items related to analyzing and interpreting data. The overall learning gain for all four questions is similar and relatively high.

Table 6. Students developed skills in data analysis and interpretation

Response	Did not learn	Learned just a little	Learned more than a little	Learned a lot	Overall Learning or Gain
Considering multiple interpretations of data to decide if something works as intended	10%	18%	35%	38%	**91%**
Identifying the strengths and limitations of data or arguments presented in technical or STEM texts	11%	14%	33%	42%	**89%**
Identifying the limitations of the methods and tools used for collecting data	11%	16%	31%	43%	**90%**
Creating charts or graphs to display data and find patterns	10%	14%	33%	43%	**90%**

Participant Survey (n = 267)

6 Development of 21st Century Skills

In addition to reporting to what extent they experienced gains in STEM-related skills, students were also asked to indicate gains in 21st Century Skills. Students reported increases in nearly all areas; they were less likely to indicate growth in their media and technological literacy skills, though this may be most likely due to JSHS participants not engaging in related activities.

The surveys asked about skills in five main areas:

1. Communication and Collaboration
2. Critical Thinking and Problem Solving
3. Creativity and Innovation
4. Initiative, Self-Direction, and Flexibility
5. Media and Technological Literacy

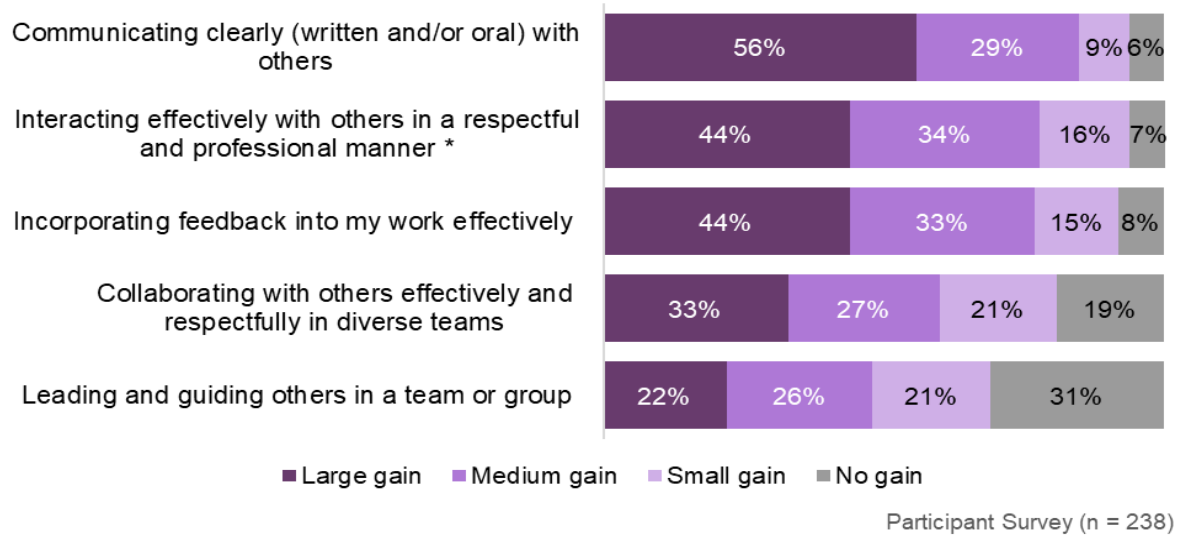
Results from each domain are below.

6.1 Communication and Collaboration

Overall, students reported gains in their communication and collaboration skills. They reported that they gained skills in incorporating feedback into their work (92%), interacting with others in a respectful and professional manner (93%), collaborating with others effectively and respectfully in diverse teams (81%), and communicating clearly (written and/or oral) with others (94%). Students were least likely to report gains in leading and guiding others in a team or group (69%), though this was not a central focus of JSHS as students largely work individually.

Figure 3 below shows responses to these items, including the full range of scaled responses (i.e., from “no gain” to “large gain”).

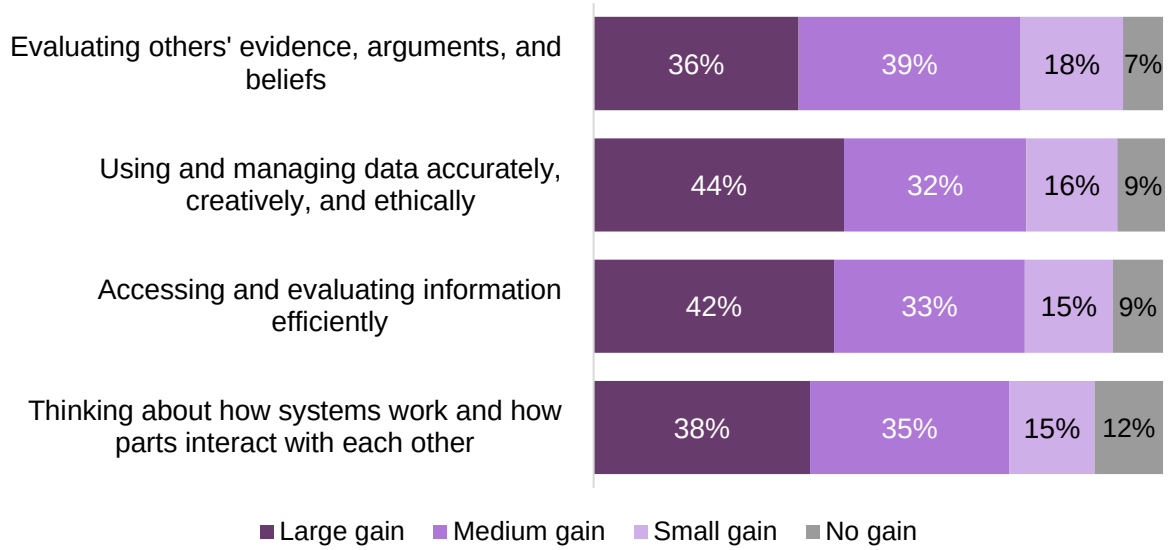
Figure 3. Students improved their communication skills, but were less likely to report improved skills leading within a team



6.2 Critical Thinking and Problem Solving

Students indicated that they improved various critical thinking and problem-solving skills. Most participants reported gains in their ability to use and manage data accurately, creatively, and ethically (91%); think about how systems work and how parts interact with each other (88%); evaluate others' evidence, arguments, and beliefs (93%); and access and evaluate information efficiently (91%). See Figure 4 below for the full range of responses to these items, including the full range of scaled responses (i.e., from "no gain" to "large gain").

Figure 4. Students improved various critical thinking and problem solving skills

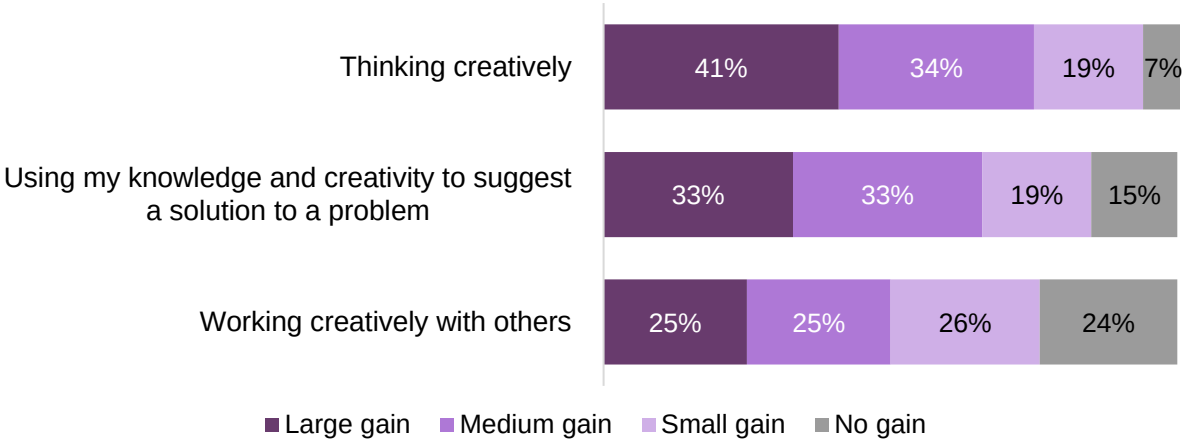


Participant Survey (n = 240)

6.3 Creativity and Innovation

Students increased their innovation skills and ability to use creative approaches to address problems. As Figure 5 shows, most students reported that they increased their skills at thinking creatively (93%) and using knowledge and creativity to suggest a solution to a problem (85%). Fewer students reported increased skills in working creatively with others (76%), but that may be due to the nature of the program.

Figure 5. Students increased their ability to work more flexibly and creatively.

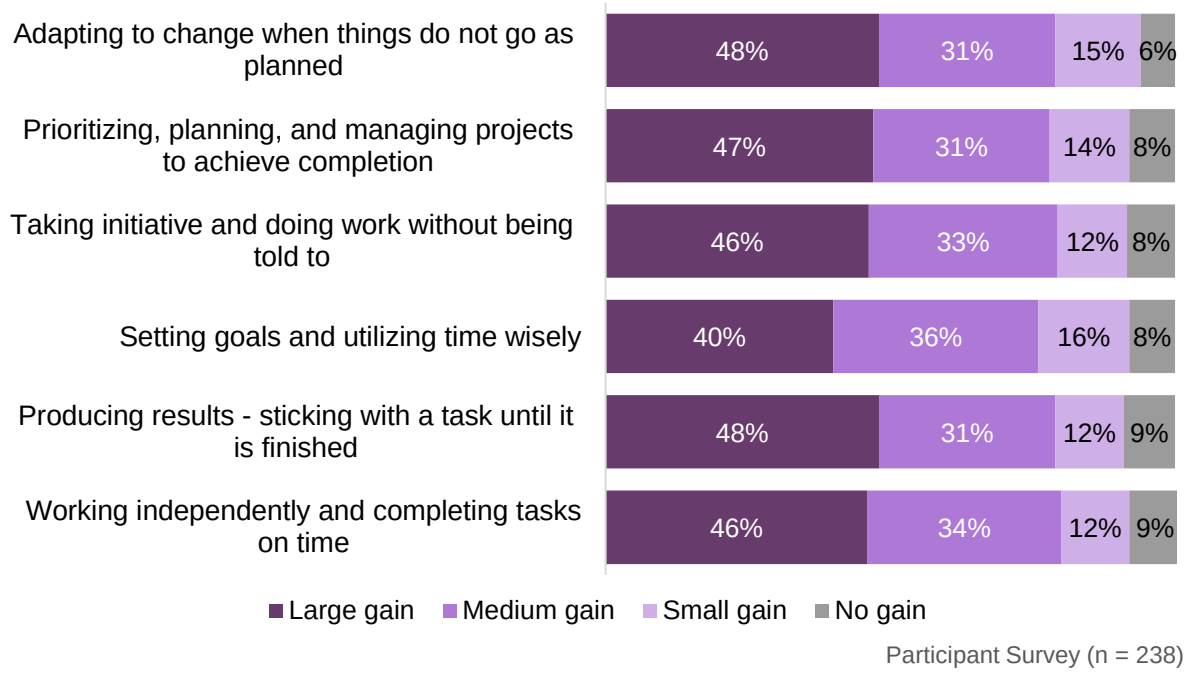


Participant Survey (n = 240)

6.4 Initiative, Self-Direction, and Flexibility

The majority of students reported gains in work habits related to taking initiative, self-direction, and flexibility. For example, 94% of students reported becoming better able to adapt to change when things do not go as planned. Similarly, 92% of students reported improvement in setting goals and utilizing time wisely, prioritizing, planning, and managing projects, and taking initiative within their projects. At least 91% of students reported at least "a small gain" in all the items listed in Figure 6. See Figure 5 for the full list of items and range of responses.

Figure 6. Students increased work habits related to taking initiative, self-direction, and flexibility

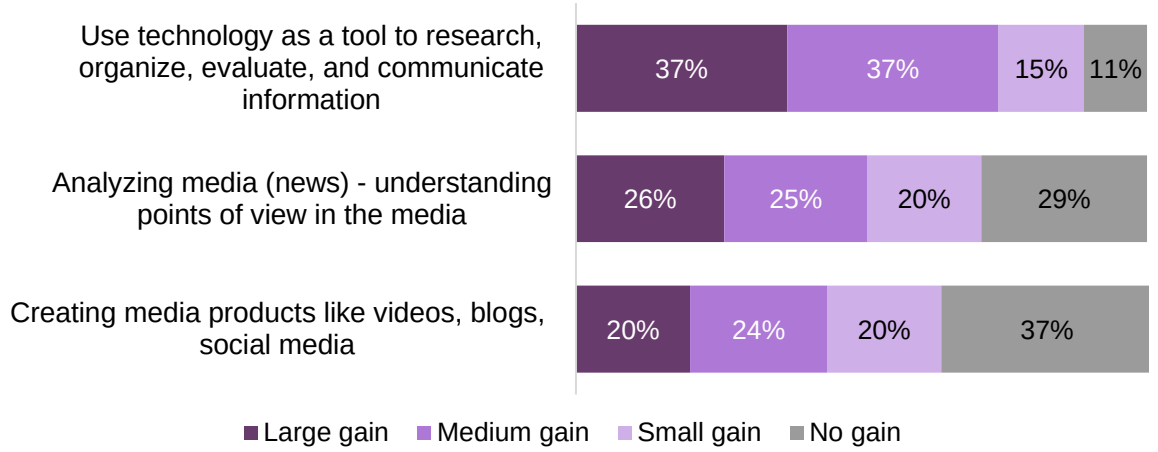


Participant Survey (n = 238)

6.5 Media and Technological Literacy

Among the 21st century skills assessed on the survey, students were least likely to report gains in media and technological literacy. Overall, between 83% and 89% of students reported gains in this area (see Figure 7). These relatively lower percentages are most likely due to students not engaging in related activities.

Figure 7. Students were less likely to report gains in media and technological literacy



Participant Survey (n = 238)

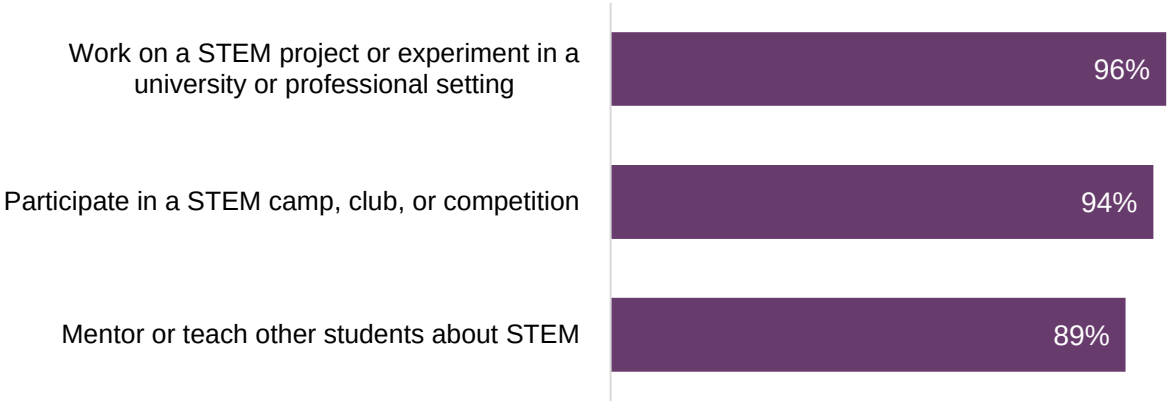
7 Interest in STEM and STEM Careers

The survey results show that participating in JSHS positively influenced students' inclination toward STEM education, interest and exploration, as well as community service projects and mentoring or teaching other students. The program also increased students' interest in pursuing a STEM career and Army or DoD research; many students learned about Army, or DoD careers through JSHS and AEOP.

7.1 Interest in STEM

Most students reported that they were more likely to engage in other STEM activities after their participation in JSHS. More than four-fifths of all students reported a higher inclination to engage in STEM education and training opportunities such as working on a STEM project or experiment (96%) or participating in a STEM camp, club, or competition (94%) after participating in AEOP (Figure 8).

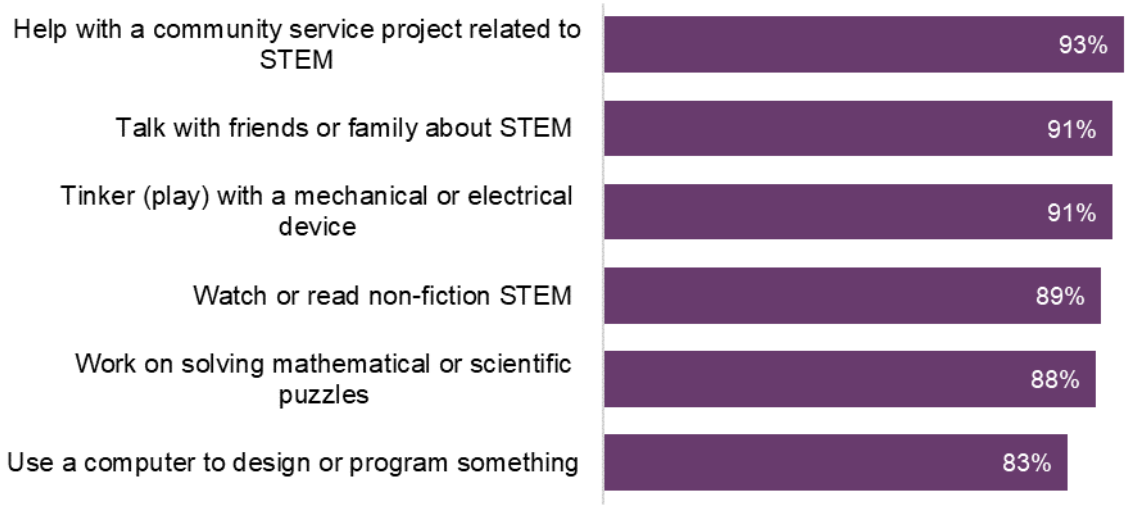
Figure 8. Most students reported an increase in their interest in participating in other kinds of STEM-related activities



Participant Survey (n = 194)
Responses include those who reported, "more likely" and "much more likely."

Most students reported that they were more interested in STEM information and exploration after their participation in JSHS. More than four-fifths of students also more interested in exploring other activities like tinkering with mechanical or electrical devices (91%), helping with a community service project related to STEM (93%), or talking with friends or family about STEM (91%) (Figure 9).

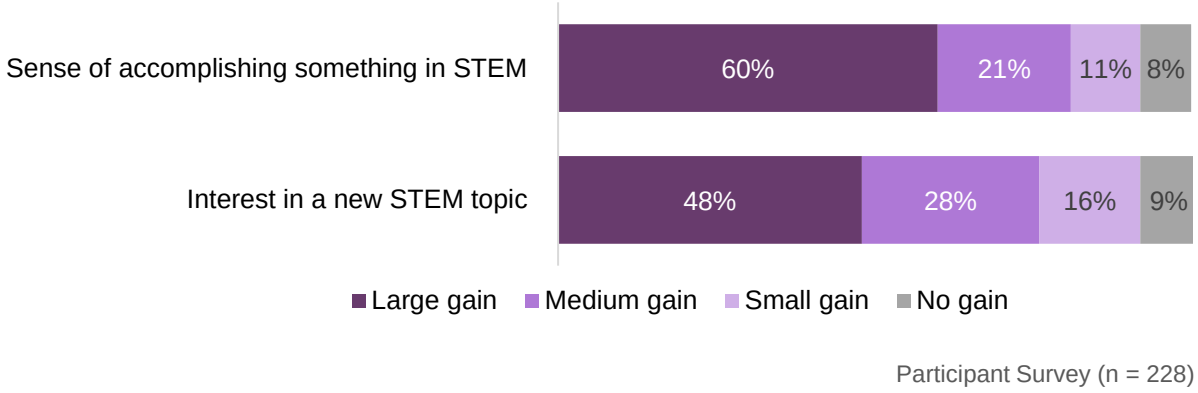
Figure 9. More than half of students reported an increase in their interest in STEM information and exploration



Participant Survey (n = 196)
Responses include those who reported, "more likely" and "much more likely."

Most students indicated they gained an interest in a new STEM topic (89%) and a sense of accomplishing something in STEM (84%) due to participating in JSHS (Figure 10).

Figure 10. Most students said JSHS increased their STEM Confidence

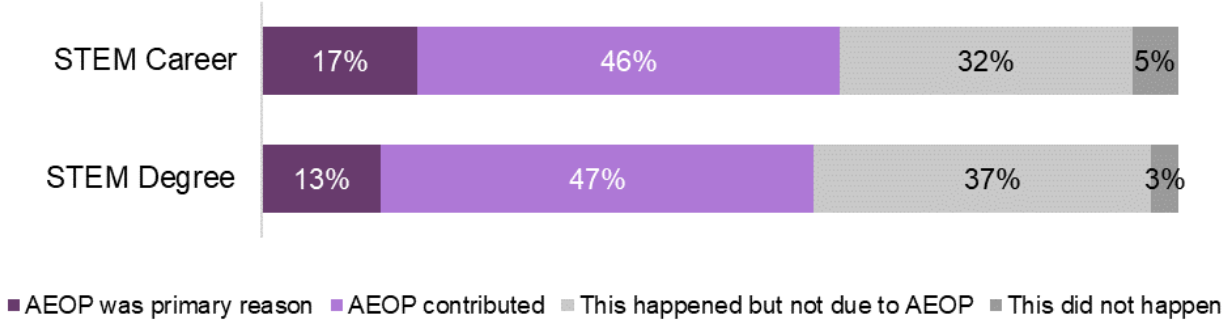


Participant Survey (n = 228)

7.2 Interest in Pursuing STEM Education and Careers

JSHS had a positive influence on students' interests in STEM education and careers. The surveys asked students about their interests in earning a STEM degree and pursuing a STEM career (see Figure 10 and Figure 11). As Figure 10 shows, 60% of students reported that the program had influenced students' interest in *pursuing a STEM degree*. When asked about their interest in *pursuing a STEM career*, 63% of students indicated that JSHS had an influence (Figure 11).

Figure 11. JSHS had a positive influence on students' interest in having a STEM career and in earning a STEM degree

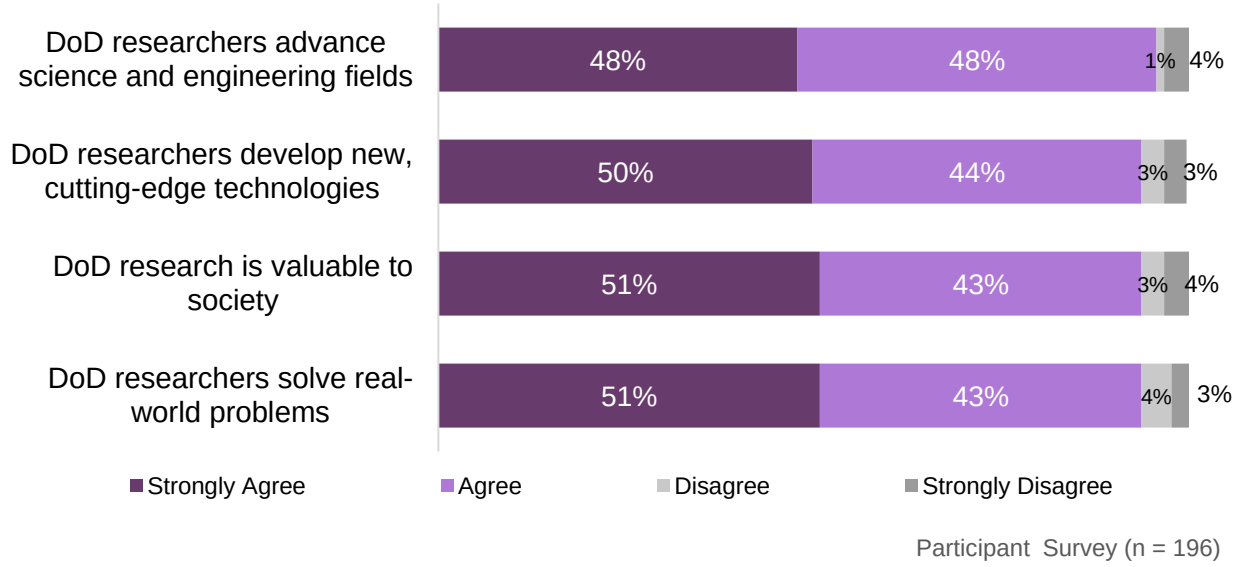


Participant Survey (n = 193)

7.3 Interest in Army/DoD STEM Research and Careers

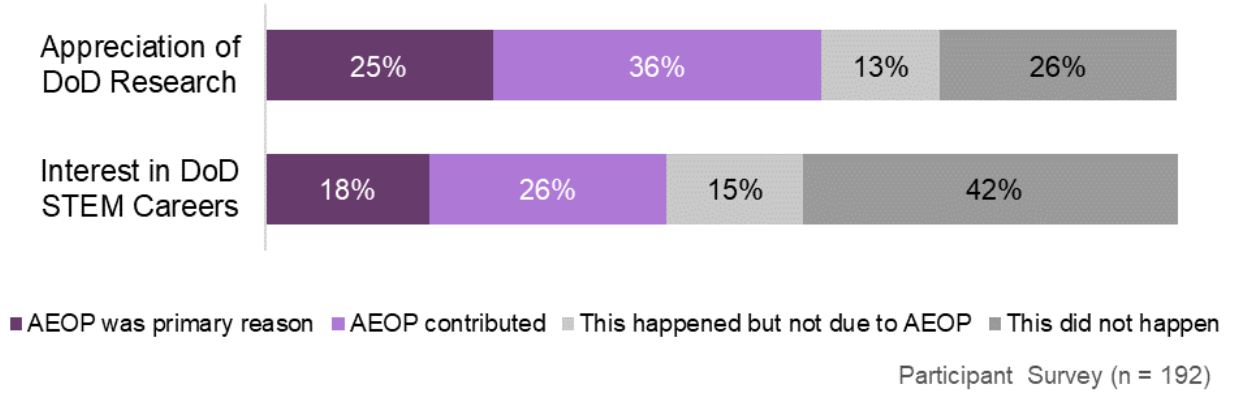
Students gained a greater appreciation of and interest in Army/DoD STEM research and careers through their participation in JSHS. AEOP programs have an explicit connection to the Army and DoD. Overall, at least 94% of all students agreed or strongly agreed that DoD researchers advance science and engineering fields; that DoD researchers develop new, cutting-edge technologies; that DoD researchers solve real-world problems; and that DoD research is valuable to society (Figure 12).

Figure 12. Students understand that DoD research is important



The majority of students (61%) agreed that AEOP contributed to students' appreciation of Army/DoD research (Figure 13). In addition, 44% of students reported that their interest in an Army or DoD career increased as result of JSHS.

Figure 13. JSHS contributed to increasing students' appreciation for Army/DoD research and interest in DoD STEM careers



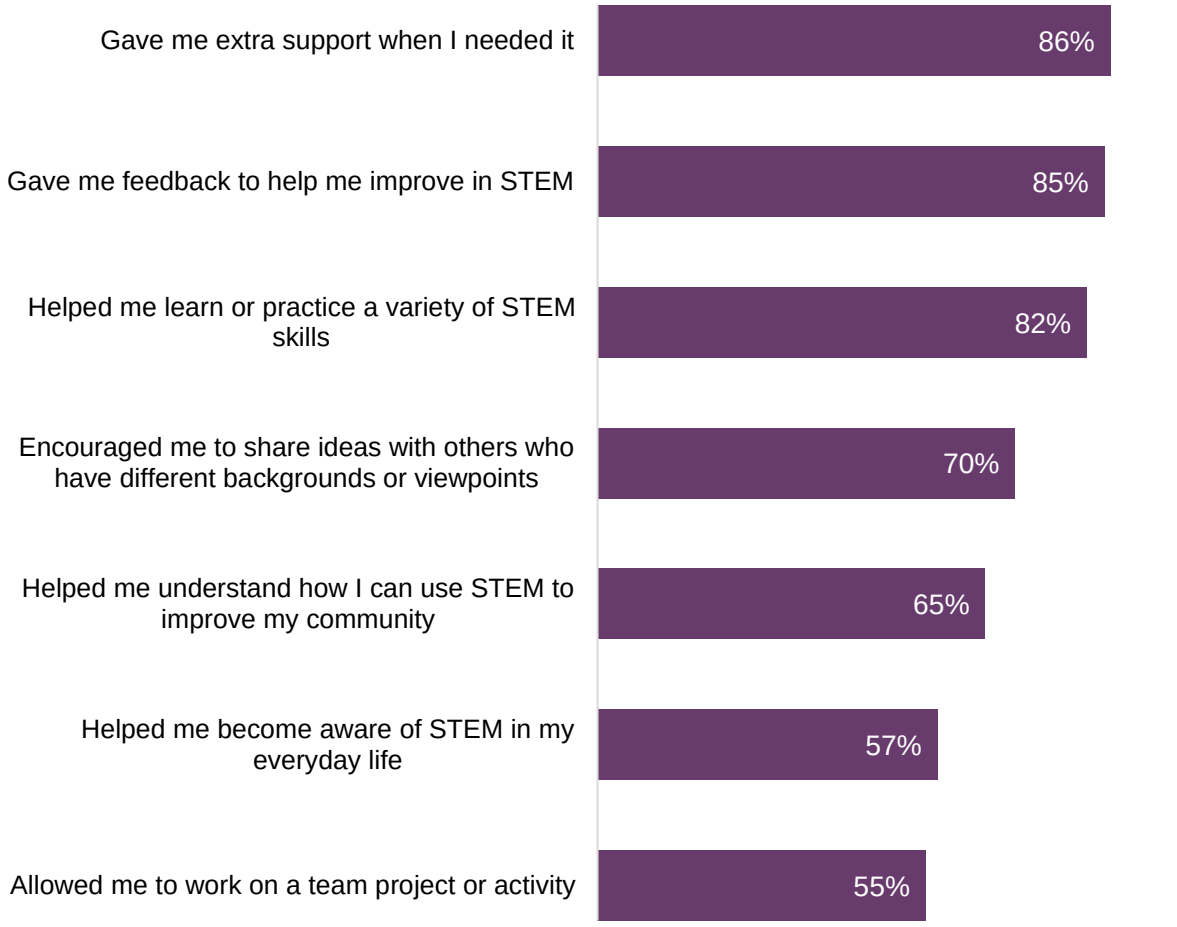
8 Impact of S&E Mentors on Program Participants

Mentors play an important role in JSHS. Although there are no survey data from JSHS mentors, student survey results show that students reported positive experiences working with their mentors and suggest mentors had a strong impact on participants.

Students reported that their mentors used common strategies to achieve AEOP goals. The survey asked students about a range of mentor strategies employed in AEOP (see Figure

14). For example, about three-fifths of students (57%) reported that mentors helped them become aware of STEM in everyday life, while 85% of students indicated that mentors gave them feedback to help them improve in STEM.

Figure 14. Participants reported their JSHS mentors used various strategies commonly used across AEOP



Participant Survey (n = 211)

9 Recommendations

This report distills findings across the student participant surveys as they align with AEOP's overarching research questions. As stated in the limitations, data collected for this evaluation are not necessarily representative of the entire program; however, based on the results presented above, we offer the following recommendations:

Programmatic Considerations

- **Continue to offer hands-on, authentic, relevant research experiences.** Research shows these kinds of experiences are important to developing and sustaining students' interest in STEM education and career pathways.
- **Align judges and projects by content area.** Student surveys indicated that a lack of alignment between students' research area and judges' expertise was sometimes an issue which detracted from their overall satisfaction with the program.
- **Consider increasing communication with participants.** The student surveys indicated a desire for more communication before the program start date and during the program. Students advocated for activity schedules and other logistical information to be shared ahead of time. During the program, students felt they would benefit from some type of peer review during the program or more feedback from judges.

Evaluation Considerations

- **Continue to examine ways to increase response rates.** As noted above, the variable response rates across programs make it difficult to generalize the findings across AEOP. The EDC evaluation team is working with IPAs to troubleshoot these issues and develop strategies to improve response rates.