Army Educational Outreach Program

Unite

2016 Annual Program Evaluation Report

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Executive Summary

Unite, managed by the Technology Student Association (TSA), is an AEOP pre-collegiate program for talented high school students from groups historically underrepresented and underserved in science, technology, engineering, and mathematics (STEM). Unite encourages and helps prepare high school students to pursue a college education and career in engineering and other STEM-related fields. In a four to six-week summer program at a partner university, Unite provides academic and social support to participants so that they have the ability and confidence to pursue careers in STEM fields.

This report documents the evaluation of the FY16 Unite program. Purdue University, in collaboration with the TSA, collected the FY16 evaluation data for the Unite program. The evaluation reports addressed questions related to program strengths and challenges, benefits to participants, and overall effectiveness in meeting AEOP and program objectives. The assessment strategy for Unite included questionnaires for students and mentors, 2 site visits, 3 student focus groups, 2 mentor focus groups, and an annual program report compiled by TSA.

Unite sites for 2016 included:

Alabama State University (AL)*
Fayetteville State University (NC)*
Florida Agricultural and Mechanical University (FL)*
Harris-Stowe State University (MO)*
Howard University (Washington, DC)*
Jackson State University (MS)*
Marshall University (WV)*
Michigan Technological University (MI)
New Jersey Institute of Technology (NJ)
Texas Southern University (TX)*
University of Colorado, Colorado Springs (CO)*
University of Nevada, Las Vegas (NV)*
University of New Mexico (UNM)*
University of Pennsylvania (UPENN)
University of Puerto Rico, Rio Piedras (PR)*
Virginia Tech (VA)

* Indicates Historically Black Colleges and Universities (HBCUs) and minority-serving institutions (MSIs)

2016 Unite Fast Facts	
Description	STEM Enrichment Activity: Pre-collegiate, engineering summer program at university host sites, targeting students from groups historically underserved and under-represented in STEM
Participant Population	rising 9th-12th grade students from groups historically underserved and under-represented in STEM
No. of Applicants	685 (446 on Cvent)
No. of Students	282 (250 on Cvent)
Placement Rate	41%
No. of Adults	285
No. of Army S&Es	18
Number of Army/DoD Research Laboratories	11
No. of K-12 Teachers	37
No. of K-12 Schools	220
No. of K-12 Schools – Title I	98‡
No. of College/Universities	16
No. of HBCU/MSIs	12
Total Cost	$560,682
Stipend Cost	$86,300
Cost Per Student Participant	$1988

‡ *Data from Unite reflects the number of participants from Title I schools rather than the number of Title I schools.*

"Unite has given me a better understand of what kind of STEM jobs there are and what each field does. There are several fields that I have learned about that I could be interested in pursuing as a career. I have also learned that STEM is something that interests me and something that I could be good at."-- Unite Student

Summary of Findings

The FY16 evaluation of Unite collected data about participants, their perceptions of program processes, resources, and activities, and indicators of achievement related to AEOP's and Unite's objectives and intended outcomes. A summary of findings is provided in the following table.

2016 Unite Evaluation Findings	
Participant Profiles	
Unite experienced growth in program interest and participation, and served increasing numbers of students from groups underserved and underrepresented in STEM.	Unite achieved a 28% increase in applicants to the program in FY16 as compared to FY15. Enrollment data indicate that the overall enrollment increased by 29% (in FY16 there were 282 participants; in FY15 there were 200 participants). Substantially more participants were from Title I schools in FY16 as well (98 as compared to 36 in FY15).
	In FY16, Unite enrollment included students from groups historically underrepresented and underserved in STEM. Over half of participants were female, and over half (57%) identified himself or herself as Black or African American (this is an increase over FY15 when 39% of participants identified themselves as Black or African American). There was a slight increase in participation by students identifying themselves as Hispanic or Latino in FY16 (18% as compared to 14% in FY15). All students who responded to the registration information item indicated that they received free or reduced-price school lunch.
	Most student questionnaire respondents attended urban schools (72%), a school context that tends to serve higher proportions of underserved students.
Actionable Program Evaluation	
Unite is successfully reaching out to schools and teachers serving historically underrepresented and underserved groups, however participants continue to report that personal connections are a primary source of information about AEOPs.	Efforts to market to and recruit students from schools and school networks identified as serving populations of traditionally underrepresented and underserved students were employed by Unite sites. Students most frequently learned about the AEOP from a school newsletter, email, or website; from someone who works at their school; or from a family member.
Students are motivated to participate in Unite by a variety of factors.	Students were most frequently motivated to participate in Unite by an interest in STEM and the desire to learn something new or interesting. Other motivators included figuring out education and career goals and learning in ways not possible in school.

Unite successfully engaged students in meaningful team-based, hands-on STEM learning experiences.	Students reported consistently engaging in STEM activities such as learning about new STEM topics, learning about careers that use STEM, and communicating with other students about STEM during Unite.
	A large majority of students reported that they engaged in STEM practices such as working as part of a team, participating in hands-on activities, and analyzing data or information on most days or every day of Unite.
	Students reported more intensive STEM learning and greater engagement in STEM practices in their Unite experience than they typically have in school.
	Unite mentors reported using a wide variety of mentoring practices to establish the relevance of learning activities, support the diverse needs of learners, develop student collaboration and interpersonal skills, and engage student in authentic STEM activities.
Unite participants reported increased awareness of and interest in AEOPs, but there is room for growth in the marketing of other AEOP opportunities.	Most Unite students have not participated in other AEOPs in the past, however the majority expressed increased awareness of AEOPs and reported interest in participating in AEOPs in the future after participating in Unite. Students indicated that participation in Unite, invited speakers and career events, and their mentors were the most impactful resources for learning about AEOPs.
	Most mentors did not discuss AEOPs other than Unite with students. Notably, fewer than half of mentors reported discussing programs for which students are or will soon be eligible, such as SEAP, GEMS Near Peer Mentors, and JSHS.
	Mentors had more experience with AEOP resources designed to expose student to AEOPs, such as the AEOP website and brochure, in FY16 as compared to FY15.
Students and mentor had high levels of overall satisfaction with Unite.	Students reported high levels of satisfaction with features of the Unite program including field trips or laboratory tours, teaching or mentoring, invited speakers or career events, and the variety of STEM topics available. Students perceived STEM learning, career information, college information and preparation, and experience to be key benefits of the program.
	Mentors reported high levels of satisfaction with features of the Unite program including the location of Unite activities, teaching or mentoring, and laboratory tours. Mentors perceived student STEM learning, career information, and opportunities for new experiences to be key strengths of Unite.
Outcomes Evaluation	
Unite students reported gains in their STEM knowledge and competencies with significantly higher gains	Unite students reported large or extreme gains in their STEM knowledge in areas such as their in-depth knowledge of a STEM topic, their knowledge of research conducted in a STEM topic or field, and their knowledge of how scientists and engineers work on real problems in STEM.

reported by male students.	Unite students reported large or extreme gains in their STEM skills in areas such as their ability to define a problem that can be solved by developing a new or improved object, process, or system; their ability to make a model of an object or system to show its parts and how they work; and in their ability to consider different interpretations of data when deciding if a solution works as intended.
	Although a vast majority of students reported that Unite contributed to gains in knowledge about science and engineering practices, male students reported higher gains in STEM knowledge and STEM competencies than did female students.
Unite students reported gains in their 21st Century Skills.	A majority of students reported large or extreme gains in all of the 21st Century Skills such as including others' perspectives when making decisions, communicating effectively with others, and making changes when things do not go as planned.
Unite students' reported higher education aspirations after Unite participation and slight shifts in their career aspirations after their Unite experience.	After participating in Unite, students reported aspiring to go further in their schooling than they would have before Unite, with the greatest change being in the proportion of students who expected to continue their education beyond a Bachelor's degree (48% before Unite, 66% after).
	There were slight shifts in students' career aspirations toward STEM related fields after participating in Unite as compared to before. For example, 27% indicated aspiring to a career in engineering or architecture before Unite, while 33% expressed interest in these fields after. Fewer students reported aspiring to non-STEM careers after participating in Unite.
Unite students reported having interest in future AEOP opportunities, but substantial numbers had not heard of AEOPs for which they are eligible.	A large majority of students indicated that Unite contributed to their increased awareness of AEOPs and their increased desire to participate in AEOPs in the future. However, over a quarter of students reported not having heard about programs for which they are or soon will be eligible such as GEMS, JSHS, SEAP, and GEMS Near Peer Mentors.
Unite continues contribute to students' increased awareness of STEM research and careers overall, and DoD STEM research and careers specifically.	Most students reported an increased awareness of, and interest in DoD STEM careers.
	All students reported learning about at least one STEM career and a large majority learned about at least one DoD STEM career during Unite.
	Students reported overwhelmingly positive attitudes toward DoD STEM research and researchers.

Unite students reported gains in their STEM identity and their future out-of-school STEM engagement after participating in Unite.	Students reported gains in their STEM identities, or perceptions of themselves as capable of succeeding in STEM. The majority of students reported large or extreme gains in areas such as their sense of accomplishing something in STEM, feeling prepared for more challenging STEM activities, and their decision on a path to pursue a STEM career.
	Most students reported that they will be more likely or much more likely to engage in STEM activities such as working on a STEM project or experiment in a university or professional setting, taking an elective STEM class, working on solving mathematical or scientific puzzles, and talking with friends or family about STEM.

Responsiveness to FY15 Evaluation Recommendations

The primary purpose of the AEOP program evaluation is to serve as a vehicle to inform future programming and continuous improvement efforts with the goal of making progress toward the AEOP priorities. In previous years the timing of the delivery of the annual program evaluation reports has precluded the ability of programs to use the data as a formative assessment tool. However, beginning with the FY16 evaluation, the goal is for programs to be able to leverage the evaluation reports as a means to target specific areas for improvement and growth.

In this report, we will highlight recommendations made in FY15 to programs and summarize efforts and outcomes reflected in the FY16 APR toward these areas.

AEOP Priority: Broaden, deepen, and diversify the pool of STEM talent in support of our Defense Industry Base.

Finding: Future marketing efforts could focus on the need for a more diverse pool of STEM professionals and take the opportunity to showcase the diversity of mentors in electronic and printed materials.

Unite FY16 Efforts and Outcomes: This will be discussed with sites individually, as needed, and as a group in the upcoming year wrap-up conference call.

Finding: The program may want to emphasize recruiting a more diverse pool of mentors and students by considering social media communication plans. Social media has the potential to reach more students and mentors than personal connections.

Unite FY16 Efforts and Outcomes: TSA used social media and press release venues (as well as the TSA website) to communicate news of Unite. Sites used social media, local media sources, and their websites to share news of Unite. TSA issued one press release, one tweet, and one Facebook post regarding Unite. Individual sites implemented varying marketing plans including elements such as websites,

printed matter, local TV and radio, social media, community programs, school counselors, word of mouth, and personal contact.

Finding: Given that Unite is doing a good job recruiting minority populations in STEM, the program is encouraged to systematically incorporate materials for the mentors to share successes of minority populations in STEM.

Unite FY16 Efforts and Outcomes: The program administrator will discuss the availability of success stories from sites in the wrap-up conference call, and will seek assistance from Widmeyer, who may have success stories from other IPAs that can be distributed to Unite sites.

AEOP Priority: Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army

Finding: In an effort to increase and standardize the information [AEOP opportunities] provided to students, it would be beneficial to create a resource that profiles AEOPs and the relationship they have to ongoing education, on-the-job training, and related research activities of Army careers. The application to be a mentor could ask for their plan to explicitly discuss these resources thus expanding the network of ongoing opportunities for students.

Unite FY16 Efforts and Outcomes: The program administrator responded, "Is such a resource something that AEOP currently has compiled? If not, I can begin work on this for AEOP programs that are natural transitions to and from Unite. Once completed, this resource can be made available to mentors in the Unite program, with the expectation that mentors should develop a plan for sharing this information with student participants."

Finding: It would beneficial to create a resource that profiles Army STEM interests and the education, on-the-job training, and related research activities of Army careers. Further, efforts should be focused on growing the participation of more Army S&Es

Unite FY16 Efforts and Outcomes: The program administrator responded, "Is such a resource something that AEOP currently has compiled? If not, I can begin work on this for AEOP programs that are natural transitions to and from Unite. Once completed, this resource can be made available to mentors in the Unite program, with the expectation that mentors should develop a plan for sharing this information with student participants."

Finding: Efforts should be undertaken to improve participation in evaluation activities

Unite FY16 Efforts and Outcomes: Added emphasis about this requirement will be part of the Unite wrap-up conference call, as well as spring correspondence with Unite site directors for summer 2017 programs.

Recommendations for FY17 Program Improvement/Growth

Evaluation findings indicate that FY16 was overall a successful year for the Unite program. Unite has been successful in its focus on recruiting underrepresented and underserved participants to the program[1]. Students and mentors reported high levels of satisfaction with the Unite experience. In particular, Unite students reported gains in STEM learning and also reported being actively engaged in STEM practices. Students gained awareness of and interest in other AEOPs, STEM careers, and DoD STEM careers. Mentors used a variety of strategies to support student STEM learning, to support student engagement in STEM activities, and to support students' development of STEM education and career pathways. Students are more interested in pursuing post-graduate studies after participating in Unite, and students particularly valued the hands-on experiences, field trips, and speakers incorporated into the Unite program.

While the successes for Unite detailed above are commendable, there are some areas that have potential for growth and/or improvement. The evaluation team therefore offers the following recommendations for FY16 and beyond.

AEOP Priority: Broaden, deepen, and diversify the pool of STEM talent in support of our Defense Industry Base

1. AEOP objectives include expanding participation of historically underrepresented and underserved populations. In 2015 and 2016, Unite engaged a majority of female and Black or African American students, however students continue to report that personal connections are a primary source of information about AEOPs. Since emails, newsletters, and websites distributed through students' schools are also a key source of information, future marketing efforts could focus on disseminating these resources through schools more effectively.
2. Evaluation findings indicate that male Unite participants believed they gained more in terms of their STEM knowledge and STEM competencies than did female participants, although both males and females reported similar gains in terms of their STEM identities. The program may wish to review its practices and content to ensure that both address the needs of female participants and that mentors in the FY17 program are aware of these findings.

AEOP Priority: Support and empower educators with unique Army research and technology resources

[1] Underserved populations are inclusive of low-income students, students belonging to race and ethnic minorities that are historically underrepresented in STEM (e.g., Alaska Natives, Native Americans, Blacks or African Americans, Hispanics, Native Hawaiians and other Pacific Islanders), students with disabilities, students with English as a second language, first generation college students, students in rural and frontier schools, and females in certain STEM fields (e.g., physical science, computer science, mathematics, or engineering).

1. The Unite program may benefit from developing resources designed to provide information to students about DoD STEM research and careers. Evaluation findings indicate that mentors and field trips/speakers are key resources for this information. Because of the variety of locations of Unite programs, field trips and speakers highlighting DoD STEM research and careers are not consistently available to all sites. Creating resources that highlight the diversity of STEM career opportunities within the DoD may be beneficial. These resources may include, for example, virtual field trips to DoD STEM research sites or a database of Army S&E's willing to interact with students remotely via video or other technological means. These resources could also be used in mentor orientation to disseminate information about specific Army/DoD STEM research and careers. Furthermore, efforts to grow the participation of Army S&E's in the Unite program may be useful.

AEOP Priority: Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army

1. Few mentors explicitly discussed AEOP opportunities other than Unite with their students and substantial numbers of students had not heard of programs for which they are or soon will be eligible such as GEMS, JSHS, SEAP, and GEMS Near Peer Mentors. Since students identified mentors as a key source of AEOP information, mentors' lack of familiarity with other AEOP opportunities may be a barrier to disseminating this information to students. In an effort to increase and standardize the information provided to students, it may be beneficial to create resources that profile AEOP programs and the relationship they have to ongoing education, on-the-job training, and DoD/Army careers and ensure that these resources reach mentors and students. Additionally, mentor orientation activities could include information about other AEOPs and resources and provide strategies for mentors to share this information with students.

2. Efforts should be undertaken to improve participation in evaluation activities, as continued low response rates for the mentor questionnaire raises questions about the representativeness of the results. Improved program communication with the individual program sites about expectations for the Unite evaluation study may help. In addition, the evaluation instruments may need to be streamlined as response fatigue can affect participation.

Introduction

The Army Educational Outreach Program (AEOP) vision is to offer a collaborative and cohesive portfolio of Army sponsored science, technology, engineering and mathematics (STEM) programs that effectively engage, inspire, and attract the next generation of STEM talent through K-college programs and expose them to Department of Defense (DoD) STEM careers. The consortium, formed by the Army Educational Outreach Program Cooperative Agreement (AEOP CA), supports the AEOP in this mission by engaging non-profit, industry, and academic partners with aligned interests, as well as a management structure that collectively markets the portfolio among members, leverages available resources, and provides expertise to ensure the programs provide the greatest return on investment in achieving the Army's STEM goals and objectives.

AEOP Goals

Goal 1: STEM Literate Citizenry.

- Broaden, deepen, and diversify the pool of STEM talent in support of our defense industry base.

Goal 2: STEM Savvy Educators.

- Support and empower educators with unique Army research and technology resources.

Goal 3: Sustainable Infrastructure.

- Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army.

This report documents the evaluation of one of the AEOP elements, Unite. The Unite program is administered on behalf of the Army by the Technology Student Association (TSA). The evaluation study was performed by Purdue University in cooperation with Battelle, the Lead Organization (LO) in the AEOP CA consortium.

Program Overview

Unite is an AEOP pre-collegiate program for talented high school students from groups historically underrepresented and underserved in science, technology, engineering, and mathematics (STEM). Unite encourages and helps prepare high school students to pursue a college education and career in engineering and other STEM-related fields. In a four to six-week summer program, Unite provides academic and social support to participants so that they have the ability and confidence to pursue careers in STEM fields.

Sixteen sites were competitively selected to receive 2-year awards through Unite in FY16. Operating on a 2-year cycle, Although Unite sites differ from one another; they all meet universal program requirements. This allows for a general consistency in student experiences and outcomes, and still gives sites the flexibility to design the details of their program to meet the unique needs of their students. All Unite programs are designed to meet the following objectives:

1. Effectively show participants the real-world applications of math and science;

2. Raise participant confidence in the ability to participate in engineering activities;
3. Inspire participants to consider engineering majors in college;
4. Remove social barriers and negative attitudes about engineering;
5. Promote collaboration and problem-solving in a team environment;
6. Expose participants to STEM careers in the Army and DoD; and,
7. Increase the number of STEM graduates to fill the projected shortfall of scientists and engineers in national and Department of Defense (DoD) careers.

The 16 host sites, which included 12 HBCUs/MSIs, received applications from substantially more qualified students than there were available participation slots for the 2016 Unite program. Overall, 685 students applied, of whom 282 were enrolled, representing a 41% placement rate. Although Unite had substantially more applications in FY16 (685) than in FY15 (491), the placement rate remained constant from FY15 to FY16.

There were 285 adult participants in day-to-day program activities for Unite, including university faculty and students, local teachers, and industry STEM professionals who play important roles as "mentors" to Unite students. This number included 18 Army S&Es and 37 K-12 teachers.

Table 1 contains an overview of demographic data for Unite participants. These data suggest that Unite was successful in attracting participation from female students—a population that is historically underrepresented in many STEM fields. Unite also had success in providing outreach to students from historically underserved and underrepresented racial/ethnic groups and low-income groups. Nearly three-quarters of Unite students (72%) attended urban schools, and all students who provided this information at registration reported that they received free or reduced-price lunch, a commonly used indicator of family income.

Table 1. 2016 Unite Student Participant Profile		
Demographic Category		
Respondent Gender (n =282)		
Female	144	51%
Male	138	49%
Choose not to report	0	0%
Respondent Race/Ethnicity (n =282)		
Asian	24	9%
Black or African American	163	58%
Hispanic or Latino	51	18%
Native American or Alaska Native	4	1%
Native Hawaiian or Other Pacific Islander	1	<1%
White	28	10%
Other race or ethnicity	11	4%
Choose not to report	0	0%
School setting (n=220)		
Urban (city)	159	72%
Suburban	44	20%
Rural (country)	14	6%
Frontier or tribal School	2	<1%
DoDDS/DoDEA School	0	0%
Home school	1	<1%
Online school	0	0%
Choose not to report	3	1%
Total		
Receives free or reduced-price lunch (n=210)		
Yes	210	100%
No	0	0%

The total cost of the 2016 Unite program was $560,682. The average cost per student was $1,988. Aligned with the rates of similar AEOP initiatives, Unite provides participants with a stipend of $100 per week. Table 2 provides the participation data by site. Table 3 summarizes these and other 2016 Unite program costs.

Table 2. 2016 Unite Participation					
Unite Site	**University Faculty**	**K-12 Teachers**	**Undergrad/ Grad Students**	**Army/DoD S&Es**	**Others**
TOTAL	**80**	**37**	**112**	**18**	**107**
Alabama State University (AL)	2	5	6	5	8
Fayetteville State University (NC)	---	3	2	2	6

Florida Agricultural and Mechanical University (FL)	8	---	6	2	7
Harris-Stowe State University (MO)	15	1	7	4	40
Howard University (DC)	1	---	2	---	---
Jackson State University (MS)	3	1	1	---	---
Marshall University (WV)	14	---	4	1	5
Michigan Technological University (MI)	4	---	36	1	10
New Jersey Institute of Technology (NJ)	---	4	8	1	---
Texas Southern University (TX)	12	---	2	1	11
University of Colorado, Colorado Springs (CO)	9	4	7	---	12
University of Nevada, Las Vegas (NV)	2	2	6	---	8
University of New Mexico (NM)	6	4	14	1	---
University of Pennsylvania (PA)	1	2	2	---	---
University of Puerto Rico, Rio Piedras (PR)	3		5	---	---
Virginia Tech (VA)	---	11	4	---	---

*May include some mentors

Table 2. 2016 Unite Program Costs	
2016 Unite – Cost Per Participant	
Administrative costs (includes salaries, fringe)	$71,620
Scholarships/Awards Cost (includes STEM-in-Action, mini-grants), if applicable	$444,293 (awards to sixteen Unite sites)
Travel	$14,794
Materials/Supplies	$10,641
Indirect	$19,334
Total Cost	**$560,682**
No. of Student Participants (Registered)	**282**
Cost per Student Participant	**$1988**

Evidence-Based Program Change

The AEOP identified three key priorities for the portfolio which were evaluated in FY16:

1. Increase outreach to populations that are historically underserved and under-represented in STEM;
2. Increase participants' awareness of Army/DoD STEM careers; and
3. Increase participants' awareness of other AEOP opportunities.

TSA initiated the following program changes/additions to the FY16 administration of the Unite program in light of the key AEOP priorities, the FY15 Unite evaluation study, and site visits conducted by TSA and the LO:

I. Increase outreach to populations that are historically underserved and underrepresented in STEM.

a) Sites disseminated information about Unite through websites, printed matter, local TV and radio, social media, community programs, school counselors, word of mouth, and personal contact.

b) Sites recruited students through local, urban, rural, and/or Title 1 schools (with high rates of free and reduced lunch, low income students, and first generation youth), GEAR UP and TRIO programs, existing campus pre-collegiate development programs, TSA contacts (two), and tribal government personnel.

c) Sites developed and delivered academic curriculum (both HSA and CL) and hands-on activities in STEM areas (including STEM career exploration), English/communication, SAT/ACT prep, college and career readiness, and fitness.

II. Increase participant's awareness of other Army/DoD STEM careers.

a) For sites needing assistance with Army/DoD/STEM contacts (professionals/facilities), help was initiated through communication with AEOP/Army liaison.

b) Sites with existing contacts/resources successfully reached out and arranged Army/DoD/STEM speakers and field trips.

III. Increase participants' awareness of other AEOP opportunities.

a) AEOP brochures and branded items were provided to all sites for distribution to participants.

b) Sites were given suggestions about how to help ensure participant knowledge of AEOP opportunities and DoD careers .

c) Sites distributed AEOP brochures, presented information at orientation and closing events, and provided occasions for student research (and/or mentor-directed discussion) about AEOP opportunities during program time frames.

d) Sites organized DoD field trips and speakers, as available, to enhance STEM career awareness.

e) During site visits, evaluators/AEOP representatives shared ideas with site directors about ways to increase participant awareness of AEOP opportunities and DoD STEM careers.

FY16 Evaluation At-A-Glance

Purdue University, in collaboration with TSA, conducted a comprehensive evaluation of the Unite program. The Unite logic model below presents a summary of the expected outputs and outcomes for the Unite program in relation to the AEOP and Unite-specific priorities. The logic model guided the overall Unite evaluation strategy.

Inputs	Activities	Outputs	Outcomes (Short term)	Impact (Long Term)
• Army sponsorship • TSA providing oversight of site programming • Operations conducted by 16 universities • Students participating in 16 Unite programs • STEM professionals and educators serving as Unite instructors • Stipends for students to support meals and travel • Centralized branding and comprehensive marketing • Centralized evaluation	• Students engage in hands-on programs focused on rigorous classroom instruction that prepared students for admissions into engineering tracks in college • STEM professionals and educators facilitate hands-on learning experiences for students • Program activities that expose students to AEOP programs and/or STEM careers in the Army or DoD	• Number and diversity of student participants engaged in programs • Number and diversity of STEM professionals and educators serving as instructors for programs • Number and diversity of Army/DoD scientists and engineers and other military personnel engaged in programs • Number and Title 1 status of high schools served through participant engagement • Students, instructors, site coordinators, and TSA contributing to evaluation	• Increased participant STEM competencies (confidence, knowledge, skills, and/or abilities to do STEM) • Increased interest in future STEM engagement • Increased participant awareness of and interest in other AEOP opportunities • Increased participant awareness of and interest in STEM research and careers • Increased participant awareness of and interest in Army/DoD STEM research and careers • Implementation of evidence-based recommendations to improve Unite programs	• Increased student participation in other AEOP opportunities and Army/DoD-sponsored scholarship/ fellowship programs • Increased student pursuit of STEM coursework in secondary and post-secondary schooling • Increased student pursuit of STEM degrees • Increased student pursuit of STEM careers • Increased student pursuit of Army/DoD STEM careers • Continuous improvement and sustainability of Unite

The evaluation included information from multiple participant groups about Unite processes, resources, activities, and their potential effects in order to address key evaluation questions related to program strengths and challenges, benefits to participants, and overall effectiveness in meeting AEOP and Unite program objectives.

Key Evaluation Questions

- What aspects of Unite programs motivate participation?
- What aspects of Unite program structure and processes are working well?
- What aspects of Unite programs could be improved?
- Did participation in Unite programs:
  - Increase students' STEM competencies?
  - Increase students' positive attitudes toward STEM?
  - Increase students' interest in future STEM learning?
  - Increase students' awareness of and interest in other AEOP opportunities?
  - Increase students' awareness of and interest in Army/DoD STEM careers?

The assessment strategy for Unite included student and mentor questionnaires, 2 site visits, 3 student focus groups, 2 mentor focus groups, and 1 Annual Program Report (APR) prepared by TSA using data from all Unite sites. Tables 4-8 outline the information collected in student and instructor questionnaires and focus groups, as well as information from the APR that is relevant to this evaluation report.

Table 4. 2016 Student Questionnaires

Category	Description
Profile	**Demographics:** Participant gender, age, grade level, race/ethnicity, and socioeconomic status indicators
	Education Intentions: Degree level, confidence to achieve educational goals, field sought
AEOP Goal 1	**Capturing the Student Experience:** In-school vs. In-program experience
	STEM Competencies: Gains in Knowledge of STEM, Science & Engineering Practices; contribution of AEOP
	Transferrable Competencies: Gains in 21st Century Skills
	STEM Identity: Gains in STEM identity, intentions to participate in STEM, and STEM-oriented education and career aspirations; contribution of AEOP
	AEOP Opportunities: Past participation, awareness of, and interest in participating in other AEOP programs; contribution of AEOP, impact of AEOP resources
	Army/DoD STEM: Exposure to Army/DoD STEM jobs, attitudes toward Army/DoD STEM research and careers, change in interest for STEM and Army/DoD STEM jobs; contribution of AEOP, impact of AEOP resources

AEOP Goal 2 and 3	**Mentor Capacity:** Perceptions of mentor/teaching strategies (students respond to a subset)
	Comprehensive Marketing Strategy: how students learn about AEOP, motivating factors for participation, impact of AEOP resources on awareness of AEOPs and Army/DoD STEM research and careers

Table 5. 2016 Mentor Questionnaires	
Category	**Description**
Profile	**Demographics:** Participant gender, race/ethnicity, occupation, past participation
Satisfaction & Suggestions	Awareness of Unite, motivating factors for participation, satisfaction with and suggestions for improving Unite programs, benefits to participants
AEOP Goal 1	**Capturing the Student Experience:** In-program experience
	STEM Competencies: Gains in Knowledge of STEM, Science & Engineering Practices; contribution of AEOP
	Transferrable Competencies: Gains in 21st Century Skills
	AEOP Opportunities: Past participation, awareness of other AEOP programs; efforts to expose students to AEOPs, impact of AEOP resources on efforts; contribution of AEOP in changing student AEOP metrics
	Army/DoD STEM: attitudes toward Army/DoD STEM research and careers, efforts to expose students to Army/DoD STEM research/careers, impact of AEOP resources on efforts; contribution of AEOP in changing student Army/DoD career metrics
AEOP Goal 2 and 3	**Mentor Capacity:** Perceptions of mentor/teaching strategies
	Comprehensive Marketing Strategy: how mentors learn about AEOP, usefulness of AEOP resources on awareness of AEOPs and Army/DoD STEM research and careers

Table 6. 2016 Student Focus Groups	
Category	**Description**
Profile	Gender, race/ethnicity, grade level, past participation in Unite, past participation in other AEOP programs
Satisfaction & Suggestions	Awareness of Unite, motivating factors for participation, involvement in other science competitions in addition to Unite, satisfaction with and suggestions for improving Unite programs, benefits to participants
AEOP Goal 1 & 2 Program Efforts	**Army STEM: AEOP Opportunities –** Extent to which students were exposed to other AEOP opportunities
	Army STEM: Army/DoD STEM Careers – Extent to which students were exposed to STEM and Army/DoD STEM jobs

Table 7. 2016 Mentor Focus Groups	
Category	**Description**
Profile	Gender, race/ethnicity, occupation, organization, role in Unite, past participation in Unite, past participation in other AEOP programs
Satisfaction & Suggestions	Perceived value of Unite, benefits to participants suggestions for improving Unite programs
AEOP Goal 1 & 2 Program Efforts	**Army STEM: AEOP Opportunities –** Efforts to expose students to AEOP opportunities
	Army STEM: Army/DoD STEM Careers – Efforts to expose students to STEM and Army/DoD STEM jobs
	Mentor Capacity: Local Educators – Strategies used to increase diversity/support diversity in Unite

Table 8. 2016 Annual Program Report	
Category	**Description**
Program	Description of course content, activities, and academic level (high school or college)
AEOP Goal 1 & 2 Program Efforts	**Underserved Populations:** mechanisms for marketing to and recruitment of students from underserved populations
	Army STEM: Army/DoD STEM Careers – Career day exposure to Army STEM research and careers; Participation of Army engineers and/or Army research facilities in career day activities
	Mentor Capacity: Local Educators - University faculty and student involvement, teacher involvement

Detailed information about methods and instrumentation, sampling and data collection, and analysis are described in Appendix A, the evaluation plan. The reader is strongly encouraged to review Appendix A to clarify how data are summarized, analyzed, and reported in this document. Findings of statistical and/or practical significance are noted in the report narrative, with tables and footnotes providing results from tests for significance. Focus group protocols are provided in Appendix B (students) and Appendix C (mentors); the student questionnaire is provided in Appendix D and the mentor questionnaire is provided in Appendix E. Major trends in data and analyses are reported herein.

Study Sample

Table 9 provides an analysis of student and mentor participation in the Unite questionnaires, the response rate, and the margin of error at the 95% confidence level (a measure of how representative the sample is of the population). The margin of error for mentor surveys is larger than generally acceptable, indicating that the samples may not be representative of their respective populations. The student response rate for 2016 (58%) is higher than in 2015 (56%) and 2014 (41%), however the mentor response rate is lower in 2016 (15%) than it was in 2015 (21%) or 2014 (30%). Because of the small number of responses to the mentor survey, caution is warranted when interpreting these data, as the responses may not be representative of the mentor population participating in the Unite program. The number of student and mentor participants by site and number of actual survey respondents is found in Table 10.

Table 9. 2016 Unite Questionnaire Participation

Participant Group	Respondents (Sample)	Total Participants (Population)	Participation Rate	Margin of Error @ 95% Confidence[2]
Students	164	282	58%	±5.0%
Mentors	44	285	15%	±13.6%

Table 10. 2016 Unite Site Survey Respondent Numbers

2016 Unite Site	Students		Mentors	
	No. of Participants	No. of Survey Respondents	No. of Participants	No. of Survey Respondents
Alabama State University	15	12	26	9
Florida Agricultural and Mechanical University	13	11	23	6
Howard University	10	0	3	0
Marshall University	27	0	24	0
Michigan Technological University	7	4	51	1
New Jersey Institute of Technology	22	20	13	6
University of Colorado, Colorado Springs	17	12	32	3
University of New Mexico	14	7	25	2
University of Pennsylvania	18	8	5	1
University of Puerto Rico, Rio Piedras	20	18	7	5

[2] "Margin of error @ 95% confidence" means that 95% of the time, the true percentage of the population who would select an answer lies within the stated margin of error. For example, if 47% of the sample selects a response and the margin of error at 95% confidence is calculated to be 5%, if you had asked the question to the entire population, there is a 95% likelihood that between 42% and 52% would have selected that answer. A 2-5% margin of error is generally acceptable at the 95% confidence level.

Virginia Tech	15	0	16	0
Fayetteville State University (NC)	20	17	13	7
Harris-Stowe State University (MO)	23	0	67	0
Jackson State University (MS)	15	0	5	0
Texas Southern University (TX)	26	19	26	0
University of Nevada, Las Vegas (NV)	20	0	18	0
Not Identified		36		4
TOTAL	**282**	**164**	**354**	**44**

Three student focus groups and 2 mentor focus groups were conducted that included students and mentors from 2 sites. A total of 19 students participated in focus groups. Of these, 13 were Black or African American, 3 were Hispanic/Latino, 1 was Asian, and 2 were other races/ethnicities. Two mentors, 1 male and 1 female, participated in the mentor focus group. Both mentor participants were Black or African American. Focus groups were not intended to yield generalizable findings; rather they were intended to provide additional evidence of, explanation for, or illustrations of student questionnaire data. They add to the overall narrative of Unite's efforts and impact, and highlight areas for future exploration in programming and evaluation.

Respondent Profiles

Student demographics. Demographic information collected from Unite student questionnaire respondents is summarized in Tables 11 and 12. More females (52%) than males (48%) completed the questionnaire. More responding students identified with the race/ethnicity category of Black or African American (51%) than any other single race/ethnicity category. There is also substantial representation of Hispanic or Latino students (31%) among questionnaire respondents.

Unite students responding to the questionnaire are demographically similar to the population of 2016 Unite students overall. Similar to demographic data for all enrolled students, over half of respondents were female and over half identified themselves as Black or African American. Likewise, most responding students attended urban schools. It is noteworthy that 34% of responding students indicated that they did not receive free or reduced-price lunch while the data provided in the 2016 APR indicated that all registered students who provided data for this item received free or reduced-price lunch.

Table 11. 2016 Unite Student Respondent Profile		
Demographic Category	**Questionnaire Respondents**	
Respondent Gender (n = 104)		
Female	54	52%
Male	50	48%
Choose not to report	0	0%
Respondent Race/Ethnicity (n = 104)		
Asian	4	4%
Black or African American	53	51%
Hispanic or Latino	32	31%
Native American or Alaska Native	0	0%
Native Hawaiian or Other Pacific Islander	0	0%
White	12	12%
Other race or ethnicity, (specify):†	3	3%
Choose not to report	0	0%
Respondent Grade Level (n = 164)		
9th	16	10%
10th	75	46%
11th	40	24%
12th	33	20%
College Freshman	0	0%
Choose not to report	0	0%
Respondent Eligible for Free/Reduced-Price Lunch (n = 104)		
Yes	64	62%
No	36	34%
Choose not to report	4	4%

†Other = Mixed/Unknown; Black AND Hispanic; African American/Asian

Table 12. 2016 Unite Student Respondent School Information		
Demographic Category	**Questionnaire Respondents**	
Respondent School Location (n = 104)		
Urban (city)	82	79%
Suburban	16	15%
Frontier or tribal school	0	0%
Rural (country)	6	6%
Home School	0	0%
Online School	0	0%
Department of Defense School (DoDEA or DODDS)	0	0%

Students were asked how many times they participated in each of the AEOP programs in the past. Table 13 shows that very few students had participated in any other AEOP. A small number of students (7%) had participated in Unite previously, and 2% of students reported participating in Camp Invention and SEAP. A third of students reported having participated in other STEM programs, however.

Table 13. Student Participation in AEOP Programs (n=104)

	Response Percent	Response Total
Camp Invention	2%	2
eCYBERMISSION	0%	0
Junior Solar Sprint (JSS)	0%	0
Gains in the Education of Mathematics and Science (GEMS)	1%	1
Unite	7%	7
Junior Science & Humanities Symposium (JSHS)	0%	0
Science & Engineering Apprenticeship Program (SEAP)	2%	2
Research & Engineering Apprenticeship Program (REAP)	1%	1
High School Apprenticeship Program (HSAP)	1%	1
College Qualified Leaders (CQL)	0%	0
Undergraduate Research Apprenticeship Program (URAP)	0%	0
Science Mathematics & Research for Transformation (SMART)	0%	0
I've never participated in any AEOP programs	66%	69
Other STEM Program	33%	34

Mentor demographics. Demographic information was also collected for mentors who responded to the questionnaire. These data are summarized in Table 14. Most responding mentors were female (70%) although only 10 mentors responded to this item. Likewise, of the 10 mentors who responded to the item asking about their race/ethnicity, 50% identified as Black or African American, 20% as Hispanic or Latino, 20% as White, and 10% as Asian. Mentors were drawn from a variety of professions, with 26% of respondents being teachers; 26% scientists, engineers, or mathematicians in training; 12% university educators, 9% other school staff, and 2% scientists, engineers, or mathematics professionals. Another 26% indicated "other" for their occupation.

"My overall experience with Unite has been very satisfying! I appreciate the opportunity to host such a program for local and regional underrepresented high-school students who are very deserving of this experience to increase their awareness of STEM careers. I observed their joy and excitement in participating in the program, which in turn brought me joy."-- Unite Mentor

Table 14. 2016 Unite Mentor Respondent Profile		
Demographic Category	**Questionnaire Respondents**	
Respondent Gender (n = 10)		
Female	7	70%
Male	3	30%
Respondent Race/Ethnicity (n =10)		
Asian	1	10%
Black or African American	5	50%
Hispanic or Latino	2	20%
Native American or Alaska Native	0	0%
Native Hawaiian or Other Pacific Islander	0	0%
White	2	20%
Other race or ethnicity, (specify)	0	0%
Choose not to report	0	0%
Respondent Occupation (n = 43)		
Teacher	11	26%
Other school staff	4	9%
University educator	5	12%
Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.)	11	26%
Scientist, Engineer, or Mathematics professional	1	2%
Other, (specify) †	11	26%
Respondent Role in Unite (n = 42)		
Instructor (typically a University or Army Scientist or Engineer)	16	38%
Classroom Assistant	15	36%
Resource Teacher	4	10%
Other, (specify) ††	7	17%

†Other = academic assistant; student employee; graduate student; Scientist, Engineer, University; student (college); counselor; Program Coordinator; academic advisor for talent; Program Assistant; Teaching Assistant; Outreach Professional

†† Other = Program Coordinator; Peer Mentor; Guest Instructor; Program Coordinator; I served in various roles assisting the instructors, and I also taught virtual job; shadow to the students as well as other workshops throughout the camp; Coordinator; Director

Actionable Program Evaluation

The Actionable Program Evaluation is intended to provide assessment and evaluation of program processes, resources, and activities for the purpose of recommending improvements as the program moves forward. This section highlights information outlined in the Satisfaction & Suggestions sections of Tables 3-7.

A focus of the Actionable Program Evaluation is efforts toward the long-term goal of Unite and all of the AEOP to increase and diversify the future pool of talent capable of contributing to the nation's scientific and technology progress. Unite sites reach out to students of traditionally underrepresented and underserved populations. Thus, it is important to consider how Unite is marketed and ultimately recruits student participants, the factors that motivate students to participate in Unite, participants' perceptions of and satisfaction with activities, what value participants place on program activities, and what recommendations participants have for program improvement. The following sections report perceptions of students and mentors that pertain to current programmatic efforts and recommend evidence-based improvements to help Unite achieve outcomes related to AEOP programs and objectives. Specifically, to help Unite continue to expand participation from and support STEM education for students from underrepresented and underserved groups.

Marketing and Recruiting Underrepresented and Underserved Populations

Many Unite sites employed multi-pronged efforts to market programs to and recruit students from schools identified as serving large populations of traditionally underrepresented and underserved students. Unite sites marketed their programs in a variety of ways:

- Sites disseminated information about Unite through websites, printed matter, local TV and radio, social media, community programs, school counselors, word of mouth, and personal contact
- Sites recruited students through local, urban, rural, and/or Title 1 schools (with high rates of free and reduced lunch, low income students, and first generation youth), GEAR UP and TRIO programs, existing campus pre-collegiate development programs, TSA contacts (two), and tribal government personnel.
- Sites developed and delivered academic curriculum (both HSA and CL) and hands-on activities in STEM areas (including STEM career exploration), English/communication, SAT/ACT prep, college and career readiness, and fitness.
- Individual sites use their university websites and their own social media handles for marketing Unite.
- The program administrator solicited photos, videos, stories from sites – which, in turn, were provided by sites – and passed them on to Widmeyer for marketing uses.
- The TSA used social media and press release venues (as well as the TSA website) to communicate news of Unite.
- Sites used social media, local media sources, and their websites to share news of Unite.

For the purposes of understanding, which recruitment methods are most effective, students were asked on the questionnaire to select all of the different ways they heard about AEOP (see Table 15). The most frequently mentioned source of information about AEOP were a school newsletter, email or website (34%), someone who works at the school the student attends (29%), and a family member (26%). Another 17% learned about AEOP from someone who works with the program. Only 4% became aware of AEOP from the AEOP website, and only 2% learned about AEOP from social media.

Table 15. How Students Learned about AEOP (n=104)

	Response Percent	Response Total
Army Educational Outreach Program (AEOP) Website	4%	4
AEOP on Facebook, Twitter, Instagram, or other social media	2%	2
School or university newsletter, email, or website	34%	35
Past participant of program	6%	6
Friend	11%	11
Family Member	26%	27
Someone who works at the school or university I attend	29%	30
Someone who works with the program	17%	18
Someone who works with the Department of Defense (Army, Navy, Air Force, etc.)	1%	1
Community group or program	4%	4
Choose Not to Report	5%	5

Students in focus groups were asked how they heard about Unite. Students reported hearing about the program from a variety of sources, including family members, past participants, teachers, guidance counselors, newsletters, and the AEOP website. For example,

> *I heard about this from my guidance counselor at school. I chose it because I was very interested in engineering because at school, it was this program I was in. I enjoyed it*. (Unite Student)

> *I visited the AEOP website and I saw the different programs listed. I, too, tried to apply for SEAP, but I think they give priority to older children. I did see Unite on the list, so I tried to apply for that. I'm really interested in computer science and coding*. (Unite Student)

I heard it from a teacher at my school. Since there was an engineering school, and I was very interested in engineering. Because I wanted to pursue a degree in computer engineering, I took the opportunity of applying for this program. (Unite Student)

I heard about it from my father. It seemed like a cool program because I'm really not doing that much this summer. I want to be a mechanical engineer when I grow up. It seemed like a good opportunity to put myself out there and see what it actually is, to work with this type of equipment. (Unite Student)

Table 16 displays the data about how mentors learned about AEOP. The most frequently chosen source of information was someone who works at the school or university the mentor attends (35%) followed by someone who works with the program (25%). Less frequently chosen responses included a school or university newsletter, email, or website (18%); the AEOP website (12%); a past participant of the program (6%); and AEOP on social media (6%).

Table 16. How Mentors Learned About AEOP (n=10)

	Response Percent	Response Total
Army Educational Outreach Program (AEOP) Website	11.76 %	2
AEOP on Facebook, Twitter, Instagram, or other social media	5.88 %	1
School or university newsletter, email, or website	17.65 %	3
Past participant of program	5.88 %	1
Friend	0.00 %	0
Family Member	0.00 %	0
Someone who works at the school or university I attend	35.29 %	6
Someone who works with the program	23.53 %	4
Someone who works with the Department of Defense (Army, Navy, Air Force, etc.)	0.00 %	0
Community group or program	0.00 %	0
Choose Not to Report	0.00 %	0

Motivating Factors for Participation

Students were asked to respond to an item about why they chose to participate in Unite. Students responded by choosing any source of motivation that influenced them from a list (see Table 17). The most frequently chosen motivators were the desire to learn something new or interesting (79%) and interest in STEM (79%). Over half of students also indicated that learning in ways not possible in school (57%), figuring out education or career goals (57%),

building a college application or résumé (54%), and the desire to expand laboratory or research skills (52%) were motivators for participating in Unite.

Table 17. Factors Motivating Students to Participate in Unite (n=104)

	Response Percent	Response Total
Teacher or professor encouragement	23%	24
An academic requirement or school grade	7%	7
Desire to learn something new or interesting	79%	82
The mentor(s)	13%	13
Building college application or résumé	54%	56
Networking opportunities	34%	35
Interest in science, technology, engineering, or mathematics	79%	82
Interest in STEM careers with the Army	15%	16
Having fun	49%	51
Earning stipends or awards for doing STEM	27%	28
Opportunity to do something with friends	22%	23
Opportunity to use advanced laboratory technology	48%	50
Desire to expand laboratory or research skills	52%	54
Learning in ways that are not possible in school	57%	59
Serving the community or country	18%	19
Exploring a unique work environment	45%	47
Figuring out education or career goals	57%	59
Seeing how school learning applies to real life	37%	38
Recommendations of past participants	9%	9
Choose Not to Report	3%	3

Students participating in focus group were also asked about why they chose to participate in Unite. Students focused on career information and experience in their responses. The comments below are characteristic of focus group responses:

> *I thought it would be a good opportunity for myself. I knew I would like engineering a lot, because that's something I want to do in the future, so I took the opportunity.* (Unite Student)

I wanted to do this program because I thought engineering is a career that I might want to pursue, and something educational that I would like to do during my summer. (Unite Student)

I enjoyed engineering since I was actually little, before I even knew what engineering was. When I found out about this program, I was like, this could be a good idea to see if I actually enjoy more complicated parts of engineering. (Unite Student)

I joined this just to meet new people, and to get some hands-on training experience with engineering, and to enjoy my summer. (Unite Student)

The Unite Experience

Students were asked about the nature of the activities in which they participated in Unite, and how their Unite experience compared to their STEM learning opportunities in school. Table 18 displays student responses about the frequency of student activities in Unite. These data indicate that a majority of students engaged in a variety of activities most days or every day of their Unite experience. For example, students reported learning about STEM topics new to them (84%), learning about different careers that use STEM (78%), and communicating with other students about STEM (74%) on most days or every day of Unite. Overall, the vast majority of students reported that they engaged at least once in all of the STEM activities listed.

"I enjoyed learning the different areas of engineering and what is available to me in the future. Not only did I like finding out what jobs are out there, but I also found it very valuable discovering what degrees I would need to make these jobs possible."-- Unite Student

Table 18. Nature of Student Activities in Unite (n=162)

	Not at all	At least once	A few times	Most days	Every day	Response Total
Learn about science, technology, engineering, or mathematics (STEM) topics that are new to you	0.6%	3.7%	12.3%	24.7%	58.6%	
	1	6	20	40	95	**162**
Apply STEM learning to real-life situations	1.9%	8.6%	16.7%	34.0%	38.9%	
	3	14	27	55	63	**162**
Learn about new discoveries in STEM	3.1%	4.4%	20.1%	25.2%	47.2%	
	5	7	32	40	75	**159**
Learn about different careers that use STEM	2.5%	3.7%	15.4%	28.4%	50.0%	
	4	6	25	46	81	**162**
Interact with scientists or engineers	3.7%	6.8%	23.5%	30.9%	35.2%	
	6	11	38	50	57	**162**
Communicate with other students about STEM	2.5%	4.3%	19.9%	21.7%	51.6%	
	4	7	32	35	83	**161**

Since a goal of the Unite program is to increase the number and diversity of students who pursue STEM careers, it is important to know how many jobs/careers (both STEM and DoD STEM) the students learned about during their experience. Table 19 displays student responses for the past three years. In 2016, all responding students reported learning about at least one STEM job/career, and the majority (77%) reported learning about 5 or more. Somewhat fewer students reported learning about at least one DoD STEM job/career (81%), and 31% reported learning about 5 or more STEM jobs/careers in the DoD. Unite students in 2016 reported learning slightly more STEM jobs/careers than in previous years, but slightly fewer DoD STEM jobs/careers than they reported learning about in 2015.

Table 19. Number of STEM Jobs/Careers Students Learned about During Unite						
	STEM Jobs/Careers			DoD STEM Jobs/Careers		
	2014 (n = 109)	2015 (n = 155)	2016 (n = 161)	2014 (n = 108)	2015 (n = 155)	2016 (n = 160)
None	3%	1%	0%	20%	14%	19%
1	1%	1%	1%	14%	11%	7%
2	7%	6%	5%	15%	11%	14%
3	18%	16%	7%	21%	24%	18%
4	15%	18%	10%	6%	14%	11%
5 or more	56%	58%	77%	24%	26%	31%

Students were also asked to indicate which resources impacted their awareness of DoD STEM careers. Participation in Unite (71%), invited speakers or career events (69%), and students' mentors (66%) were most often reported as being somewhat or very much responsible for this impact (see Table 20). Over half of students reported not having experienced some AEOP resources, including AEOP on social media (51%) and the It Starts Here! magazine (51%).

"Unite has given me a better understand of what kind of STEM jobs there are and what each field does. There are several fields that I have learned about that I could be interested in pursuing as a career. I have also learned that STEM is something that interests me and something that I could be good at."-- Unite Student

Table 20. Impact of Resources on Student Awareness of DoD Careers (n=161)

	Did not experience	Not at all	A little	Somewhat	Very much	Response Total
Technology Student Association (TSA) website	43.4%	9.4%	19.5%	15.7%	11.9%	
	69	15	31	25	19	**159**
Army Educational Outreach Program (AEOP) website	31.4%	9.4%	23.3%	18.9%	17.0%	
	50	15	37	30	27	**159**
AEOP on Facebook, Twitter, Pinterest or other social media	51.3%	16.5%	14.6%	10.1%	7.6%	
	81	26	23	16	12	**158**
AEOP brochure	35.8%	11.9%	18.2%	18.9%	15.1%	
	57	19	29	30	24	**159**
It Starts Here! Magazine	51.0%	14.0%	14.0%	10.8%	10.2%	
	80	22	22	17	16	**157**
My Unite mentor(s)	16.3%	6.3%	11.9%	29.4%	36.3%	
	26	10	19	47	58	**160**
Invited speakers or "career" events during Unite	16.1%	5.0%	10.6%	20.5%	47.8%	
	26	8	17	33	77	**161**
Participation in Unite	13.1%	3.8%	11.9%	21.9%	49.4%	
	21	6	19	35	79	**160**

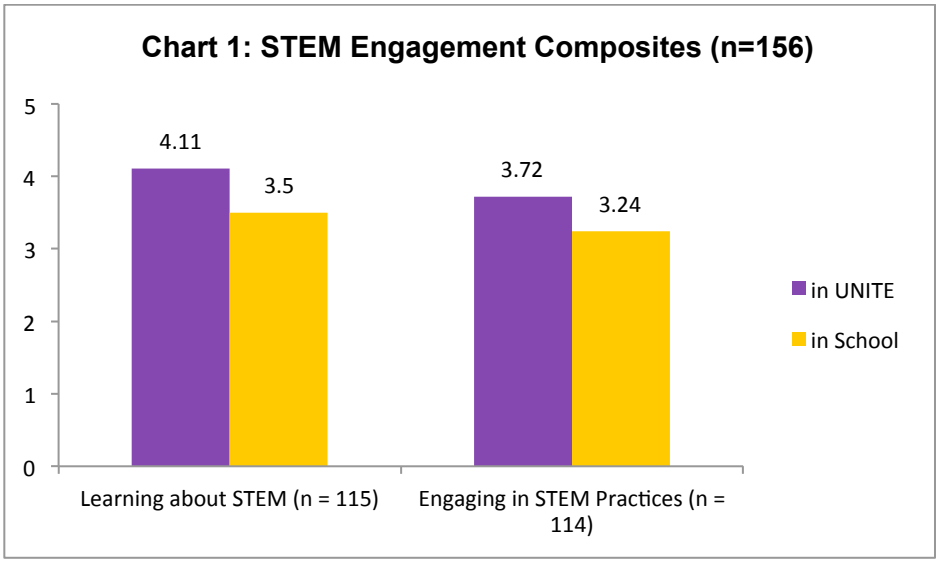
Students were asked on the questionnaire how often they engaged in various STEM practices during Unite. Results indicate that students were very engaged in doing STEM during the program (see Table 21). For example, over half of responding students indicated working as part of a team (77%), participating in hands-on activities (77%), analyzing data or information (68%), and using laboratory procedures and tools (61%) most days or every day of their Unite experience. Mentors were asked to indicate the frequency with which students' engaged in these activities as well and their responses are similar although mentors tended to indicate that students engaged in most activities every day more frequently than students.

Table 21. Student Engagement in STEM Practices in Unite (n=162)

	Not at all	At least once	A few times	Most days	Every day	Response Total
Use laboratory procedures and tools	1.2%	8.0%	29.0%	33.3%	28.4%	
	2	13	47	54	46	**162**
Participate in hands-on STEM activities	0.6%	3.1%	19.9%	29.8%	46.6%	
	1	5	32	48	75	**161**
Work as part of a team	2.5%	4.9%	15.4%	29.0%	48.1%	
	4	8	25	47	78	**162**
Identify questions or problems to investigate	3.1%	4.4%	23.8%	35.6%	33.1%	
	5	7	38	57	53	**160**
Design an investigation	9.3%	13.0%	25.5%	26.1%	26.1%	
	15	21	41	42	42	**161**
Carry out an investigation	6.8%	9.9%	29.2%	28.6%	25.5%	
	11	16	47	46	41	**161**
Analyze data or information	1.9%	6.2%	24.8%	33.5%	33.5%	
	3	10	40	54	54	**161**
Draw conclusions from an investigation	4.9%	10.5%	24.7%	31.5%	28.4%	
	8	17	40	51	46	**162**
Come up with creative explanations or solutions	3.7%	8.1%	21.7%	31.7%	34.8%	
	6	13	35	51	56	**161**
Build or make a computer model	30.9%	20.4%	15.4%	19.1%	14.2%	
	50	33	25	31	23	**162**

A composite score[3] was calculated for each of these two sets of items, the first titled "Learning about STEM in Unite,"[4] and the second "Engaging in STEM Practices in Unite."[5] Response categories were converted to a scale of 1 = "Not at all" to 5 = "Every day" and the average across all items in the scale was calculated. The composite scores were used to test whether there were differences in student experiences by gender and race/ethnicity. There were no significant differences by gender on either variable.

To examine how the Unite experience compares to their typical school experience, students were asked how often they engaged in the same activities in school. These responses were also combined into two composite variables: "Learning about STEM in School,"[6] and "Engaging in STEM Practices in School"[7] that are parallel to the ones asking about Unite. As can be seen in Chart 1, scores were significantly higher on the "in Unite" versions of both composites than on the in school versions (large effects of d = 1.15 standard deviations and d = 0.1.01 standard deviations, respectively).[8] These data indicate that Unite provides students with more intensive STEM learning experiences than they would typically receive in school.



[3] Using multiple statistical tests on related outcomes requires the use of a Type I error rate adjustment to reduce the likelihood of false positives (i.e., detecting a difference when one does not truly exist). However, Type I error rate adjustments lead to a reduction in statistical power (i.e., the ability to detect a difference if it does exist). The use of a composite score helps avoid both of these problems by reducing the total number of statistical tests used. In addition, composite scores are typically more reliable than individual questionnaire items.

[4] The Cronbach's alpha reliability for these 6 items was 0.902.

[5] The Cronbach's alpha reliability for these 10 items was 0.931.

[6] Cronbach's alpha reliability of 0.928.

[7] Cronbach's alpha reliability of 0.930.

[8] Dependent Samples t-test for STEM Learning: $t(161)=7.32$, $p<.001$; Dependent Samples t-test for STEM Engagement: $t(160)=6.40$, $p<.001$

The Role of Mentors

Mentors play a critical role in the Unite program. Mentors design and facilitate learning activities, deliver content through instruction, supervise and support collaboration and teamwork, provide one-on-one support to students, chaperone students, advise students on educational and career paths, and generally serve as STEM role models for Unite students. Mentors responding to the mentor questionnaire reported working between 1 and 31 students.

Mentors were also asked whether or not they used a number of strategies when working with students. These strategies comprised five main areas of effective mentoring:[9]

1. Establishing the relevance of learning activities;
2. Supporting the diverse needs of students as learners;
3. Supporting students' development of collaboration and interpersonal skills;
4. Supporting students' engagement in "authentic" STEM activities; and
5. Supporting students' STEM educational and career pathways.

As shown in Table 22, mentors used a number of strategies to help make the learning activities relevant to students. For example, nearly all reported helping students become aware of the role(s) that STEM plays in their everyday lives (98%), becoming familiar with students' backgrounds and interests (96%), and giving students real-life problems to investigate or solve (93%). A large majority of mentors also used strategies such as asking students to relate real-life events or activities to topics covered in Unite (89%), helping students understand how STEM can help them improve their own community (86%), and encouraging students to suggest new readings, activities, or projects (86%). Somewhat fewer mentors reported selecting readings or activities that related to students' backgrounds (64%).

[9] Mentoring strategies examined in the evaluation were best practices identified in various articles including:

Maltese, A. V., & Tai, R. H. (2011). Pipeline persistence: Examining the association of educational experiences with earned degrees in STEM among US students. *Science Education*, *95*(5), 877-907.

Ornstein, A. (2006). The frequency of hands-on experimentation and student attitudes toward science: A statistically significant relation (2005-51-Ornstein). *Journal of Science Education and Technology*, *15*(3-4), 285-297.

Sadler, P. M., Sonnert, G., Hazari, Z., & Tai, R. (2012). Stability and volatility of STEM career interest in high school: A gender study. *Science Education*, *96*(3), 411-427.

Table 22. Mentors Using Strategies to Establish Relevance of Learning Activities (n=44)

	Yes - I used this strategy	No - I did not use this strategy	Response Total
Become familiar with my student(s) background and interests at the beginning of the Unite experience	95.5%	4.5%	
	42	2	**44**
Giving students real-life problems to investigate or solve	93.2%	6.8%	
	41	3	**44**
Selecting readings or activities that relate to students' backgrounds	63.6%	36.4%	
	28	16	**44**
Encouraging students to suggest new readings, activities, or projects	84.1%	15.9%	
	37	7	**44**
Helping students become aware of the role(s) that STEM plays in their everyday lives	97.7%	2.3%	
	43	1	**44**
Helping students understand how STEM can help them improve their own community	86.4%	13.6%	
	38	6	**44**
Asking students to relate real-life events or activities to topics covered in Unite	88.6%	11.4%	
	39	5	**44**

Mentors also reported using a variety of strategies to support the diverse needs of students as learners. Table 23 shows that nearly all mentors reported treating all students the same way, regardless of gender or race/ethnicity (98%), and 91% indicated using a variety of teaching and/or mentoring activities. Many mentors also engaged in activities such as directing students to other individuals or programs for additional support as needed (86%), integrating ideas from education literature to teach/mentor groups underrepresented in STEM (84%), identifying students' learning styles (73%), and highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM (72%).

Table 23. Mentors Using Strategies to Support Diverse Needs of Students as Learners (n=44)

	Yes - I used this strategy	No - I did not use this strategy	Response Total
Identify the different learning styles that my student (s) may have at the beginning of the Unite experience	72.7%	27.3%	
	32	12	**44**
Interact with students and other personnel the same way regardless of their background	97.7%	2.3%	
	43	1	**44**
Use a variety of teaching and/or mentoring activities to meet the needs of all students	90.9%	9.1%	
	40	4	**44**
Integrating ideas from education literature to teach/mentor students from groups underrepresented in STEM	84.1%	15.9%	
	37	7	**44**
Providing extra readings, activities, or learning support for students who lack essential background knowledge or skills	70.5%	29.5%	
	31	13	**44**
Directing students to other individuals or programs for additional support as needed	86.4%	13.6%	
	38	6	**44**
Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM	72.1%	27.9%	
	31	12	**43**

Mentors also reported using strategies to support students' development of collaboration and interpersonal skills (see Table 24). For example, all responding mentors indicated having students work on collaborative activities or projects as members of a team, 95% had students listen to the ideas of others with an open mind, 93% allowed students to resolve conflicts and reach agreement within their team, and 91% had students exchange ideas with others whose backgrounds or viewpoints were different from their own.

Table 24. Mentors Using Strategies to Support Student Development of Collaboration and Interpersonal Skills (n=43)

	Yes - I used this strategy	No - I did not use this strategy	Response Total
Having my student(s) tell other people about their backgrounds and interests	83.7%	16.3%	
	36	7	**43**
Having my student(s) explain difficult ideas to others	79.1%	20.9%	
	34	9	**43**
Having my student(s) listen to the ideas of others with an open mind	95.3%	4.7%	
	41	2	**43**
Having my student(s) exchange ideas with others whose backgrounds or viewpoints are different from their own	90.7%	9.3%	
	39	4	**43**
Having my student(s) give and receive constructive feedback with others	83.7%	16.3%	
	36	7	**43**
Having students work on collaborative activities or projects as a member of a team	100.0%	0.0%	
	43	0	**43**
Allowing my student(s) to resolve conflicts and reach agreement within their team	93.0%	7.0%	
	40	3	**43**

Mentors were asked about strategies they used to support student engagement in authentic STEM activities (see Table 25). Nearly all mentors reported providing students with constructive feedback to improve their STEM competencies (98%), supervising students while they practiced STEM research skills (96%), and allowing students to work independently to improve their self-management abilities (96%). Most mentors also used strategies such as encouraging students to seek support from other team members (93%), encouraging students to learn collaboratively (91%), and demonstrating laboratory/field techniques, procedures, and tools for students (84%).

Table 25. Mentors Using Strategies to Support Student Engagement in "Authentic" STEM Activities (n=44)

	Yes - I used this strategy	No - I did not use this strategy	Response Total
Teaching (or assigning readings) about specific STEM subject matter	81.8%	18.2%	
	36	8	**44**
Having my student(s) search for and review technical research to support their work	68.2%	31.8%	
	30	14	**44**
Demonstrating laboratory/field techniques, procedures, and tools for my student(s)	84.1%	15.9%	
	37	7	**44**
Supervising my student(s) while they practice STEM research skills	95.5%	4.5%	
	42	2	**44**
Providing my student(s) with constructive feedback to improve their STEM competencies	97.6%	2.4%	
	41	1	**42**
Allowing students to work independently to improve their self-management abilities	95.5%	4.5%	
	42	2	**44**
Encouraging students to learn collaboratively (team projects, team meetings, journal clubs, etc.)	90.9%	9.1%	
	40	4	**44**
Encouraging students to seek support from other team members	93.0%	7.0%	

Table 26 displays mentor responses an item asking about mentoring strategies focused on supporting students' STEM educational and career pathways. All mentors reported asking students about their educational and career goals (94%) and a large majority also reported providing guidance about educational pathways that will prepare students for STEM careers (93%), recommending extracurricular programs that align with students' goals (86%), discussing STEM career opportunities in private industry or academia (86%), and discussing the economic, political, ethical, and/or social context of a STEM career (86%). Most mentors also reported using strategies such as recommending student and professional organizations in STEM (77%), discussing STEM career opportunities within the DoD or other government agencies (68%), and recommending AEOPs that align with students' goals (64%).

Table 26. Mentors Using Strategies to Support Student STEM Education and Career Pathways (n=44)

	Yes - I used this strategy	No - I did not use this strategy	Response Total
Asking my student(s) about their educational and/or career goals	100.0%	0.0%	
	44	0	**44**
Recommending extracurricular programs that align with students' goals	86.4%	13.6%	
	38	6	**44**
Recommending Army Educational Outreach Programs that align with students' goals	63.6%	36.4%	
	28	16	**44**
Providing guidance about educational pathways that will prepare my student(s) for a STEM career	93.0%	7.0%	
	40	3	**43**
Discussing STEM career opportunities within the DoD or other government agencies	68.2%	31.8%	
	30	14	**44**
Discussing STEM career opportunities in private industry or academia	86.4%	13.6%	
	38	6	**44**
Discussing the economic, political, ethical, and/or social context of a STEM career	86.4%	13.6%	
	38	6	**44**
Recommending student and professional organizations in STEM to my student(s)	77.3%	22.7%	
	34	10	**44**
Helping students build a professional network in a STEM field	68.2%	31.8%	
	30	14	**44**
Helping my student(s) with their resume, application, personal statement, and/or interview preparations	54.5%	45.5%	
	24	20	**44**

Because maintaining the pipeline of AEOP programs with quality students is a priority, mentors were asked which of the AEOP programs mentors explicitly discussed with their students during Unite (see Table 27). The most frequently discussed program was Unite (80%). The majority of mentors did not discuss any of the other AEOPs with students with the exception of REAP (51% discussed this program with students). Surprisingly, the least discussed programs were JSHS (21%) and CQL (21%), programs for which students are currently or will soon be eligible.

Table 27. Mentors Explicitly Discussing AEOPs with Students (n=44)

	Yes - I discussed this program with my student(s)	No - I did not discuss this program with my student(s)	Response Total
Gains in the Education of Mathematics and Science (GEMS)	41.9%	58.1%	
	18	25	43
Unite	79.5%	20.5%	
	35	9	44
Junior Science & Humanities Symposium (JSHS)	20.9%	79.1%	
	9	34	43
Science & Engineering Apprenticeship Program (SEAP)	44.2%	55.8%	
	19	24	43
Research & Engineering Apprenticeship Program (REAP)	51.2%	48.8%	
	22	21	43
High School Apprenticeship Program (HSAP)	31.0%	69.0%	
	13	29	42
College Qualified Leaders (CQL)	20.9%	79.1%	
	9	34	43
GEMS Near Peer Mentor Program	27.9%	72.1%	
	12	31	43
Undergraduate Research Apprenticeship Program (URAP)	32.6%	67.4%	
	14	29	43
Science Mathematics, and Research for Transformation (SMART) College Scholarship	48.8%	51.2%	
	21	22	43
National Defense Science & Engineering Graduate (NDSEG) Fellowship	25.6%	74.4%	
	11	32	43
I discussed AEOP with my student(s) but did not discuss any specific program	54.8%	45.2%	
	23	19	42

Mentors were also asked how useful various resources were in their efforts to expose students to the different AEOPs. As shown in Table 28, participation in Unite (75%), invited speakers or career events (64%), program managers or site coordinators (58%), and the AEOP website (48%) were most often rated as "very much" useful for this purpose. Most mentors reported not having experienced resources such as the It Starts Here! magazine (59%), AEOP on social media (54%), and the TSA website (52%). It is noteworthy that a substantially larger proportion of mentors had experienced the AEOP website (21% reported not having experienced) as compared to mentor reports in the FY15 evaluation when 41% of mentors reported that they had not experienced this resource. Likewise, in the FY15 evaluation, 55% of responding mentors had not experienced the AEOP brochure; this percentage dropped to 23% in FY16.

Table 28. Usefulness of Resources for Exposing Students to AEOPs (n=44)

	Did not experience	Not at all	A little	Somewhat	Very much	Response Total
Technology Student Association (TSA) website	52.3%	2.3%	13.6%	13.6%	18.2%	
	23	1	6	6	8	**44**
Army Educational Outreach Program (AEOP) website	20.5%	4.5%	6.8%	20.5%	47.7%	
	9	2	3	9	21	**44**
AEOP on Facebook, Twitter, Pinterest or other social media	53.5%	9.3%	4.7%	23.3%	9.3%	
	23	4	2	10	4	**43**
AEOP brochure	22.7%	4.5%	9.1%	22.7%	40.9%	
	10	2	4	10	18	**44**
It Starts Here! Magazine	59.1%	9.1%	4.5%	11.4%	15.9%	
	26	4	2	5	7	**44**
Unite Program administrator or site coordinator	18.6%	4.7%	0.0%	18.6%	58.1%	
	8	2	0	8	25	**43**
Invited speakers or "career" events	18.2%	2.3%	2.3%	13.6%	63.6%	
	8	1	1	6	28	**44**
Participation in Unite	2.3%	2.3%	9.1%	11.4%	75.0%	
	1	1	4	5	33	**44**

Mentors were asked to also indicate how useful these resources were for exposing students to DoD STEM careers (see Table 29). Responses are similar to those to the previous item, with mentors most likely to rate participation in Unite as "very much" useful (55%) followed by invited speakers or career events (48%), and program managers or site

coordinators (46%). Interestingly, a larger proportion of mentors reported not having experienced the AEOP website (34%) and the AEOP brochure (37%) for this item.

Table 29. Usefulness of Resources in Exposing Students to DoD STEM Careers (n=44)

	Did not experience	Not at all	A little	Somewhat	Very much	Response Total
Technology Student Association (TSA) website	50.0%	6.8%	6.8%	25.0%	11.4%	
	22	3	3	11	5	**44**
Army Educational Outreach Program (AEOP) website	34.1%	4.5%	2.3%	34.1%	25.0%	
	15	2	1	15	11	**44**
AEOP on Facebook, Twitter, Pinterest or other social media	54.5%	11.4%	6.8%	22.7%	4.5%	
	24	5	3	10	2	**44**
AEOP brochure	37.2%	4.7%	2.3%	32.6%	23.3%	
	16	2	1	14	10	**43**
It Starts Here! Magazine	61.4%	6.8%	0.0%	20.5%	11.4%	
	27	3	0	9	5	**44**
Unite Program administrator or site coordinator	20.5%	4.5%	4.5%	25.0%	45.5%	
	9	2	2	11	20	**44**
Invited speakers or "career" events	18.2%	4.5%	6.8%	22.7%	47.7%	
	8	2	3	10	21	**44**
Participation in Unite	13.6%	4.5%	2.3%	25.0%	54.5%	
	6	2	1	11	24	**44**

Satisfaction with Unite

In order to gain a sense of the effectiveness of the program, students and mentors were asked how satisfied they were with a number of features of the Unite program. Table 30 shows that a large majority of responding students were somewhat or very much satisfied with each of the listed program features. Over three-quarters of students were at least somewhat satisfied with all aspects of the program, including field trips or laboratory tours (90%), teaching or mentoring during program activities (90%), invited speakers or career events (89%), the variety of STEM topics available to them (89%), and applying or registering for the program (86%).

Table 30. Student Satisfaction with Unite Program Features (n=164)

	Did not experience	Not at all	A little	Somewhat	Very much	Response Total
Applying or registering for the program	1.2%	1.2%	9.1%	27.4%	61.0%	
	2	2	15	45	100	**164**
Communicating with your Unite host site organizers	4.3%	1.8%	10.4%	28.7%	54.9%	
	7	3	17	47	90	**164**
The physical location(s) of Unite activities	1.8%	0.6%	8.0%	27.6%	62.0%	
	3	1	13	45	101	**163**
The variety of STEM topics available to you in Unite	2.5%	1.9%	7.4%	26.5%	61.7%	
	4	3	12	43	100	**162**
Teaching or mentoring provided during Unite activities	0.6%	0.6%	8.6%	26.4%	63.8%	
	1	1	14	43	104	**163**
Stipends (payment)	4.3%	0.6%	8.6%	19.1%	67.3%	
	7	1	14	31	109	**162**
Educational materials (e.g., workbooks, online resources, etc.) used during program activities	1.8%	0.0%	13.4%	27.4%	57.3%	
	3	0	22	45	94	**164**
Invited speakers or "career" events	3.7%	2.4%	5.5%	28.7%	59.8%	
	6	4	9	47	98	**164**
Field trips or laboratory tours	0.6%	1.8%	8.6%	21.5%	67.5%	
	1	3	14	35	110	**163**

An open-ended item on the questionnaire asked student about their overall satisfaction with the Unite experience. The responses were overwhelmingly positive. Of the 136 students who answered this question, 118 (87%) commented on only positive aspects of the program. These responses were often as simple as, "This was a great experience for me." Other students provided more detail about what they enjoyed about the program was provided, most often focusing on their learning experiences and the college and career information they received. For example,

I love my Unite experience. I feel like I know more now and now I know what college I really want to go because of the college visits we took. I loved the hands on experience; we did a lot of building … I learned a lot about team work too. (Unite Student)

My overall Unite experience was fantastic, I really enjoyed it. I love the teachers, they went out of their way to teach us. I liked the way that students came from everywhere... I love the trips that showed us different colleges and different traditions they have. (Unite Student)

Overall, I extremely enjoyed my experience with the Unite program. I learned about different technologies, engineering, mathematics, and the biodiversity of insects. Meeting new people, learning more about the world, and learning more about what I like has made me more focused on what I think I will do in life. I thank the Unite program for showing me many different things, and changing my views in a good way. (Unite Student)

The other 15 responses (11%) also contained positive comments but included some caveats. Students offered a variety of caveats, including comments about the length of the days, the length of lectures, and a desire for more challenging math, science, or computing content. No students expressed dissatisfaction with the program.

When asked to provide three ways that the program could be improved, 123 students answered, although 39 indicated that no improvement was necessary and many offered fewer than three improvements. The most common theme in the responses to this open-ended item, described in 50 responses, was the suggestion to increase the number of field trips and speakers. Other relatively frequently mentioned improvements were to provide more hands-on activities (27 responses), requests to include or improve food (23 responses), requests for a larger variety of topics or fields (22 responses), general requests for more activities (21 responses), suggestions to provide more in-depth coverage of topics (16 responses), comments on the schedule (15 responses – included 6 requests for shorter days and 3 requests for longer breaks), a desire for a longer program (11 responses), and requests for a larger stipend.

Students in focus groups also offered suggestions for program improvement. For example,

One suggestion, I would say, would be a lot more hands-on because I like to feel and touch and maneuver things and try to put it together. (Unite Student)

I believe we should have a lot more students come to Unite so we can interact more and see what each other know from other programs that we've attended from AEOP. (Unite Student)

Let more people hear it, because I think it would be a benefit if a lot more people could interact, and possible get more people to get accepted into it. I know y'all can't accept everybody, but maybe more sponsorship and more people. (Unite Student)

Mentors also reported being somewhat or very much satisfied with the program components they experienced as (see Table 31). For example 98% were somewhat or very much satisfied with the physical location of Unite activities, 96% with support for instruction or mentorship during program activities, and 86% were somewhat or very much satisfied with the field trips or laboratory tours.

Table 31. Mentor Satisfaction with Unite Program Features (n=44)

	Did not experience	Not at all	A little	Somewhat	Very much	Response Total
Application or registration process	34.1%	0.0%	6.8%	11.4%	47.7%	
	15	0	3	5	21	**44**
Communicating with Technology Student Association (TSA)	36.4%	0.0%	2.3%	9.1%	52.3%	
	16	0	1	4	23	**44**
Communicating with Unite site coordinators	11.4%	0.0%	0.0%	22.7%	65.9%	
	5	0	0	10	29	**44**
The physical location(s) of Unite's activities	2.3%	0.0%	0.0%	16.3%	81.4%	
	1	0	0	7	35	**43**
Support for instruction or mentorship during program activities	2.3%	0.0%	2.3%	11.4%	84.1%	
	1	0	1	5	37	**44**
Stipends (payment)	20.5%	2.3%	9.1%	9.1%	59.1%	
	9	1	4	4	26	**44**
Invited speakers or "career" events	18.2%	0.0%	0.0%	9.1%	72.7%	
	8	0	0	4	32	**44**
Field trips or laboratory tours	11.4%	0.0%	2.3%	6.8%	79.5%	
	5	0	1	3	35	**44**

The mentor questionnaire also included open-ended items asking for their opinions about the program. Forty mentors responded to an item asking them to identify the three most important strengths of Unite. Although a variety of strengths were noted, the most frequently described were student learning (15 responses), career information (14 responses), student opportunity for new experiences (13 responses), and the hands-on components of the program (12 responses). These themes were echoed in the mentor focus group. Mentors said, for example,

> *I think Unite is good for students who are trying to make decisions on their future careers. Most of the people here want to be engineers, but upon getting here, they found out, "OK. Maybe I should try out something else. Maybe Biology or something." I feel it is good for people who at that point at which they are making their decision on what they want to study in the future.* (Unite Mentor)

> *It's peer research. They're learning from each other, so they don't feel like I'm a big, bad instructor standing at the board, telling them what to do. They don't feel like the TAs are checking behind them. We let them make their own mistakes and then we let them figure out what those mistakes are.* (Unite Mentor)

Other responses to the open-ended questionnaire item focused on Unite's emphasis on teamwork (7 responses), mentoring opportunities (7 responses), and the availability of resources for the program (7 responses).

Mentors were asked to note three ways in which Unite should be improved for future participants. Of 36 mentors who responded to this question, the most frequently cited improvement was to increase the number of field trips and speakers (14 responses). Other relatively frequently mentioned responses included providing more AEOP information (7 responses), providing more outreach for the program (7 responses), and including a wider variety of topics and activities.

Lastly, mentors were asked to share their overall satisfaction with their Unite experience. The responses were overwhelmingly positive. Of the 35 individuals who responded to this question, 34 had something positive to say, 1 added a caveat to their positive response suggesting more time with students, and 1 entered a brief response indicating that the quality of the food provided should be improved. Positive comments focused on both the mentors' experience and the student learning experience in Unite. For example,

> *The Unite program was an excellent opportunity not only to teach and introduce young students into the world of STEM and it's many opportunities. But also a learning experience as an classroom assistant and educator to better approach students. Truly, an excellent experience both for students and teachers/instructors.* (Unite Mentor)

> *This is my third year with the Unite program and I am thoroughly satisfied with the program. It is always a pleasure to affect the lives of the youth in a positive manner. It feels great to see that the students really appreciate the program and retain everything they learn. Overall the program this year was great.* (Unite Mentor)

In summary the Actionable Program Evaluation evidence indicates that the program actively engages students in authentic STEM experiences and provides them with information and experiences that influence their aspirations for the future. The purposeful site selection has allowed the program to recruit many students from underrepresented and underserved students.

Once in the Unite program, students learned about DoD or STEM job/careers, crediting participation in the program, their mentors, and invited speakers as useful resources. While some mentors reported discussing other AEOPs with students, the majority of mentors did not discuss most programs for which students currently are or will soon be eligible. Mentors indicated increased awareness of the AEOP website and brochure for AEOP information as compared to the FY15 evaluation.

The Unite program actively engages students in learning about STEM and in STEM practices at higher levels than they report experiencing STEM learning and engagement in school. Students and mentors alike cited STEM learning and career information as primary benefits of the program. The majority of mentors reported employing strategies to help make learning activities relevant to students, support the diverse needs of students as learners, support students' development of collaboration and interpersonal skills, support students' engagement in authentic STEM activities, and support students' STEM education and career pathways. Overall, students and mentors were very much satisfied with the Unite program.

Outcomes Evaluation

The evaluation of Unite included measurement of several outcomes relating to AEOP and program objectives, including impacts on students' STEM competencies (e.g., knowledge and skills), STEM identity and confidence, interest in and intent for future STEM engagement (e.g., further education and careers), attitudes toward research, and their knowledge of and interest in participating in additional AEOP opportunities.[10]

STEM competencies are necessary for a STEM-literate citizenry. These competencies include foundational knowledge, skills, and abilities in STEM, as well as the confidence to apply them appropriately. STEM competencies are important for those engaging in STEM enterprises, but also for all members of society as critical consumers of information and effective decision makers in a world that is heavily reliant on STEM. The evaluation of Unite measured students' self-reported gains in STEM competencies and engagement in opportunities intended to develop what is considered to be a critical STEM skill in the 21st century—collaboration and teamwork.

STEM Knowledge and Skills. Nearly all responding students reported gains in their STEM knowledge as a result of the Unite program, with most indicating large or extreme gains in each area (see Table 32). For example, large or extreme gains were reported by 72% on their in-depth knowledge of a STEM topic, by 75% in their knowledge of research conducted in a STEM topic or field, and by 75% in their knowledge of how scientists and engineers work on real problems in STEM. Mentors reported similar impacts on their students' STEM knowledge although they were more likely to report large or extreme gains than were students.

[10] The outcomes measured in the evaluation study were informed by the following documents:

Committee on STEM Education. (2013*). Federal Science, Technology, Engineering, and Mathematics (STEM) education 5-year strategic plan: A report from the Committee on STEM Education, National Science and Technology Council.* Washington, DC: The White House, Office of Science and Technology Policy.

National Research Council. (2009). Learning Science in Informal Environments: People, Places, and Pursuits. Committee on Learning Science in Informal Environments. Philip Bell, Bruce Lewenstein, Andrew W. Shouse, and Michael A. Feder, Editors. Board on Science Education, Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

President's Council of Advisors on Science and Technology (P-CAST). (February 2012). *Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics.* Executive Office of the President.

Report of the Academic Competitiveness Council (ACC). (2007). U.S. Department of Education. Available on the Department's Web site at: http://www.ed.gov/about/inits/ed/competitiveness/acc-mathscience/index.html.

Table 32. Student Report of Impacts on STEM Knowledge (n=162)

	No gain	A little gain	Some gain	Large gain	Extreme gain	Response Total
In depth knowledge of a STEM topic(s)	0.6%	4.9%	22.2%	40.1%	32.1%	
	1	8	36	65	52	**162**
Knowledge of research conducted in a STEM topic or field	1.3%	5.6%	18.8%	41.9%	32.5%	
	2	9	30	67	52	**160**
Knowledge of research processes, ethics, and rules for conduct in STEM	1.9%	6.2%	25.9%	40.1%	25.9%	
	3	10	42	65	42	**162**
Knowledge of how scientists and engineers work on real problems in STEM	1.2%	5.6%	18.5%	35.8%	38.9%	
	2	9	30	58	63	**162**
Knowledge of what everyday research work is like in STEM	2.5%	3.1%	20.5%	39.8%	34.2%	
	4	5	33	64	55	**161**

The student questionnaire also asked students to report on the impacts of Unite on their STEM competencies, i.e., students' abilities to use STEM practices (see Table 33). The majority of students reported large or extreme gains in each area listed. For example, 62% reported a large or extreme gain in their ability to define a problem that can be solved by developing a new or improved object, process, or system; 61% in their ability to make a model of an object or system to show its parts and how they work; and 60% in their ability to consider different interpretations of data when deciding if a solution works as intended.

The student questionnaire items for STEM Knowledge and STEM Competencies were combined into composite variables[11] to test for differential impacts across subgroups of students. There was a significant difference in the STEM knowledge composite by gender with males reporting significantly higher than females (effect size is small with d = 0.33). [12] No statistically significant differences exist by race/ethnicity. There was a significant difference in the STEM competencies composite by gender with males reporting significantly higher than females (effect size is small with d = 0.35).[13] No statistically significant differences exist by race/ethnicity.

[11] The Cronbach's alpha reliability for STEM Knowledge was 0.918; The Cronbach's alpha reliability for STEM Competencies was .944

[12] Two-tailed independent samples t-test, $t(148) = 2.00$, $p = 0.048$.

[13] Independent Samples t-test for STEM Competencies: t(148)=2.13, p=.035

Table 33. Students Reporting Gains in Their STEM Competencies (n=162)

	No gain	A little gain	Some gain	Large gain	Extreme gain	Response Total
Defining a problem that can be solved by developing a new or improved object, process, or system	2.5%	6.8%	29.2%	36.0%	25.5%	
	4	11	47	58	41	**161**
Using knowledge and creativity to propose a testable solution for a problem	1.9%	9.4%	26.3%	36.3%	26.3%	
	3	15	42	58	42	**160**
Making a model of an object or system to show its parts and how they work	3.8%	7.5%	28.1%	31.9%	28.8%	
	6	12	45	51	46	**160**
Carrying out procedures for an experiment and recording data accurately	1.9%	6.9%	31.3%	31.3%	28.8%	
	3	11	50	50	46	**160**
Using computer models of an object or system to investigate cause and effect relationships	6.2%	10.6%	29.8%	29.8%	23.6%	
	10	17	48	48	38	**161**
Considering different interpretations of the data when deciding if a solution works as intended	2.5%	8.8%	28.8%	36.3%	23.8%	
	4	14	46	58	38	**160**
Organizing data in charts or graphs to find patterns and relationships	9.3%	12.4%	29.2%	28.0%	21.1%	
	15	20	47	45	34	**161**
Supporting a solution for a problem with data from experiments	5.0%	10.0%	31.3%	31.3%	22.5%	
	8	16	50	50	36	**160**
Defending an argument that conveys how a solution best meets design criteria	6.2%	9.9%	24.8%	31.1%	28.0%	
	10	16	40	50	45	**161**
Integrating information from technical or scientific texts and other media to support your solution to a problem	5.1%	12.0%	31.6%	27.8%	23.4%	
	8	19	50	44	37	**158**
Communicating information about your design experiments and solutions in different ways (through talking, writing, graphics, or math equations)	3.7%	5.6%	25.9%	38.9%	25.9%	
	6	9	42	63	42	**162**

The student questionnaire also asked students to rate the impact of Unite on their "21st Century Skills," or skills such as communication and collaboration that are necessary across a wide variety of fields (see Table 34). A majority of students reported large or extreme gains in all items listed, such as including others' perspectives when making decisions (77%), communicating effectively with others (74%), and making changes when things do not go as planned (73%). A composite score was calculated for the items[14]. There were no significant differences by gender or by race/ethnicity.

Table 34. Student Report of Impacts on 21st Century Skills (n=162)

	No gain	A little gain	Some gain	Large gain	Extreme gain	Response Total
Sticking with a task until it is finished	1.2%	5.6%	22.8%	36.4%	34.0%	
	2	9	37	59	55	**162**
Making changes when things do not go as planned	0.6%	5.7%	20.8%	40.9%	32.1%	
	1	9	33	65	51	**159**
Working well with students from all backgrounds	1.9%	6.2%	16.1%	40.4%	35.4%	
	3	10	26	65	57	**161**
Including others' perspectives when making decisions	1.9%	4.4%	20.6%	40.0%	33.1%	
	3	7	33	64	53	**160**
Communicating effectively with others	0.6%	4.3%	20.5%	37.3%	37.3%	
	1	7	33	60	60	**161**
Viewing failure as an opportunity to learn	1.9%	3.2%	22.2%	33.5%	39.2%	
	3	5	35	53	62	**158**

STEM Identity and Confidence. Students may be more likely to pursue STEM further in their education and choose STEM careers in the future if they have deep knowledge and skills in STEM fields. However, they are unlikely to do so unless they see themselves as capable of succeeding in STEM.[15] Consequently, the student questionnaire included a series of items intended to measure the impact of Unite on students' STEM identities (see Table 35). Students reported

[14] 21st Century Skills composite has a Cronbach's alpha reliability of .886.

[15] Chang, M. J., Sharkness, J., Hurtado, S. and Newman, C. B. (2014), What matters in college for retaining aspiring scientists and engineers from underrepresented racial groups. J. Res. Sci. Teach., 51: 555–580.

positive impacts in this area as evidenced by the majority of students who reported large or extreme gains in all areas listed. For example, 76% of students reported large or extreme gains in their sense of accomplishing something in STEM, 76% in feeling prepared for more challenging STEM activities, and 66% in their decision on a path to pursue a STEM career. Composites were also created from these items[16] and were compared across subgroups of students. There were no significant differences by gender or race/ethnicity.

Table 35. Student Report of Impacts on Student Identity (n=160)

	No gain	A little gain	Some gain	Large gain	Extreme gain	Response Total
Interest in a new STEM topic	6.3%	5.6%	21.9%	31.9%	34.4%	
	10	9	35	51	55	**160**
Deciding on a path to pursue a STEM career	5.0%	8.8%	20.1%	30.8%	35.2%	
	8	14	32	49	56	**159**
Sense of accomplishing something in STEM	0.6%	3.8%	20.1%	41.5%	34.0%	
	1	6	32	66	54	**159**
Feeling prepared for more challenging STEM activities	1.3%	4.4%	18.9%	36.5%	39.0%	
	2	7	30	58	62	**159**
Thinking creatively about a STEM project or activity	1.9%	4.4%	25.0%	36.3%	32.5%	
	3	7	40	58	52	**160**
Desire to build relationships with mentors who work in STEM	0.0%	3.1%	25.8%	32.7%	38.4%	
	0	5	41	52	61	**159**
Connecting a STEM topic or field to my personal values	1.9%	3.8%	20.9%	37.3%	36.1%	
	3	6	33	59	57	**158**

Interest and Future Engagement in STEM. Developing a STEM-literate citizenry is a key goal of the AEOP programs. This requires that students be engaged in and out of school with high quality STEM activities. In order **t**o examine the impact of Unite on students' interest in future engagement in STEM, the questionnaire asked them to reflect on whether the likelihood of their engaging in STEM activities outside of school changed as a result of their Unite experience. Table 36 displays student responses for this item. A majority of student reported an increased likelihood of engaging in each

[16] The Cronbach's alpha reliability for these 7 items was 0.911.

activity with the exception of watching or reading non-fiction STEM (48% indicated being more likely or much more likely). Three-quarters or more of students reported being more likely to work on a STEM project or experiment in a university or professional setting (76%) and to take an elective STEM class (75%). Over half of students reported being more likely to engage in activities such as working on solving mathematical or scientific puzzles (71%), talking with friends or family about STEM (69%), tinkering with a mechanical or electrical devise (69%), and mentoring or teaching other students about STEM (66%). A composite score was created from these items,[17] and composite scores were compared across subgroups of students. There were no statistically significant differences by gender or race/ethnicity.

"Unite has given me a better understand of what kind of STEM jobs there are and what each field does. There are several fields that I have learned about that I could be interested in pursuing as a career. I have also learned that STEM is something that interests me and something that I could be good at."-- Unite Student

[17] These 10 items had a Cronbach's alpha reliability of 0.906.

Table 36. Change in Likelihood Students Will Engage in STEM Activities Outside of School (n=162)

	Much less likely	Less likely	About the same before and after	More likely	Much more likely	Response Total
Watch or read non-fiction STEM	4.9%	11.1%	36.4%	31.5%	16.0%	
	8	18	59	51	26	**162**
Tinker (play) with a mechanical or electrical device	2.5%	6.2%	21.6%	33.3%	36.4%	
	4	10	35	54	59	**162**
Work on solving mathematical or scientific puzzles	0.6%	3.1%	25.0%	40.0%	31.3%	
	1	5	40	64	50	**160**
Use a computer to design or program something	3.1%	4.3%	23.0%	36.0%	33.5%	
	5	7	37	58	54	**161**
Talk with friends or family about STEM	0.6%	3.7%	26.1%	37.3%	32.3%	
	1	6	42	60	52	**161**
Mentor or teach other students about STEM	1.9%	5.6%	26.9%	40.6%	25.0%	
	3	9	43	65	40	**160**
Help with a community service project related to STEM	0.6%	3.1%	29.8%	37.9%	28.6%	
	1	5	48	61	46	**161**
Participate in a STEM camp, club, or competition	1.9%	2.5%	16.1%	41.6%	37.9%	
	3	4	26	67	61	**161**
Take an elective (not required) STEM class	1.2%	1.9%	21.7%	35.4%	39.8%	
	2	3	35	57	64	**161**
Work on a STEM project or experiment in a university or professional setting	1.2%	3.1%	20.4%	32.7%	42.6%	
	2	5	33	53	69	**162**

A key goal for AEOP programs is to keep students engaged across the portfolio of programs. In order to determine student interests in other programs, the questionnaire asked students how interested they are in participating in AEOPs in the future. Table 37 demonstrates that over half of students are at least somewhat interested in participating in all listed AEOPs in the future with the exception of JSHS (42% expressed some interest). Not surprisingly, the program in which students were most interested in participating in the future was Unite, with 85% of students expressing some interest in participating again. Over half of students were at least somewhat interested in participating in programs such as HSAP (56%), REAP (56%), SEAP (55%), GEMS (54%), and CQL (51%). However, over a quarter of students reported not having heard about programs for which they are or soon will be eligible such as GEMS (28%), JSHS (30%), SEAP (25%), and GEMS Near Peer Mentors (30%).

To better understand how resources are being leveraged to inform students about AEOPs, students were asked to report on how various resources impacted their awareness of AEOPs. As shown in Table 38, participation in Unite was most likely to be rated as impacting their awareness "somewhat" or "very much" (79%), followed by invited speakers or career events (75%), their mentor (72%), and the AEOP website (47%). Fewer than half of students rated resources such as the AEOP brochure (34%), the TSA website (29%), and AEOP on social media (21%) as at least somewhat useful. Around half of students had not experienced the It Starts Here! magazine (54%), AEOP on social media (49%), and the TSA website (48%).

"I really enjoyed working with the students. They all were very interested and curious to learn about different opportunities in STEM. In addition, I learned about different career opportunities that I can use in the future."-- Unite Mentor

Table 37. Student Interest in Future AEOP Programs (n=162)

	I've never heard of this program	Not at all	A little	Somewhat	Very much	Response Total
Gains in the Education of Mathematics and Science (GEMS)	28.0%	5.6%	16.1%	26.7%	23.6%	
	45	9	26	43	38	**161**
Unite	2.5%	0.6%	11.9%	25.0%	60.0%	
	4	1	19	40	96	**160**
Junior Science & Humanities Symposium (JSHS)	30.2%	9.9%	17.9%	21.0%	21.0%	
	49	16	29	34	34	**162**
Science & Engineering Apprenticeship Program (SEAP)	25.0%	3.8%	16.9%	22.5%	31.9%	
	40	6	27	36	51	**160**
Research & Engineering Apprenticeship Program (REAP)	23.3%	3.8%	17.0%	23.9%	32.1%	
	37	6	27	38	51	**159**
High School Apprenticeship Program (HSAP)	24.7%	3.1%	16.7%	25.9%	29.6%	
	40	5	27	42	48	**162**
College Qualified Leaders (CQL)	29.6%	6.8%	13.0%	21.0%	29.6%	
	48	11	21	34	48	**162**
GEMS Near Peer Mentor Program	29.6%	5.7%	15.1%	27.7%	22.0%	
	47	9	24	44	35	**159**
Undergraduate Research Apprenticeship Program (URAP)	26.7%	3.7%	18.0%	24.8%	26.7%	
	43	6	29	40	43	**161**
Science Mathematics, and Research for Transformation (SMART) College Scholarship	24.1%	4.3%	11.1%	26.5%	34.0%	
	39	7	18	43	55	**162**
National Defense Science & Engineering Graduate (NDSEG) Fellowship	30.4%	5.0%	15.5%	25.5%	23.6%	
	49	8	25	41	38	**161**

Table 38. Impact of Resources on Student Awareness of AEOPs (n=160)

	Did not experience	Not at all	A little	Somewhat	Very much	Response Total
Technology Student Association (TSA) website	47.5%	9.4%	14.4%	16.9%	11.9%	
	76	15	23	27	19	**160**
Army Educational Outreach Program (AEOP) website	30.4%	5.1%	18.4%	21.5%	24.7%	
	48	8	29	34	39	**158**
AEOP on Facebook, Twitter, Pinterest or other social media	49.4%	16.3%	13.1%	11.3%	10.0%	
	79	26	21	18	16	**160**
AEOP brochure	36.5%	9.4%	20.1%	17.0%	17.0%	
	58	15	32	27	27	**159**
It Starts Here! Magazine	53.5%	18.9%	10.7%	7.5%	9.4%	
	85	30	17	12	15	**159**
My Unite mentor(s)	14.4%	3.1%	10.6%	30.6%	41.3%	
	23	5	17	49	66	**160**
Invited speakers or "career" events during Unite	12.0%	2.5%	10.8%	26.6%	48.1%	
	19	4	17	42	76	**158**
Participation in Unite	11.3%	1.3%	8.1%	23.1%	56.3%	
	18	2	13	37	90	**160**

Attitudes toward Research. An important prerequisite to their continued interest in the field and potential involvement in DoD STEM careers in the future is students' attitudes about the importance of DoD research. In order to gauge students' attitudes in this area, the questionnaire also asked students about their opinions of what DoD researchers do and the value of DoD research more broadly (see Table 39). A large majority of students agreed or strongly agreed that DoD researchers advance science and engineering fields (84%), that DoD researchers develop new, cutting edge technologies (82%), that DoD researchers solve real-world problems (81%), and that DoD research is valuable to society (81%).

Table 39. Student Opinions about DoD Researchers and Research (n=160)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Response Total
DoD researchers advance science and engineering fields	0.0%	1.9%	14.4%	52.5%	31.3%	
	0	3	23	84	50	**160**
DoD researchers develop new, cutting edge technologies	0.0%	2.5%	15.0%	46.3%	36.3%	
	0	4	24	74	58	**160**
DoD researchers solve real-world problems	0.0%	0.6%	18.8%	48.8%	31.9%	
	0	1	30	78	51	**160**
DoD research is valuable to society	0.6%	0.0%	18.9%	41.5%	39.0%	
	1	0	30	66	62	**159**

Education and Career Aspirations. A goal of the Unite program is to encourage students to pursue STEM professions. To this end, the evaluation examined the program's impact on students' education and career aspirations. In terms of education, the questionnaire asked students how far they wanted to go in school before and after participating in Unite. As shown in Table 40, when asked to think back on how far they wanted to go in school before participating in Unite, 44% wanted to finish college with a Bachelor's degree and 47% wanted to get more education after college. After their participation in Unite, there was an upward trend in desire to get more education after college, with 29% of students indicated that they wanted to finish college with a Bachelor's degree while 66% wanted to get more education after college.

Table 40. Student Education Aspirations Before Unite

	Before Unite (n=162)		After Unite (n=160)	
	Response Percent	Response Total	Response Percent	Response Total
Graduate from high school	6.17 %	10	3.13 %	5
Go to a trade or vocational school	0.00 %	0	0.63 %	1
Go to college for a little while	2.47 %	4	1.25 %	2
Finish college (get a Bachelor's degree)	43.83 %	71	29.38 %	47
Get more education after college	47.53 %	77	65.63 %	105

In terms of career aspirations, students were asked what kind of work they expect to be doing at age 30, both reflecting on what their aspiration was before participating in Unite and after Unite. The data in Table 41 show slight shifts in students' career aspirations toward STEM related fields. For example, 27% indicated aspiring to a career in engineering or architecture before Unite, while 33% expressed interest in these fields after. Slightly fewer students expressed aspirations to be an athlete or work in sports after Unite (3% before compared to 1% after). Similarly, slightly fewer students were undecided about their career aspirations after Unite (15% before compared to 14% after).

"My Unite experience has increased my interest in pursuing a career in STEM disciplines by exploring the different areas in STEM and deciding what I like and what I don't. I have learned a lot and wish to continue on being a part of programs similar to Unite to clarify what I will study in college."-- Unite Student

Table 41. Apprentice Career Aspirations Before and After Unite

	Before Unite (n=157)		After Unite (n=153)	
	Response Percent	Response Total	Response Percent	Response Total
Undecided	14.65 %	23	13.73 %	21
Scientist or researcher	8.28 %	13	10.46 %	16
Work in computers or technology	10.83 %	17	11.11 %	17
Engineer or architect	27.39 %	43	33.33 %	51
Work in the medical field (doctor, nurse, lab	14.01 %	22	14.38 %	22
Teacher	3.18 %	5	1.31 %	2
Business person or manager	2.55 %	4	3.27 %	5
Lawyer	0.64 %	1	0.65 %	1
Military, police, or security	3.82 %	6	2.61 %	4
Artist (writer, dancer, painter)	1.27 %	2	0.65 %	1
Skilled craftsperson (carpenter, electrician,	0.64 %	1	0.00 %	0
Athlete or other work in sports	3.18 %	5	1.31 %	2
Other, (specify) †	9.55 %	15	7.19 %	11

† Before Unite Other = Lego Engineer/Designer; computer science; all of them; professional ball player; OBGYN; biomedical engineer/physician; I wanted to be in both the engineering and medical field (BMEngineer); actuary; translator; Game Design; Sports medicine; Physician; nurse; Cosmetic Chemist; undecided

† After Unite Other = Lego Engineer/Designer; computer engineering; all of them; OBGYN; I still want to be in both the engineering and medical field (BMEngineer); actuary; translator; Game Design; Sports medicine doctor; nurse or laboratory work; Cosmetic Chemist; Actuary

Students were also asked about the extent to which they expect to use their STEM knowledge, skills, and/or abilities in their work when they are age 30. As seen in Table 42, all but 1 student reported expecting to use STEM somewhat in their career. A large majority of participants (94%) expect to use STEM over half of the time in their work at age 30.

Table 42. Students Expecting to use STEM in Their Work at Age 30 (n=160)

	Response Percent	Response Total
not at all	0.63 %	1
up to 25% of the time	5.63 %	9
up to 50% of the time	20.00 %	32
up to 75% of the time	33.13 %	53
up to 100% of the time	40.63 %	65

Overall Impact. Students were asked about impacts of participating in Unite more broadly. The data displayed in Table 43 indicate that students thought Unite had a substantial impact on them. For example, a large majority of responding students indicated being more confident in their STEM knowledge, skills, and abilities after participation, with 90% reporting that Unite contributed to this impact or was the primary reason for this impact. Similarly, 81% of students indicated that Unite contributed to their increased awareness of other AEOPs, and 81% that Unite contributed to their increased interest in participating in other AEOPs. Students also reported that Unite contributed to increases in areas such as their interest in STEM degrees (83%), their interest in pursuing a STEM career (81%), and their interest in pursuing a STEM career with the Army or DoD (72%). These items were combined into a composite variable[18] to test for differences among subgroups of students; no significant differences were found. Mentors were also asked about impacts on students in these areas; in general, their reports of impacts were somewhat higher than those of the students.

[18] The Cronbach's alpha reliability for these 10 items was 0.894.

Table 43. Student Opinions of Unite Impacts (n=162)

	Disagree - This did not happen	Disagree - This happened but not because of Unite	Agree - Unite contributed	Agree - Unite was primary reason	Response Total
I am more confident in my STEM knowledge, skills, and abilities	1.9%	3.7%	61.5%	32.9%	
	3	6	99	53	**161**
I am more interested in participating in STEM activities outside of school requirements	1.9%	8.8%	55.0%	34.4%	
	3	14	88	55	**160**
I am more aware of other AEOPs	9.9%	8.7%	46.0%	35.4%	
	16	14	74	57	**161**
I am more interested in participating in other AEOPs	8.8%	10.0%	43.1%	38.1%	
	14	16	69	61	**160**
I am more interested in taking STEM classes in school	2.5%	16.9%	47.5%	33.1%	
	4	27	76	53	**160**
I am more interested in earning a STEM degree	2.5%	14.9%	48.4%	34.2%	
	4	24	78	55	**161**
I am more interested in pursuing a career in STEM	3.8%	15.7%	48.4%	32.1%	
	6	25	77	51	**159**
I am more aware of Army or DoD STEM research and careers	9.3%	8.7%	47.2%	34.8%	
	15	14	76	56	**161**
I have a greater appreciation of Army or DoD STEM research	9.9%	8.7%	47.8%	33.5%	
	16	14	77	54	**161**
I am more interested in pursuing a STEM career with the Army or DoD	15.6%	12.5%	44.4%	27.5%	
	25	20	71	44	**160**

An open-ended item on the questionnaire asked students about the activities or experiences that helped increase their interest in pursuing careers in STEM disciplines. While few specific activities or experiences were mentioned among the 136 respondents to this item, 127 respondents indicated that Unite contributed to their increased interest in STEM and STEM careers. For example,

> *I actually did not know about the endless possibilities in the STEM work field. The Unite program has exposed me to new opportunities and possibilities that will make me more presentable when I will have to join the work force. The Unite program has made me want to do even more ambitious things when I will get a job.* (Unite Student)

> *I feel much more confident and sure of pursuing a possible career using what I learned in this program constantly. I would like to thank you for giving me the chance to be able to experience one of the best learning adventures of my life.* (Unite Student)

> *Unite activities and experience helped me get a closer look to what working with STEM is like. Because of this, I can now choose my career more wisely, already having experience in working with other fields and topics.* (Unite Student)

> *My Unite experience has increased my interest in pursuing a career in STEM disciplines by exploring the different areas in STEM and deciding what I like and what I don't. I have learned a lot and wish to continue on being a part of programs similar to Unite to clarify what I will study in college.* (Unite Student)

Student comments from focus groups expand on the impact of Unite. As three focus group participants said:

> *[In Unite] we're sharing our ideas, we're going to work better, and be a better group. We also gain a lot of knowledge in this program… like mechanical engineering, electrical engineering, or computer engineering. It was a pretty cool experience.* (Unite Student)

> *I think it increased my work ethic, because before high school, I could easily breeze through all the easy work that I get in school. Here I really had to actually think and put an effort to it.* (Unite Student)

> *[In] Unite, we've done a lot more in the STEM field…in school we don't really have the materials, the chips or these things to build hands-on projects. Unite gives us a better opportunity to do hands on stuff* (Unite Student)

Summary of Findings

The FY16 evaluation of Unite collected data about participants; their perceptions of program processes, resources, and activities; and indicators of achievement in outcomes related to AEOP and program objectives. A summary of findings is provided in Table 44.

Table 44. 2016 Unite Evaluation Findings	
Participant Profiles	
Unite experienced growth in program interest and participation, and served increasing numbers of students from groups underserved and underrepresented in STEM.	Unite achieved a 28% increase in applicants to the program in FY16 as compared to FY15. Enrollment data indicate that the overall enrollment increased by 29% (in FY16 there were 282 participants; in FY15 there were 200 participants). Substantially more participants were from Title I schools in FY16 as well (98 as compared to 36 in FY15).
	In FY16, Unite enrollment included students from groups historically underrepresented and underserved in STEM. Over half of participants were female, and over half (57%) identified himself or herself as Black or African American (this is an increase over FY15 when 39% of participants identified themselves as Black or African American). There was a slight increase in participation by students identifying themselves as Hispanic or Latino in FY16 (18% as compared to 14% in FY15). All students who responded to the registration information item indicated that they received free or reduced-price school lunch.
	Most student questionnaire respondents attended urban schools (72%), a school context that tends to serve higher proportions of underserved students.
Actionable Program Evaluation	
Unite is successfully reaching out to schools and teachers serving historically underrepresented and underserved groups, however participants continue to report that personal connections are a primary source of information about AEOPs.	Efforts to market to and recruit students from schools and school networks identified as serving populations of traditionally underrepresented and underserved students were employed by Unite sites. Students most frequently learned about the AEOP from a school newsletter, email, or website; from someone who works at their school; or from a family member.
Students are motivated to participate in Unite by a variety of factors.	Students were most frequently motivated to participate in Unite by an interest in STEM and the desire to learn something new or interesting. Other motivators included figuring out education and career goals and learning in ways not possible in school.

Unite successfully engaged students in meaningful team-based, hands-on STEM learning experiences.	Students reported consistently engaging in STEM activities such as learning about new STEM topics, learning about careers that use STEM, and communicating with other students about STEM during Unite.
	A large majority of students reported that they engaged in STEM practices such as working as part of a team, participating in hands-on activities, and analyzing data or information on most days or every day of Unite.
	Students reported more intensive STEM learning and greater engagement in STEM practices in their Unite experience than they typically have in school.
	Unite mentors reported using a wide variety of mentoring practices to establish the relevance of learning activities, support the diverse needs of learners, develop student collaboration and interpersonal skills, and engage student in authentic STEM activities.
Unite participants reported increased awareness of and interest in AEOPs, but there is room for growth in the marketing of other AEOP opportunities.	Most Unite students have not participated in other AEOPs in the past, however the majority expressed increased awareness of AEOPs and reported interest in participating in AEOPs in the future after participating in Unite. Students indicated that participation in Unite, invited speakers and career events, and their mentors were the most impactful resources for learning about AEOPs.
	Most mentors did not discuss AEOPs other than Unite with students. Notably, fewer than half of mentors reported discussing programs for which students are or will soon be eligible, such as SEAP, GEMS Near Peer Mentors, and JSHS.
	Mentors had more experience with AEOP resources designed to expose student to AEOPs, such as the AEOP website and brochure, in FY16 as compared to FY15.
Students and mentor had high levels of overall satisfaction with Unite.	Students reported high levels of satisfaction with features of the Unite program including field trips or laboratory tours, teaching or mentoring, invited speakers or career events, and the variety of STEM topics available. Students perceived STEM learning, career information, college information and preparation, and experience to be key benefits of the program.
	Mentors reported high levels of satisfaction with features of the Unite program including the location of Unite activities, teaching or mentoring, and laboratory tours. Mentors perceived student STEM learning, career information, and opportunities for new experiences to be key strengths of Unite.
Outcomes Evaluation	
Unite students reported gains in their STEM knowledge and competencies with significantly higher gains reported by male students.	Unite students reported large or extreme gains in their STEM knowledge in areas such as their in-depth knowledge of a STEM topic, their knowledge of research conducted in a STEM topic or field, and their knowledge of how scientists and engineers work on real problems in STEM.
	Unite students reported large or extreme gains in their STEM skills in areas such as their ability to define a problem that can be solved by developing a new or improved

	object, process, or system; their ability to make a model of an object or system to show its parts and how they work; and in their ability to consider different interpretations of data when deciding if a solution works as intended.
	Although a vast majority of students reported that Unite contributed to gains in knowledge about science and engineering practices, male students reported higher gains in STEM knowledge and STEM competencies than did female students.
Unite students reported gains in their 21st Century Skills.	A majority of students reported large or extreme gains in all of the 21st Century Skills such as including others' perspectives when making decisions, communicating effectively with others, and making changes when things do not go as planned.
Unite students' reported higher education aspirations after Unite participation and slight shifts in their career aspirations after their Unite experience.	After participating in Unite, students reported aspiring go further in their schooling than they would have before Unite, with the greatest change being in the proportion of students who expected to continue their education beyond a Bachelor's degree (48% before Unite, 66% after).
	There were slight shifts in students' career aspirations toward STEM related fields after participating in Unite as compared to before. For example, 27% indicated aspiring to a career in engineering or architecture before Unite, while 33% expressed interest in these fields after. Fewer students reported aspiring to non-STEM careers after participating in Unite.
Unite students reported having interest in future AEOP opportunities, but substantial numbers had not heard of AEOPs for which they are eligible.	A large majority of students indicated that Unite contributed to their increased awareness of AEOPs and their increased desire to participate in AEOPs in the future. However, over a quarter of students reported not having heard about programs for which they are or soon will be eligible such as GEMS, JSHS, SEAP, and GEMS Near Peer Mentors.
Unite continues contribute to students' increased awareness of STEM research and careers overall, and DoD STEM research and careers specifically.	Most students reported an increased awareness of and interest in DoD STEM careers.
	All students reported learning about at least one STEM career and a large majority learned about at least one DoD STEM career during Unite.
	Students reported overwhelmingly positive attitudes toward DoD STEM research and researchers.
Unite students reported gains in their STEM identity and their future out-of-school STEM engagement after participating in Unite.	Students reported gains in their STEM identities, or perceptions of themselves as capable of succeeding in STEM. The majority of students reported large or extreme gains in areas such as their sense of accomplishing something in STEM, feeling prepared for more challenging STEM activities, and their decision on a path to pursue a STEM career.

	Most students reported that they will be more likely or much more likely to engage in STEM activities such as working on a STEM project or experiment in a university or professional setting, taking an elective STEM class, working on solving mathematical or scientific puzzles, and talking with friends or family about STEM.

Responsiveness to FY15 Evaluation Recommendations

The primary purpose of the AEOP program evaluation is to serve as a vehicle to inform future programming and continuous improvement efforts with the goal of making progress toward the AEOP priorities. In previous years the timing of the delivery of the annual program evaluation reports has precluded the ability of programs to use the data as a formative assessment tool. However, beginning with the FY16 evaluation, the goal is for programs to be able to leverage the evaluation reports as a means to target specific areas for improvement and growth.

In this report, we will highlight recommendations made in FY15 to programs and summarize efforts and outcomes reflected in the FY16 APR toward these areas.

AEOP Priority: Broaden, deepen, and diversify the pool of STEM talent in support of our Defense Industry Base.

Finding: Future marketing efforts could focus on the need for a more diverse pool of STEM professionals and take the opportunity to showcase the diversity of mentors in electronic and printed materials.

Unite FY16 Efforts and Outcomes: This will be discussed with sites individually, as needed, and as a group in the upcoming year wrap-up conference call.

Finding: The program may want to emphasize recruiting a more diverse pool of mentors and students by considering social media communication plans. Social media has the potential to reach more students and mentors than personal connections.

- **Unite FY16 Efforts and Outcomes:** TSA used social media and press release venues (as well as the TSA website) to communicate news of Unite. Sites used social media, local media sources, and their websites to share news of Unite. TSA issued one press release, one tweet, and one Facebook post regarding Unite. Individual sites implemented varying marketing plans including elements such as websites, printed matter, local TV and radio, social media, community programs, school counselors, word of mouth, and personal contact.

Finding: Given that Unite is doing a good job recruiting minority populations in STEM, the program is encouraged to systematically incorporate materials for the mentors to share successes of minority populations in STEM.

Unite FY16 Efforts and Outcomes: The program administrator will discuss the availability of success stories from sites in the wrap-up conference call, and will seek assistance from Widmeyer, who may have success stories from other IPAs that can be distributed to Unite sites.

AEOP Priority: Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army

Finding: In an effort to increase and standardize the information [AEOP opportunities] provided to students, it would be beneficial to create a resource that profiles AEOPs and the relationship they have to ongoing education, on-the-job training, and related research activities of Army careers. The application to be a mentor could ask for their plan to explicitly discuss these resources thus expanding the network of ongoing opportunities for students.

Unite FY16 Efforts and Outcomes: The program administrator responded, "Is such a resource something that AEOP currently has compiled? If not, I can begin work on this for AEOP programs that are natural transitions to and from Unite. Once completed, this resource can be made available to mentors in the Unite program, with the expectation that mentors should develop a plan for sharing this information with student participants."

Finding: It would beneficial to create a resource that profiles Army STEM interests and the education, on-the-job training, and related research activities of Army careers. Further, efforts should be focused on growing the participation of more Army S&Es

Unite FY16 Efforts and Outcomes: The program administrator responded, "Is such a resource something that AEOP currently has compiled? If not, I can begin work on this for AEOP programs that are natural transitions to and from Unite. Once completed, this resource can be made available to mentors in the Unite program, with the expectation that mentors should develop a plan for sharing this information with student participants."

Finding: Efforts should be undertaken to improve participation in evaluation activities

Unite FY16 Efforts and Outcomes: Added emphasis about this requirement will be part of the Unite wrap-up conference call, as well as spring correspondence with Unite site directors for summer 2017 programs.

Recommendations for FY17 Program Improvement/Growth

Evaluation findings indicate that FY16 was overall a successful year for the Unite program. Unite has been successful in its focus on recruiting underrepresented and underserved participants to the program[19]. Students and mentors reported

[19] Underserved populations are inclusive of low-income students, students belonging to race and ethnic minorities that are historically underrepresented in STEM (e.g., Alaska Natives, Native Americans, Blacks or African Americans, Hispanics, Native Hawaiians and other Pacific Islanders), students with disabilities, students with

high levels of satisfaction with the Unite experience. In particular, Unite student students reported gains in STEM learning and also reported being actively engaged in STEM practices. Students gained awareness of and interest in other AEOPs, STEM careers, and DoD STEM careers. Mentors used a variety of strategies to support student STEM learning, to support student engagement in STEM activities, and to support students' development of STEM education and career pathways. Students are more interested in pursuing post-graduate studies after participating in Unite, and students particularly valued the hands-on experiences, field trips, and speakers incorporated into the Unite program.

While the successes for Unite detailed above are commendable, there are some areas that have potential for growth and/or improvement. The evaluation team therefore offers the following recommendations for FY16 and beyond.

AEOP Priority: Broaden, deepen, and diversify the pool of STEM talent in support of our Defense Industry Base

1. AEOP objectives include expanding participation of historically underrepresented and underserved populations. In 2015 and 2016, Unite engaged a majority of female and Black or African American students, however students continue to report that personal connections are a primary source of information about AEOPs. Since emails, newsletters, and websites distributed through students' schools are also a key source of information, future marketing efforts could focus on disseminating these resources through schools more effectively.
2. Evaluation findings indicate that male Unite participants believed they gained more in terms of their STEM knowledge and STEM competencies than did female participants, although both males and females reported similar gains in terms of their STEM identities. The program may wish to review its practices and content to ensure that both address the needs of female participants and that mentors in the FY17 program are aware of these findings.

AEOP Priority: Support and empower educators with unique Army research and technology resources

1. The Unite program may benefit from developing resources designed to provide information to students about DoD STEM research and careers. Evaluation findings indicate that mentors and field trips/speakers are key resources for this information. Because of the variety of locations of Unite programs, field trips and speakers highlighting DoD STEM research and careers are not consistently available to all sites. Creating resources that highlight the diversity of STEM career opportunities within the DoD may be beneficial. These resources may include, for example, virtual field trips to DoD STEM research sites or a database of Army S&E's willing to interact with students remotely via video or other technological means. These resources could also be used in mentor orientation to disseminate information about specific Army/DoD STEM research and careers. Furthermore, efforts to grow the participation of Army S&E's in the Unite program may be useful.

English as a second language, first generation college students, students in rural and frontier schools, and females in certain STEM fields (e.g., physical science, computer science, mathematics, or engineering).

AEOP Priority: Develop and implement a cohesive, coordinated, and sustainable STEM education outreach infrastructure across the Army

1. Few mentors explicitly discussed AEOP opportunities other than Unite with their students and substantial numbers of students had not heard of programs for which they are or soon will be eligible such as GEMS, JSHS, SEAP, and GEMS Near Peer Mentors. Since students identified mentors as a key source of AEOP information, mentors' lack of familiarity with other AEOP opportunities may be a barrier to disseminating this information to students. In an effort to increase and standardize the information provided to students, it may be beneficial to create resources that profile AEOP programs and the relationship they have to ongoing education, on-the-job training, and DoD/Army careers and ensure that these resources reach mentors and students. Additionally, mentor orientation activities could include information about other AEOPs and resources and provide strategies for mentors to share this information with students.

2. Efforts should be undertaken to improve participation in evaluation activities, as continued low response rates for the mentor questionnaire raises questions about the representativeness of the results. Improved program communication with the individual program sites about expectations for the Unite evaluation study may help. In addition, the evaluation instruments may need to be streamlined as response fatigue can affect participation.

Appendices

Appendix A

FY16 Unite Evaluation Plan

Questionnaires

Purpose

Per the FY16 Army Education Outreach Program (AEOP) Annual Program Plan (APP), Purdue University will conduct an evaluation study of Unite that includes two post-program questionnaires:

1. AEOP Participant Questionnaire to be completed by student participants of the Unite program at all university sites; and
2. AEOP Mentor Questionnaire to be completed by Unite instructors, Unite Classroom Assistants, Unite Resource Teachers, and/or others (typically a business, industry, or DoD/Army scientist or engineer) who support students as they participate in the Unite program.

Questionnaires are the primary method of data collection for AEOP evaluation and collect information about participants' experiences with and perceptions of program resources, structures, and activities; potential benefits to participants; and strengths and areas of improvement for programs.

From FY15 to FY16, questionnaire assessments have been revised and shorted while maintaining alignment with:

- Army's strategic plan and AEOP Priorities 1 (STEM Literate Citizenry), 2 (STEM Savvy Educators) and 3 (Sustainable Infrastructure);
- Federal guidance for evaluation of Federal STEM investments (e.g., implementation and outcomes evaluation, outcomes evaluation of STEM-specific competencies, transferrable competencies, identifying with STEM, intentions to engage in STEM-related activities, and educational/career pathways);
- Best practices and published assessment tools in STEM education, informal STEM education, STEM outreach, and evaluation research communities;
- AEOP's vision to improve the quality of the data collected, focusing on changes in intended student outcomes and contributions of AEOPs like Unite effecting those changes.

Deployment of common questionnaires with items that are appropriate for all AEOP programs allows evaluators to compare findings across AEOPs and, if administered in successive years, to establish longitudinal studies of student outcomes through the pipeline of AEOP programming. Questionnaires incorporate batteries of items from established assessments that have been validated in published research making external comparisons possible.

All AEOPs are expected to administer a Participant and a Mentor questionnaire provided to them by Purdue University. AEOP-wide Participant and Mentor questionnaires have two versions each; an "advanced" version (for JSHS and apprenticeship programs) and a "basic" version (for GEMS, JSS, and Unite). Similar item sets are used in both versions, with slight modifications to item wording or the number of items used to accommodate the needs of participants from each individual program. Additionally, program-specific questionnaires have been customized to gather information about programmatic structures, resources, and activities that are unique to each AEOP.

Participant Questionnaire Administration Details

- Distribute the survey near or after the conclusion of an event or the students' Unite experience;
    - Please encourage Unite students to participate in AEOP evaluation efforts. Before, during, and after the Unite program activities please mention that questionnaires are forthcoming. It is also helpful to remind instructors, teachers, and assistants about questionnaires so they can encourage students to participate as well as remind themselves to participate in the surveys;
- If other, non-AEOP, survey(s) will be administered to students please encourage them to prioritize the completion of AEOP's Unite evaluation survey. These data are critical to maintain funding for Unite. Additionally, evaluators will release de-identified data from these assessments to Unite site organizers to help them focus on program improvement efforts;
- The Unite survey will be distributed using the CVENT registration records, so please inform students and mentors that their registration is crucial for the AEOPs records and to look for further communication from TSA and the AEOP through the CVENT portal:

Participants – Evaluation Questionnaire Invitation

Dear Unite participant,

Evaluators from Purdue University are conducting a study to learn about student experiences in Unite. We are asking you to fill out this survey because you participated in Unite. Your feedback will be used to help us improve Unite for students in the future. The sponsor of Unite, the Army Educational Outreach Program (AEOP), is paying for this study. In 2016, more than 200 students and 100 adults will participate in Unite and evaluators from Purdue University want to hear from you and your mentors.

Here's how you can help:

1) *Complete the Unite Student Survey using the hyperlink below. Your parent or guardian has already provided permission for us to ask you to participate in the survey. Now, it is up to you to decide whether you want to participate or not. The survey takes 25-30 minutes to complete on average.*

Unite Student Survey Link: http://www.cvent.com/d/4fqw85

2) *Pass this email along to adult(s) who supported you as you as you prepared for Unite. Ask them to complete the* ***Unite Mentor Survey.*** *The survey will take 25-30 minutes.*

Unite Mentor Survey Link: *http://www.cvent.com/d/bfqw8t*

If you have any questions about these surveys or your participation in the evaluation study ***please contact the Purdue University evaluation team:*** *Dr. Carla C. Johnson, carlacjohnson@purdue.edu or at (765) 494-0019.*

Thank you so much for your participation in the evaluation of Unite!

Mentor Questionnaire Administration Details

- Distribute the survey near or after the conclusion of the mentors' Unite experience;
- Encourage all adults serving as Unite instructors, Unite Classroom Assistants, Unite Resource Teachers, and/or others (typically a business, industry, or DoD/Army scientist or engineer) who supported students as they participated in Unite to complete the survey;
    - Encourage participation in evaluation before, during, and after program activities, if you have access to participants;
- If other, non-AEOP, survey(s) will be administered to adults please encourage them to prioritize the completion of AEOP's Unite evaluation survey. These data are critical to maintain funding for Unite. Additionally, evaluators will release de-identified data from these assessments to Unite site organizers to help them focus on program improvement efforts;
- The Unite survey will be distributed using the CVENT registration records, so please inform students and mentors that their registration is crucial for the AEOPs records and to look for further communication from TSA and the AEOP through the CVENT portal:

Adult Participants – Evaluation Questionnaire Invitation
Dear Colleague:
You are receiving this email because you participated in the 2016 Unite program in support of one or more student learning experience(s).

Evaluators from Purdue University are conducting program evaluation on behalf of the Technology Student Association (TSA) and U.S. Army. The purpose of the evaluation is to determine how well the Army Educational Outreach Program (AEOP) is achieving its primary mission – promoting student interest and engagement in science, technology, engineering, and mathematics (STEM). Purdue University is surveying adults who participated in Unite in support of students as they participated in the Unite program (e.g., Unite instructors, University/Army Scientists or Engineers, Classroom Assistants, Resource Teachers, etc.). More than 200 students and 100 adults participated in the Unite program this year and Purdue University wants to hear from you!

Here's how you can help:

1) *Click on the link below and complete the* ***Unite Mentor Survey****. The survey will take about 25-30 minutes.*

Unite Mentor Survey Link: *http://www.cvent.com/d/bfqw8t*

2) *Pass an email along to those students you supported in Unite and ask them to complete the appropriate survey. Their survey also takes about 25-30 minutes to complete.* **Unite Student Survey Link:** http://www.cvent.com/d/4fqw85

If you have any questions about the evaluation, these surveys, or your participation in the evaluation, ***please contact the Purdue University evaluation team:*** *Dr. Carla C. Johnson, carlacjohnson@purdue.edu or at (765) 494-0019.*
Thank you so much for your participation in the evaluation of Unite.

Focus Groups

Focus Groups Site Visits/Onsite Focus Groups

Purpose:
As per the approved FY16 AEOP APP, the external evaluation of Unite includes site visits/onsite focus groups.

Site visits provide the evaluation team with first-hand opportunities to speak with students and their mentors. We are able to observe the AEOPs in action. The information gleaned from these visits assists us in illustrating and more deeply understanding the findings of other data collected (from questionnaires). In total, the evaluation findings are used to highlight program successes and inform program changes so that the AEOPs can be even better in the future.

Evaluation Activities during Unite Site Visits:

- One or two 45 minute focus group with 6-8 apprentice participants;
- One 45-minute focus group with 6-8 mentors;
- 30-60 minutes to observe the program (specifically, to see students engaged in program activities, preferably with their mentors); and
- 10-15 minute transitions between each evaluation activity for moving groups in and out and providing evaluators with time to organize paperwork and take nature breaks.

Data Analyses
Quantitative and qualitative data were compiled and analyzed after all data collection concluded. Evaluators summarized quantitative data with descriptive statistics such as numbers of respondents, frequencies and proportions of responses, average response when responses categories are assigned to a 6-point scale (e.g., 1 = "Strongly Disagree" to 6 = "Strongly Agree"), and standard deviations. Emergent coding was used for the qualitative data to identify the most common themes in responses.

Evaluators conducted inferential statistics to study any differences among participant groups (e.g., by gender or race/ethnicity) that could indicate inequities in the SEAP program. Statistical significance indicates whether a result is unlikely to be due to chance alone. Statistical significance was determined with t-tests, chi-square tests, and various non-parametric tests as appropriate, with significance defined at $p < 0.05$. Because statistical significance is sensitive to the number of respondents, it is more difficult to detect significant changes with small numbers of respondents. Practical significance, also known as effect size, indicates the magnitude of an effect, and is typically reported when differences are statistically significant. The formula for effect sizes depends on the type of statistical test used, and is specified, along with generally accepted rules of thumb for interpretation, in the body of the report.

Appendix B

FY16 Unite Student Focus Group Protocol

2016 Unite Evaluation Study
Student Focus Group or Interview Protocol

Facilitator: My name is [evaluator] and I'd like to thank you for meeting with us today! We are really excited to learn more about your experiences in Unite. In case you have not been in an evaluation interview before, I'd like to give you some ground rules that I like to use in interviews. They seem to help the interview move forward and make everyone a little more comfortable:

- What is shared in the interview stays in the room.
- It is important for us to hear the positive and negative sides of all issues.
- Only one person speaks at a time.
- This is voluntary - you may choose not to answer any question, or stop participating at any time.
- We will be audio recording the session for note-taking purposes only. Audio will be destroyed.
- Do you have any questions before we begin?

Key Questions

1. **Why did you choose to participate in Unite this year?**
    - How did you hear about Unite?
    - Who did you hear about it from?

The Army Educational Outreach Program (AEOP) is a primary sponsor of Unite. We do these interviews to help the AEOP create reports and defend funding for the program. They need specific information to defend the money for the program.

2. **We need to understand more about how Unite is teaching students about STEM career opportunities in the Army and Department of Defense.**
    - During Unite, did you learn anything about STEM careers in the Army or Department of Defense?
    - How did you learn about them (e.g., field trips, invited speakers, other activities, etc.)?
    - Are you interested in pursuing a career in STEM with the Army or Department of Defense?
3. **The AEOP sponsors a wide range of national STEM outreach programs other than Unite. You are definitely eligible to participate in some of these programs and we need to know if you learned about them during Unite**
    - During Unite, did you learn about any of the outreach programs that the AEOP sponsors? (SMART, NDSEG, Unite, etc.)
    - How did you learn about them?
    - Do you think that you will try to participate in any of those programs?
4. **Tell us about your experiences in Unite this year.**
    - What, specifically do you think you got out of participating in Unite?
    - How do your experiences in Unite compare to your school experiences in STEM?
    - What would you say was the biggest benefit you gained from participating in Unite?
5. **Do you have any suggestions for improving Unite for other students in the future?**
6. **Last Chance - Have we missed anything? Tell us anything you want us to know that we haven't asked about.**

Appendix C

FY16 Unite Mentor Focus Group Protocol

2016 Unite Evaluation Study
Mentor Focus Group or Interview Protocol

Facilitator: My name is [evaluator] and I'd like to thank you for meeting with us today! We are really excited to learn more about your experiences in Unite. In case you haven't been in a focus group before, I'd like to give you some ground rules that I like to use in focus groups. They seem to help the group move forward and make everyone a little more comfortable:

- What is shared in the room stays in the room.
- Only one person speaks at a time.
- If you disagree please do so respectfully.
- It is important for us to hear the positive and negative sides of all issues.
- We will be audio recording the session for note-taking purposes only. Audio will be destroyed.
- Do you have any questions about participating in the focus group?

Key Questions:

1. **When you think about Unite, what kind of value does this program add**?
    - How do you think students benefit from participating in Unite?
    - Can you think of a particular student or group of students that benefit the most from Unite?
    - How have you benefited from participating in Unite?

One of the primary sponsors of the Unite program is the Army Educational Outreach Program (AEOP). The AEOP needs specific information to create reports and defend funding for its outreach programs, Unite included.

2. **We need to understand more about how Unite is helping students know more about STEM career opportunities in the Department of Defense, especially civilian positions.**
    - Have you seen any efforts by Unite to educate participants about the Army, DoD, or careers in the DoD?
    - What strategies seem to be the most effective for Unite students?
    - Do you have any suggestions for helping Unite teach students about careers in the DoD?

The AEOP sponsors a wide range of national STEM outreach programs that these students qualify for.

3. **The AEOP needs to know if Unite is teaching students about the other STEM outreach programs that it sponsors.**
    - First, are you aware of the other programs offered by the AEOP? (e.g., Unite, CQL, CQL, SMART, etc.)
    - Have you seen any efforts at Unite to educate adults or students about the other AEOP programs?
    - What seems to work the best? The worst?
    - Any suggestions for helping the AEOP educate these students about the other programs?

4. **The AEOP is trying to make sure that its programs become more effective at reaching adult and youth participants from underserved and underrepresented groups (racial/ethnic groups, low SES, etc.).**
    - Have you seen any efforts by Unite to help engage underserved or underrepresented groups of adults and youth?
    - What strategies seem to work the best? The worst?
    - Any suggestions for helping Unite reach new populations of adult and youth participants?

5. **What suggestions do you have for improving Unite?**
6. **Last Chance - Have we missed anything? Tell us anything you want us to know that we didn't ask about.**

Appendix D

FY16 Unite Student Survey Instrument

Contact Information		
Please verify the following information:		
*First Name:		
*Last Name:		
*Email Address:		
All fields with an asterisk (*) are required.		

*1. Do you agree to participate in this survey? (required)(*Required)		
Select one.		
○	Yes, I agree to participate in this survey	
○	No, I do not wish to participate in this survey	Go to end of chapter

So that we can understand how diverse students think about their participation in AEOP programs, please tell us about yourself and your school.

2. What grade will you start in the fall? (select one)	
Select one.	
○	9th
○	10th
○	11th
○	12th
○	College freshman
○	Choose not to report
○	Other, (specify)::

3. What is your gender?	
Select one.	
○	Male
○	Female
○	Choose not to report

4. What is your race or ethnicity?	
Select one.	
○	Hispanic or Latino
○	Asian
○	Black or African American
○	Native American or Alaska Native
○	Native Hawaiian or Other Pacific Islander
○	White
○	Choose not to report
○	Other race or ethnicity, (specify)::

5. Do you get free or reduced lunches at school?	
Select one.	
○	Yes
○	No
○	Choose not to report

6. At which of the following Unite sites did you participate? (Select ONE)

Select one.

○	Alabama State University (AL)
○	Florida Agricultural and Mechanical University (FL)
○	Howard University (DC)
○	Marshall University (WV)
○	Michigan Technological University (MI)
○	New Jersey Institute of Technology (NJ)
○	University of Colorado, Colorado Springs (CO)
○	University of New Mexico (NM)
○	University of Pennsylvania (PA)
○	University of Puerto Rico, Rio Piedras (PR)
○	Virginia Tech (VA)

7. How often did you do each of the following in STEM classes at school?

Select one per row.

	Not at all	*At least once*	*A few times*	*Most days*	*Every day*
Learn about science, technology, engineering, or mathematics (STEM) topics that are new to you	○	○	○	○	○
Apply STEM learning to real-life situations	○	○	○	○	○
Learn about new discoveries in STEM	○	○	○	○	○
Learn about different careers that use STEM	○	○	○	○	○
Interact with scientists or engineers	○	○	○	○	○
Communicate with other students about STEM	○	○	○	○	○

8. How often did you do each of the following in Unite this year?

Select one per row.

	Not at all	*At least once*	*A few times*	*Most days*	*Every day*
Learn about science, technology, engineering, or mathematics (STEM) topics that are new to you	○	○	○	○	○
Apply STEM learning to real-life situations	○	○	○	○	○
Learn about new discoveries in STEM	○	○	○	○	○
Learn about different careers that use STEM	○	○	○	○	○
Interact with scientists or engineers	○	○	○	○	○
Communicate with other students about STEM	○	○	○	○	○

9. How often did you do each of the following in STEM classes at school?

Select one per row.

	Not at all	*At least once*	*A few times*	*Most days*	*Every day*
Use laboratory procedures and tools	○	○	○	○	○
Participate in hands-on STEM activities	○	○	○	○	○
Work as part of a team	○	○	○	○	○
Identify questions or problems to investigate	○	○	○	○	○
Design an investigation	○	○	○	○	○
Carry out an investigation	○	○	○	○	○
Analyze data or information	○	○	○	○	○
Draw conclusions from an investigation	○	○	○	○	○
Come up with creative explanations or solutions	○	○	○	○	○
Build or make a computer model	○	○	○	○	○

10. How often did you do each of the following in Unite this year?

Select one per row.

	Not at all	*At least once*	*A few times*	*Most days*	*Every day*
Use laboratory procedures and tools	○	○	○	○	○
Participate in hands-on STEM activities	○	○	○	○	○
Work as part of a team	○	○	○	○	○
Identify questions or problems to investigate	○	○	○	○	○
Design an investigation	○	○	○	○	○
Carry out an investigation	○	○	○	○	○
Analyze data or information	○	○	○	○	○
Draw conclusions from an investigation	○	○	○	○	○
Come up with creative explanations or solutions	○	○	○	○	○
Build or make a computer model	○	○	○	○	○

11. The list below includes effective teaching and mentoring strategies. From the list, please indicate which strategies that your mentor(s) used when working with you in Unite:

Select one per row.

	Yes - my mentor used this strategy with me	*No - my mentor did not use this strategy with me*
Helped me become aware of STEM in my everyday life	○	○
Helped me understand how I can use STEM to improve my community	○	○
Used a variety of strategies to help me learn	○	○
Gave me extra support when I needed it	○	○
Encouraged me to share ideas with others who have different backgrounds or viewpoints than I do	○	○
Allowed me to work on a team project or activity	○	○
Helped me learn or practice a variety of STEM skills	○	○
Gave me feedback to help me improve in STEM	○	○
Talked to me about the education I need for a STEM career	○	○
Recommended Army Educational Outreach Programs that match my interests	○	○
Discussed STEM careers with the DoD or government	○	○

12. How much did each of the following resources help you learn about Army Educational Outreach Programs (AEOPs)?

Select one per row.

	Did not experience	*Not at all*	*A little*	*Somewhat*	*Very much*
Technology Student Association (TSA) website	○	○	○	○	○
Army Educational Outreach Program (AEOP) website	○	○	○	○	○
AEOP on Facebook, Twitter, Pinterest or other social media	○	○	○	○	○
AEOP brochure	○	○	○	○	○
It Starts Here! Magazine	○	○	○	○	○
My Unite mentor(s)	○	○	○	○	○
Invited speakers or “career” events during Unite	○	○	○	○	○
Participation in Unite	○	○	○	○	○

13. How much did each of the following resources help you learn about STEM careers in the Army or Department of Defense (DoD)?

Select one per row.

	Did not experience	*Not at all*	*A little*	*Somewhat*	*Very much*
Technology Student Association (TSA) website	○	○	○	○	○
Army Educational Outreach Program (AEOP) website	○	○	○	○	○
AEOP on Facebook, Twitter, Pinterest or other social media	○	○	○	○	○
AEOP brochure	○	○	○	○	○
It Starts Here! Magazine	○	○	○	○	○
My Unite mentor(s)	○	○	○	○	○
Invited speakers or “career” events during Unite	○	○	○	○	○
Participation in Unite	○	○	○	○	○

14. How SATISFIED were you with each of the following?

Select one per row.

	Did not experience	*Not at all*	*A little*	*Somewhat*	*Very much*
Applying or registering for the program	○	○	○	○	○
Communicating with your Unite host site organizers	○	○	○	○	○
The physical location(s) of Unite activities	○	○	○	○	○
The variety of STEM topics available to you in Unite	○	○	○	○	○
Teaching or mentoring provided during Unite activities	○	○	○	○	○
Stipends (payment)	○	○	○	○	○
Educational materials (e.g., workbooks, online resources, etc.) used during program activities	○	○	○	○	○
Invited speakers or "career" events	○	○	○	○	○
Field trips or laboratory tours	○	○	○	○	○

15. As a result of your Unite experience, how much did you GAIN in the following areas?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
In depth knowledge of a STEM topic(s)	○	○	○	○	○
Knowledge of research conducted in a STEM topic or field	○	○	○	○	○
Knowledge of research processes, ethics, and rules for conduct in STEM	○	○	○	○	○
Knowledge of how scientists and engineers work on real problems in STEM	○	○	○	○	○
Knowledge of what everyday research work is like in STEM	○	○	○	○	○

16. Which category best describes the focus of your Unite experience?

Select one.

○	Science
○	Technology
○	Engineering
○	Mathematics

17. As a result of your Unite experience, how much did you GAIN in the following areas?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Asking a question that can be answered with one or more scientific experiments	○	○	○	○	○
Using knowledge and creativity to suggest a testable explanation (hypothesis) for an observation	○	○	○	○	○
Supporting an explanation for an observation with data from experiments	○	○	○	○	○
Defending an argument that conveys how an explanation best describes an observation	○	○	○	○	○
Integrating information from technical or scientific texts and other media to support your explanation of an observation	○	○	○	○	○
Communicating about your experiments and explanations in different ways (through talking, writing, graphics, or mathematics)	○	○	○	○	○

18. As a result of your Unite experience, how much did you GAIN in the following areas?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Defining a problem that can be solved by developing a new or improved object, process, or system	○	○	○	○	○
Using knowledge and creativity to propose a testable solution for a problem	○	○	○	○	○
Making a model of an object or system to show its parts and how they work	○	○	○	○	○
Carrying out procedures for an experiment and recording data accurately	○	○	○	○	○
Using computer models of an object or system to investigate cause and effect relationships	○	○	○	○	○
Considering different interpretations of the data when deciding if a solution works as intended	○	○	○	○	○
Organizing data in charts or graphs to find patterns and relationships	○	○	○	○	○
Supporting a solution for a problem with data from experiments	○	○	○	○	○
Defending an argument that conveys how a solution best meets design criteria	○	○	○	○	○
Integrating information from technical or scientific texts and other media to support your solution to a problem	○	○	○	○	○
Communicating information about your design experiments and solutions in different ways (through talking, writing, graphics, or math equations)	○	○	○	○	○

19. As a result of your Unite experience, how much did you GAIN in each of the skills/abilities listed below?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Sticking with a task until it is finished	○	○	○	○	○
Making changes when things do not go as planned	○	○	○	○	○
Working well with students from all backgrounds	○	○	○	○	○
Including others' perspectives when making decisions	○	○	○	○	○
Communicating effectively with others	○	○	○	○	○
Viewing failure as an opportunity to learn	○	○	○	○	○

20. As a result of your Unite experience, how much did you GAIN in the following areas?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Interest in a new STEM topic	○	○	○	○	○
Deciding on a path to pursue a STEM career	○	○	○	○	○
Sense of accomplishing something in STEM	○	○	○	○	○
Feeling prepared for more challenging STEM activities	○	○	○	○	○
Thinking creatively about a STEM project or activity	○	○	○	○	○
Desire to build relationships with mentors who work in STEM	○	○	○	○	○
Connecting a STEM topic or field to my personal values	○	○	○	○	○

21. AS A RESULT OF YOUR Unite experience, are you MORE or LESS likely to engage in the following activities in science, technology, engineering, or mathematics (STEM) outside of school requirements or activities?

Select one per row.

	Much less likely	*Less likely*	*About the same before and after*	*More likely*	*Much more likely*
Watch or read non-fiction STEM	○	○	○	○	○
Tinker (play) with a mechanical or electrical device	○	○	○	○	○
Work on solving mathematical or scientific puzzles	○	○	○	○	○
Use a computer to design or program something	○	○	○	○	○
Talk with friends or family about STEM	○	○	○	○	○
Mentor or teach other students about STEM	○	○	○	○	○
Help with a community service project related to STEM	○	○	○	○	○
Participate in a STEM camp, club, or competition	○	○	○	○	○
Take an elective (not required) STEM class	○	○	○	○	○
Work on a STEM project or experiment in a university or professional setting	○	○	○	○	○

22. Before you participated in Unite, how far did you want to go in school?

Select one.

○	Graduate from high school
○	Go to a trade or vocational school
○	Go to college for a little while
○	Finish college (get a Bachelor's degree)
○	Get more education after college

23. After you have participated in Unite, how far do you want to go in school?

Select one.

○	Graduate from high school
○	Go to a trade or vocational school
○	Go to college for a little while
○	Finish college (get a Bachelor's degree)
○	Get more education after college

24. When you are 30, to what extent do you expect to use your STEM knowledge, skills, and/or abilities in your job?

Select one.

○	not at all
○	up to 25% of the time
○	up to 50% of the time
○	up to 75% of the time
○	up to 100% of the time

25. Before you participated in Unite, what kind of work did want to do when you are 30 years old? (select one)

Select one.

○	Undecided
○	Scientist or researcher
○	Work in computers or technology
○	Engineer or architect
○	Work in the medical field (doctor, nurse, lab technician)
○	Teacher
○	Business person or manager
○	Lawyer
○	Military, police, or security
○	Artist (writer, dancer, painter)
○	Skilled craftsperson (carpenter, electrician, machinist)
○	Athlete or other work in sports
○	Other, (specify)::

26. After you have participated in Unite, what kind of work do you want to do when you are 30 years old? (select one)

Select one.

○	Undecided
○	Scientist or researcher
○	Work in computers or technology
○	Engineer or architect
○	Work in the medical field (doctor, nurse, lab technician)
○	Teacher
○	Business person or manager
○	Lawyer
○	Military, police, or security
○	Artist (writer, dancer, painter)
○	Skilled craftsperson (carpenter, electrician, machinist)
○	Athlete or other work in sports
○	Other, specify::

27. How interested are you in participating in the following programs in the future?

Select one per row.

	I've never heard of this program	*Not at all*	*A little*	*Somewhat*	*Very much*
Gains in the Education of Mathematics and Science (GEMS)	○	○	○	○	○
Unite	○	○	○	○	○
Junior Science & Humanities Symposium (JSHS)	○	○	○	○	○
Science & Engineering Apprenticeship Program (SEAP)	○	○	○	○	○
Research & Engineering Apprenticeship Program (REAP)	○	○	○	○	○
High School Apprenticeship Program (HSAP)	○	○	○	○	○
College Qualified Leaders (CQL)	○	○	○	○	○
GEMS Near Peer Mentor Program	○	○	○	○	○
Undergraduate Research Apprenticeship Program (URAP)	○	○	○	○	○
Science Mathematics, and Research for Transformation (SMART) College Scholarship	○	○	○	○	○
National Defense Science & Engineering Graduate (NDSEG) Fellowship	○	○	○	○	○

28. How many jobs/careers in STEM did you learn about during Unite?

Select one.

○	None
○	1
○	2
○	3
○	4
○	5 or more

29. How many Army or Department of Defense (DoD) STEM jobs/careers did you learn about during Unite?

Select one.

○	None
○	1
○	2
○	3
○	4
○	5 or more

30. How much do you agree or disagree with the following statements about Department of Defense (DoD) researchers and research:

Select one per row.

	Strongly Disagree	*Disagree*	*Neither Agree nor Disagree*	*Agree*	*Strongly Agree*
DoD researchers advance science and engineering fields	○	○	○	○	○
DoD researchers develop new, cutting edge technologies	○	○	○	○	○
DoD researchers solve real-world problems	○	○	○	○	○
DoD research is valuable to society	○	○	○	○	○

31. Which of the following statements describe you AFTER PARTICIPATING IN THE Unite PROGRAM?

Select one per row.

	Disagree - This did not happen	*Disagree - This happened but not because of Unite*	*Agree - Unite contributed*	*Agree - Unite was primary reason*
I am more confident in my STEM knowledge, skills, and abilities	○	○	○	○
I am more interested in participating in STEM activities outside of school requirements	○	○	○	○
I am more aware of other AEOPs	○	○	○	○
I am more interested in participating in other AEOPs	○	○	○	○
I am more interested in taking STEM classes in school	○	○	○	○
I am more interested in earning a STEM degree	○	○	○	○
I am more interested in pursuing a career in STEM	○	○	○	○
I am more aware of Army or DoD STEM research and careers	○	○	○	○
I have a greater appreciation of Army or DoD STEM research	○	○	○	○
I am more interested in pursuing a STEM career with the Army or DoD	○	○	○	○

32. What topic(s) from your Unite experience were most impressive?

33. How have your Unite activities or experience helped increase your interest in pursuing a career in STEM disciplines?

34. What are the three most important ways that Unite has helped you?	
Benefit #1:	
Benefit #2:	
Benefit #3:	

35. What are the three ways that we could make Unite better?	
Improvement #1:	
Improvement #2:	
Improvement #3:	

36. Please tell us about your overall satisfaction with your Unite experience.

Appendix E

FY16 Unite Mentor Survey Instrument

Contact Information		
Please verify the following information:		
*First Name:		
*Last Name:		
*Email Address:		
All fields with an asterisk (*) are required.		

*1. Do you agree to participate in this survey? (required)(*Required)		
Select one.		
○	Yes, I agree to participate in this survey	(Go to question number 2.)
○	No, I do not wish to participate in this survey	Go to end of chapter

4. What is your gender?	
Select one.	
○	Male
○	Female
○	Choose not to report

5. What is your race or ethnicity?	
Select one.	
○	Hispanic or Latino
○	Asian
○	Black or African American
○	Native American or Alaska Native
○	Native Hawaiian or Other Pacific Islander
○	White
○	Choose not to report
○	Other race or ethnicity, (specify)::

6. Which of the following BEST describes the organization you work for? (select ONE)

Select one.

○	No organization
○	School or district (K-12)
○	State educational agency
○	Institution of higher education (vocational school, junior college, college, or university)
○	Private Industry
○	Department of Defense or other government agency
○	Non-profit
○	Other, (specify):

7. Which of the following BEST describes your current occupation? (select ONE)

Select one.

○	Teacher	(Go to question number 8.)
○	Other school staff	(Go to question number 8.)
○	University educator	(Go to question number 13.)
○	Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.)	(Go to question number 13.)
○	Scientist, Engineer, or Mathematics professional	(Go to question number 13.)
○	Other, (specify)::	(Go to question number 13.)

8. What grade level(s) do you teach (select all that apply)?

Select all that apply.

☐	Upper elementary
☐	Middle school
☐	High school

11. Do you work at a "Title-I" school?	
Select one.	
○	Yes
○	No
○	I am not sure

12. Which of the following subjects do you teach? (select ALL that apply)	
Select all that apply.	
If answered, go to question number 14.	
☐	Upper elementary
☐	Physical science (physics, chemistry, astronomy, materials science, etc.)
☐	Biological science
☐	Earth, atmospheric, or oceanic science
☐	Environmental science
☐	Computer science
☐	Technology
☐	Engineering
☐	Mathematics or statistics
☐	Medical, health, or behavioral science
☐	Social Science (psychology, sociology, anthropology)
☐	Other, (specify)::

13. Which of the following best describes your primary area of research?

Select one.

○	Physical science (physics, chemistry, astronomy, materials science, etc.)
○	Biological science
○	Earth, atmospheric, or oceanic science
○	Environmental science
○	Computer science
○	Technology
○	Engineering
○	Mathematics or statistics
○	Medical, health, or behavioral science
○	Social Science (psychology, sociology, anthropology)
○	Other, (specify)::

14. At which of the following Unite sites did you participate? (Select ONE)

Select one.

○	Alabama State University
○	Florida Agricultural and Mechanical University
○	Howard University
○	Marshall University
○	Michigan Technological University
○	New Jersey Institute of Technology
○	University of Colorado, Colorado Springs
○	University of New Mexico
○	University of Pennsylvania
○	University of Puerto Rico, Rio Piedras
○	Virginia Tech

15. Which of the following BEST describes your role during Unite?	
Select one.	
○	Instructor (typically a University or Army Scientist or Engineer)
○	Classroom Assistant
○	Resource Teacher
○	Other, (specify)::

16. How many Unite students did you work with this year?
_____ students.

19. How SATISFIED were you with the following Unite features?					
Select one per row.					
	Did not experience	*Not at all*	*A little*	*Somewhat*	*Very much*
Application or registration process	○	○	○	○	○
Communicating with Technology Student Association (TSA)	○	○	○	○	○
Communicating with Unite site coordinators	○	○	○	○	○
The physical location(s) of Unite's activities	○	○	○	○	○
Support for instruction or mentorship during program activities	○	○	○	○	○
Stipends (payment)	○	○	○	○	○
Invited speakers or “career” events	○	○	○	○	○
Field trips or laboratory tours	○	○	○	○	○

20. The list below describes mentoring strategies that are effective ways to establish the relevance of learning activities for students. From the list below, please indicate which strategies you used when working with your student(s) in Unite.

Select one per row.

	Yes - I used this strategy	*No - I did not use this strategy*
Become familiar with my student(s) background and interests at the beginning of the Unite experience	○	○
Giving students real-life problems to investigate or solve	○	○
Selecting readings or activities that relate to students' backgrounds	○	○
Encouraging students to suggest new readings, activities, or projects	○	○
Helping students become aware of the role(s) that STEM plays in their everyday lives	○	○
Helping students understand how STEM can help them improve their own community	○	○
Asking students to relate real-life events or activities to topics covered in Unite	○	○

21. The list below describes mentoring strategies that are effective ways to support the diverse needs of students as learners. From the list below, please indicate which strategies you used when working with your student(s) in Unite.

Select one per row.

	Yes - I used this strategy	*No - I did not use this strategy*
Identify the different learning styles that my student (s) may have at the beginning of the Unite experience	○	○
Interact with students and other personnel the same way regardless of their background	○	○
Use a variety of teaching and/or mentoring activities to meet the needs of all students	○	○
Integrating ideas from education literature to teach/mentor students from groups underrepresented in STEM	○	○
Providing extra readings, activities, or learning support for students who lack essential background knowledge or skills	○	○
Directing students to other individuals or programs for additional support as needed	○	○
Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM	○	○

22. The list below describes mentoring strategies that are effective ways to support students' development of collaboration and interpersonal skills. From the list below, please indicate which strategies you used when working with your student(s) in Unite.

Select one per row.

	Yes - I used this strategy	*No - I did not use this strategy*
Having my student(s) tell other people about their backgrounds and interests	○	○
Having my student(s) explain difficult ideas to others	○	○
Having my student(s) listen to the ideas of others with an open mind	○	○
Having my student(s) exchange ideas with others whose backgrounds or viewpoints are different from their own	○	○
Having my student(s) give and receive constructive feedback with others	○	○
Having students work on collaborative activities or projects as a member of a team	○	○
Allowing my student(s) to resolve conflicts and reach agreement within their team	○	○

23. The list below describes mentoring strategies that are effective ways to support students' engagement in "authentic" STEM activities. From the list below, please indicate which strategies you used when working with your student(s) in Unite.

Select one per row.

	Yes - I used this strategy	*No - I did not use this strategy*
Teaching (or assigning readings) about specific STEM subject matter	○	○
Having my student(s) search for and review technical research to support their work	○	○
Demonstrating laboratory/field techniques, procedures, and tools for my student(s)	○	○
Supervising my student(s) while they practice STEM research skills	○	○
Providing my student(s) with constructive feedback to improve their STEM competencies	○	○
Allowing students to work independently to improve their self-management abilities	○	○
Encouraging students to learn collaboratively (team projects, team meetings, journal clubs, etc.)	○	○
Encouraging students to seek support from other team members	○	○

24. This list describes mentoring strategies that are effective ways to support students' STEM educational and career pathways. The list also includes items that reflect AEOP and Army priorities. From this list, please indicate which strategies you used when working with your student(s) in Unite.

Select one per row.

	Yes - I used this strategy	*No - I did not use this strategy*
Asking my student(s) about their educational and/or career goals	○	○
Recommending extracurricular programs that align with students' goals	○	○
Recommending Army Educational Outreach Programs that align with students' goals	○	○
Providing guidance about educational pathways that will prepare my student(s) for a STEM career	○	○
Discussing STEM career opportunities within the DoD or other government agencies	○	○
Discussing STEM career opportunities in private industry or academia	○	○
Discussing the economic, political, ethical, and/or social context of a STEM career	○	○
Recommending student and professional organizations in STEM to my student(s)	○	○
Helping students build a professional network in a STEM field	○	○
Helping my student(s) with their resume, application, personal statement, and/or interview preparations	○	○

25. How useful were each of the following in your efforts to expose student(s) to Army Educational Outreach Programs (AEOPs) during Unite?

Select one per row.

	Did not experience	*Not at all*	*A little*	*Somewhat*	*Very much*
Technology Student Association (TSA) website	○	○	○	○	○
Army Educational Outreach Program (AEOP) website	○	○	○	○	○
AEOP on Facebook, Twitter, Pinterest or other social media	○	○	○	○	○
AEOP brochure	○	○	○	○	○
It Starts Here! Magazine	○	○	○	○	○
Unite Program administrator or site coordinator	○	○	○	○	○
Invited speakers or “career” events	○	○	○	○	○
Participation in Unite	○	○	○	○	○

26. How USEFUL were each of the following in your efforts to expose your student(s) to Department of Defense (DoD) STEM careers during Unite .

Select one per row.

	Did not experience	*Not at all*	*A little*	*Somewhat*	*Very much*
Technology Student Association (TSA) website	○	○	○	○	○
Army Educational Outreach Program (AEOP) website	○	○	○	○	○
AEOP on Facebook, Twitter, Pinterest or other social media	○	○	○	○	○
AEOP brochure	○	○	○	○	○
It Starts Here! Magazine	○	○	○	○	○
Unite Program administrator or site coordinator	○	○	○	○	○
Invited speakers or “career” events	○	○	○	○	○
Participation in Unite	○	○	○	○	○

27. Which of the following AEOPs did YOU EXPLICITLY DISCUSS with your student(s) during Unite? (check ALL that apply)

Select one per row.

	Yes - I discussed this program with my student(s)	*No - I did not discuss this program with my student(s)*
Gains in the Education of Mathematics and Science (GEMS)	○	○
Unite	○	○
Junior Science & Humanities Symposium (JSHS)	○	○
Science & Engineering Apprenticeship Program (SEAP)	○	○
Research & Engineering Apprenticeship Program (REAP)	○	○
High School Apprenticeship Program (HSAP)	○	○
College Qualified Leaders (CQL)	○	○
GEMS Near Peer Mentor Program	○	○
Undergraduate Research Apprenticeship Program (URAP)	○	○
Science Mathematics, and Research for Transformation (SMART) College Scholarship	○	○
National Defense Science & Engineering Graduate (NDSEG) Fellowship	○	○
I discussed AEOP with my student(s) but did not discuss any specific program	○	○

28. How much do you agree or disagree with the following statements about Department of Defense (DoD) researchers and research:

Select one per row.

	Strongly Disagree	*Disagree*	*Neither Agree nor Disagree*	*Agree*	*Strongly Agree*
DoD researchers advance science and engineering fields	○	○	○	○	○
DoD researchers develop new, cutting edge technologies	○	○	○	○	○
DoD researchers solve real-world problems	○	○	○	○	○
DoD research is valuable to society	○	○	○	○	○

29. How often did YOUR STUDENT(S) have opportunities to do each of the following in Unite?

Select one per row.

	Not at all	*At least once*	*A few times*	*Most days*	*Every day*
Learn new science, technology, engineering, or mathematics (STEM) topics	○	○	○	○	○
Apply STEM knowledge to real-life situations	○	○	○	○	○
Learn about new discoveries in STEM	○	○	○	○	○
Learn about different careers that use STEM	○	○	○	○	○
Interact with scientists or engineers	○	○	○	○	○
Communicate with other students about STEM	○	○	○	○	○
Use laboratory or field techniques, procedures, and tools	○	○	○	○	○
Participate in hands-on STEM activities	○	○	○	○	○
Work as part of a team	○	○	○	○	○
Identify questions or problems to investigate	○	○	○	○	○
Design an investigation	○	○	○	○	○
Carry out an investigation	○	○	○	○	○
Analyze data or information	○	○	○	○	○
Draw conclusions from an investigation	○	○	○	○	○
Come up with creative explanations or solutions	○	○	○	○	○
Build or make a computer model	○	○	○	○	○

30. AS A RESULT OF THEIR Unite EXPERIENCE, how much did your student(s) GAIN in the following areas?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
In depth knowledge of a STEM topic(s)	○	○	○	○	○
Knowledge of research conducted in a STEM topic or field	○	○	○	○	○
Knowledge of research processes, ethics, and rules for conduct in STEM	○	○	○	○	○
Knowledge of how professionals work on real problems in STEM	○	○	○	○	○
Knowledge of what everyday research work is like in STEM	○	○	○	○	○

31. Which category best describes the focus of your student(s) Unite activities?

Select one.

○	Science	(Go to question number 32.)
○	Technology	(Go to question number 33.)
○	Engineering	(Go to question number 33.)
○	Mathematics	(Go to question number 33.)

32. AS A RESULT OF THEIR Unite EXPERIENCE, how much did your student(s) GAIN in their abilities to do each of the following?

Select one per row.

If answered, go to question number 34.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Asking a question that can be answered with one or more scientific experiments	○	○	○	○	○
Using knowledge and creativity to suggest a testable explanation (hypothesis) for an observation	○	○	○	○	○
Making a model of an object or system showing its parts and how they work	○	○	○	○	○
Carrying out procedures for an experiment and recording data accurately	○	○	○	○	○
Using computer models of objects or systems to test cause and effect relationships	○	○	○	○	○
Organizing data in charts or graphs to find patterns and relationships	○	○	○	○	○
Considering different interpretations of data when deciding how the data answer a question	○	○	○	○	○
Supporting an explanation for an observation with data from experiments	○	○	○	○	○
Defending an argument that conveys how an explanation best describes an observation	○	○	○	○	○
Integrating information from technical or scientific texts and other media to support your explanation of an observation	○	○	○	○	○
Communicating about your experiments and explanations in different ways (through talking, writing, graphics, or mathematics)	○	○	○	○	○

33. AS A RESULT OF THEIR Unite EXPERIENCE, how much did your student(s) GAIN in their ability to do each of the following?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Defining a problem that can be solved by developing a new or improved object, process, or system	○	○	○	○	○
Using knowledge and creativity to propose a testable solution for a problem	○	○	○	○	○
Making a model of an object or system to show its parts and how they work	○	○	○	○	○
Carrying out procedures for an experiment and recording data accurately	○	○	○	○	○
Using computer models of an object or system to investigate cause and effect relationships	○	○	○	○	○
Considering different interpretations of the data when deciding if a solution works as intended	○	○	○	○	○
Organizing data in charts or graphs to find patterns and relationships	○	○	○	○	○
Supporting a solution for a problem with data from experiments	○	○	○	○	○
Defending an argument that conveys how a solution best meets design criteria	○	○	○	○	○
Integrating information from technical or scientific texts and other media to support your solution to a problem	○	○	○	○	○
Communicating information about your design experiments and solutions in different ways (through talking, writing, graphics, or math equations)	○	○	○	○	○

34. AS A RESULT OF THE Unite EXPERIENCE, how much did your student(s) GAIN (on average) in the skills/abilities listed below?

Select one per row.

	No gain	*A little gain*	*Some gain*	*Large gain*	*Extreme gain*
Sticking with a task until it is finished	○	○	○	○	○
Making changes when things do not go as planned	○	○	○	○	○
Including others' perspectives when making decisions	○	○	○	○	○
Communicating effectively with others	○	○	○	○	○
Desire to build relationships with professionals in a field	○	○	○	○	○
Connecting a topic or field with their personal values	○	○	○	○	○

35. Which of the following statements describe YOUR STUDENT(S) after participating in the Unite program?

Select one per row.

	Disagree - This did not happen	*Disagree - This happened but not because of Unite*	*Agree - Unite contributed*	*Agree - Unite was primary reason*
More confident in STEM knowledge, skills, and abilities	○	○	○	○
More interested in participating in STEM activities outside of school requirements	○	○	○	○
More aware of other AEOPs	○	○	○	○
More interested in participating in other AEOPs	○	○	○	○
More interested in taking STEM classes in school	○	○	○	○
More interested in earning a STEM degree	○	○	○	○
More interested in pursuing a career in STEM	○	○	○	○
More aware of DoD STEM research and careers	○	○	○	○
Greater appreciation of DoD STEM research	○	○	○	○
More interested in pursuing a STEM career with the DoD	○	○	○	○

36. What are the three most important strengths of Unite?	
Strength #1:	
Strength #2:	
Strength #3:	

37. What are the three ways Unite should be improved for future participants?	
Improvement #1:	
Improvement #2:	
Improvement #3:	

38. Please tell us about your overall satisfaction with your Unite experience.

Appendix F

TSA FY16 Evaluation Report Response