Army Educational Outreach Program

Unite

2015 Annual Program Evaluation Report

ARMY EDUCATIONAL OUTREACH PROGRAM

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U.S. Army Contacts

Jagadeesh Pamulapati, Ph.D.
Director for Integration and Laboratory Management Policy
Office of the Assistant Secretary of the Army
Acquisition, Logistics, and Technology
(703) 617-0309
jagadeesh.pamulapati.civ@mail.mil

Andrea Simmons-Worthen
Army Educational Outreach Program Director on
behalf of the Office of the Deputy
Secretary of the Army for Research and Technology
(703) 617-0202
andrea.e.simmons.ctr@mail.mil

AEOP Cooperative Agreement Managers

Louie Lopez
AEOP Cooperative Agreement Manager
U.S. Army Research, Development, and
Engineering Command (RDECOM)
(410) 278-9858
louie.r.lopez.civ@mail.mil

Battelle Memorial Institute

David Burns
Project Director, AEOP CA
Director of STEM Innovation Networks
(859) 322-7431
burnsd@battelle.org

Unite Program Administrators

Hillary Lee
Unite Program Director
Technology Student Association
(703) 860-9000
hlee@tsaweb.org

Rosanne White, Ph.D.
Principal Investigator
Technology Student Association
(703) 860-9000
rwhite@tsaweb.org

PURDUE UNIVERSITY

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Evaluation Team Contacts

Carla C. Johnson, Ed.D.
Evaluation Director, AEOP CA
Purdue University
(765) 494-0019
carlacjohnson@purdue.edu

Toni A. Sondergeld, Ph.D.
Asst. Evaluation Director, AEOP CA
Metriks Amerique
(419) 902-6898
tonisondergeld@metriks.com

Erin Peters Burton, Ph.D.
Asst. Evaluation Director, AEOP CA
Metriks Amerique
(419) 902-6898
erin.peters1@gmail.com

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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 become successful engineers.

This report documents the evaluation of the FY15 Unite program. Virginia Tech, in collaboration with TSA, collected the FY2015 evaluation data for the Unite program. Purdue University, the new evaluation lead, prepared the FY2015 evaluation reports, which 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, 12 interviews with students and 15 with mentors, and an annual program report compiled by TSA.

Unite sites included Alabama State University (ASU), University of Colorado, Colorado Springs (UCCS), Florida International University (FIU), Savannah State University (SSU), Xavier University of New Orleans (XULA), Jackson State University (JSU), New Jersey Institute of Technology (NJIT), University of New Mexico (UNM), University of Pennsylvania (UPENN), and South Dakota School of Mines and Technology (SDSMT).

2015 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	Primarily rising 11th grade students from groups historically underserved and under-represented in STEM
No. of Applicants	491
No. of Students	200
Placement Rate	41%
No. of Adults	112
No. of Army S&Es	9
No. of Army Agencies	6
No. of K-12 Teachers	51
No. of K-12 Schools	129
No. of K-12 Schools – Title I	36[‡] (decrease of 32% from FY14)
No. of College/Universities	10

No. of HBCU/MSIs	7
Total Cost	$ 323,632
Stipend Cost	$86,300
Cost Per Student Participant	$ 1,619

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

Summary of Findings

The FY15 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.

2015 Unite Evaluation Findings	
Participant Profiles	
Unite experienced growth in program interest and participation from most underrepresented groups, but fewer females and students from K-12 Title I schools were represented.	Unite was successful in achieving a 12% increase in applicants to the program in FY15. Enrollment data indicate that the overall enrollment increased 6% (FY15 200 participants; FY14 189 participants). However, the number of participating K-12 Title I schools decreased by 32% and the participation of females decreased in FY15 (45%) from FY14 (65%).
	In FY15, Unite enrollment included students from historically underrepresented and underserved minority race/ethnicity and low-income groups. Records indicate that a majority (39%) of students who indicated a race/ethnic category identified as Black or African American, and 14% as Hispanic or Latino/a. A majority of students responding to the evaluation questionnaire reported qualifying for free or reduced-price lunch (51%). Attracting a majority of students from historically underrepresented and underserved groups and free or reduced price lunch qualifiers as Unite students were also evident in 2014, demonstrating a consistent pattern, though percentages for each group decreased in FY15.
	Unite served students from school contexts that tend to have a higher number or proportions of underserved groups. Most student questionnaire respondents attended public schools (78%) and schools in urban settings (44%) or frontier/tribal schools (8%).
Demographic characteristics of Unite mentors reflect the diversity of the student participants.	STEM mentors, including university faculty, high school and university students, local teachers, and industry STEM professionals consisted of 44% females. Although 55% of Unite mentors chose not to report race/ethnic identity, a majority (31%) of the responding mentors identified as Black or African American.
Actionable Program Evaluation	

Unite is successfully reaching out to schools and teachers serving historically underrepresented and underserved groups, but more could be done with digital communication.	A multi-pronged effort to market programs to and recruit students from schools and school networks identified as serving large populations of traditionally underrepresented and underserved students was successful in attracting and accepting positions as participants and mentors. Personal contacts and websites were the most frequently reported forms of information to learn about Unite. However, efforts such as university websites and social media (Facebook) were least frequently mentioned as sources of learning about Unite.
	Students most frequently learned about the local Unite program from past participants (18%), or mentors from the Unite program (16%). Only 3% of students reported learning about Unite from social media. Likewise, mentors reported learning about Unite from past participants (64%) and 0% of mentors learned about Unite from social media.
Students are motivated to learn more about STEM through Unite programs.	Students were most frequently motivated to participate in Unite by the desire to learn something new or interesting (49%) and because of their interest in STEM (62%).
Unite successfully engages students in team-based, hands-on STEM learning that is meaningful.	80% of responding students indicated working as part of a team on most days or every day, 71% reported participating in hands-on activities and 69% reported analyzing data or information on most or every day.
	In addition, students indicated being integrally involved the work of STEM on most days or every day, including posing questions to investigate (68%), coming up with creative explanations or solutions (65%), using laboratory procedures and tools (62%), drawing conclusions (62%), designing investigations (57%), and carrying out investigations (60%). The amount of student engagement in STEM practices in Unite has remained consistently high in all items as compared to 2014
	Students reported greater opportunities to learn about STEM and greater engagement in STEM practices in their Unite experience than they typically have in school.
	The majority of mentors reported that students engaged in STEM activities that were meaningful and authentic, indicating that perceptions of the usefulness of activities for students and mentors were aligned.
Unite promotes overall STEM research and careers but can improve marketing of other AEOP opportunities.	Unite sites offered a variety of activities for promoting STEM careers, including interactive expert panels, off- and on-campus STEM expos, and field trips to Army, university, and other research labs and facilities. In open-ended question responses, Unite students mentioned these activities as the most impactful.
	Similar to findings of the FY14 Unite evaluation, 80% of Unite students are unaware of other AEOP programs when they register for Unite. Further, most mentors had no awareness of or past participation in an AEOP initiative beyond Unite. As was the case in FY14, mentors report that they mention other student opportunities, but do not

	discuss specific programs in AEOP.
	Participation in Unite (68%), invited speakers or career events (58%), and students' mentors (60%) were most often reported as being somewhat or very much responsible for student awareness of DoD STEM careers. The 2015 percentages were similar to the trends found in 2014.
The Unite experience is greatly valued by students and mentors.	Mentors and students were very satisfied with the Unite program. The categories that were most mentioned were field trips or laboratory tours, physical location of Unite activities, communication with the Unite site coordinators, invited speakers or career events, and instruction or mentorship.
	The majority of responding mentors indicated having a positive experience with Unite. Mentors commented that the program provides students a way to deepen their knowledge about STEM and gain insight into a college experience.
Outcomes Evaluation	
Unite increased students' STEM knowledge and competencies, particularly in groups traditionally underserved and underrepresented in STEM.	Unite students reported large or extreme gains on their knowledge of how professionals work on real problems in STEM, what everyday research work is like in STEM, a STEM topic or field in depth, the research processes, ethics, and rules for conduct in STEM, and research conducted in a STEM topic or field. Students who qualified for free and reduced lunch reported higher gains in STEM knowledge compared to students who did not qualify for free and reduced lunch programs.
	Although a vast majority of students reported that Unite contributed to gains in knowledge about science and engineering practices, students who qualified for free and reduced lunch reported higher gains in science and engineering practices compared to students who did not qualify for free and reduced lunch programs.
Unite increased participating students' 21st Century Skills.	Over 75% of the students reported extreme or large gains in all of the 21st Century Skills. Low-SES students reported higher gains on 21st Century Skills Gains compared to students with higher-SES due to the Unite program.
The number of Unite mentors and participating Army agencies decreased in FY15. However, Unite mentors were skilled in supporting students traditionally underserved or underrepresented in STEM.	The number of Unite mentors and participating Army agencies both decreased by 55% in FY15 compared to FY14. 100% of mentors reported treating all students the same way, regardless of gender or race/ethnicity, and 97% indicated using diverse teaching/mentoring activities. Many mentors provided extra readings for students who lacked essential background knowledge and skills (85%), helped students find additional support if needed (79%), tried to find out about student learning styles (76%), and integrated ideas from education literature to teach/mentor students from groups underrepresented in STEM.
Unite succeeded in raising students education aspirations, and students	After participating in Unite, students indicated being more likely 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

shifted their career aspirations toward STEM after their Unite experience.	degree (48% before Unite, 73% after).
	Students were asked to indicate what kind of work they expected to be doing at age 30, and the data were coded as STEM-related or non-STEM-related. More students shifted away from medical careers toward engineering and computer science careers after Unite.
Unite students show substantial interest in future AEOP opportunities, but are largely unaware of the specifics of joining other AEOP programs.	The majority of students indicated wanting to participate in another AEOP program after Unite, however 20% indicated they had not heard of other AEOP programs even after the Unite experience. Only 61% of mentors recommended other AEOP programs to students.
Unite continues to successfully raise awareness of STEM research and careers overall, and DoD STEM research and careers specifically.	99% of students indicated they were aware of STEM careers because of Unite, and 86% reported learning about STEM DoD careers in Unite. Further, more mentors discussed STEM careers within the DOD or government in 2015 than in 2014 (57% in 2014, 62% in 2015). However, the number of participating Army S&E's decreased by 55% in FY15.
Unite provides STEM experiences for students that are not typically experienced in school.	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. Scores were significantly higher on the "in Unite" versions of both composites than on the in school versions. These data indicate that Unite provides students with more intensive STEM learning experiences than they would typically receive in school.

Recommendations

Evaluation findings indicate that FY15 was a successful year for the Unite program. Unite has had consistent success attracting both students and mentors from traditionally underrepresented and underserved groups. This success may be attributed to Unite's program focus being only on including underrepresented and underserved participants[1]. Unite has experienced success in recruiting diverse STEM mentors and have had women, Black or African American, and Hispanic and Latino/a students and mentors in FY14 and FY15. Students and mentors overwhelmingly reported their satisfaction with the Unite experience. In particular, Unite has shown to increase student STEM experiences, science and engineering practices and has promoted awareness of STEM careers with the students. The mentors have reported they have used effective instructional techniques that students report are engaging. The Unite program succeeded in

[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).

increasing STEM knowledge and skills of students, increasing mentor and student diversity, encouraged students to pursue additional post-graduate studies, and providing an authentic hands-on experience for students.
While the successes for Unite detailed above are commendable, there are some areas that remain with 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 2014 and 2015, Unite has engaged a majority of female, Black or African American, and Hispanic or Latino/a students and mentors, which is a positive trend. 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.

2. Student and mentor recruitment for Unite is largely accomplished with personal interactions, either by knowing a professor or peer who attended Unite previously. Only a few respondents mentioned the AEOP website as their initial source of information about Unite, and only 1% of students and no mentors mentioned social media as a source. As a result, the ability of Unite to recruit underserved or underrepresented populations of students depends upon the diversity of the schools in which recruitment takes place. Thus, 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.

3. Unite is very effective in giving students authentic opportunities to engage in STEM knowledge and skills, and for mentors to build the next generation of STEM professionals. Nearly all mentors reported asking students to relate outside events or activities to topics covered in the program and giving students real-life problems, and a vast majority helped students see how STEM can affect them or their communities. Almost all mentors tried to learn about the students and their interests at the beginning of the program. However, one area that was weak in terms of mentor-student interactions was the mentors selecting readings or activities the related to students' backgrounds, and mentors highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM. 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.

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

1. Few mentors were aware of specific AEOP programs and even fewer mentors explicitly discussed other AEOP opportunities with their students. This lack of awareness is a barrier in communicating about other AEOP

opportunities. In an effort to increase and standardize the information provided to students, it would be beneficial to create a resource that profiles AEOP programs and the relationship they have to ongoing education, on-the-job training, and related research activities of Army careers. Such a resource could not only start the conversation about AEOP programs and motivate further exploration beyond the resource itself, but could be used to train the mentors to learn more about specific AEOP opportunities. The application to be a mentor could ask for their plan to explicitly discuss these resources thus expanding the network of ongoing opportunities for the students. This is particularly important for Unite since it engages students before students make decisions about college and career.

2. Unite program administrators may also want to build in systematic opportunities to provide this information to their students about DoD STEM research and careers. The field trips informed students about science and engineering opportunities with the Army, but because of the variety of locations of Unite programs, the field trips are not consistent from site to site. In an effort to increase and standardize the information provided to students, it would be 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&E's in the Unite program. Engaging more S&E's will provide more opportunities for participants to interact with real-world Army/DoD role models. These suggested resources could not only start the conversation about Army STEM careers and motivate further exploration beyond the resource itself, but could be used to train the mentors to learn more about specific Army/DoD STEM research and careers.

3. Efforts should be undertaken to improve participation in evaluation activities, as the low response rates for both the mentor questionnaires raise questions about the representativeness of the results. Low response rates were a concern during the 2013, 2014 and 2015 questionnaire administration, and this indicates an ongoing problem for survey response rates. Improved 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 the questionnaires are quite lengthy (estimated response time 45 minutes) and 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. Data analyses and reports were prepared using data collected by the former LO, Virginia Tech (VT).

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 become successful engineers.

10 sites were competitively selected in 2014 to receive 2-year awards through Unite. Operating on a 2-year cycle, Unite targets cohorts of rising 10th grade students in the first year of the cycle and returning and new rising 11th grade students in the second year. 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 10 host sites, which included 7 HBCUs/MSIs, received applications from substantially more qualified students than there were available participation slots for the 2015 Unite program. Overall, 491 students applied, of which 200 were enrolled, which represents a 6% increase in enrollment from FY14 (189). Unite also had more applications in FY15 (491) than in FY14 (437). Table 1 summarizes interest and final enrollment by site.

Table 1. 2015 Unite Site Applicant and Enrollment Numbers

2015 Unite Site	No. of Applicants	No. of Enrolled Participants
Alabama State University (ASU)	19	14
University of Colorado, Colorado Springs (UCCS)	15	14
Florida International University (FIU)	25	25
Savannah State University (SSU)	15	15
Xavier University of New Orleans (XULA)	40	20
Jackson State University (JSU)	28	10
New Jersey Institute of Technology (NJIT)	30	23
University of New Mexico (UNM)	24	9
University of Pennsylvania (UPENN)	65	18
South Dakota School of Mines and Technology (SDSMT)	80	52
TOTAL	**341**	**200**

There were 112 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 (see Table 2).

Table 2. 2015 Unite Participation					
Unite Site	**University Faculty**	**K-12 Teachers**	**Undergrad/ Grad Students**	**Army/DoD S&Es**	**Others**
Alabama State University	2	4	4	3	NA
University of Colorado, Colorado Springs	8	5	6	NA	NA
Florida International University	3	4	5	NA	NA
Savannah State University	2	19*	See K-12	NA	NA
Xavier University of New Orleans	NA	6	NA	NA	1
Jackson State University	2	NA	3	NA	NA
New Jersey Institute of Technology	NA	4	2	NA	NA
University of New Mexico	2	5	6	3	NA
University of Pennsylvania	NA	1	3	3	1
South Dakota School of Mines and Technology	2	**3**	NA	NA	NA
TOTAL	**21**	**51**	**29**	**9**	**2**

*May include some mentors

The total cost of the 2015 Unite program was $323,632. The average cost per student was $1,619. Aligned with the rates of similar AEOP initiatives, Unite provides participants with a stipend of $100 per week. Table 3 summarizes these and other 2014 Unite program costs.

Table 3. 2015 Unite Program Costs	
2015 Unite – Cost Per Participant	
Total Participants	200
Total Cost	$323,632
Cost Per Participant	$1,619
2015 Unite - Cost Breakdown Per Participant	
Average Administrative Cost to TSA	$338
Average Program Cost to Host Site (not including stipend)	$849
Average Participant Stipend	$431
Cost Per Participant	**$1619**

Evidence-Based Program Change

The AEOP identified three key priorities for the portfolio which were evaluated in FY15:

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 FY15 administration of the Unite program in light of the key AEOP priorities, the FY14 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. Approximately 75% of the students were identified as Title I or target schools, which tend to have higher populations of historically underserved and underrepresented in STEM.

b. 42% of schools from which enrolled students were recruited were reported by sites as Title 1 or target schools; some sites did not report any type of school designation, though it is highly likely that these sites had students coming from Title 1 or target schools. The IPA emphasized in these discussions the requirement in 2015 to recruit returning 11th grade students based on the two-year cohort established in 2014 (which targeted rising 10th grade students). If a site felt it would not be able to reach expected enrollment numbers with returning students, the site was encouraged to recruit new rising 11th grade students.

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

a. TSA made contact with the Army asking for assistance in securing local Army contacts for the purpose of arranging Army engineer speakers for career days. TSA also encouraged sites to make use of their own local Army contacts to arrange speakers and field trips. Ten to twenty Army contacts were provided by Army/AEOP to the Unite program.

III. Increase participants' awareness of other AEOP opportunities.

a. Sites reported distributing Army/AEOP-supplied materials/items to Unite participants during orientation. Additional efforts to increase awareness of the AEOP pipeline of programs were provided to students through classroom activities (AEOP website research for resources and career opportunities) and career panel presentations.

b. Information shared with the Unite IPA about summer Unite programs was passed on to the VT PR Communications Director for posting through various venues (news releases, tweets, Facebook posts); additional items included in the final reports will be shared with the director in the coming weeks

c. Following a winter conference call with all 2014 site directors, a Unite information document (featuring highlights of the 2014-2015 sites) was produced by the Unite IPA and distributed to Unite site directors for communication/networking purposes.

d. All 2015 Unite sites were encouraged to provide structured opportunities for students to learn about AEOP programs and how to get involved in them. Some accomplished this through 1) special spring programs in which Unite alumni (who promoted the program) and potential enrollees interacted in STEM activities, 2) a broad overview of AEOP programs presented at orientation and closing ceremonies, and 3) time set aside time in the program schedule for student investigation/research on the AEOP website. For many students enrolled in the 2015 Unite program, this year was the second year of their involvement in the two-year Unite cohort. These students received information about AEOP opportunities for two years. Some Unite students (current and former) transitioned this year into REAP programs. Regarding social media exposure, the Unite IPA received numerous photos from 2015 sites that were sent to the VT Communications director for posting on Facebook and Twitter.

FY15 Evaluation At-A-Glance

Purdue University, in collaboration with TSA and using data collected by Virginia Tech, 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 10 universities • Students participating in 10 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, 12 interviews with students and 15 with mentors, 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. 2015 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. 2015 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. 2015 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. 2015 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. 2015 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. Data summaries are provided in Appendix B (student) and Appendix C (mentor). Focus group protocols are provided in Appendix D (students and mentors); student questionnaire is provided in Appendix E; mentor questionnaire is provided in Appendix F; and the APR template is located in Appendix G. Major trends in data and analyses are reported herein.

Study Sample

Students from Unite sites responded to questionnaires, as did mentors from the sites. Table 9 shows the number of student and mentor respondents by site.

Table 9. 2015 Unite Site Survey Respondent Numbers				
2015 Unite Site	**Students**		**Mentors**	
	No. of Participants	**No. of Survey Respondents**	**No. of Participants**	**No. of Survey Respondents**
Alabama State University	14	11	9	10
Florida International University	25	18	10	1
Jackson State University	10	8	5	3
New Jersey Institute of Technology	23	16	6	4
Savannah State University	15	12	2	2
South Dakota School of Mines and Technology	52	32	5	0
University of Colorado, Colorado Springs	14	13	14	0
University of New Mexico	9	0*	11	0
University of Pennsylvania	18	12	4	6
Xavier University of Louisiana	20	18	6	6
Not Identified		16		2
TOTAL	**200**	**156**	**72**	**34**

*Survey was not administered to this site due to miscommunication between UNITE site and local program staff.

Table 10 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 both the student and mentor surveys is larger than generally acceptable, particularly the mentor survey, indicating that the samples may not be representative of their respective populations. Note that the student response rate is higher than in 2014 (which was 41%), however the mentor response rate is lower in 2015 than it was in 2014 (30%). Mentor survey participation as well as student survey participation is an area in which continued effort will be needed.

Table 10. 2015 Unite Questionnaire Participation				
Participant Group	**Respondents (Sample)**	**Total Participants (Population)**	**Participation Rate**	**Margin of Error @ 95% Confidence[2]**
Students	156	280	56%	±5.5%
Mentors	34	160	21%	±17.6%

[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.

Seven student phone interviews were conducted that included students from 4 of the 10 Unite sites. Student phone interviews included 4 females and 3 males with 6 of them being rising 11th graders and one being a rising 10th grader. Of the 7 students who were interviewed, 5 identified with the race/ethnicity category of Black or African American and 2 identified as Hispanic or Latino/a. Seven mentor interviews were also conducted, which included 4 females and 3 males. Mentors who were interviewed identified with the race/ethnicity category of Black or African American (5), White (1), and Asian (1), included teachers, and university faculty members. Interviews 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 questionnaire respondents is summarized in Table 11.[3] Based on the responses, more females (45%) than males (28%) completed the questionnaire. More responding students identified with the race/ethnicity category of Black or African American (39%) than any other single race/ethnicity category. There is substantial representation of Native American or Alaskan Natives (14%) and Hispanic or Latino (14%) populations, although 26% of the students chose not to report their race/ethnicity. Demographics of the 2014 Unite respondents were similar to those reported in 2015.

Rising 11th graders represented the largest group of Unite students (47%); 19% were rising 12th graders, and 6% were rising 10th graders. Forty-two participants (27%) chose not to report their grade level. Table 11 shows that a majority of respondents (51%) reported qualifying for free or reduced-price lunch (FRL)—a common indicator of low-income status. Table 12 shows that most Unite students attended schools in urban areas (55%). (The APR does not contain complete data on these characteristics to allow for comparison between the respondents and the population.)

In summary, 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 race/ethnicity and low-income groups. Unite served students who regularly attended school in a variety of settings, including urban, rural, and reservation or tribal schools, which historically have lower or limited resources than suburban schools.

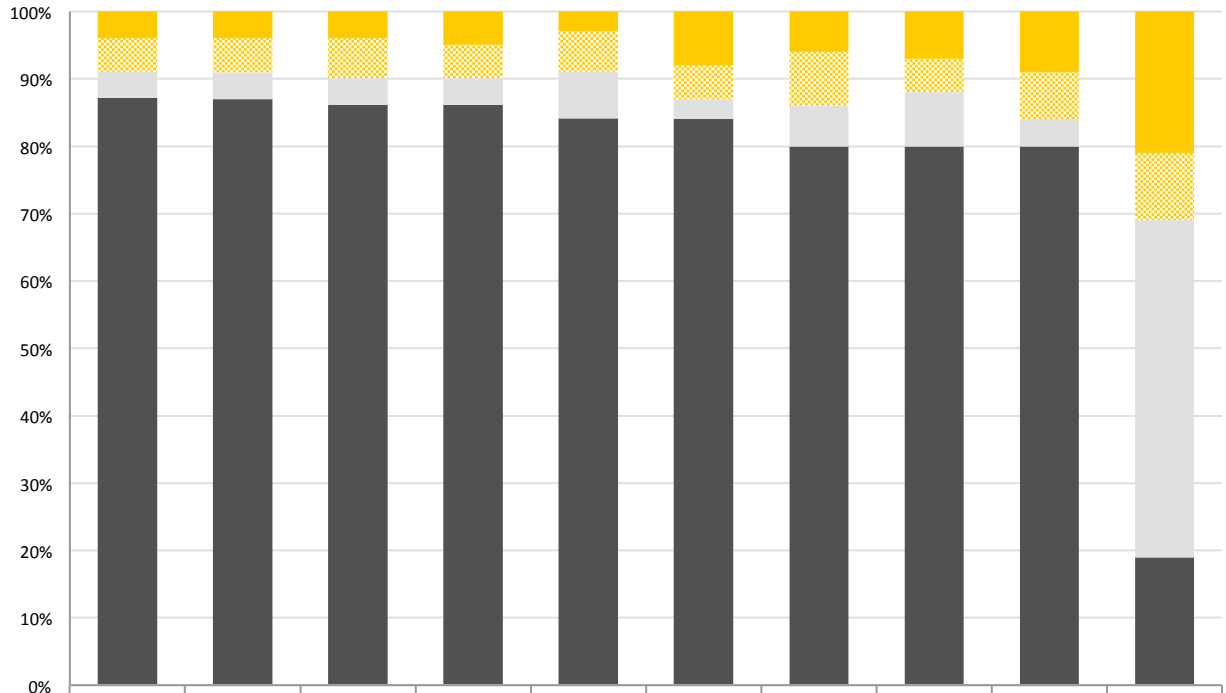
[3] In FY15 the AEOP developed and implemented a new application tool through the vendor, Cvent. This centralized tool will facilitate accurate and improved collection of demographic information from participants across the portfolio of AEOP initiatives.

Table 11. 2015 Unite Student Respondent Profile		
Demographic Category	**Questionnaire Respondents**	
Respondent Gender (n = 156)		
Female	70	45%
Male	44	28%
Choose not to report	42	27%
Respondent Race/Ethnicity (n = 156)		
Asian	5	3%
Black or African American	61	39%
Hispanic or Latino	22	14%
Native American or Alaska Native	21	14%
Native Hawaiian or Other Pacific Islander	0	0%
White	5	3%
Other race or ethnicity, (specify):[†]	1	1%
Choose not to report	41	26%
Respondent Grade Level (n = 156)		
9th	10	6%
10th	73	47%
11th	29	19%
12th	2	1%
Choose not to report	42	27%
Respondent Eligible for Free/Reduced-Price Lunch (n = 116)		
Yes	80	51%
No	29	19%
Choose not to report	47	30%

Table 12. 2015 Unite Student Respondent School Information		
Demographic Category	**Questionnaire Respondents**	
Respondent School Location (n = 156)		
Urban (city)	69	44%
Suburban	24	15%
Frontier or tribal school	13	8%
Rural (country)	4	3%
Choose not to report	46	30%

In the registration process, students were asked how many times they participated in each of the AEOP programs. Chart 1 shows that 81% of responding students reported participating in Unite at least once. However, few students (20% or less) reported participating in any of the other AEOP programs, these results are almost identical to the 2014 report of students' participation in AEOP programs from Unite.

Chart 1: Student Participation in AEOP Programs (n = 194)



	Camp Invention	eCYBER MISSION	HSAP	JSS	JSHS	GEMS Near Peers	REAP	GEMS	SEAP	UNITE
Three or more times	4%	4%	4%	5%	3%	8%	6%	7%	9%	21%
Twice	5%	5%	6%	5%	6%	5%	8%	5%	7%	10%
Once	4%	4%	4%	4%	7%	3%	6%	8%	4%	50%
Never	88%	87%	87%	87%	85%	84%	80%	80%	80%	19%

Mentor demographics. Extensive demographic information was collected on the mentors, which are summarized in Table 13. When considering these data, please keep in mind that the response rate of mentors was only 21%. Slightly more responding mentors were male than female (41% vs. 34%). The majority of mentors chose not to report their race/ethnicity (55%), but from those who did, the majority (31%) identified as Black or African American. Mentors were drawn from a variety of professions, with 38% of respondents being teachers; 21% scientists, engineers, or mathematicians in training; 7% scientists, engineers, or mathematics professionals; and 10% university educators. Another 10% indicated "other" for their occupation. Additional characteristics of the mentors are included in Appendix C.

Table 13. 2015 Unite Mentor Respondent Profile		
Demographic Category	**Questionnaire Respondents**	
Respondent Gender (n = 29)		
Female	12	41%
Male	10	34%
Respondent Race/Ethnicity (n =29)		
Asian	2	7%
Black or African American	9	31%
Hispanic or Latino	0	0%
Native American or Alaska Native	0	0%
Native Hawaiian or Other Pacific Islander	1	3%
White	1	3%
Other race or ethnicity, (specify):	0	0%
Choose not to report	16	55%
Respondent Occupation (n = 34)		
Teacher	13	38%
Other school staff	4	12%
University educator	3	8%
Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.)	7	21%
Scientist, Engineer, or Mathematics professional	2	6%
Other, (specify):	5	15%
Respondent Role in Unite (n = 34)		
Instructor (typically a University or Army Scientist or Engineer)	18	52%
Classroom Assistant	8	24%
Resource Teacher	4	12%
Other, (specify):	4	12%

Actionable Program Evaluation

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 4-8.

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. Although the goal of the program was to recruit rising 10th grade students (who would then return for a second year as rising 11th graders), some sites were unsuccessful in recruiting a sufficient number of students. Consequently, some sites recruited rising 11th graders; one site (SDSMT) created a "pre-Unite" program for rising 10th graders and a full Unite program for rising 11th graders. Unite sites marketed their programs in a variety of ways:

- Information shared with the Unite IPA about summer Unite programs was passed on to the VT PR Communications Director for posting through various venues (news releases, tweets, Facebook posts);
- Brochures and information booklets were distributed to local schools, school districts, and STEM youth organizations;
- Following a winter conference call with all 2014 site directors, a Unite information document (featuring highlights of the 2014-2015 sites) was produced by the Unite IPA and distributed to Unite site directors for communication/networking purposes;
- University webpages had information regarding Unite;
- Social media via Facebook (JSU); and
- Site directors contacted prior Unite cohort students directly for re-enrollment purposes; sites recruited new students through their online information portals/websites, personal contact, weekend STEM-related academies, press releases, social media, direct mail, news telecasts, application packets distributed to local high school counselors, existing overarching programs, and, in one case, an external TSA consultant.

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 Unite. As seen on Chart 2, the most frequently mentioned source of information about the local Unite program was a past participant of the program (18%), followed by someone who works with Unite (16%). Other sources mentioned were school newsletter, email or website (13%),

someone who works at the school the students attend (11%), and friend (11%). Only 3% became aware of Unite from the website, and only 1% learned about Unite on Twitter, 1% on Pinterest or other social media, and 1% on AEOP Facebook page.

These findings suggest that past experience with Unite is very influential for recruiting participants. However, resources that typically are very effective for disseminating information such as social media or websites are not very effective at creating an awareness of the Unite program. Additionally, results suggest concurrently running programs may offer another, very useful avenue for recruitment of Unite youth participants in the future. In addition, it is important to note the role of site selection in recruiting participants from underrepresented and underserved groups. The addition of South Dakota School of Mines and Technology as a site in 2014 led to the dramatic increase in the number of Native Americans being served by the program, which remains relatively high at 14% of total Unite students.

Chart 2: How Students Learned about UNITE

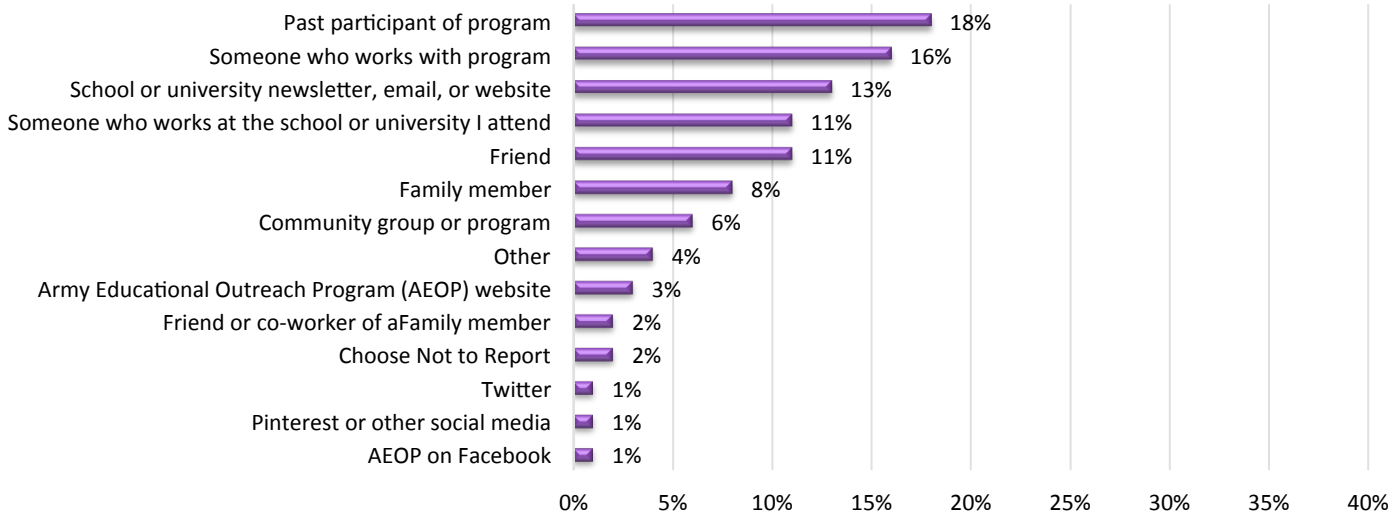
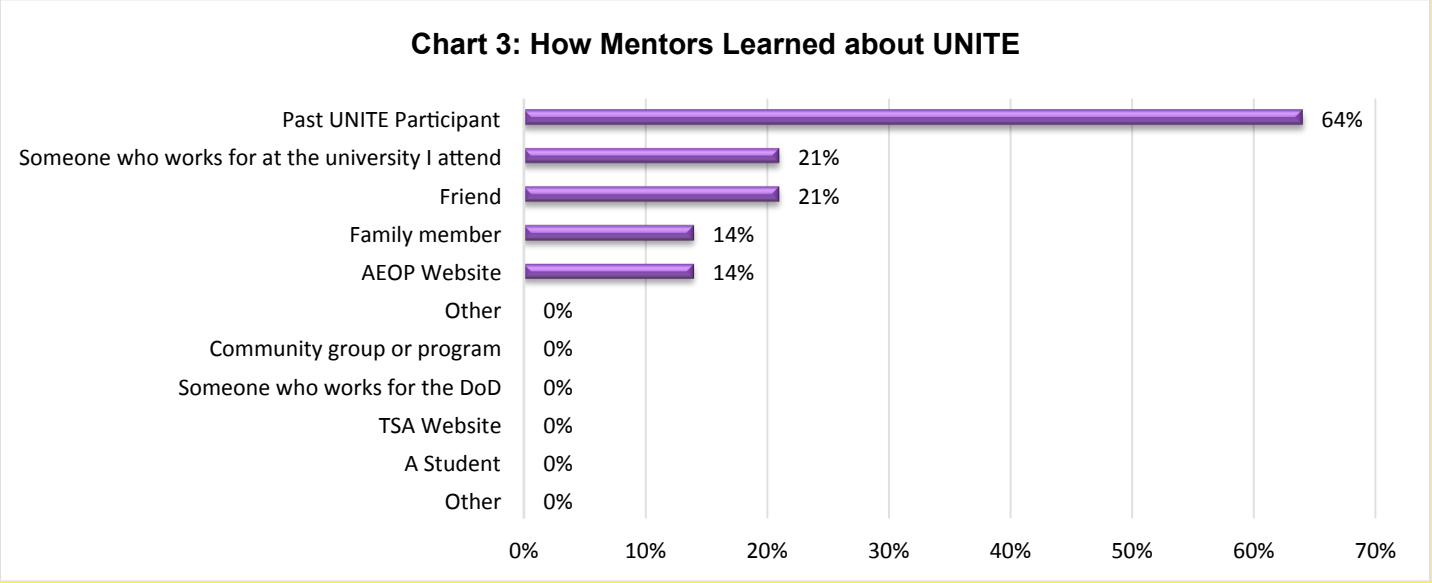


Chart 3 displays the data about how mentors learned about Unite. The vast majority of responding mentors learned about Unite from a past Unite participant (64%) and also from co-workers (21%) and friends (21%). To a lesser extent, mentors reported learning about Unite from family members (14%) and the AEOP website (14%).



Motivating Factors for Participation

Motivating factors for students. Questions about sources of motivation to participate in Unite were asked in both the questionnaire and in interviews. Students responded by choosing any source of motivation that influenced them from a list. Table 14 shows that more than 6 in 10 responding students indicated that they had an interest in STEM (62%). Almost 5 out of 10 students indicated they were motivated to join Unite through a desire to learn something new or interesting (49%). Other sources of motivation included building a college application or resume (25%), having fun (22%), figuring out education or career goals (19%), and learning in ways that are not possible in school (17%).

Table 14. Factors Motivating Students "Very Much" to Participate in Unite (n = 193)

Item	Questionnaire Respondents
Interest in science, technology, engineering, or mathematics (STEM)	62%
Desire to learn something new or interesting	49%
Building college application or resume	25%
Having fun	22%
Figuring out education or career goals	19%
Learning in ways that are not possible in school	17%
Interest in STEM careers with the Army	13%
Teacher or professor encouragement	13%
Opportunity to use advanced laboratory technology	12%
Exploring a unique work environment	11%

Serving the community or country	10%
Desire to expand laboratory or research skills	8%
The mentor(s)	8%
Networking opportunities	6%
Other	6%
Earning stipends or awards for doing STEM	5%
Seeing how school learning applies to real life	4%
An academic requirement or school grade	4%
Recommendations of past participants	3%
Opportunity to do something with friends	2%

During the phone interviews, students participating in Unite were asked about what they were interested in and possible careers in STEM. The comments from the three students below are characteristic of interview responses when asked why they chose to participate in Unite:

> *The TSA state advisor told us about it, and since I wanted to go into a STEM career, I just decided I should go, since it's only an hour away* (Unite Student)

> *[Participating in Unite] gives me a head start to my 11th grade year at school. The same classes we do at Unite – chemistry, algebra two, English, and technology and engineering; it's the same thing that I will be doing when I go back to school in the fall. It's going to give me a head start, and it's going to keep my GPA up because I'm going to already know what to expect when I go back to school* (Unite Student)

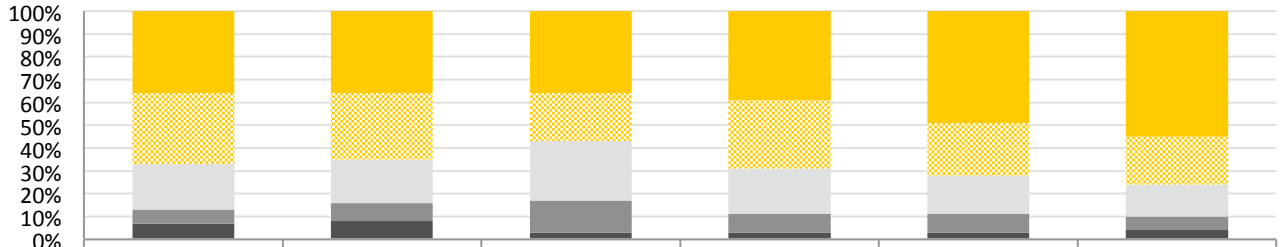
> *I wanted to participate because know it's going to give me a head start in my next year of high school, and it's going to give me a preview of what my future job would be like, which is engineering.* (Unite Student)

The Unite Experience

At the end of their experience, students were asked about the nature of the activities in which they participated in Unite, and how that experience compared to their STEM learning opportunities in school. When asked what field their Unite experience focused on, 45% of responding students selected engineering, 22% science, 21% technology, and 13% mathematics. Students were also asked a series a questions about what their Unite experience focused on. Chart 4 shows that the majority of respondents indicated learning about new STEM topics, communicating with other students about STEM, learning about different careers that use STEM, interacting with scientists or engineers, learning about new discoveries in STEM, and applying STEM to real-life situations on most or every day of the experience. Overall, the students report that all of the STEM activities on the questionnaire were done at least once for 92% or more of the

students. Mentors were asked similar questions about the nature of their students' experiences. Overall, their responses paint a similar picture of the Unite experience (responses to these items can be found in Appendix C).[4]

Chart 4: Nature of Student Activities in UNITE (n = 154-156)



	Apply STEM learning to real-life situations	Learn about new discoveries in STEM	Interact with scientists or engineers	Learn about different careers that use STEM	Communicate with other students about STEM	Learn about science, technology, engineering, or mathematics (STEM) topics that are new to you
Every day	36%	36%	36%	39%	49%	55%
Most days	31%	29%	21%	30%	23%	21%
A few times	20%	19%	26%	20%	17%	14%
At least once	6%	8%	14%	8%	8%	6%
Not at all	7%	8%	3%	3%	3%	4%

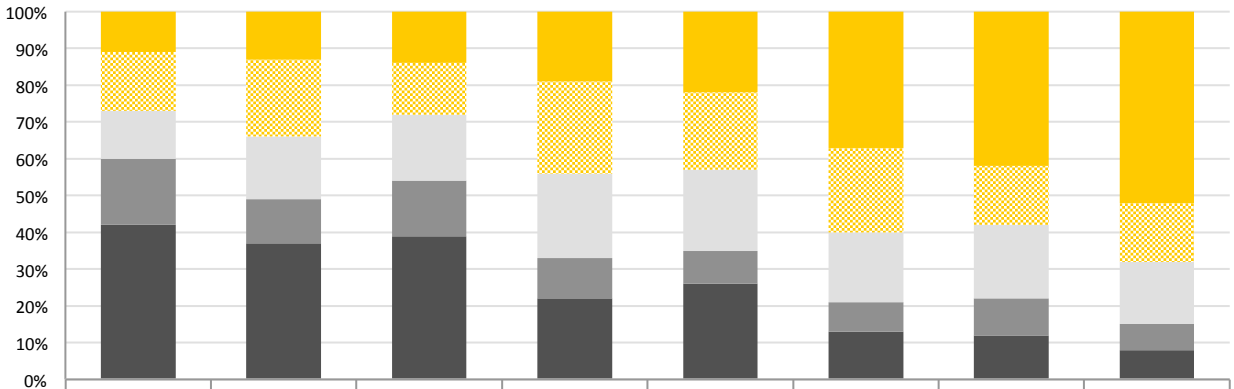
One goal of the Unite program is to increase the number and diversity of students who purse STEM careers, it is important to know how many jobs/careers (both STEM and DoD STEM) the students learned about during their experience. Table 15 shows that 99% of the students reported learning about at least one STEM job/career, and the majority (58%) reported learning about 5 or more. Similarly, 86% of students reported learning about at least one DoD STEM job/career, and 26% reported learning about many different STEM jobs/careers in the DoD. Unite students in 2015 reported learning slightly more STEM and DoD STEM jobs/careers than in 2014, and slightly less than in 2013.

[4] Because of the low response rates on both the student and mentor questionnaires, it is impossible to determine whether any differences between the two datasets are real or an artifact of which students and mentors provided data. In addition, as mentors typically worked with multiple students, it is not clear which students mentors were considering when responding to these items.

Table 15. Number of STEM Jobs/Careers Students Learned about During Unite						
	STEM Jobs/Careers			DoD STEM Jobs/Careers		
	2013 (n = 122)	2014 (n = 109)	2015 (n = 155)	2013 (n = 68)	2014 (n = 108)	2015 (n = 155)
None	0%	3%	1%	8%	20%	14%
1	2%	1%	1%	11%	14%	11%
2	4%	7%	6%	22%	15%	11%
3	9%	18%	16%	19%	21%	24%
4	20%	15%	18%	11%	6%	14%
5 or more	65%	56%	58%	29%	24%	26%

In addition to awareness of DoD STEM Careers by Unite students, the questionnaire asked which resources impacted their awareness of DoD STEM careers. Participation in Unite (68%), invited speakers or career events (58%), and students' mentors (60%) were most often reported as being somewhat or very much responsible for this impact (see Chart 5). The 2015 percentages were similar to the trends found in 2014.

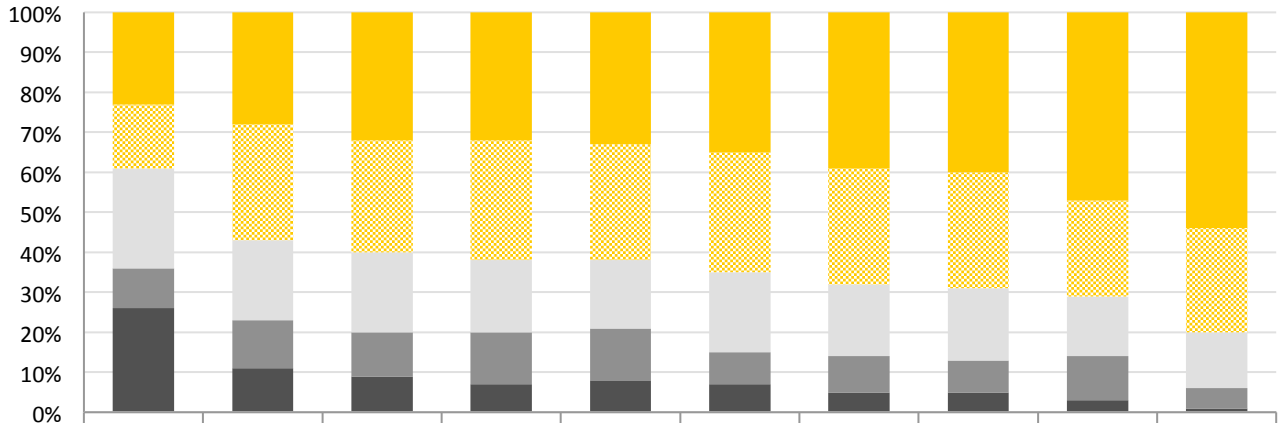
Chart 5: Impact of Resources on Student Awarenessof DoD STEM Careers (n = 151-155)



	It Starts Here! Magazine	Technology Student Association (TSA) website	AEOP on Facebook, Twitter, Pinterest or other social media	Army Educational Outreach Program (AEOP) website	AEOP brochure	My UNITE mentor(s)	Invited speakers or "career" events during UNITE	Participation in UNITE
Very Much	11%	13%	14%	19%	22%	37%	42%	52%
Somewhat	16%	21%	14%	25%	21%	23%	16%	16%
A little	13%	17%	18%	23%	22%	19%	20%	17%
Not at all	18%	12%	15%	11%	9%	8%	10%	7%
Did not experience	42%	37%	39%	22%	26%	13%	12%	8%

Students were asked on the questionnaire how often they engaged in various STEM practices during Unite. Results indicate that students were very actively engaged in doing STEM during the program (see Chart 6). For example, 80% of responding students indicated working as part of a team on most days or every day; 71% reported participating in hands-on activities and 69% reported analyzing data or information on most or every day. In addition, students indicated being integrally involved the work of STEM on most days or every day, including posing questions to investigate (68%), coming up with creative explanations or solutions (65%), using laboratory procedures and tools (62%), drawing conclusions (62%), designing investigations (57%), and carrying out investigations (60%). The amount of student engagement in STEM practices in Unite has remained consistently high in all items as compared to 2014. Data from the mentor questionnaire (shown in Appendix F) are generally aligned with data from the student questionnaire.

Chart 6: Student Engagement in STEM Practices in UNITE (n = 152-155)



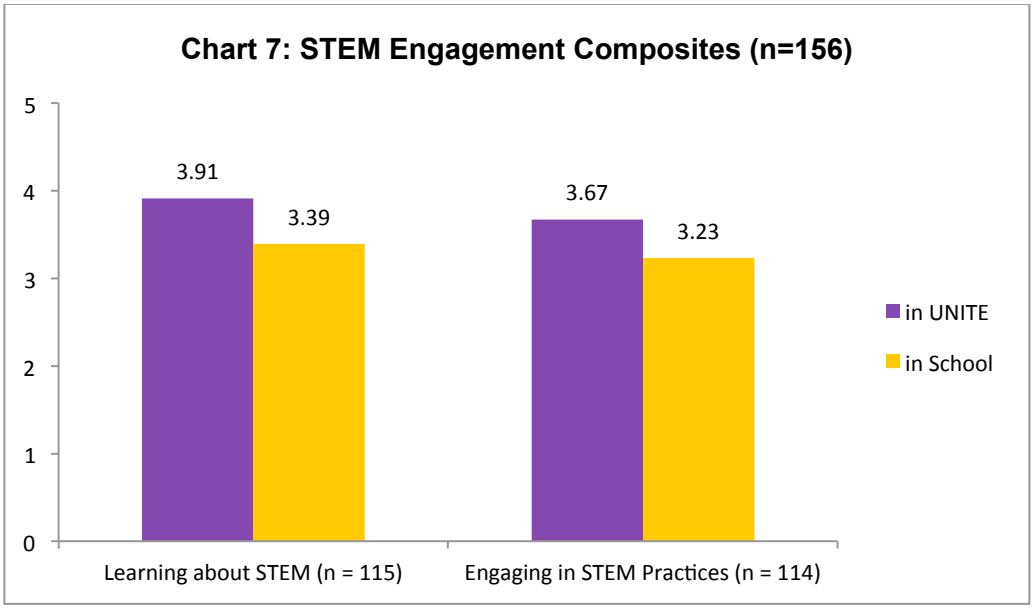
	Build or make a computer model	Design an investigation	Carry out an investigation	Draw conclusions from an investigation	Use laboratory procedures and tools	Come up with creative explanations or solutions	Identify questions or problems to investigate	Analyze data or information	Participate in hands-on STEM activities	Work as part of a team
Every day	23%	28%	32%	32%	33%	35%	39%	40%	47%	54%
Most days	16%	29%	28%	30%	29%	30%	29%	29%	24%	26%
A few times	25%	20%	20%	18%	17%	20%	18%	18%	15%	14%
At least once	10%	12%	11%	13%	13%	8%	9%	8%	11%	5%
Not at all	26%	11%	9%	7%	8%	7%	5%	5%	3%	1%

A composite score[5] was calculated for each of these two sets of items, the first titled "Learning about STEM in Unite,"[6] and the second "Engaging in STEM Practices in Unite."[7] Response categories were converted to a scale of 1 = "Not at all"

[5] 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

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 FRL status (***Note.*** Racial/ethnic differences cannot be assessed on any variable since there were only 5 White students completing the survey). There were no significant differences by gender on either variable. However, students receiving free/reduced lunch had significantly higher scores on the Engaging in STEM Practices in Unite composite (a moderate effect of d = 0.514 standard deviations).[8]

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 (individual item responses can be found in Appendix B). These responses were also combined into two composite variables: "Learning about STEM in School,"[9] and "Engaging in STEM Practices in School"[10] that are parallel to the ones asking about Unite. As can be seen in Chart 7, scores were significantly higher on the "in Unite" versions of both composites than on the in school versions (large effects of d = 0.954 standard deviations and d = 0.816 standard deviations, respectively).[11] These data indicate that Unite provides students with more intensive STEM learning experiences than they would typically receive in school.



these problems by reducing the total number of statistical tests used. In addition, composite scores are typically more reliable than individual questionnaire items.

[6] The Cronbach's alpha reliability for these 6 items was 0.920.

[7] The Cronbach's alpha reliability for these 10 items was 0.954.

[8] Two-tailed independent samples t-test, $t(107) = 2.67$, $p = 0.009$.

[9] Cronbach's alpha reliability of 0.922.

[10] Cronbach's alpha reliability of 0.948.

[11] Two-tailed dependent samples t-tests: Learning about STEM, $t(155) = 5.94$, $p < 0.001$; Engaging in STEM Practices, $t(155) = 5.08$, $p < 0.001$.

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 10 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:[12]

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 16, mentors to help make the learning activities relevant to students used many strategies. For example, nearly all reported asking students to relate outside events or activities to topics covered in the program (97%) and giving students real-life problems (94%). A vast majority also helped students see how STEM can affect them or their communities (94% and 82%, respectively), and almost all mentors tried to learn about the students and their interests at the beginning of the program (91%). Over three-quarters of mentors encouraged students to suggest new readings, activities or projects (77%). Fewer mentors selected readings or activities that related to the student's backgrounds (62%).

Table 16. Mentors Using Strategies to Establish Relevance of Learning Activities (n = 34)

Item	Questionnaire Respondents
Asking students to relate real-life events or activities to topics covered in Unite	97%
Giving students real-life problems to investigate or solve	94%
Helping students become aware of the role(s) that STEM plays in their everyday lives	94%
Become familiar with my student(s) background and interests at the beginning of the	91%

[12] 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.

Unite experience	
Helping students understand how STEM can help them improve their own community	82%
Encouraging students to suggest new readings, activities, or projects	77%
Selecting readings or activities that relate to students' backgrounds	62%

Mentors also reported using a variety of strategies to support the diverse needs of students as learners. Table 17 shows that 100% of mentors reported treating all students the same way, regardless of gender or race/ethnicity, and 97% indicated using diverse teaching/mentoring activities. Many mentors provided extra readings for students who lacked essential background knowledge and skills (85%), helped students find additional support if needed (79%), tried to find out about student learning styles (76%), and integrated ideas from education literature to teach/mentor students from groups underrepresented in STEM. To a lesser extent, mentors highlighted under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM (64%).

Table 17. Mentors Using Strategies to Support the Diverse Needs of Students as Learners (n = 33)

Item	Questionnaire Respondents
Interact with students and other personnel the same way regardless of their background	100%
Use a variety of teaching and/or mentoring activities to meet the needs of all students	97%
Providing extra readings, activities, or learning support for students who lack essential background knowledge or skills	85%
Directing students to other individuals or programs for additional support as needed	79%
Identify the different learning styles that my student (s) may have at the beginning of the Unite experience	76%
Integrating ideas from education literature to teach/mentor students from groups underrepresented in STEM	70%
Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM	64%

In addition to using specific strategies to support the diverse needs of students as learners, mentors reported using many strategies to support students' development of collaboration and interpersonal skills (see Table 18). For example, nearly all of those responding to the questionnaire indicated having students work as members of a team on activities or projects (97%), develop ways to resolve conflict and reach agreement among the team (94%), and listen to the ideas of others with an open mind (94%). The vast majority also had students exchange ideas with others whose backgrounds or viewpoints were different from their own (82%), participate in giving and receiving feedback (88%), and explain difficult ideas to others (85%).

Table 18. Mentors Using Strategies to Support Student Development of Collaboration and Interpersonal Skills (n = 34)	
Item	**Questionnaire Respondents**
Having students work on collaborative activities or projects as a member of a team	97%
Having my student(s) listen to the ideas of others with an open mind	94%
Allowing my student(s) to resolve conflicts and reach agreement within their team	94%
Having my student(s) give and receive constructive feedback with others	88%
Having my student(s) tell other people about their backgrounds and interests	88%
Having my student(s) explain difficult ideas to others	85%
Having my student(s) exchange ideas with others whose backgrounds or viewpoints are different from their own	82%

Mentors were asked about strategies used to support student engagement in authentic STEM activities as shown in Table 19, 94% of responding mentors reported encouraging students to see support from other team members, and 94% also responded that they encouraged their students to seek support from other team members. The strategies of allowing students to work independently as appropriate for their self-management abilities and STEM competencies and encouraging opportunities in which students could learn from others were each used by 91% of mentors. Helping students practice STEM skills with supervision (82%), having students search for and review technical research to support their work (82%), and teaching/assigning readings about specific STEM subject matter (82%) were also widely used strategies. Almost three-quarters of the mentors demonstrated laboratory/field techniques, procedures and tools for their student(s).

Table 19. Mentors Using Strategies to Support Student Engagement in "Authentic" STEM Activities (n = 34)	
Item	**Questionnaire Respondents**
Encouraging students to learn collaboratively (team projects, team meetings, journal clubs, etc.)	94%
Encouraging students to seek support from other team members	94%
Providing my student(s) with constructive feedback to improve their STEM competencies	91%
Allowing students to work independently to improve their self-management abilities	91%
Supervising my student(s) while they practice STEM research skills	82%
Teaching (or assigning readings) about specific STEM subject matter	82%
Having my student(s) search for and review technical research to support their work	82%
Demonstrating laboratory/field techniques, procedures, and tools for my student(s)	74%

Table 20 details how mentors responded to questions about mentoring strategies focused on supporting students' STEM educational and career pathways.[13] Nearly all of the responding mentors reported asking students about their educational and career goals (94%). Many also provided guidance to students, either about educational pathways that would prepare them for a STEM career (85%) or recommending extracurricular programs that align with their educational goals (82%). These data are almost identical to the data from the 2014 survey.

A few strategies that have been reported more frequently than in 2014 are discussing the economic, political, ethical, and/or social context of a STEM career (67% in 2014, 79% in 2015), and discussing STEM careers within the DOD or government (57% in 2014, 62% in 2015). In addition, given the interest in having students graduate into other AEOP opportunities, it is also surprising that only 61% of mentors recommended other AEOP programs to students.

Table 20. Mentors Using Strategies to Support Student STEM Educational and Career Pathways (n = 33-34)

Item	Questionnaire Respondents
Asking my student(s) about their educational and/or career goals	94%
Providing guidance about educational pathways that will prepare my student(s) for a STEM career	85%
Recommending extracurricular programs that align with students' goals	82%
Discussing STEM career opportunities in private industry or academia	79%
Recommending student and professional organizations in STEM to my student(s)	79%
Discussing the economic, political, ethical, and/or social context of a STEM career	74%
Discussing STEM career opportunities within the DoD or other government agencies	62%
Helping my student(s) with their resume, application, personal statement, and/or interview preparations	62%
Recommending Army Educational Outreach Programs that align with students' goals	61%
Helping students build a professional network in a STEM field	59%

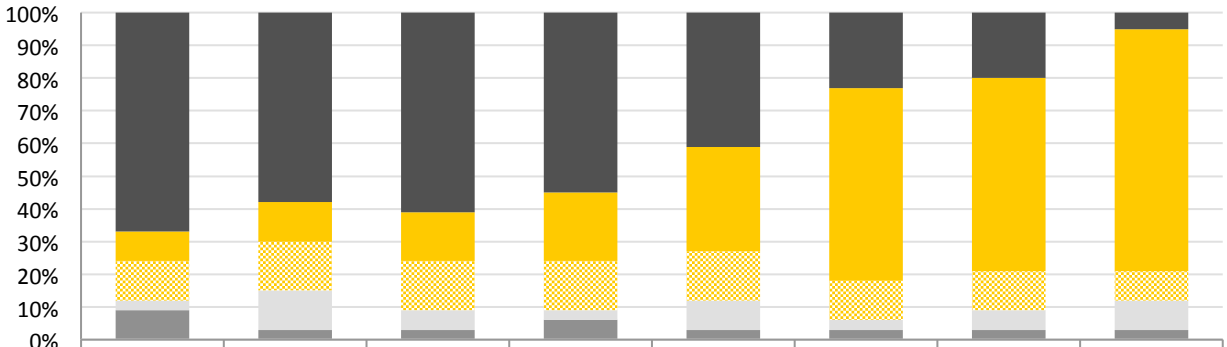
Because maintaining the pipeline of AEOP programs with quality students is a priority, mentors were asked which of the AEOP programs mentors explicitly discussed with their students during Unite. Not surprisingly, the most frequently discussed program was Unite (68%), as shown in Table 21. About half of the responding mentors indicated discussing at least one other AEOP with students, most commonly REAP (41%) and GEMS (41%). Compared to 2014, the percentages for Unite and REAP were down slightly, but were doubled for the GEMS program. Other programs discussed with students by a quarter or more of responding mentors were JSHS (29%), SEAP (27%), SMART (27%), GEMS Near Peer Mentor Program (24%), and HSAP (25%). Slightly more than half (53%) of the mentors discussed AEOP, but did not mention specific programs. The least discussed programs were URAP (21%) and CQL (18%).

[13] The student questionnaire included a subset of these items. The student data are similar to the mentor data, and can be found in Appendix B.

Table 21. Mentors Explicitly Discussing AEOPs with Students (n = 34)	
Item	**Questionnaire Respondents**
Unite	68%
I discussed AEOP with my student(s) but did not discuss any specific program	53%
Gains in the Education of Mathematics and Science (GEMS)	41%
Research & Engineering Apprenticeship Program (REAP)	41%
Junior Science & Humanities Symposium (JSHS)	29%
Science & Engineering Apprenticeship Program (SEAP)	27%
Science Mathematics, and Research for Transformation (SMART) College Scholarship	27%
High School Apprenticeship Program (HSAP)	24%
GEMS Near Peer Mentor Program	24%
Undergraduate Research Apprenticeship Program (URAP)	21%
College Qualified Leaders (CQL)	18%

To get a sense of the ways mentors discussed AEOP programs with students; mentors were asked how useful various resources were in their efforts to expose students to the different AEOPs. As shown in Chart 8, participation in Unite (74%), invited speakers or career events (59%) and program managers or site coordinators (59%), were most often rated as "very much" useful. Materials provided by the AEOP program tended not to be seen as very useful, with large proportions of mentors indicating they did not experience these resources. For example, 41% of mentors reported that they did not experience the AEOP website, and only 32% rated them as "very much" useful. Similarly, 55% of responding mentors did not experience the AEOP brochure, 61% did not experience the TSA website, and 58% did not experience social media. Most notably, 67% of the mentors reported they did not experience the It Starts Here Magazine.

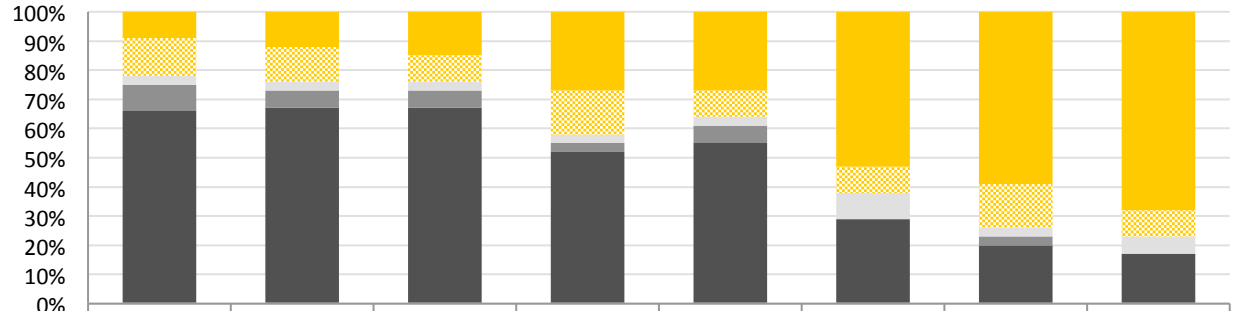
Chart 8: Usefulness of Resources for Exposing Students to AEOPs (n = 34)



	It Starts Here! Magazine	AEOP on Facebook, Twitter, Pinterest or other social media	Technology Student Association (TSA) website	AEOP brochure	Army Educational Outreach Program (AEOP) website	UNITE Program administrator or site coordinator	Invited speakers or "career" events	Participation in UNITE
Did not experience	67%	58%	61%	55%	41%	23%	20%	5%
Very Much	9%	12%	15%	21%	32%	59%	59%	74%
Somewhat	12%	15%	15%	15%	15%	12%	12%	9%
A little	3%	12%	6%	3%	9%	3%	6%	9%
Not at all	9%	3%	3%	6%	3%	3%	3%	3%

As seen in Chart 9, mentors were also asked how useful these resources were for exposing students to DoD STEM careers. Similar to the previous item, mentors were most likely to rate participation in Unite as useful, with 68% selecting "very much." Invited speakers or career events (59%), and program managers or site coordinators (53%) were seen as very useful by a substantive number of responding mentors. Again, AEOP materials were less likely to be seen as very useful for this purpose (a range of 9-27%), with 55-67% of mentors indicating they did not experience these resources.

Chart 9: Usefulness of Resources for Exposing Students to DoD STEM Careers (n = 32-34)



	AEOP on Facebook, Twitter, Pinterest or other social media	It Starts Here! Magazine	Technology Student Association (TSA) website	Army Educational Outreach Program (AEOP) website	AEOP brochure	UNITE Program administrator or site coordinator	Invited speakers or "career" events	Participation in UNITE
Very Much	9%	12%	15%	27%	27%	53%	59%	68%
Somewhat	13%	12%	9%	15%	9%	9%	15%	9%
A little	3%	3%	3%	3%	3%	9%	3%	6%
Not at all	9%	6%	6%	3%	6%	0%	3%	0%
Did not experience	66%	67%	67%	52%	55%	29%	20%	17%

The usefulness of invited speakers and career events were described in more detail in the mentor interviews. As two described how their site approached the marketing of DoD STEM careers:

> *Our students actually visited Picatinny Arsenal over this summer where they met with a lot of engineers, and they had tours of the facility. Even they were able to try out a video game that they use for training. (Unite Mentor)*

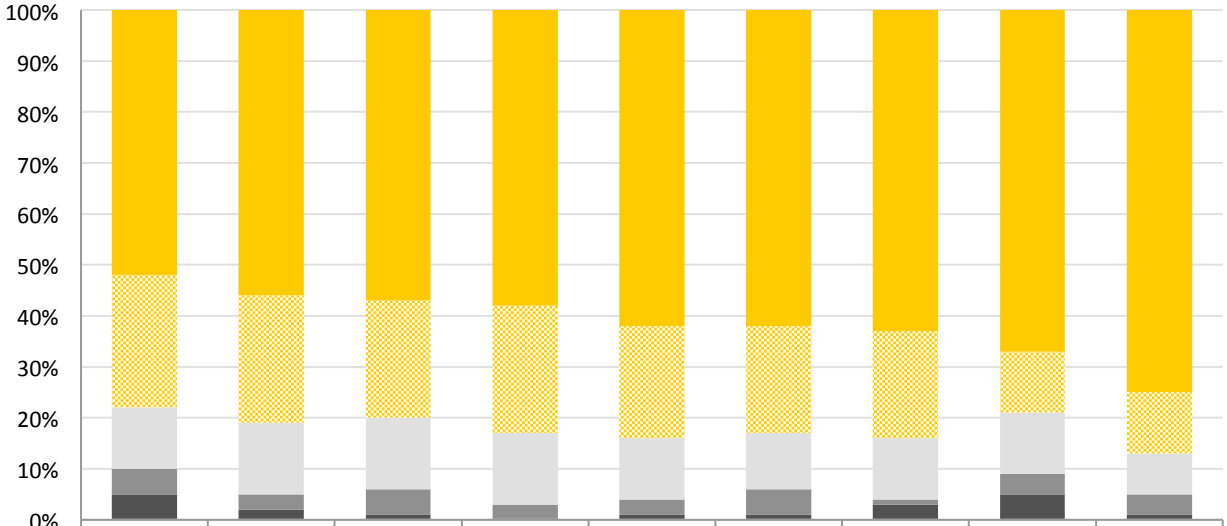
> *[The Unite program is able to give students] authentic information. According to some [students], they were able to interview 13 different engineers that are working in the Coral Springs area. I think it really helps develop some professional identity. (Unite Mentor)*

Satisfaction with Unite

In order to gain as 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. Chart 10 shows that the vast majority of responding students were somewhat or very much satisfied with each of the listed program features. Over 75% of students were at least somewhat satisfied or very much satisfied with all aspects of the program, including field trips or laboratory tours, the invited speakers or career events, instruction or mentorship during program activities, the stipend, the physical location

of Unite activities, registration, the variety of STEM topics, educational materials, and communication with Unite organizers.

Chart 10: Student Satisfaction with UNITE Program Features (n = 151-155)



	Interacting with your UNITE host site organizers	Educational materials (e.g., workbooks, online resources, etc.) used during program activities	The variety of STEM topics available to you in UNITE	Applying or registering for the program	The physical location(s) of UNITE activities	Teaching or mentoring provided during UNITE activities	Invited speakers or "career" events	Field trips or laboratory tours	Stipends (payment)
Very Much	52%	56%	57%	58%	62%	62%	63%	67%	75%
Somewhat	26%	25%	23%	25%	22%	21%	21%	12%	12%
A little	12%	14%	14%	14%	12%	11%	12%	12%	8%
Not at all	5%	3%	5%	3%	3%	5%	1%	4%	4%
Did not experience	5%	2%	1%	0%	1%	1%	3%	5%	1%

An open-ended item on the questionnaire asked student about their overall satisfaction with the Unite experience. The responses were overwhelmingly positive. Of the 134 students who answered this question, 129 (96%) commented on only positive aspects of the program. These responses were sometimes as simple as, "I am very satisfied with the program." Other times, more detail about what they enjoyed about the program was provided, such as in the following examples:

Unite is a really good program and I enjoyed it. I would really recommend students who plan to pursue a career in STEM that they experience the Unite program because it can really help them. Unite has really been a great experience and I would love to do this again. (Unite Student)

I truly enjoyed the mentors in the program and their level experience in their fields. They provided us with a great program and they made sure that we learned the material that was being taught. They also made sure that we left the program smarter than we were when we initially arrived to the program. (Unite Student)

I am very appreciative for the opportunity to go into the Unite program. It taught me skills I will take with me all throughout life. I hope to continue on to the REAP program and continue learning with these amazing programs. (Unite Student)

The five (4%) other responses referred to a combination of programs that seemed to dilute the rigor of Unite. Sample statements from the students about the program can be found below.

I was not very satisfied with the Unite program. Mainly because the program was mixed with the SoColo Reach program. The students of SoColo Reach were mainly students who were trying to find a career and haven't decided it yet. However, the Unite students already know they wanted to become an engineer so it was very boring for the Unite students. Besides learning what I already knew the program was a good program to hangout and meet new friends. (Unite Student)

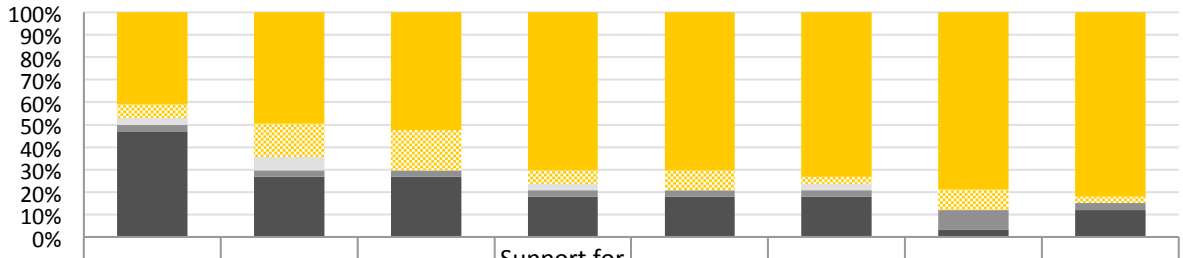
I was very dissatisfied with my Unite experience. We were told that we would be getting a junior level competitive engineering experience, but instead we got a sophomore level academic fitness program for failing students in the form Socolo Reach. It was a grave error to mix the two programs, as each had separate and distinct goals. If I was not receiving free food and a $500 stipend, I would have quit the program week one. I will most certainly not be participating in Unite again. (Unite Student)

When asked how the program could be improved, 113 students answered, though 5 students (4%) indicated similar to the overall experience comments that Unite should not be combined with SoColo REACH. An additional 5 students (4%) responded that there should be no change. The most common theme in the responses to this open-ended item, described by 52 (46%) related to the program's content, and suggested that the science content be more rigorous. Other suggestions included improving the field trips (18%), having more hands-on and outdoor activities (12%), and increasing the length of the program, serving lunch or otherwise changing the schedule (13%).

Similar to the responses of the students, mentors also reported being somewhat or very much satisfied with the program components they experienced as shown in Chart 11. For example 85% were somewhat or very much satisfied with the field trips or laboratory tours, 88% were somewhat or very much satisfied with the physical location of Unite

activities, 77% were somewhat or very much satisfied with communication with the Unite site coordinators, 80% were somewhat or very much satisfied with invited speakers or career events, and 77% were somewhat or very much satisfied support for instruction or mentorship.

Chart 11: Mentor Satisfaction with UNITE Program Features (n = 34)



	Communicating with Technology Student Association (TSA)	Stipends (payment)	Application or registration process	Support for instruction or mentorship during program activities	Invited speakers or "career" events	Communicating with UNITE site coordinators	The physical location(s) of UNITE's activities	Field trips or laboratory tours
Very Much	41%	50%	53%	71%	71%	74%	79%	82%
Somewhat	6%	15%	18%	6%	9%	3%	9%	3%
A little	3%	6%	0%	3%	0%	3%	0%	0%
Not at all	3%	3%	3%	3%	3%	3%	9%	3%
Did not experience	47%	27%	27%	18%	18%	18%	3%	12%

Similar to the student questionnaire, the mentor questionnaire included open-ended items asking for their opinions about the program. One item asked them to identify the three most important strengths of Unite; 31 of 34 mentors responded to this question. Although several important aspects of the program were listed, the most frequently described was exposing students to the STEM careers (19 mentors, or 61%). Mentors wrote things like "hands-on STEM experiences" and "recognizing the importance of a diverse workforce." This sentiment was echoed in the mentor interviews. As three mentors said:

> *All students will be benefited to some extent. Some of the skills that they learn in the school, they may not have these benefits. That would give them an exposure how in the school traditional topics are taught, and at the college level what they would be seeing. Basically, scaling down some of the experimental activities, or hands-on activities, that K12 students can do, and get interest. By and large all the students will definitely see the benefits, but some of them may be better off to gain the experience. (Unite Mentor)*

The field trip for the STEM is real life in action kind of thing, but I also think the panel, special kinds of people on the panel, you get more information from those individuals who share what they're doing on the panel. They benefit from both, in both ways. (Unite Mentor)

Just in my observation of the students, it's really powerful for kids whose parents have blue-collar jobs that maybe 30 years ago didn't necessarily need a college degree in order to mobilize, and so they didn't go but they want their kid to go and don't necessarily know how to help them get from point A to point B. In addition to just trying to help them build professional identity, we also did some individual coaching with them. We take a look at where they are in terms of taking math, doing math classes in high school, and just putting some other things on their radar like what level math should you be at by the time you graduate from high school to really get considered for college in engineering, whether it's here at UCCS or anywhere. (Unite Mentor)

Other responses to the open-ended questionnaire item focused on Unite's emphasis on communication skills (31%), collaboration (18%), field trips (18%), hands-on activities (15%), and authentic STEM settings (9%).

Mentors were asked to note three ways in which Unite should be improved for future participants. Of the 26 out of 34 individuals who responded to this question, more than half (54%) indicated the need for additional resources such as "increase funding to support more participants". Like some of the students, several mentors suggested improvements to field trips (15%), either noting that there should be more field trips or that the type of field trips should be broadened. Some comments referred to including more STEM topics, others how projects or presentations should be designed, and adding more science related to engineering. Lastly, mentors were asked to share their overall satisfaction with their Unite experience. The responses were largely positive. Of the 27 out of 24 individuals who responded to this question, 100% described having a positive experience. For example:

Students in my chemistry class were able to study about seven important concepts that they will cover during the first half of chemistry. They were also able to master several basic math skills and calculator usage that will make them more confident and willing to tackle the math of chemistry. (Unite Mentor)

"It's an experience my school couldn't provide. I know, had it not been for Unite; I would have never been to an Army base. Except that one time in eighth grade, but that was still thanks to Unite."-- Unite Student

This was a wonderful opportunity to expose students from under-represented groups to important STEM topics and to encourage their involvement and excitement in high performance computing. I look forward to participating in the program again in the future. (Unite Mentor)

In summary the Actionable Program Evaluation evidence indicates that the program is actively engages students in authentic STEM experiences, and expanding their aspirations for the future. The purposeful site selection has allowed the program to recruit many students from underrepresented and underserved students. The marketing of Unite could be reinforced through a more concentrated social media campaign.

Once in the Unite program, students learn about DoD or STEM job/careers, crediting participation in the program and invited speakers as useful in this process. In an attempt to increase student engagement in the AEOP programs, mentors are also discussing other AEOPs with students, however many mentors are still not discussing of the specifics of the AEOP programs.

The Unite program actively engages students in learning about STEM and in STEM practices, more than they would typically experience in school. Students are very aware of the increased opportunities Unite provides, and have independently mentioned this aspect in open-ended questions. The majority of mentors reported employing strategies to help make the learning activities relevant to students, support the diverse needs of students as learners, support students' development of collaboration and interpersonal skills, and support student engagement in authentic STEM activities. 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, careers), attitudes toward research, and their knowledge of and interest in participating in additional AEOP opportunities.[14] STEM competencies are necessary for a STEM-literate citizenry. STEM 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. As explained in Chart 12, nearly all responding students reported gains in their STEM knowledge as a result of the Unite program, with large majorities indicating large or extreme gains in each area. For example, large or extreme gains were reported by 78% of students on their knowledge of how professionals work on real problems in STEM, and 74% on their knowledge of what everyday research work is like in STEM. Similar impacts were reported on knowledge of research conducted in a STEM topic or field (73%), knowledge of a STEM topic or field in depth (72%), and knowledge of research processes, ethics, and rules for conduct in STEM (68%). Mentors reported similar impacts on their students' STEM knowledge (see Appendix C).

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

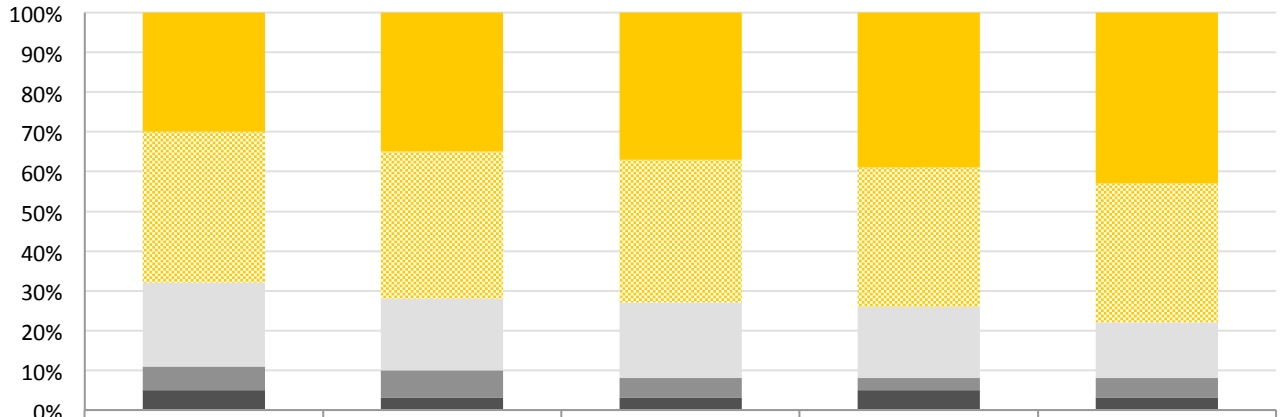
Committee on STEM Education. (2013*). Federal Science, Technology, Engineering, and Mathematics (STEM) education 5-year strategic plan: A report from the Committee on STEM Education, National Science and Technology Council.* Washington, DC: The White House, Office of Science and Technology Policy.

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.

Chart 12: Student Report of Impacts on STEM Knowledge (n = 153-154)



	Knowledge of research processes, ethics, and rules for conduct in STEM	Knowledge of research conducted in a STEM topic or field	In depth knowledge of a STEM topic(s)	Knowledge of what everyday research work is like in STEM	Knowledge of how scientists and engineers work on real problems in STEM
Extreme gain	30%	35%	37%	39%	43%
Large gain	38%	37%	36%	35%	35%
Some gain	21%	18%	19%	18%	14%
A little gain	6%	7%	5%	3%	5%
No gain	5%	3%	3%	5%	3%

For the purposes of looking closer at the types of competencies impacted by Unite, the student questionnaire also asked about perceived impacts on STEM skills, i.e., students' abilities to use STEM practices. Students were presented with different sets of items depending on the focus of their Unite experience (science vs. technology, engineering, or mathematics). Table 22 shows the percentage of responding students reporting large or extreme gains in science-related practices. About three-quarters of the responding students reported large or greater gains on their ability to make a model to represent the key features and functions of an observed phenomenon (29%), defend an argument that conveys how an explanation describes an observed phenomenon (83%), integrate information from technical or scientific texts (78%), and carry out an investigation (73%). Fewer responding students, but still more than half, reported large gains on their ability knowledge and creativity to suggest a testable explanation for an observation (70%), use computer models of objects or systems to test cause and effect relationships (70%), organize data in charts or graphs to find patterns and relationships (65%), consider different interpretations of data when deciding how the data answer a question (65%), support an explanation for an observation with data from experiments (65%), and ask a question that can be answered with one or more scientific experiments (65%). Percentages of large or extreme gains for all categories reported in 2015 were roughly 20% higher than the survey results in 2014. These student questionnaire

items were combined into a composite variable[15] to test for differential impacts across subgroups of students. There were no significant differences by gender. However, low-SES students reported higher gains in STEM knowledge compared to students with higher-SES (small effect size of d = 0.410 standard deviations).[16] .

Table 22. Students Reporting Large or Extreme Gains in their STEM Competencies – Science Practices (n = 22-23)	
Item	**Questionnaire Respondents**
Making a model of an object or system showing its parts and how they work	83%
Defending an argument that conveys how an explanation best describes an observation	83%
Integrating information from technical or scientific texts and other media to support your explanation of an observation	78%
Communicating about your experiments and explanations in different ways (through talking, writing, graphics, or mathematics)	78%
Carrying out procedures for an experiment and recording data accurately	73%
Using knowledge and creativity to suggest a testable explanation (hypothesis) for an observation	70%
Using computer models of objects or systems to test cause and effect relationships	70%
Organizing data in charts or graphs to find patterns and relationships	65%
Considering different interpretations of data when deciding how the data answer a question	65%
Supporting an explanation for an observation with data from experiments	65%
Asking a question that can be answered with one or more scientific experiments	65%

Table 23 shows data for students whose experience focused on the other STEM areas (technology, engineering, and mathematics), specifically self-reported impacts on their abilities related to key engineering practices. A majority of responding students reported large or extreme gains in each of the engineering practices, except for organizing data in charts or graphs to find patterns and relationships (49%). For example, 70% indicated large or extreme gains on their ability to make a model of an object or system to show its parts and how they work. The reported gains in engineering practices are similar to those reported for science practices.

[15] The Cronbach's alpha reliability for these 5 items was 0.956.

[16] Two-tailed independent samples t-test, $t(106) = 2.11$, $p = 0.038$.

Table 23. Students Reporting Large or Extreme Gains in their STEM Competencies – Engineering Practices (n = 128-133)	
Item	**Questionnaire Respondents**
Making a model of an object or system to show its parts and how they work	70%
Communicating information about your design experiments and solutions in different ways (through talking, writing, graphics, or math equations)	68%
Carrying out procedures for an experiment and recording data accurately	67%
Using knowledge and creativity to propose a testable solution for a problem	65%
Defining a problem that can be solved by developing a new or improved object, process, or system	61%
Considering different interpretations of the data when deciding if a solution works as intended	59%
Supporting a solution for a problem with data from experiments	58%
Using computer models of an object or system to investigate cause and effect relationships	57%
Integrating information from technical or scientific texts and other media to support your solution to a problem	56%
Defending an argument that conveys how a solution best meets design criteria	56%
Organizing data in charts or graphs to find patterns and relationships	49%

Composite scores were calculated for each set of practices items[17] on the student questionnaire to examine whether the Unite program had differential impacts on subgroups of students. There were no significant differences by gender. However, low-SES students reported higher gains on each composite compared to students with higher-SES (moderate effect size of d = 0.530 standard deviations for Science Practices and a small effect size of d = .282 standard deviations for Engineering Practices).[18]

The student questionnaire also asked students about the impact of Unite on their "21st Century Skills" that are necessary across a wide variety of fields. As seen in Chart 13, students reported that they had extreme or large gains in all categories. Notably, over 75% of the students reported extreme or large gains in all of the 21st Century Skills listed on the questionnaire. A composite score was calculated for the six items[19]. There were no significant differences by gender.

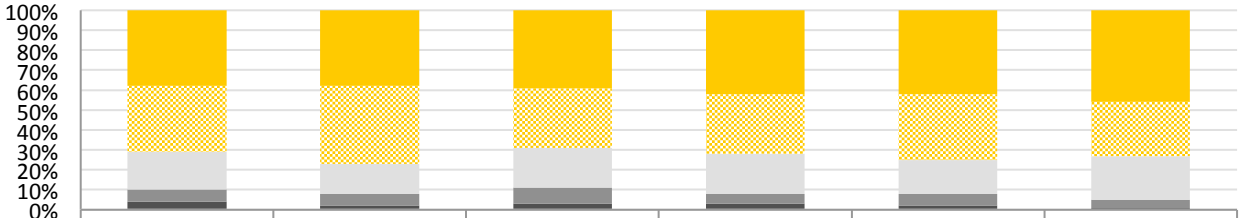
[17] The science practices composite has a Cronbach's alpha reliability of 0.911; the engineering practices composite has a Cronbach's alpha reliability of 0.961.

[18] Two-tailed independent samples t-test, $t(16) = 2.50$, $p = 0.024$; $t(89) = 2.77$, $p = 0.007$.

[19] 21st Century Skills composite has a Cronbach's alpha reliability of .944.

However, low-SES students reported higher gains on 21st Century Skills Gains compared to students with higher-SES (small effect size of d = 0.456 standard deviations).[20]

Chart 13: Student Report of Impacts on 21st Century Skills (n = 154-156)



	Sticking with a task until it is finished	Communicating effectively with others	Making changes when things do not go as planned	Viewing failure as an opportunity to learn	Including others' perspectives when making decisions	Working well with students from all backgrounds
Extreme gain	38%	38%	39%	42%	42%	46%
Large gain	33%	39%	30%	30%	33%	27%
Some gain	19%	15%	20%	20%	17%	22%
A little gain	6%	6%	8%	5%	6%	4%
No gain	4%	2%	3%	3%	2%	1%

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 if they do not see themselves as capable of succeeding in STEM.[21] Consequently, the student questionnaire included a series of items intended to measure the impact of Unite on students' STEM identity. Chart 14 strongly shows results that strongly suggest the program has had a positive impact in this area. Between 65% and 72% of students reported a large or extreme gain in connecting a STEM topic to their personal values, a sense of accomplishment in something STEM, an interest in a new STEM topic, thinking creatively about a STEM project, the desire to build relationships with mentors who work in STEM, considering a path to pursue a STEM career, and sense of preparedness for more challenging STEM activities. Comparing results on the composite created from these items,[22] and composite scores were compared across subgroups of students. There were no significant differences by gender. However, low-SES students

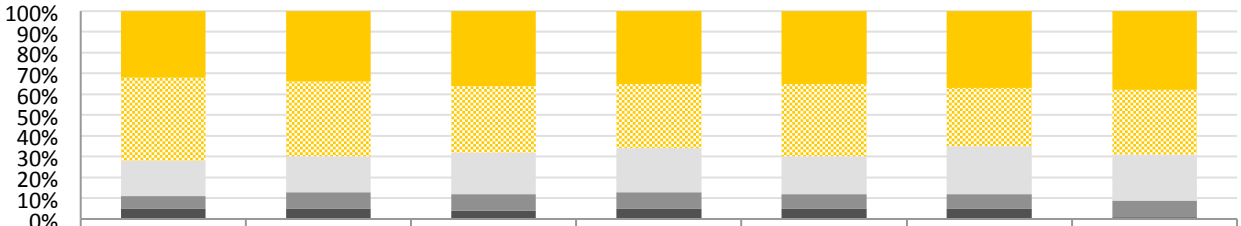
[20] Two-tailed independent samples t-test, $t(107) = 2.36$, $p = 0.020$.

[21] 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.

[22] The Cronbach's alpha reliability for these 7 items was 0.958.

reported higher gains on STEM Identity Gains compared to students with higher-SES (small effect size of d = 0.466 standard deviations).[23]

Chart 14: Student Report of Impacts on STEM Identity (n = 153-156)



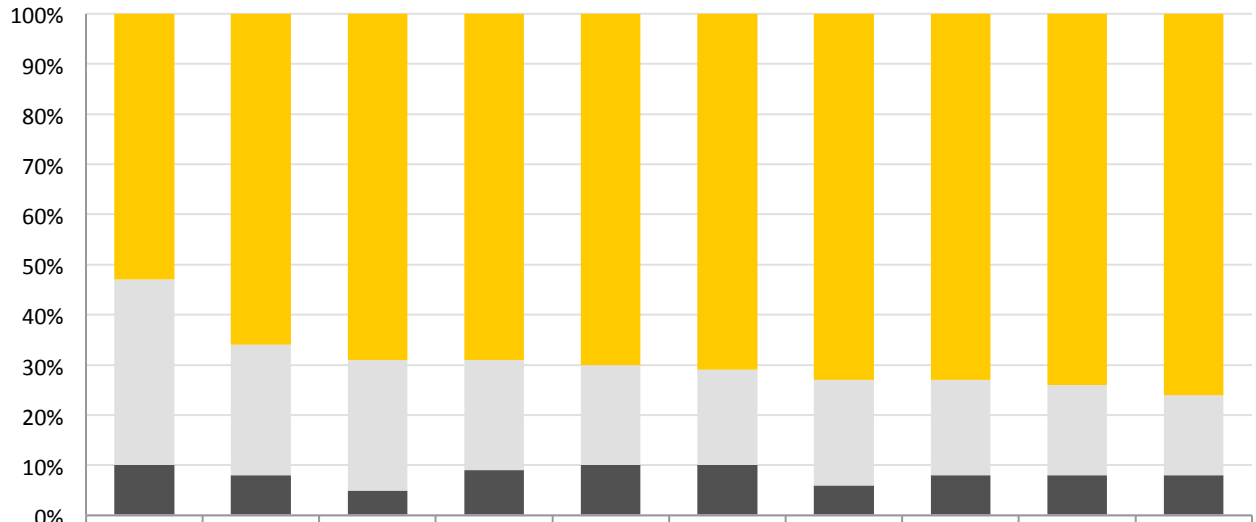
	Connecting a STEM topic or field to my personal values	Sense of accomplishing something in STEM	Interest in a new STEM topic	Thinking creatively about a STEM project or activity	Desire to build relationships with mentors who work in STEM	Deciding on a path to pursue a STEM career	Feeling prepared for more challenging STEM activities
Extreme gain	32%	34%	36%	35%	35%	37%	38%
Large gain	40%	36%	32%	31%	35%	28%	31%
Some gain	17%	17%	20%	21%	18%	23%	22%
A little gain	6%	8%	8%	8%	7%	7%	8%
No gain	5%	5%	4%	5%	5%	5%	1%

Interest and Future Engagement in STEM. Developing a STEM-literate citizenry is a key goal of the AEOP programs. To do so, students need to be engaged in and out of school with high quality STEM activities. In order to 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 experience, as well as their interest level in participating in future AEOP programs. Chart 15 shows that students indicated they were more likely to engage in many of these activities as a result of Unite. For example, 76% of students reported they are more likely to participate in a STEM camp, fair, or competition; 74% reported being more likely to tinker with a mechanical or electrical device; 73% to work on a STEM project or experiment in a university or professional setting; and 73% to talk with friends or family about STEM. The percentages of students more likely to engage in these activities increase by roughly 10% from 2014 to 2015. A composite score was created from these items,[24] and composite scores were compared across subgroups of students. There were no statistically significant differences by gender, or FRL status.

[23] Two-tailed independent samples t-test, $t(107) = 2.41$, $p = 0.018$.

[24] These 10 items had a Cronbach's alpha reliability of 0.943.

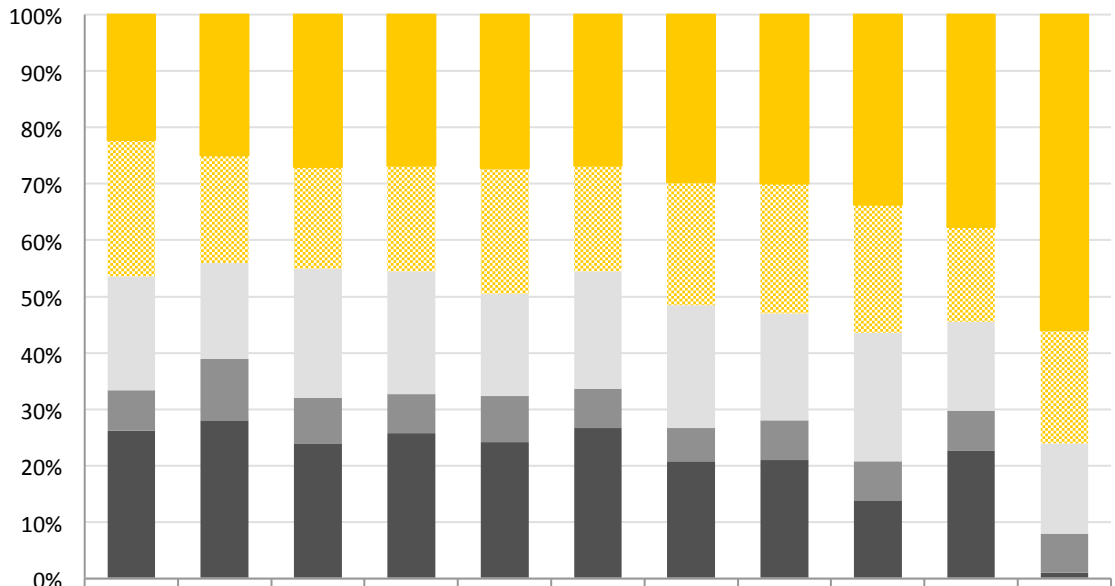
Chart 15: Change in Likelihood Students Will Engage in STEM Activities Outside of School (n = 154-155)



	Watch or read non-fiction STEM	Mentor or teach other students about STEM	Work on solving mathematical or scientific puzzles	Help with a community service project related to STEM	Take an elective (not required) STEM class	Use a computer to design or program something	Talk with friends or family about STEM	Work on a STEM project or experiment in a university or professional setting	Tinker (play) with a mechanical or electrical device	Participate in a STEM camp, club, or competition
More likely	53%	66%	69%	69%	70%	71%	73%	73%	74%	76%
About the same	37%	26%	26%	22%	20%	19%	21%	19%	18%	16%
Less likely	10%	8%	5%	9%	10%	10%	6%	8%	8%	8%

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 future AEOP programs. As Chart 16 shows, a large majority (76%) indicated being interested in participating in Unite again. Roughly 40-50% of the students reported interest in the other AEOP programs in the future. For example, 57% reported interest in REAP, 55% in SMART, 53% in HSAP, and 52% in SEAP.

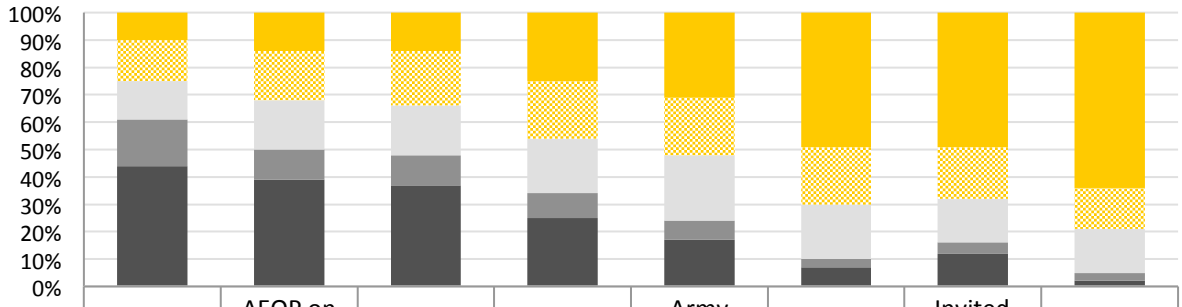
Chart 16: Student Interest in Future AEOP Programs (n = 152-156)



	JSHS	GEMS Near Peer Mentor Program	GEMS	CQL	URAP	NDSEG	SEAP	HSAP	REAP	SMART	UNITE
Very Much	22%	25%	27%	27%	27%	27%	30%	30%	34%	38%	56%
Somewhat	24%	19%	18%	19%	22%	19%	22%	23%	23%	17%	20%
A little	20%	17%	23%	22%	18%	21%	22%	19%	23%	16%	16%
Not at all	7%	11%	8%	7%	8%	7%	6%	7%	7%	7%	7%
I've never heard of this program	26%	28%	24%	26%	24%	27%	21%	21%	14%	23%	1%

To better understand how to communicate information about other AEOP programs, students were asked which resources impacted their awareness of the various AEOPs. As shown in Chart 17, participation in Unite was most likely to be rated as impacting their awareness "somewhat" or "very much" (79%). Invited speakers or career events (68%), their mentor (70%), the AEOP website (52%), and the AEOP brochure (56%). To a lesser extent, the TSA website (34%), social media (32%) and It Starts Here! Magazine (25%) had an impact on student awareness of AEOPs.

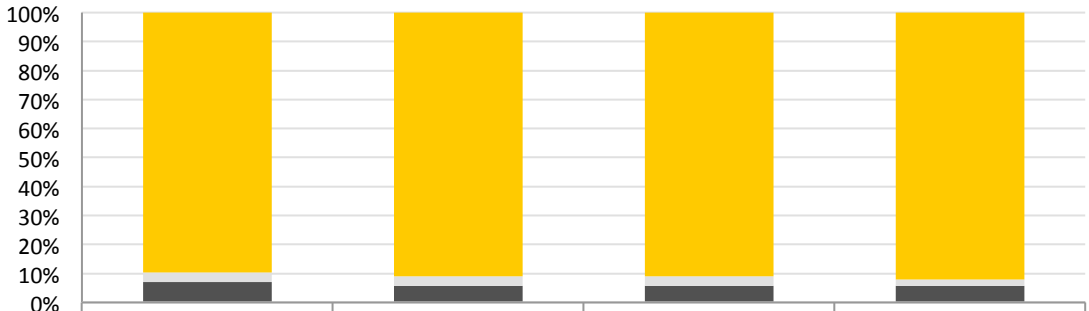
Chart 17: Impact of Resources on Student Awareness of AEOPs (n = 152-155)



	It Starts Here! Magazine	AEOP on Facebook, Twitter, Pinterest or other social media	Technology Student Association (TSA) website	AEOP brochure	Army Educational Outreach Program (AEOP) website	My UNITE mentor(s)	Invited speakers or "career" events during UNITE	Participation in UNITE
Very Much	10%	14%	14%	25%	31%	49%	49%	64%
Somewhat	15%	18%	20%	21%	21%	21%	19%	15%
A little	14%	18%	18%	20%	24%	20%	16%	16%
Not at all	17%	11%	11%	9%	7%	3%	4%	3%
Did not experience	44%	39%	37%	25%	17%	7%	12%	2%

Attitudes toward Research. An important prerequisite to their continued interest in the field and potential involvement 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. Chart 18 displays the data indicate that most responding students have favorable opinions in all of the areas on the questionnaire. For example, 81% agreed or strongly agreed that DoD research is valuable to society, 80% that DoD researchers develop cutting-edge technologies, and 81% that DoD researchers solve real-world problems. The percentage of students with positive opinions increased by 15-20% from 2014 to 2015.

Chart 18: Student Opinions about DoD Researchers and Research (n = 154-156)



	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
Strongly agree or agree	77%	80%	81%	81%
Neither agree nor disagree	3%	3%	3%	2%
Strong disagree or disagree	6%	5%	5%	5%

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 24, when asked to think back on how far they wanted to go in school before participating in Unite, 45% wanted to finish college with a Bachelor's degree and 48% wanted to get more education after college. After their participation in Unite, these percentages indicated that 73% students wanted to get more education after college, and 23% wanted to finish with a Bachelor's degree. This indicates that Unite was very impactful on student's aspirations for higher education.

Table 24. Student Education Aspirations (n = 156)

	Before Unite	After Unite
Graduate from high school	4%	4%
Go to a trade or vocational school	1%	0%
Go to college for a little while	2%	0%
Finish college (get a Bachelor's degree)	45%	23%
Get more education after college	48%	73%

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 25 indicate that a substantial portion of responding students shifted their career aspirations from non-STEM related fields to STEM related

fields. For example, 26% indicated aspiring to a career in engineering before Unite, with another 22% interested in medicine. After Unite, 34% of students expressed interest in engineering, and 16% in medicine.

Table 25. Student Career Aspirations (n = 150)		
	Before Unite	**After Unite**
Engineer or architect	26%	34%
Work in the medical field (doctor, nurse, lab technician)	22%	16%
Other, (specify):	11%	10%
Work in computers or technology	6%	9%
Undecided	8%	6%
Military, police, or security	5%	6%
Scientist or researcher	3%	5%
Artist (writer, dancer, painter)	4%	4%
Athlete or other work in sports	7%	4%
Teacher	1%	2%
Lawyer	5%	2%
Business person or manager	1%	1%
Skilled craftsperson (carpenter, electrician, machinist)	1%	1%

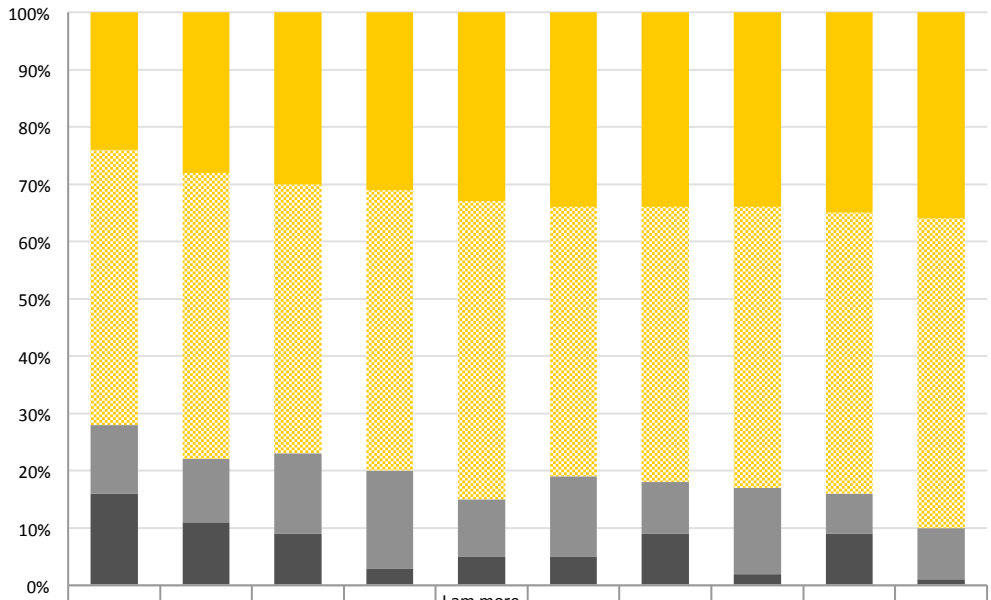
Students were also asked the extent to which they expect to use their STEM knowledge, skills, and/or abilities in their work when they are age 30. As seen in Table 26, 98% students expect to use STEM somewhat in their career. A majority of participants (70%) expect to use STEM at least half of the time in their work at age 30, and 20% expect to use STEM 26-50% of the time.

Table 26. Students Expecting to use STEM in Their Work at Age 30 (n = 156)	
	Questionnaire Respondents
Not at all	2%
Less than 25% of the time	8%
26% to 50% of the time	20%
51% to 75% of the time	37%
75% to 100% of the time	33%

Overall Impact. Students were asked about impacts of participating in Unite more broadly. From these data shown in Chart 19, it is clear that students thought the program 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, students indicated increased awareness of other AEOPs (35% reporting that Unite contributed, 49% reporting that Unite was primary reason) and more interest in participating in other AEOPs (34% and 48%). Students also reported greater appreciation of DoD STEM research and careers (30% and 47%), awareness of DoD STEM research and careers (28% and 50%), and interest in pursuing a STEM career with the DoD (24% and 48%). These items were combined into a composite variable[25] 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 substantially higher than those of the students.

[25] The Cronbach's alpha reliability for these 10 items was 0.921.

Chart 19: Student Opinions of UNITE Impacts (n = 152-155)



	I am more interested in pursuing a STEM career with the Army or DoD	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 career in STEM	I am more interested in STEM activities outside of school requirements	I am more interested in taking STEM classes in school	I am more interested in other AEOPs	I am more interested in earning a STEM degree	I am more aware of other AEOPs	I am more confident in my STEM knowledge, skills, and abilities
Agree - UNITE was primary reason	24%	28%	30%	31%	33%	34%	34%	34%	35%	36%
Agree - UNITE contributed	48%	50%	47%	49%	52%	47%	48%	49%	49%	54%
Disagree - This happened but not because of UNITE	12%	11%	14%	17%	10%	14%	9%	15%	7%	9%
Disagree - This did not happen	16%	11%	9%	3%	5%	5%	9%	2%	9%	1%

An open-ended item on the questionnaire asked students explain the most impressive experience from Unite. Student responses addressed a variety of themes and 147 of 159 students responded (92%). By far the most impressive activities were learning how to code (33%), working with drones (19%) and building robots (40%). The other students referred to academic benefits, such as feeling more prepared for the upcoming school year and/or college, learning how to problem solve, or having a better idea about college.

"I was only ever interested in Mechanical, Electrical, and Civil Engineering because I was pretty hopeless and frustrated as far as Computer Engineering (programming) was concerned. However, after joining Unite, I realized that it takes time and experience and I am now a bit more confident that I can program better.-- Unite Student

Student comments from the interviews expand on how impactful Unite was to them. As two said:

> *My Engineering class was amazing my two years at the Unite Program! We were able to build robots, a radio, fly drones, and more! I know understand why engineers' jobs are so important to our lives, they actually play a big role in our lives when you think about it! Mathematics played a huge role because I have always loved math, but being in Unite. I have grown to love it more, I had a understanding that math plays a role in majority of the STEM careers and our life! Also being taught by an excellent math teacher was fun, because now I have a head start for the next school year. My Unite communication class was very helpful as well to everyday life. The skills I had before I came to Unite where good, but completing that communication class made it better! The science class I took at Unite was fun, we did hands on experiments which helped me remember information that I will need for the upcoming school year!* (Unite Student)

> *We had speakers to come and tell us about how their job is related to engineering, and one of them came from the Army engineering job. And we had another speaker who was from engineering, and they had an office in New Orleans. He was telling us about how his job relates to engineering too. And we had NASA, then they were engineering also.* (Unite Student)

Summary of Findings

The FY15 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 27.

Table 27. 2015 Unite Evaluation Findings	
Participant Profiles	
Unite experienced growth in program interest and participation from most underrepresented groups, but fewer females and students from K-12 Title I schools were represented.	Unite was successful in achieving a 12% increase in applicants to the program in FY15. Enrollment data indicate that the overall enrollment increased 6% (FY15 200 participants; FY14 189 participants). However, the number of participating K-12 Title I schools decreased by 32% and the participation of females decreased in FY15 (45%) from FY14 (65%).
	In FY15, Unite enrollment included students from historically underrepresented and underserved minority race/ethnicity and low-income groups. Records indicate that a majority (39%) of students who indicated a race/ethnic category identified as Black or African American, and 14% as Hispanic or Latino/a. A majority of students responding to the evaluation questionnaire reported qualifying for free or reduced-price lunch (51%). Attracting a majority of students from historically underrepresented and underserved groups and free or reduced price lunch qualifiers as Unite students were also evident in 2014, demonstrating a consistent pattern, though percentages for each group decreased in FY15.
	Unite served students from school contexts that tend to have a higher number or proportions of underserved groups. Most student questionnaire respondents attended public schools (78%) and schools in urban settings (44%) or frontier/tribal schools (8%).
Demographic characteristics of Unite mentors reflect the diversity of the student participants.	Students most frequently learned about the local Unite program from past participants (18%), or mentors from the Unite program (16%). Only 3% of students reported learning about Unite from social media. Likewise, mentors reported learning about Unite from past participants (64%) and 0% of mentors learned about Unite from social media.
Students are motivated to learn more about STEM through Unite programs.	Stu sor
Unite successfully engages students in team-based, hands-on STEM learning that	80% of responding students indicated working as part of a team on most days or every day, 71% reported participating in hands-on activities and 69% reported analyzing data or information on most or every day.

is meaningful.	In addition, students indicated being integrally involved the work of STEM on most days or every day, including posing questions to investigate (68%), coming up with creative explanations or solutions (65%), using laboratory procedures and tools (62%), drawing conclusions (62%), designing investigations (57%), and carrying out investigations (60%). The amount of student engagement in STEM practices in Unite has remained consistently high in all items as compared to 2014
Students are motivated to learn more about STEM through Unite programs.	Students reported greater opportunities to learn about STEM and greater engagement in STEM practices in their Unite experience than they typically have in school.
Unite successfully engages students in team-based, hands-on STEM learning that is meaningful. **Unite promotes overall STEM research and careers but can improve marketing of other AEOP opportunities.**	The majority of mentors reported that students engaged in STEM activities that were meaningful and authentic, indicating that perceptions of the usefulness of activities for students and mentors were aligned.
	Unite sites offered a variety of activities for promoting STEM careers, including interactive expert panels, off- and on-campus STEM expos, and field trips to Army, university, and other research labs and facilities. In open-ended question responses, Unite students mentioned these activities as the most impactful.
	Similar to findings of the FY14 Unite evaluation, 80% of Unite students are unaware of other AEOP programs when they register for Unite. Further, most mentors had no awareness of or past participation in an AEOP initiative beyond Unite. As was the case in FY14, mentors report that they mention other student opportunities, but do not discuss specific programs in AEOP.
	Participation in Unite (68%), invited speakers or career events (58%), and students' mentors (60%) were most often reported as being somewhat or very much responsible for student awareness of DoD STEM careers. The 2015 percentages were similar to the trends found in 2014.
The Unite experience is greatly valued by students and mentors. **Outcomes Evaluation**	Mentors and students were very satisfied with the Unite program. The categories that were most mentioned were field trips or laboratory tours, physical location of Unite activities, communication with the Unite site coordinators, invited speakers or career events, and instruction or mentorship.
	The majority of responding mentors indicated having a positive experience with Unite. Mentors commented that the program provides students a way to deepen their knowledge about STEM and gain insight into a college experience.
Unite increased students' STEM knowledge and competencies, particularly in groups traditionally	Unite students reported large or extreme gains on their knowledge of how professionals work on real problems in STEM, what everyday research work is like in STEM, a STEM topic or field in depth, the research processes, ethics, and rules for conduct in STEM, and research conducted in a STEM topic or field. Students who

underserved and underrepresented in STEM.	qualified for free and reduced lunch reported higher gains in STEM knowledge compared to students who did not qualify for free and reduced lunch programs.	
	Although a vast majority of students reported that Unite contributed to gains in knowledge about science and engineering practices, students who qualified for free and reduced lunch reported higher gains in science and engineering practices compared to students who did not qualify for free and reduced lunch programs.	
Unite increased participating students' 21st Century Skills.		Ov Ski stu
Unite mentors were skilled in supporting students traditionally underserved or underrepresented in STEM. Unite succeeded in raising students education aspirations, and students shifted their career aspirations toward STEM after their Unite experience.	100% of mentors reported treating all students the same way, regardless of gender or race/ethnicity, and 97% indicated using diverse teaching/mentoring activities. Many mentors provided extra readings for students who lacked essential background knowledge and skills (85%), helped students find additional support if needed (79%), tried to find out about student learning styles (76%), and integrated ideas from education literature to teach/mentor students from groups underrepresented in STEM.	
	After participating in Unite, students indicated being more likely 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, 73% after).	
Unite increased participating students' 21st Century Skills.	Students were asked to indicate what kind of work they expected to be doing at age 30, and the data were coded as STEM-related or non-STEM-related. More students shifted away from medical careers toward engineering and computer science careers after Unite.	
Unite students show substantial interest in future AEOP opportunities, but are largely unaware of the specifics of joining other AEOP programs.	The majority of students indicated wanting to participate in another AEOP program after Unite, however 20% indicated they had not heard of other AEOP programs even after the Unite experience. Only 61% of mentors recommended other AEOP programs to students.	
Unite continues to successfully raise awareness of STEM research and careers overall, and DoD STEM research and careers specifically.	99% of students indicated they were aware of STEM careers because of Unite, and 86% reported learning about STEM DoD careers in Unite. Further, more mentors discussed STEM careers within the DOD or government in 2015 than in 2014 (57% in 2014, 62% in 2015). However, the number of participating Army S&E's decreased by 55% in FY15.	
Unite provides STEM	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. Scores	

experiences for students that are not typically experienced in school.	were significantly higher on the "in Unite" versions of both composites than on the in school versions. These data indicate that Unite provides students with more intensive STEM learning experiences than they would typically receive in school.

Recommendations

Evaluation findings indicate that FY15 was a successful year for the Unite program. Unite has had consistent success attracting both students and mentors from traditionally underrepresented and underserved groups. This success may be attributed to Unite's program focus being only on including underrepresented and underserved participants[26]. Unite has experienced success in recruiting diverse STEM mentors and have had women, Black or African American, and Hispanic and Latino/a students and mentors in FY14 and FY15. Students and mentors overwhelmingly reported their satisfaction with the Unite experience. In particular, Unite has shown to increase student STEM experiences, science and engineering practices and has promoted awareness of STEM careers with the students. The mentors have reported they have used effective instructional techniques that students report are engaging. The Unite program succeeded in increasing STEM knowledge and skills of students, increasing mentor and student diversity, encouraged students to pursue additional post-graduate studies, and providing an authentic hands-on experience for students.

While the successes for Unite detailed above are commendable, there are some areas that remain with 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 2014 and 2015, Unite has engaged a majority of female, Black or African American, and Hispanic or Latino/a students and mentors, which is a positive trend. 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.

2. Student and mentor recruitment for Unite is largely accomplished with personal interactions, either by knowing a professor or peer who attended Unite previously. Only a few respondents mentioned the AEOP website as their initial source of information about Unite, and only 1% of students and no mentors mentioned social media as a source. As a result, the ability of Unite to recruit underserved or underrepresented populations of students depends upon the diversity of the schools in which recruitment takes place. Thus, 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.

3. Unite is very effective in giving students authentic opportunities to engage in STEM knowledge and skills, and for mentors to build the next generation of STEM professionals. Nearly all mentors reported asking students to relate outside events or activities to topics covered in the program and giving students real-life problems, and a vast

[26] 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).

majority helped students see how STEM can affect them or their communities. Almost all mentors tried to learn about the students and their interests at the beginning of the program. However, one area that was weak in terms of mentor-student interactions was the mentors selecting readings or activities the related to students' backgrounds, and mentors highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM. 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.

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

1. Few mentors were aware of specific AEOP programs and even fewer mentors explicitly discussed other AEOP opportunities with their students. This lack of awareness is a barrier in communicating about other AEOP opportunities. In an effort to increase and standardize the information provided to students, it would be beneficial to create a resource that profiles AEOP programs and the relationship they have to ongoing education, on-the-job training, and related research activities of Army careers. Such a resource could not only start the conversation about AEOP programs and motivate further exploration beyond the resource itself, but could be used to train the mentors to learn more about specific AEOP opportunities. The application to be a mentor could ask for their plan to explicitly discuss these resources thus expanding the network of ongoing opportunities for the students. This is particularly important for Unite since it engages students before students make decisions about college and career.

2. Unite program administrators may also want to build in systematic opportunities to provide this information to their students about DoD STEM research and careers. The field trips informed students about science and engineering opportunities with the Army, but because of the variety of locations of Unite programs, the field trips are not consistent from site to site. In an effort to increase and standardize the information provided to students, it would be 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&E's in the Unite program. Engaging more S&E's will provide more opportunities for participants to interact with real-world Army/DoD role models. These suggested resources could not only start the conversation about Army STEM careers and motivate further exploration beyond the resource itself, but could be used to train the mentors to learn more about specific Army/DoD STEM research and careers.

3. Efforts should be undertaken to improve participation in evaluation activities, as the low response rates for both the mentor questionnaires raise questions about the representativeness of the results. Low response rates were a concern during the 2013, 2014 and 2015 questionnaire administration, and this indicates an ongoing problem for survey response rates. Improved 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 the

questionnaires are quite lengthy (estimated response time 45 minutes) and response fatigue can affect participation.

Appendices

Appendix A

FY15 Unite Evaluation Plan

Questionnaires

Purpose

Per the FY15 Army Education Outreach Program (AEOP) Annual Program Plan (APP), Virginia Tech will conduct an evaluation study of Unite that includes two post-program questionnaires:

1. AEOP Youth Questionnaire to be completed by student participants of the Unite program at all ten university sites; and
2. AEOP Mentor Questionnaire to be completed by Unite instructors (typically a University or Army Scientist or Engineer), Unite Classroom Assistants, Unite Resource Teachers, and/or others 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 FY14 to FY15, 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 Youth and a Mentor questionnaire provided to them by VT. AEOP-wide Youth 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.

Youth Questionnaire Administration Details

- Distribute the survey near or after the conclusion of an event or the students' Unite experience;
- Please encourage youth participants 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 a reminder for 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 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:

Youth Participants – Evaluation Questionnaire Invitation

Dear Unite participant,

Evaluators from Virginia Tech 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 2015, more than 200 students and 100 adults will participate in Unite and evaluators from Virginia Tech 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: Unique URL generated by CVENT
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.*

If you have any questions about these surveys or your participation in the evaluation study please contact the AEOP Evaluation team at Virginia Tech: Tanner Bateman – tbateman@vt.edu.

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 (typically a University or Army Scientist or Engineer), Unite Classroom Assistants, Unite Resource Teachers, and/or others 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 them;
- 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 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 2015 Unite program in support of one or more students' learning experience(s).

Evaluators from Virginia Tech are conducting program evaluation on behalf of the Technology Student Association (TSA) and U.S. Army. The purpose of 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). Virginia Tech 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 Virginia Tech 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** provided by the CVENT system*
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.*

If you have any questions about the evaluation, these surveys, or your participation in the evaluation, please contact the AEOP Evaluation team: Tanner Bateman at tbateman@vt.edu.

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

Regards,

Telephone Interviews

Purpose

Per the FY15 Army Education Outreach Program (AEOP) Annual Program Plan (APP), Virginia Tech will conduct an evaluation study of Unite that includes telephone interviews with adult and student Unite participants.

Interviews provide the evaluation team first-hand opportunities to speak with youth and adult Unite participants. The contextual information gleaned from these interviews help evaluators understand the nuance of the evaluation data collected from questionnaires, adding depth to evaluative findings. VT's interview assessment efforts focus on program successes and attempt to inform useful program changes so that Unite can improve in the future.

Evaluation activities during Virginia Tech's Phone Interview

- 8 – 12 one-on-one phone interviews with Unite youth (approx. 15-20 min. each);
- 5 – 8 one-on-one phone interviews with Unite adult participants (approx. 15-20 min each);

Selecting Interview Participants

VT will purposefully sample from Unite participants using CVENT enrollment data (site name, student/mentor participant names, gender, & race/ethnicity). The IPA and VT will "invite" selected participants that comprise the desired sample to participate via email through the CVENT portal. Participants will each RSVP prior to the scheduled interview date so that an alternate may be identified if needed.

Purposeful sampling is an attempt to assemble a sample of participants that are likely to provide information about the full range of experiences possible in Unite. The interview sample will be selected using the following information:

- Gender
- Grade level
- Racial/ethnic group
- Socio-economic status indicators (e.g., qualification for free or reduced-price lunches)
- Program Role (adult participants; resource teacher, instructor, speaker, etc.)

Scheduling and Technology:

VT will establish dates and times for each interview that accommodate the program activities for each site. The majority of these dates will occur in mid to late July – the purpose of which is to speak with participants after they have experienced the majority of experiences available in their Unite program. VT will attempt to convene interviews between 10 a.m. and 2 p.m. in each site's time zone to minimize disruption to the program.

A simple telephone will be used to conduct each interview. Evaluators at Virginia Tech will also use a recording device to record the interview. All recordings are used for note-taking and transcription purposes only. After transcription, audio files will be destroyed.

Obtaining Informed Assent/Consent: Prior to the Interview

Youth and adult participants should be informed of the evaluation interview *before* it is conducted. This ensures that individuals do not feel pressured to participate. It would be ideal if VT, the IPA, and event coordinators work together to invite youth and adults to participate and provide them with demographic surveys and consent/assent forms:

- Use the recruitment email text below to invite youth and adult participants to volunteer for interviews.
- Be sure to include the date and time of the interview as well as the location of the telephone that they can use for the interview call.
- Attach the appropriate assent/consent form to the email
    - **"2015.Unite.AdultConsent.PhoneInterview.docx"**
    - **"2015.Unite.MinorAssent.PhoneInterview.docx"**
- Attach the appropriate demographic survey for participants to fill out and email to the evaluators
    - **"2015.Unite.Adult PhoneInterveiw.DemoSurvey.docx"**
    - **"2015.Unite.Student PhoneInterview.DemoSurvey.docx"**
- VT evaluators will also provide and review the assent/consent forms with participants just prior to conducting the Interview. *Interviews will be audio-recorded for note taking purposes.*

Interview Invitation Email:

Dear [participant],

I would like to inform you that evaluators from Virginia Tech will be carrying out interviews with Unite participants on behalf of the Army Educational Outreach Program (AEOP). Virginia Tech is very interested in hearing your opinions about Unite and would like to formally invite you to participate in one of the interviews, on the telephone, at a time listed below.

Purpose of the Interview:

Evaluators from Virginia Tech are conducting the evaluation study to determine if Unite is achieving its objective(s) as a program, the results of which will be used by one of the primary sponsors of Unite (U.S. Army) to ensure funding for the program in the future. Interviews provide evaluators the opportunity to speak with students and mentors about their experiences in Unite which helps them illustrate and understanding how the Unite program affects participants. In the end, Virginia Tech's findings will demonstrate Unite's success as a program and to make Unite better for future participants.

Interview Logistics:

We are working with the VT evaluation team to organize an interview during your Unite event. Interviews are being conducted across the Unite program with student participants and with mentors (anyone who supervises, guides, or supports Unite students) Please look at the dates, times, and locations of the interviews and decide which one you are available to attend:

1. ***Student Interview #1: Date, Time, Location of telephone or quiet room***
2. ***Student Interview #2: Date, Time, Location of telephone or quiet room***
3. ***Mentor Interview: Date, Time, Location of telephone or quiet room***

Participating in the Interview:

Interviews will be conducted with students across all 10 Unite sites and evaluators will ask all participants the same series of questions. The interview will take 15 – 20 minutes of your time. If you do not volunteer, Virginia Tech evaluators would still like to hear from you so they will send you an evaluation questionnaire after Unite.

If you volunteer, please fill out the appropriate forms attached to this message – one for minors (17 yrs. or younger) and one for adults.

If you have questions about the Unite interviews, please contact the VT evaluation team:
Tanner Bateman - tbateman@vt.edu.

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 5-point scale (e.g., 1 = "Strongly Disagree" to 5 = "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 Unite 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

FY15 Unite Participant Data Summaries

Unite Participant Data Summary

So that we can determine how diverse students respond to participation in AEOP programs, please tell us about yourself and your school. What grade will you start in the fall? (select one)		
	Freq.	**%**
4th	0	0%
5th	0	0%
6th	0	0%
7th	0	0%
8th	0	0%
9th	0	0%
10th	15	11%
11th	82	62%
12th	34	26%
College freshman	2	2%
College sophomore	0	0%
College junior	0	0%
College senior	0	0%
Graduate program	0	0%
Other, (specify):	0	0%
Choose not to report	0	0%
Total	**133**	**100%**

What is your gender?		
	Freq.	**%**
Male	52	39%
Female	79	59%
Choose not to report	2	2%
Total	**133**	**100%**

What is your race or ethnicity?		
	Freq.	**%**
Hispanic or Latino	24	18%
Asian	6	5%
Black or African American	69	52%
Native American or Alaska Native	26	20%
Native Hawaiian or Other Pacific Islander	0	0%
White	7	5%
Other race or ethnicity, (specify):	0	0%
Choose not to report	1	1%
Total	**133**	**100%**

Do you qualify for free or reduced lunches at school?		
	Freq.	**%**
Yes	94	71%
No	32	24%
Choose not to report	7	5%
Total	**133**	**100%**

Which best describes the location of your school?		
	Freq.	**%**
Frontier or tribal school	17	13%
Rural (country)	5	4%
Suburban	25	19%
Urban (city)	82	64%
Total	**133**	**100%**

Where was the Unite program located?		
	Freq.	%
Alabama State University	14	7%
Florida International University	14	7%
Jackson State University	25	13%
New Jersey Institute of Technology	15	8%
Savannah State University	20	10%
South Dakota School of Mines and Technology	10	5%
University of Colorado, Colorado Springs	23	12%
University of New Mexico	9	5%
University of Pennsylvania	18	9%
Xavier University of Louisiana	52	26%
Total	**200**	**100%**

How did you learn about Unite? (Check all that apply)						
	Freq.	%			Freq.	%
AEOP on Facebook	1	1%		Family member	11	8%
Pinterest or other social media	1	1%		Friend	15	11%
Twitter	1	1%		Someone who works at the school or university I attend	15	11%
Choose Not to Report	3	2%		School or university newsletter, email, or website	17	13%
Friend or co-worker of a Family member	3	2%		Someone who works with program	21	16%
Army Educational Outreach Program (AEOP) website	4	3%		Past participant of program	24	18%
Community group or program	8	6%		Other, (specify):	5	4%

Why did you want to participate in Unite?	
Teacher or professor encouragement	17 (4%)
An academic requirement or school grade	4 (1%)
Desire to learn something new or interesting	71 (18%)
The mentor(s)	6 (2%)
Building college application or resume	34 (9%)
Networking opportunities	6 (2%)
Interest in science, technology, engineering, or mathematics (STEM)	85 (21%)
Interest in STEM careers with the Army	13 (3%)
Having fun	31 (8%)
Opportunity to do something with friends	3 (1%)
Opportunity to use advanced laboratory technology	21 (5%)
Desire to expand laboratory or research skills	10 (3%)
Learning in ways that are not possible in school	25 (6%)
Seeing how school learning applies to real life	6 (2%)
Serving the community or country	5 (1%)
Figuring out education or career goals	**32 (8%)**
Recommendations of past participants	2 (1%)
Exploring a unique work environment	16 (4%)
Earning stipends or awards for doing STEM	8 (2%)
Other	2 (1%)

How often do you do each of the following in STEM classes at school this year?

	Not at all	At least once	A few times	Most days	Every day	n	Avg.	SD
Learn about science, technology, engineering, or mathematics (STEM) topics that are new to you	5.8%	7.7%	19.9%	24.4%	42.3%	156	3.90	1.20
	9	12	31	38	66			
Apply STEM learning to real-life situations	9.0%	12.9%	25.2%	31.0%	21.9%	156	3.44	1.22
	14	20	39	48	34			
Learn about new discoveries in STEM	12.8%	10.9%	26.9%	25.6%	23.7%	156	3.37	1.31
	20	17	42	40	37			
Learn about different careers that use STEM	10.4%	11.7%	30.5%	26.0%	21.4%	156	3.36	1.24
	16	18	47	40	33			
Interact with scientists or engineers	21.3%	18.7%	21.9%	21.3%	16.8%	156	2.94	1.39
	33	29	34	33	26			
Communicate with other students about STEM	14.1%	8.3%	25.0%	25.0%	27.6%	156	3.44	1.35
	0	0	3	12	12			

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

	Not at all	At least once	A few times	Most days	Every day	n	Avg.	SD
Learn about science, technology, engineering, or mathematics (STEM) topics that are new to you	3.8%	6.4%	13.5%	20.5%	55.8%	156	4.18	1.13
	6	10	21	32	87			
Apply STEM learning to real-life situations	7.1%	5.8%	20.0%	31.0%	36.1%	155	3.83	1.19
	11	9	31	48	56			
Learn about new discoveries in STEM	7.7%	7.7%	19.4%	29.0%	36.1%	155	3.78	1.23
	12	12	30	45	56			
Learn about different careers that use STEM	2.6%	8.4%	19.5%	29.9%	39.6%	154	3.95	1.08
	4	13	30	46	61			
Interact with scientists or engineers	2.6%	13.5%	25.6%	21.8%	36.5%	156	3.76	1.16
	4	21	40	34	57			
Communicate with other students about STEM	3.2%	7.7%	16.7%	23.1%	49.4%	156	4.08	1.12
	5	12	26	36	77			

How often do you do each of the following in STEM classes at school this year?								
	Not at all	At least once	A few times	Most days	Every day	n	Avg.	SD
Use laboratory procedures and tools	5.1%	12.2%	42.3%	23.7%	16.7%	156	3.35	1.06
	8	19	66	37	26			
Participate in hands-on STEM activities	13.0%	16.9%	22.1%	27.3%	20.8%	154	3.26	1.32
	20	26	34	42	32			
Work as part of a team	4.5%	5.1%	31.4%	26.9%	32.1%	156	3.77	1.09
	7	8	49	42	50			
Identify questions or problems to investigate	8.4%	11.0%	27.7%	29.0%	23.9%	155	3.49	1.21
	13	17	43	45	37			
Design an investigation	18.1%	16.1%	30.3%	22.6%	12.9%	155	2.96	1.28
	28	25	47	35	20			
Carry out an investigation	15.0%	13.7%	33.3%	22.9%	15.0%	153	3.09	1.25
	23	21	51	35	23			
Analyze data or information	5.8%	9.6%	27.6%	33.3%	23.7%	156	3.60	1.12
	9	15	43	52	37			
Draw conclusions from an investigation	9.7%	17.4%	26.5%	31.6%	14.8%	155	3.25	1.19
	15	27	41	49	23			
Come up with creative explanations or solutions	10.9%	9.0%	32.1%	27.6%	20.5%	156	3.38	1.22
	17	14	50	43	32			
Build or make a computer model	42.3%	15.4%	21.2%	9.6%	11.5%	156	2.33	1.40
	66	24	33	15	18			

How often do you do each of the following in Unite this year?								
	Not at all	At least once	A few times	Most days	Every day	n	Avg.	SD
Use laboratory procedures and tools	8.4%	12.9%	17.4%	29.0%	32.3%	156	3.64	1.28
	13	20	27	45	50			
Participate in hands-on STEM activities	2.6%	10.5%	14.5%	24.3%	48.0%	152	4.05	1.14
	4	16	22	37	73			
Work as part of a team	0.7%	4.6%	13.8%	25.7%	55.3%	152	4.30	0.92
	1	7	21	39	84			
Identify questions or problems to investigate	4.6%	9.2%	18.3%	29.4%	38.6%	153	3.88	1.16
	7	14	28	45	59			
Design an investigation	10.5%	12.4%	19.6%	28.8%	28.8%	153	3.53	1.31
	16	19	30	44	44			
Carry out an investigation	9.2%	10.5%	20.4%	28.3%	31.6%	152	3.63	1.28
	14	16	31	43	48			
Analyze data or information	5.2%	8.4%	18.2%	29.2%	39.0%	154	3.88	1.17
	8	13	28	45	60			
Draw conclusions from an investigation	7.1%	13.0%	18.2%	29.9%	31.8%	154	3.66	1.25
	11	20	28	46	49			
Come up with creative explanations or solutions	7.1%	7.8%	19.5%	29.9%	35.7%	154	3.79	1.21
	11	12	30	46	55			
Build or make a computer model	26.1%	9.8%	24.8%	15.7%	23.5%	153	3.01	1.50
	40	15	38	24	36			

How much did each of the following resources help you learn about Army Educational Outreach Programs (AEOPs)?								
	0	**1**	**2**	**3**	**4**	**n**	**Avg.**	**SD**
Technology Student Association website	36.8%	11.0%	18.1%	20.0%	14.2%	155	2.64	1.49
	57	17	28	31	22			
Army Educational Outreach Program (AEOP) website	17.4%	7.1%	23.9%	21.3%	30.3%	155	3.40	1.43
	27	11	37	33	47			
AEOP social media	38.8%	11.2%	18.4%	18.4%	13.2%	152	2.56	1.48
	59	17	28	28	20			
AEOP brochure	25.2%	9.0%	20.0%	21.3%	24.5%	155	3.11	1.51
	39	14	31	33	38			
AEOP instructional supplies (Rite in the Rain notebook, Lab Coat, etc.)	43.8%	17.0%	13.7%	15.0%	10.5%	153	2.31	1.43
	67	26	21	23	16			
My mentor(s)	7.2%	3.3%	19.6%	20.9%	49.0%	153	4.01	1.21
	11	5	30	32	75			
Invited speakers or "career" events	12.3%	3.9%	15.5%	18.7%	49.7%	155	3.90	1.38
	19	6	24	29	77			
Participation in Unite	1.9%	2.6%	16.2%	14.9%	64.3%	154	4.37	0.98
	3	4	25	23	99			

Note. Response scale: **0** = "Did Not Experience," **1** = "Not at all," **2** = "A little," **3** = "Somewhat," **4** = "Very much".

How much did each of the following resources help you learn about STEM careers in the Army or Department of Defense (DoD)?								
	Did not experience	Not at all	A little	Somewhat	Very much	n	Avg.	SD
Technology Student Association (TSA) website	37.4%	12.3%	16.8%	20.6%	12.9%	155	2.59	1.48
	58	19	26	32	20			
Army Educational Outreach Program (AEOP) website	21.9%	10.6%	23.2%	24.5%	19.9%	151	3.10	1.42
	33	16	35	37	30			
AEOP on Facebook, Twitter, Pinterest or other social media	39.0%	14.9%	18.2%	13.6%	14.3%	154	2.49	1.47
	60	23	28	21	22			
AEOP brochure	26.3%	9.2%	22.4%	21.1%	21.1%	152	3.01	1.49
	40	14	34	32	32			
It Starts Here! Magazine	41.8%	17.6%	13.1%	15.7%	11.8%	153	2.38	1.45
	64	27	20	24	18			
My Unite mentor(s)	12.9%	8.4%	18.7%	23.2%	36.8%	155	3.63	1.39
	20	13	29	36	57			
Invited speakers or "career" events during Unite	11.6%	10.3%	20.0%	16.1%	41.9%	155	3.66	1.41
	18	16	31	25	65			
Participation in Unite	7.7%	6.5%	17.4%	15.5%	52.9%	155	3.99	1.29
	12	10	27	24	82			

How SATISFIED were you with each of the following?	Did not experience	Not at all	A little	Somewhat	Very much	n	Avg.	SD
Applying or registering for the program	0.0%	2.6%	13.5%	25.2%	58.7%	155	4.40	0.82
	0	4	21	39	91			
Communicating with your Unite site organizers	4.5%	4.5%	12.3%	26.0%	52.6%	154	4.18	1.10
	7	7	19	40	81			
The physical location(s) of Unite	0.7%	2.6%	11.8%	22.4%	62.5%	152	4.43	0.85
	1	4	18	34	95			
The variety of STEM topics available to you in Unite	0.6%	5.2%	14.3%	23.4%	56.5%	154	4.30	0.94
	1	8	22	36	87			
Teaching or mentoring provided during URAP activities	1.3%	4.6%	10.6%	20.5%	62.9%	151	4.39	0.94
	2	7	16	31	95			
Stipends (payment)	1.3%	3.9%	8.4%	11.7%	74.7%	154	4.55	0.90
	2	6	13	18	115			
Educational materials used during program activities	1.9%	2.6%	14.2%	25.2%	56.1%	155	4.31	0.94
	3	4	22	39	87			
Invited speakers or career events	2.6%	1.3%	12.3%	20.8%	63.0%	154	4.40	0.94
	4	2	19	32	97			
Field trips or laboratory tours	5.2%	3.9%	11.6%	12.9%	66.5%	155	4.32	1.14
	8	6	18	20	103			

AS A RESULT OF YOUR Unite EXPERIENCE, how much did you GAIN in the following areas?	No gain	A little gain	Some gain	Large gain	Extreme gain	n	Avg.	SD
In depth knowledge of a STEM topic(s)	3.3%	4.6%	19.0%	35.9%	37.3%	153	3.99	1.02
	5	7	29	55	57			
Knowledge of research conducted in a STEM topic or field	3.3%	6.5%	18.3%	37.3%	34.6%	153	3.93	1.04
	5	10	28	57	53			
Knowledge of research processes, ethics, and rules for conduct in STEM	5.2%	5.8%	20.8%	38.3%	29.9%	154	3.82	1.09
	8	9	32	59	46			
Knowledge of how scientists and engineers work on real problems in STEM	3.2%	4.5%	14.3%	35.1%	42.9%	154	4.10	1.02
	5	7	22	54	66			
Knowledge of what everyday research work is like in STEM	4.5%	3.2%	18.2%	35.1%	39.0%	154	4.01	1.06
	7	5	28	54	60			

Which category best describes the focus of your Unite experience?		
	Freq.	%
Science	23	14.74%
Technology	27	17.31%
Engineering	76	48.72%
Mathematics	30	19.23%
Total	156	100%

AS A RESULT OF YOUR Unite EXPERIENCE, how much did you GAIN in the following areas?								
	No gain	A little gain	Some gain	Large gain	Extreme gain	n	Avg.	SD
Asking a question that can be answered with one or more scientific experiments	4.3%	0.0%	30.4%	52.2%	13.0%	123	3.70	0.88
	1	0	7	12	3			
Using knowledge and creativity to suggest a testable explanation (hypothesis) for an observation	4.3%	4.3%	21.7%	52.2%	17.4%	123	3.74	0.96
	1	1	5	12	4			
Making a model of an object or system showing its parts and how they work	4.3%	4.3%	8.7%	47.8%	34.8%	123	4.04	1.02
	1	1	2	11	8			
Carrying out procedures for an experiment and recording data accurately	4.5%	0.0%	22.7%	27.3%	45.5%	123	4.09	1.06
	1	0	5	6	10			
Using computer models of objects or systems to test cause and effect relationships	4.3%	13.0%	13.0%	47.8%	21.7%	123	3.70	1.11
	1	3	3	11	5			
Organizing data in charts or graphs to find patterns and relationships	8.7%	13.0%	13.0%	30.4%	34.8%	123	3.70	1.33
	2	3	3	7	8			
Considering different interpretations of data when deciding how the data answer a question	8.7%	8.7%	17.4%	34.8%	30.4%	123	3.70	1.26
	2	2	4	8	7			
Supporting an explanation for an observation with data from experiments	8.7%	8.7%	17.4%	30.4%	34.8%	123	3.74	1.29
	2	2	4	7	8			
Defending an argument that conveys how an explanation best describes an observation	0.0%	8.7%	8.7%	47.8%	34.8%	123	4.09	0.90
	0	2	2	11	8			
Integrating information from technical or scientific texts and other media to support your explanation of an observation	4.3%	8.7%	8.7%	34.8%	43.5%	123	4.04	1.15
	1	2	2	8	10			
Communicating about your experiments and explanations in different ways (through talking, writing, graphics, or mathematics)	0.0%	8.7%	13.0%	34.8%	43.5%	123	4.13	0.97
	0	2	3	8	10			

AS A RESULT OF YOUR Unite EXPERIENCE, how much did you GAIN in the following areas?								
	No gain	A little gain	Some gain	Large gain	Extreme gain	n	Avg.	SD
Defining a problem that can be solved by developing a new or improved object, process, or system	3.8%	11.3%	24.1%	36.8%	24.1%	133	3.66	1.08
	5	15	32	49	32			
Using knowledge and creativity to propose a testable solution for a problem	7.5%	5.3%	21.8%	42.1%	23.3%	133	3.68	1.12
	10	7	29	56	31			
Making a model of an object or system to show its parts and how they work	6.9%	5.3%	18.3%	38.2%	31.3%	131	3.82	1.14
	9	7	24	50	41			
Carrying out procedures for an experiment and recording data accurately	6.8%	8.3%	17.4%	38.6%	28.8%	132	3.74	1.16
	9	11	23	51	38			
Using computer models of an object or system to investigate cause and effect relationships	16.0%	6.9%	20.6%	32.8%	23.7%	131	3.41	1.35
	21	9	27	43	31			
Considering different interpretations of the data when deciding if a solution works as intended	7.8%	9.4%	23.4%	32.0%	27.3%	128	3.62	1.20
	10	12	30	41	35			
Organizing data in charts or graphs to find patterns and relationships	12.1%	12.1%	26.5%	29.5%	19.7%	132	3.33	1.26
	16	16	35	39	26			
Supporting a solution for a problem with data from experiments	6.9%	11.5%	23.1%	31.5%	26.9%	130	3.60	1.20
	9	15	30	41	35			
Defending an argument that conveys how a solution best meets design criteria	7.8%	13.2%	23.3%	28.7%	27.1%	129	3.54	1.24
	10	17	30	37	35			
Integrating information from technical or scientific texts and other media to support your solution to a problem	7.8%	9.4%	26.6%	32.8%	23.4%	128	3.55	1.18
	10	12	34	42	30			
Communicating information about your design experiments and solutions in different ways (through talking, writing, graphics, or math equations)	3.8%	11.4%	16.7%	37.1%	31.1%	132	3.80	1.12
	5	15	22	49	41			

AS A RESULT OF YOUR Unite EXPERIENCE, how much did you GAIN in the following areas?								
	No gain	A little gain	Some gain	Large gain	Extreme gain	n	Avg.	SD
Sticking with a task until it is finished Making changes when things do not go as planned	3.8% 6	5.8% 9	19.2% 30	33.3% 52	37.8% 59	156	3.96	1.07
Working well with students from all backgrounds Including others' perspectives when making decisions	2.6% 4	7.8% 12	19.5% 30	30.5% 47	39.6% 61	154	3.97	1.07
Communicating effectively with others	0.6% 1	3.8% 6	21.8% 34	26.9% 42	46.8% 73	156	4.15	0.94
Sticking with a task until it is finished Making changes when things do not go as planned	1.9% 3	5.8% 9	16.7% 26	32.7% 51	42.9% 67	156	4.09	1.00
Working well with students from all backgrounds Including others' perspectives when making decisions	1.9% 3	6.4% 10	15.4% 24	38.5% 60	37.8% 59	156	4.04	0.98
Communicating effectively with others	3.2% 5	5.1% 8	19.9% 31	30.1% 47	41.7% 65	156	4.02	1.06

AS A RESULT OF YOUR Unite EXPERIENCE, how much did you GAIN in the following areas?								
	No gain	A little gain	Some gain	Large gain	Extreme gain	n	Avg.	SD
Interest in a new STEM topic	3.9% 6	8.4% 13	20.0% 31	32.3% 50	35.5% 55	155	3.87	1.11
Deciding on a path to pursue a STEM career	5.2% 8	7.1% 11	22.6% 35	27.7% 43	37.4% 58	155	3.85	1.16
Sense of accomplishing something in STEM	4.5% 7	7.7% 12	17.3% 27	35.9% 56	34.6% 54	156	3.88	1.11
Feeling prepared for more challenging STEM activities	1.3% 2	7.8% 12	21.6% 33	31.4% 48	37.9% 58	153	3.97	1.02
Thinking creatively about a STEM project or activity	4.5% 7	8.4% 13	20.6% 32	31.0% 48	35.5% 55	155	3.85	1.13
Patience for the slow pace of STEM research	4.5% 7	6.5% 10	17.5% 27	35.7% 55	35.7% 55	154	3.92	1.10
Desire to build relationships with mentors who work in STEM	4.5% 7	6.4% 10	17.3% 27	39.7% 62	32.1% 50	156	3.88	1.07

AS A RESULT OF YOUR Unite experience, how much MORE or LESS likely are you to engage in the following activities in science, technology, engineering, or mathematics (STEM) outside of school requirements or activities?								
	Much less likely	Less likely	About the same before and after	More likely	Much more likely	n	Avg.	SD
Watch or read non-fiction STEM	3.9%	5.8%	37.0%	33.8%	19.5%	154	3.59	0.99
	6	9	57	52	30			
Tinker (play) with a mechanical or electrical device	2.6%	5.2%	18.1%	41.9%	32.3%	155	3.96	0.97
	4	8	28	65	50			
Work on solving mathematical or scientific puzzles	1.3%	3.9%	25.8%	45.2%	23.9%	155	3.86	0.87
	2	6	40	70	37			
Use a computer to design or program something	2.6%	6.5%	18.8%	38.3%	33.8%	154	3.94	1.01
	4	10	29	59	52			
Talk with friends or family about STEM	3.2%	3.2%	21.3%	35.5%	36.8%	155	3.99	1.00
	5	5	33	55	57			
Mentor or teach other students about STEM	3.2%	4.5%	25.6%	38.5%	28.2%	156	3.84	0.99
	5	7	40	60	44			
Help with a community service project related to STEM	3.9%	5.2%	22.1%	37.7%	31.2%	154	3.87	1.04
	6	8	34	58	48			
Participate in a STEM camp, club, or competition	3.2%	5.2%	16.1%	33.5%	41.9%	155	4.06	1.04
	5	8	25	52	65			
Take an elective (not required) STEM class	4.5%	5.1%	19.9%	31.4%	39.1%	156	3.96	1.10
	7	8	31	49	61			
Work on a STEM project or experiment in a university or professional setting	3.2%	4.5%	19.4%	34.8%	38.1%	155	4.00	1.03
	5	7	30	54	59			

Before you participated in Unite, how far did you want to go in school?		
	Freq.	%
Graduate from high school	7	4.52%
Go to a trade or vocational school	1	0.65%
Go to college for a little while	3	1.94%
Finish college (get a Bachelor's degree)	70	45.16%
Get more education after college	74	47.74%
Total	**155**	**100%**

After you have participated in Unite, how far do you want to go in school?		
	Freq.	%
Graduate from high school	7	4.49%
Go to a trade or vocational school	0	0.00%
Go to college for a little while	0	0.00%
Finish college (get a Bachelor's degree)	36	23.08%
Get more education after college	113	72.44%
Total	156	100%

When you are 30, to what extent do you expect to use your STEM knowledge, skills, and/or abilities in your work?		
	Freq.	%
not at all	4	2.56%
less than 25% of the time	13	8.33%
26% to 50% of the time	31	19.87%
51% to 75% of the time	57	36.54%
76% to 100% of the time	51	32.69%
Total	156	100%

BEFORE Unite, what kind of work did you expect to be doing when you are 30 years old (select the ONE answer that best describes your career goals BEFORE Unite)						
	Freq.	%			Freq.	%
Undecided	12	7.89%		Business person or manager	4	2.63%
Scientist or researcher	4	2.63%		Lawyer	8	5.26%
Work in computers or technology	9	5.92%		Military, police, or security	7	4.61%
Engineer or architect	39	25.66%		Artist (writer, dancer, painter)	6	3.95%
Work in the medical field (doctor, nurse, lab technician)	33	21.71%		Skilled craftsperson (carpenter, electrician, machinist)	2	1.32%
Teacher	2	1.32%		Athlete or other work in sports	10	6.58%
				Other, (specify):	16	10.53%
				Total	152	100%

AFTER Unite, what kind of work do you expect to be doing when you are 30 years old? (select the ONE answer that best describes your career goals AFTER Unite)						
	Freq.	**%**			**Freq.**	**%**
Undecided	9	6.00%		**Business person or manager**	2	1.33%
Scientist or researcher	8	5.33%		**Lawyer**	3	2.00%
Work in computers or technology	14	9.33%		**Military, police, or security**	9	6.00%
Engineer or architect	49	32.67%		**Artist (writer, dancer, painter)**	6	4.00%
Work in the medical field (doctor, nurse, lab technician)	24	16.00%		**Skilled craftsperson (carpenter, electrician, machinist)**	2	1.33%
Teacher	3	2.00%		**Athlete or other work in sports**	6	4.00%
				Other, specify:	15	10.00%
				Total	**150**	**100%**

How interested are you in participating in the following programs in the future?	I've never heard of this program	Not at all	A little	Somewhat	Very much	n	Avg.	SD
Gains in the Education of Mathematics and Science (GEMS)	24.4%	7.7%	23.1%	17.9%	26.9%	156	3.15	1.52
	38	12	36	28	42			
Unite	1.3%	6.5%	16.2%	20.1%	55.8%	154	4.23	1.03
	2	10	25	31	86			
Junior Science & Humanities Symposium (JSHS)	26.3%	7.2%	20.4%	24.3%	21.7%	152	3.08	1.50
	40	11	31	37	33			
Science & Engineering Apprenticeship Program (SEAP)	20.6%	5.8%	21.9%	21.9%	29.7%	155	3.34	1.48
	32	9	34	34	46			
Research & Engineering Apprenticeship Program (REAP)	13.6%	6.5%	22.7%	22.7%	34.4%	154	3.58	1.38
	21	10	35	35	53			
High School Apprenticeship Program (HSAP)	21.4%	6.5%	18.8%	23.4%	29.9%	154	3.34	1.50
	33	10	29	36	46			
College Qualified Leaders (CQL)	25.8%	7.1%	21.9%	18.7%	26.5%	155	3.13	1.53
	40	11	34	29	41			
GEMS Near Peer Mentor Program	27.7%	11.0%	17.4%	19.4%	24.5%	155	3.02	1.55
	43	17	27	30	38			
Undergraduate Research Apprenticeship Program (URAP)	24.4%	8.3%	17.9%	22.4%	26.9%	156	3.19	1.53
	38	13	28	35	42			
Science Mathematics, and Research for Transformation (SMART) College Scholarship	22.6%	7.1%	15.5%	16.8%	38.1%	155	3.41	1.59
	35	11	24	26	59			
National Defense Science & Engineering Graduate (NDSEG) Fellowship	26.9%	7.1%	20.5%	18.6%	26.9%	156	3.12	1.55
	42	11	32	29	42			

How many jobs/careers in science, technology, engineering, or math (STEM) did you learn about during Unite?		
	Freq.	%
None	2	1.29%
1	2	1.29%
2	9	5.81%
3	25	16.13%
4	28	18.06%
5 or more	89	57.42%
Total	155	100%

How many Department of Defense (DoD) STEM jobs/careers did you learn about during Unite?		
	Freq.	%
None	21	13.55%
1	18	11.61%
2	17	10.97%
3	37	23.87%
4	22	14.19%
5 or more	40	25.81%
Total	27	100%

How much you agree or disagree with each of the following statements about Department of Defense (DoD) researchers and research?	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	n	Avg.	SD
DoD researchers advance science and engineering fields	2.6%	2.6%	16.7%	53.8%	24.4%	156	3.95	0.86
	4	4	26	84	38			
DoD researchers develop new, cutting edge technologies	1.9%	2.6%	14.7%	56.4%	24.4%	156	3.99	0.82
	3	4	23	88	38			
DoD researchers solve real-world problems	1.9%	2.6%	14.3%	48.7%	32.5%	154	4.07	0.86
	3	4	22	75	50			
DoD research is valuable to society	2.6%	1.9%	13.5%	48.1%	34.0%	156	4.09	0.88
	4	3	21	75	53			

Which of the following statements describe you after participating in Unite?							
	1	2	3	4	n	Avg.	SD
I am more confident in my STEM knowledge, skills, and abilities	1.3%	9.0%	54.2%	35.5%	155	3.24	0.67
	2	14	84	55			
I am more interested in participating in STEM activities outside of school requirements	4.5%	10.3%	51.6%	33.5%	156	3.14	0.78
	7	16	80	52			
I am more aware of other AEOPs	9.0%	7.1%	49.0%	34.8%	155	3.10	0.88
	14	11	76	54			
I am more interested in participating in other AEOPs	9.1%	9.1%	48.1%	33.8%	154	3.06	0.89
	14	14	74	52			
I am more interested in taking STEM classes in school	5.2%	14.2%	47.1%	33.5%	155	3.09	0.82
	8	22	73	52			
I am more interested in earning a STEM degree	2.0%	14.5%	49.3%	34.2%	152	3.16	0.74
	3	22	75	52			
I am more interested in pursuing a career in STEM	2.6%	17.0%	49.0%	31.4%	153	3.09	0.76
	4	26	75	48			
I am more aware of Army or DoD STEM research and careers	11.2%	10.5%	50.0%	28.3%	152	2.95	0.92
	17	16	76	43			
I have a greater appreciation of Army or DoD STEM research	9.0%	13.5%	47.1%	30.3%	155	2.99	0.90
	14	21	73	47			
I am more interested in pursuing a STEM career with the Army or DoD	16.2%	11.7%	48.1%	24.0%	154	2.80	0.99
	25	18	74	37			

Note. Response scale: 1 = “Disagree – This did not happen,” 2 = “Disagree – This happened but not because of Unite,” 3 = “Agree – Unite contributed,” 4 = “Agree – Unite was the primary reason”.

Appendix C

FY15 Unite Mentor Data Summaries

Unite Mentor Data Summary

What is your gender?		
	Freq.	**%**
Male	10	34%
Female	12	41%
Choose not to report	7	25%
Total	**29**	**100%**

What is your race or ethnicity?		
	Freq.	**%**
Hispanic or Latino	0	0%
Asian	2	7%
Black or African American	9	31%
Native American or Alaska Native	0	0%
Native Hawaiian or Other Pacific Islander	1	3%
White	1	3%
Other race or ethnicity, (specify):	0	0%
Choose not to report	16	55%
Total	**29**	**100%**

Which of the following BEST describes your current occupation? (select ONE)		
	Freq.	**%**
Teacher	11	38%
Other school staff	4	14%
University educator	3	10%
Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.)	6	21%
Scientist, Engineer, or Mathematics professional	2	7%
Other, (specify):	3	10%
Total	**29**	**100%**

Which of the following BEST describes your organization? (select ONE)		
	Freq.	%
No organization	2	7%
School or district (K-12)	8	28%
State educational agency	1	3%
Institution of higher education (vocational school, junior college, college, or university)	13	45%
Industry	0	0%
Department of Defense or other government agency	1	3%
Non-profit	3	10%
Other, (specify):	1	3%
Total	29	100%

Which of the following subjects do you teach? (Select all that apply) (n = 16)						
	Freq.	%			Freq.	%
Upper elementary	0	0.00%		Technology	3	18.75%
Physical science (physics, chemistry, astronomy, materials science, etc.)	6	37.50%		Engineering	2	12.50%
Biological science	3	18.75%		Mathematics or statistics	5	31.25%
Earth, atmospheric, or oceanic science	2	12.50%		Medical, health, or behavioral science	0	0.00%
Environmental science	2	12.50%		Social Science (psychology, sociology, anthropology)	1	6.25%
Computer science	1	6.25%		Other, (specify):	3	18.75%

Which of the following best describes your primary area of research?						
	Freq.	%			Freq.	%
Physical science (physics, chemistry, astronomy, materials science, etc.)	3	17.65%		Technology	1	5.88%
Biological science	1	5.88%		Engineering	7	41.18%
Earth, atmospheric, or oceanic science	0	0.00%		Mathematics or statistics	3	17.65%
Environmental science	1	5.88%		Medical, health, or behavioral science	0	0.00%
Computer science	0	0.00%		Social Science (psychology, sociology, anthropology)	0	0.00%
				Other, (specify):	1	5.88%
				Total	17	100%

Where was the Unite program located?		
	Freq.	%
Alabama State University	10	31.25%
Florida International University	1	3.13%
Jackson State University	3	9.38%
New Jersey Institute of Technology	4	12.50%
Savannah State University	2	6.25%
South Dakota School of Mines and Technology	0	0.00%
University of Colorado, Colorado Springs	0	0.00%
University of New Mexico	0	0.00%
University of Pennsylvania	6	18.75%
Xavier University of Louisiana	6	18.75%
Total	32	100%

Which of the following BEST describes your role during Unite?		
	Freq.	%
Instructor (typically a University or Army Scientist or Engineer)	18	52.94%
Classroom assistant	8	23.53%
Resource teacher	4	11.76%
Other, (specify)	4	11.76%
Total	34	100%

How many Unite students did you work with this year? (Avg. = 29.52, SD = 48.14)		
# of Students	Freq.	%
10 – 15 students	17	50%
16 – 20 students	11	32%
21 – 25 students	2	6%
More than 25 students	4	11%
Total	34	100%

How did you learn about Unite? (Check all that apply) (n = 48)						
	Freq.	%			Freq.	%
Technology Student Association website	0	0%		Friend or co-worker of a family member	0	0%
Army Educational Outreach Program (AEOP) website	2	14%		Someone who works with the program	9	64%
School, university, or professional organization newsletter, email or website	1	7%		Someone who works at the school or university I attend	3	21%
Past Unite participant	3	21%		Someone who works with the DoD	0	0%
Friend	3	21%		Community group or program	0	0%
Family member	2	14%		Choose not to report	0	0%
				Other, (specify):	0	0%

How SATISFIED were you with each of the following Unite features?								
	0	**1**	**2**	**3**	**4**	**n**	**Avg.**	**SD**
Application or registration process	26.5%	2.9%	0.0%	17.6%	52.9%	34	3.68	1.74
	9	1	0	6	18			
Communications from Technology Student Association	47.1%	2.9%	2.9%	5.9%	41.2%	34	2.91	1.93
	16	1	1	2	14			
Communications from [Unite site]	17.6%	2.9%	2.9%	2.9%	73.5%	34	4.12	1.59
	6	1	1	1	25			
Location(s) of program activities or event	2.9%	8.8%	0.0%	8.8%	79.4%	34	4.53	1.08
	1	3	0	3	27			
Support for instruction or mentorship during program activities	17.6%	2.9%	2.9%	5.9%	70.6%	34	4.09	1.58
	6	1	1	2	24			
Participation stipends (payment)	26.5%	2.9%	5.9%	14.7%	50.0%	34	3.59	1.73
	9	1	2	5	17			
Invited speakers or "career" events	17.6%	2.9%	0.0%	8.8%	70.6%	34	4.12	1.57
	6	1	0	3	24			
Field trips or laboratory tours	11.8%	2.9%	0.0%	2.9%	82.4%	34	4.41	1.37
	4	1	0	1	28			

Note. Response scale: **0** = “Did Not Experience,” **1** = “Not at all,” **2** = “A little,” **3** = “Somewhat,” **4** = “Very much”.

The list below describes instructional and 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.

		Yes – I used this strategy		No – I did not use this strategy	
	n	Freq.	%	Freq.	%
Becoming familiar with students' backgrounds and interests at the beginning of the program	34	31	91.2%	3	8.8%
Giving students real-life problems to investigate or solve	34	32	94.1%	2	5.9%
Selecting readings or activities that relate to students' backgrounds	34	21	61.8%	13	38.2%
Encouraging students to suggest new readings, activities, or projects	34	26	76.5%	8	23.5%
Helping students become aware of the roles STEM plays in their everyday lives	34	32	94.1%	2	5.9%
Helping students understand how STEM can help them improve their communities	34	28	82.4%	6	17.6%
Asking students to relate real-life events or activities to topics covered in Unite	34	33	97.1%	1	2.9%

The list below describes instructional and 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.

		Yes – I used this strategy		No – I did not use this strategy	
	n	Freq.	%	Freq.	%
Identify the different learning styles that my student(s) may have at the beginning of the program	33	25	75.8%	8	24.2%
Interact with students and other personnel in the same way regardless of their background	33	33	100.0%	0	0.0%
Use a variety of teaching and/or mentoring activities to meet the needs of all students	33	32	97.0%	1	3.0%
Integrating ideas from education literature to teach/mentor students from groups underrepresented in STEM	33	23	69.7%	10	30.3%
Providing extra readings, activities, or learning support for students who lack essential background knowledge or skills	33	28	84.8%	5	15.2%
Directing students to other individuals or programs for additional support as needed	33	26	78.8%	7	21.2%
Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM	33	21	63.6%	12	36.4%

The list below describes instructional and 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.

		Yes – I used this strategy		No – I did not use this strategy	
	n	Freq.	%	Freq.	%
Having student(s) tell others about their backgrounds and interests	34	30	88.20%	4	11.8%
Having student(s) explain difficult ideas to others	34	29	85.3%	5	14.7%
Having student(s) listen to the ideas of others with an open mind	34	32	94.1%	2	5.9%
Having my student(s) exchange ideas with others whose backgrounds or viewpoints are different from their own	34	28	82.4%	6	17.6%
Having my student(s) give and receive constructive feedback with others	34	30	88.2%	4	11.8%
Having students work on collaborative activities or projects as a member of a team	34	33	97.1%	1	2.9%
Allowing my student(s) to resolve conflicts and reach agreement within their team	34	32	94.1%	2	5.9%

The list below describes instructional and 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.

		Yes – I used this strategy		No – I did not use this strategy	
	n	Freq.	%	Freq.	%
Teaching (or assigning readings) about specific STEM subject matter	34	28	82.4%	6	17.6%
Having my student(s) search for and review technical research to support their work	34	28	82.4%	6	17.6%
Demonstrating laboratory/field techniques, procedures, and tools for my student(s)	34	25	73.5%	9	26.5%
Supervising my student(s) while they practice STEM research skills	34	28	82.4%	6	17.6%
Providing my student(s) with constructive feedback to improve their STEM competencies	34	31	91.2%	3	8.8%
Allowing students to work independently to improve their self-management abilities	34	31	91.2%	3	8.8%
Encouraging students to learn collaboratively (team projects, team meetings, journal clubs, etc.)	34	32	94.1%	2	5.9%
Encouraging students to seek support from other team members	34	32	94.1%	2	5.9%

The list below describes instructional and 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 the list below, please indicate which strategies you used when working with your student(s) in Unite.

		Yes – I used this strategy		No – I did not use this strategy	
	n	Freq.	%	Freq.	%
Asking my student(s) about their educational and/or career goals	34	32	94.1%	2	5.9%
Recommending extracurricular programs that align with students' goals	34	28	82.4%	6	17.6%
Recommending Army Educational Outreach Programs that align with students' goals	34	20	60.6%	13	39.4%
Providing guidance about educational pathways that will prepare my student(s) for a STEM career	34	29	85.3%	5	14.7%
Discussing STEM career opportunities within the DoD or other government agencies	34	21	61.8%	13	38.2%
Discussing STEM career opportunities in private industry or academia	34	27	79.4%	7	20.6%
Discussing the economic, political, ethical, and/or social context of a STEM career	34	25	73.5%	9	26.5%
Recommending student and professional organizations in STEM to my student(s)	34	27	79.4%	7	20.6%
Helping students build a professional network in a STEM field	34	20	58.8%	14	41.2%
Helping my student(s) with their resume, application, personal statement, and/or interview preparations	34	21	61.8%	13	38.2%

How USEFUL were each of the following in your efforts to expose student(s) to Army Educational Outreach Programs (AEOPs) during Unite?								
	Did not experience	Not at all	A little	Somewhat	Very much	n	Avg.	SD
Technology Student Association website	61.8%	2.9%	5.9%	14.7%	14.7%	34	2.18	1.62
	21	1	2	5	5			
Army Educational Outreach Program (AEOP) website	41.2%	2.9%	8.8%	14.7%	32.4%	34	2.94	1.79
	14	1	3	5	11			
AEOP social media	58.8%	2.9%	11.8%	14.7%	11.8%	34	2.18	1.55
	20	1	4	5	4			
AEOP brochure	55.9%	5.9%	2.9%	14.7%	20.6%	34	2.38	1.72
	19	2	1	5	7			
It Starts Here! Magazine	67.6%	8.8%	2.9%	11.8%	8.8%	34	1.85	1.42
	23	3	1	4	3			
Program manager or site coordinators	23.5%	2.9%	2.9%	11.8%	58.8%	34	3.79	1.70
	8	1	1	4	20			
Invited speakers or “career” events	20.6%	2.9%	5.9%	11.8%	58.8%	34	3.85	1.64
	7	1	2	4	20			
Participation in Unite	5.9%	2.9%	8.8%	8.8%	73.5%	34	4.41	1.16
	2	1	3	3	25			

How USEFUL were each of the following in your efforts to expose student(s) to Department of Defense (DoD) STEM careers during Unite?								
	Did not experience	Not at all	A little	Somewhat	Very much	n	Avg.	SD
Technology Student Association website	67.6%	5.9%	2.9%	8.8%	14.7%	34	1.97	1.57
	23	2	1	3	5			
Army Educational Outreach Program (AEOP) website	52.9%	2.9%	2.9%	14.7%	26.5%	34	2.59	1.81
	18	1	1	5	9			
AEOP social media	65.6%	9.4%	3.1%	12.5%	9.4%	34	1.91	1.44
	21	3	1	4	3			
AEOP brochure	55.9%	5.9%	2.9%	8.8%	26.5%	34	2.44	1.80
	19	2	1	3	9			
It Starts Here! Magazine	66.7%	6.1%	3.0%	12.1%	12.1%	34	1.97	1.53
	22	2	1	4	4			
Program manager or site coordinators	29.4%	0.0%	8.8%	8.8%	52.9%	34	3.56	1.78
	10	0	3	3	18			
Invited speakers or “career” events	20.6%	2.9%	2.9%	14.7%	58.8%	34	3.88	1.63
	7	1	1	5	20			
Participation in Unite	17.6%	0.0%	5.9%	8.8%	67.6%	34	4.09	1.54
	6	0	2	3	23			

Which of the following AEOPs did you EXPLICITLY DISCUSS with your student(s) during Unite?					
		Yes - I discussed this program with my student(s)		No - I did not discuss this program with my student(s)	
	n	Freq.	%	Freq.	%
Gains in the Education of Mathematics and Science (GEMS)	34	14	41.2%	20	58.8%
Unite	34	23	67.6%	11	32.4%
Junior Science & Humanities Symposium (JSHS)	34	10	29.4%	24	70.6%
Science & Engineering Apprenticeship Program (SEAP)	34	9	26.5%	25	73.5%
Research & Engineering Apprenticeship Program (REAP)	34	14	41.2%	20	58.8%
High School Apprenticeship Program (HSAP)	34	8	23.5%	26	76.5%
College Qualified Leaders (CQL)	34	6	17.6%	28	82.4%
GEMS Near Peer Mentor Program	34	8	23.5%	26	76.5%
Undergraduate Research Apprenticeship Program (URAP)	34	7	20.6%	27	79.4%
Science Mathematics, and Research for Transformation (SMART) College Scholarship	34	9	26.5%	25	73.5%
National Defense Science & Engineering Graduate (NDSEG) Fellowship	34	6	17.6%	28	82.4%
I discussed AEOP with my student(s) but did not discuss any specific program	34	18	52.9%	16	47.1%

How much do you agree or disagree with each of the following statements about Department of Defense (DoD) researchers and research?								
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	n	Avg.	SD
DoD researchers advance science and engineering fields	2.9%	0.0%	2.9%	35.3%	58.8%	34	4.47	0.83
	1	0	1	12	20			
DoD researchers develop new, cutting edge technologies	2.9%	0.0%	2.9%	38.2%	55.9%	34	4.44	0.82
	1	0	1	13	19			
DoD researchers solve real-world problems	2.9%	0.0%	5.9%	32.4%	58.8%	34	4.44	0.86
	1	0	2	11	20			
DoD research is valuable to society	2.9%	0.0%	8.8%	26.5%	61.8%	34	**4.44**	0.89
	1	0	3	9	21			

How often did YOUR STUDENT(S) have opportunities to do each of the following in Unite?								
	1	**2**	**3**	**4**	**5**	**n**	**Avg.**	**SD**
Learn new science, technology, engineering, or mathematics (STEM) topics	0.0%	3.0%	3.0%	15.2%	78.8%	33	4.70	0.68
	0	1	1	5	26			
Apply STEM knowledge to real-life situations	3.0%	3.0%	0.0%	24.2%	69.7%	33	4.55	0.90
	1	1	0	8	23			
Learn about new discoveries in STEM	6.1%	3.0%	15.2%	30.3%	45.5%	33	4.06	1.14
	2	1	5	10	15			
Learn about different careers that use STEM	3.1%	6.3%	9.4%	25.0%	56.3%	33	4.25	1.08
	1	2	3	8	18			
Interact with scientists or engineers	3.0%	15.2%	15.2%	27.3%	39.4%	33	3.85	1.20
	1	5	5	9	13			
Communicate with other students about STEM	0.0%	6.1%	6.1%	18.2%	69.7%	33	4.52	0.87
	0	2	2	6	23			
Use laboratory or field techniques, procedures, and tools	6.1%	9.1%	9.1%	15.2%	60.6%	33	4.15	1.28
	2	3	3	5	20			
Participate in hands-on STEM activities	3.0%	6.1%	3.0%	6.1%	81.8%	33	4.58	1.03
	1	2	1	2	27			
Work as part of a team	3.0%	3.0%	0.0%	15.2%	78.8%	33	4.64	0.90
	1	1	0	5	26			
Identify questions or problems to investigate	3.0%	6.1%	3.0%	9.1%	78.8%	33	4.55	1.03
	1	2	1	3	26			
Design an investigation	6.1%	12.1%	27.3%	18.2%	36.4%	33	3.67	1.27
	2	4	9	6	12			
Carry out an investigation	6.1%	6.1%	27.3%	18.2%	42.4%	33	3.85	1.23
	2	2	9	6	14			
Analyze data or information	0.0%	3.0%	24.2%	24.2%	48.5%	33	4.18	0.92
	0	1	8	8	16			
Draw conclusions from an investigation	3.0%	6.1%	21.2%	24.2%	45.5%	33	4.03	1.10
	1	2	7	8	15			
Come up with creative explanations or solutions	6.3%	3.1%	12.5%	21.9%	56.3%	33	4.19	1.18
	2	1	4	7	18			
Build or make a computer model	30.3%	9.1%	21.2%	21.2%	18.2%	33	2.88	1.52
	10	3	7	7	6			

Note. Response scale: **1** = "Not at all," **2** = "At least once," **3** = "A few times," **4** = "Most days," **5** = "Every day".

Which category best describes the focus of your student's Unite project?		
	Freq.	**%**
Science	9	27.27%
Technology	6	18.18%
Engineering	16	48.48%
Mathematics	2	6.06%
Total	**33**	**100%**

AS A RESULT OF THE Unite EXPERIENCE, how much did your student(s) GAIN in the following areas?								
	1	**2**	**3**	**4**	**5**	**n**	**Avg.**	**SD**
Knowledge of a STEM topic or field in depth	3.0%	0.0%	6.1%	45.5%	45.5%	33	4.30	0.85
	1	0	2	15	15			
Knowledge of research conducted in a STEM topic or field	3.0%	0.0%	15.2%	36.4%	45.5%	33	4.21	0.93
	1	0	5	12	15			
Knowledge of research processes, ethics, and rules for conduct in STEM	6.1%	0.0%	27.3%	33.3%	33.3%	33	3.88	1.08
	2	0	9	11	11			
Knowledge of how professionals work on real problems in STEM	0.0%	3.0%	21.2%	39.4%	36.4%	33	4.09	0.84
	0	1	7	13	12			
Knowledge of what everyday research work is like in STEM	0.0%	9.1%	24.2%	39.4%	27.3%	33	3.85	0.94
	0	3	8	13	9			

Note. Response scale: **1** = "No gain," **2** = "A little gain," **3** = "Some gain," **4** = "Large gain," **5** = "Extreme gain".

AS A RESULT OF THEIR Unite EXPERIENCE, how much did your student(s) GAIN in the following areas?								
	1	**2**	**3**	**4**	**5**	**n**	**Avg.**	**SD**
Asking a question that can be answered with one or more scientific experiments	11.1%	11.1%	11.1%	22.2%	44.4%	9	3.78	1.48
	1	1	1	2	4			
Using knowledge and creativity to suggest a testable explanation (hypothesis) for an observation	0.0%	11.1%	22.2%	22.2%	44.4%	9	4.00	1.12
	0	1	2	2	4			
Making a model of an object or system showing its parts and how they work	11.1%	11.1%	33.3%	33.3%	11.1%	9	3.22	1.20
	1	1	3	3	1			
Carrying out procedures for an experiment and recording data accurately	11.1%	22.2%	22.2%	22.2%	22.2%	9	3.22	1.39
	1	2	2	2	2			
Using computer models of objects or systems to test cause and effect relationships	11.1%	22.2%	22.2%	22.2%	22.2%	9	3.22	1.39
	1	2	2	2	2			
Organizing data in charts or graphs to find patterns and relationships	0.0%	33.3%	22.2%	22.2%	22.2%	9	3.33	1.22
	0	3	2	2	2			
Considering different interpretations of data when deciding how the data answer a question	22.2%	11.1%	22.2%	22.2%	22.2%	9	3.11	1.54
	2	1	2	2	2			
Supporting an explanation for an observation with data from experiments	0.0%	11.1%	44.4%	22.2%	22.2%	9	3.56	1.01
	0	1	4	2	2			
Defending an argument that conveys how an explanation best describes an observation	0.0%	11.1%	44.4%	22.2%	22.2%	9	3.56	1.01
	0	1	4	2	2			
Integrating information from technical or scientific texts and other media to support your explanation of an observation	11.1%	33.3%	11.1%	33.3%	11.1%	9	3.00	1.32
	1	3	1	3	1			
Communicating about your experiments and explanations in different ways (through talking, writing, graphics, or mathematics)	11.1%	11.1%	22.2%	33.3%	22.2%	9	3.44	1.33
	1	1	2	3	2			

Note. Response scale: **1** = "No gain," **2** = "A little gain," **3** = "Some gain," **4** = "Large gain," **5** = "Extreme gain".

AS A RESULT OF THEIR Unite EXPERIENCE, how much did your student(s) GAIN in the following areas?								
	1	**2**	**3**	**4**	**5**	**n**	**Avg.**	**SD**
Defining a problem that can be solved by developing a new or improved object, process, or system	0.0%	0.0%	29.2%	41.7%	29.2%	24	4.00	0.78
	0	0	7	10	7			
Using knowledge and creativity to propose a testable solution for a problem	0.0%	0.0%	25.0%	37.5%	37.5%	24	4.13	0.80
	0	0	6	9	9			
Making a model of an object or system to show its parts and how they work	0.0%	0.0%	25.0%	29.2%	45.8%	24	4.21	0.83
	0	0	6	7	11			
Carrying out procedures for an experiment and recording data accurately	4.2%	4.2%	20.8%	37.5%	33.3%	24	3.92	1.06
	1	1	5	9	8			
Using computer models of an object or system to investigate cause and effect relationships	20.8%	4.2%	29.2%	25.0%	20.8%	24	3.21	1.41
	5	1	7	6	5			
Considering different interpretations of the data when deciding if a solution works as intended	12.5%	4.2%	29.2%	37.5%	16.7%	24	3.42	1.21
	3	1	7	9	4			
Organizing data in charts or graphs to find patterns and relationships	12.5%	4.2%	33.3%	29.2%	20.8%	24	3.42	1.25
	3	1	8	7	5			
Supporting a solution for a problem with data from experiments	12.5%	4.2%	25.0%	41.7%	16.7%	24	3.46	1.22
	3	1	6	10	4			
Defending an argument that conveys how a solution best meets design criteria	4.2%	12.5%	16.7%	37.5%	29.2%	24	3.75	1.15
	1	3	4	9	7			
Integrating information from technical or scientific texts and other media to support your solution to a problem	8.3%	12.5%	20.8%	25.0%	33.3%	24	3.63	1.31
	2	3	5	6	8			
Communicating information about your design experiments and solutions in different ways (through talking, writing, graphics, or math equations)	4.2%	4.2%	12.5%	45.8%	33.3%	24	4.00	1.02
	1	1	3	11	8			

Note. Response scale: **1** = "No gain," **2** = "A little gain," **3** = "Some gain," **4** = "Large gain," **5** = "Extreme gain".

AS A RESULT OF THE Unite EXPERIENCE, how much did your student(s) GAIN (on average) in the following areas?								
	1	**2**	**3**	**4**	**5**	**n**	**Avg.**	**SD**
Sticking with a task until it is finished	3.0%	0.0%	15.2%	27.3%	54.5%	33	4.30	0.95
	1	0	5	9	18			
Making changes when things do not go as planned	3.0%	6.1%	6.1%	30.3%	54.5%	33	4.27	1.04
	1	2	2	10	18			
Including others' perspectives when making decisions	3.0%	0.0%	15.2%	30.3%	51.5%	33	4.27	0.94
	1	0	5	10	17			
Communicating effectively with others	3.0%	0.0%	6.1%	39.4%	51.5%	33	4.36	0.86
	1	0	2	13	17			
Desire to build relationships with professionals in a field	3.0%	3.0%	18.2%	33.3%	42.4%	33	4.09	1.01
	1	1	6	11	14			
Connecting a topic or field with their personal values	3.0%	0.0%	24.2%	30.3%	42.4%	33	4.09	0.98
	1	0	8	10	14			

Note. Response scale: **1** = "No gain," **2** = "A little gain," **3** = "Some gain," **4** = "Large gain," **5** = "Extreme gain".

Which of the following statements describe your student(s) AFTER PARTICIPATING IN Unite?							
	1	**2**	**3**	**4**	**n**	**Avg.**	**SD**
More confident in STEM knowledge, skills, and abilities	3.0%	0.0%	42.4%	54.5%	33	3.48	0.67
	1	0	14	18			
More interested in participating in STEM activities outside of school requirements	0.0%	0.0%	51.5%	48.5%	33	3.48	0.51
	0	0	17	16			
More aware of other AEOPs	3.1%	0.0%	50.0%	46.9%	33	3.41	0.67
	1	0	16	15			
More interested in participating in other AEOPs	3.1%	0.0%	43.8%	53.1%	33	3.47	0.67
	1	0	14	17			
More interested in taking STEM classes in school	3.0%	0.0%	45.5%	51.5%	33	3.45	0.67
	1	0	15	17			
More interested in attending college	0.0%	0.0%	38.7%	61.3%	33	3.61	0.50
	0	0	12	19			
More interested in earning a STEM degree in college	3.1%	0.0%	37.5%	59.4%	33	3.53	0.67
	1	0	12	19			
More interested in pursuing a STEM career	6.1%	0.0%	45.5%	48.5%	33	3.36	0.78
	2	0	15	16			
More aware of Department of Defense (DoD) STEM research and careers	6.3%	0.0%	43.8%	50.0%	33	3.38	0.79
	2	0	14	16			
Greater appreciation of DoD STEM research and careers	6.3%	0.0%	53.1%	40.6%	33	3.28	0.77
	2	0	17	13			
More interested in pursuing a STEM career with the DoD	3.0%	0.0%	42.4%	54.5%	33	3.48	0.67
	1	0	14	18			

Note. Response scale: **1** = "Disagree – This did not happen," **2** = "Disagree – This happened but not because of Unite," **3** = "Agree – Unite contributed," **4** = "Agree – Unite was the primary reason".

Appendix D

FY14 Unite Student and Mentor Focus Group Protocol

2015 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 didn't ask about**

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 E

FY15 Unite Participant Questionnaire

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

6. At which of the following Unite sites did you participate? (Select ONE)
Select one.
○ Alabama State University
○ Florida International University
○ Jackson State University
○ New Jersey Institute of Technology
○ Savannah State University
○ South Dakota School of Mines and Technology
○ University of Colorado, Colorado Springs
○ University of New Mexico
○ University of Pennsylvania
○ Xavier University of Louisiana

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	(Go to question number 17.)
○	Technology	(Go to question number 18.)
○	Engineering	(Go to question number 18.)
○	Mathematics	(Go to question number 18.)

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

Select one per row.

If answered, go to question number 19.

	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)	○	○	○	○	○

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 F

FY15 Unite Mentor Questionnaire

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

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

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 International University
○	Jackson State University
○	New Jersey Institute of Technology
○	Savannah State University
○	South Dakota School of Mines and Technology
○	University of Colorado, Colorado Springs
○	University of New Mexico
○	University of Pennsylvania
○	Xavier University of Louisiana

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 G

TSA FY15 Evaluation Report Response

The Unite program had no formal ressponse for inclusion in the FY15 Evaluation Report.